Regal Rexnord

Gear Drives

Speed Reducers, Speed Increasers, and Gearmotors

NUTTALL GEAR™

A REGAL REXNORD BRAND

NUTTALL GEAR™
A REGAL REXNORD BRAND

DELROYD WORM GEAR™
A REGAL REXNORD BRAND

CONTRACT

1. Terms and Conditions of Sale
The terms and conditions set out in this selling policy apply to all purchases. Any modifications to these terms and conditions are **expressly objected to by Nuttall Gear LLC** and will not be accepted. Nuttall Gear LLC hereby gives notice of its objection to any different or additional terms and conditions except for any such terms and conditions as may be expressly accepted by Nuttall Gear LLC in writing and signed by an officer of Nuttall Gear LLC.

Unless different or additional terms and conditions are stated or referred to in a Nuttall Gear LLC proposal, in which event such different or additional terms and conditions shall be exclusive as to the particular subject covered, the terms and conditions supersede and/or modify any prior or contemporaneous agreements or correspondence between the parties.

2. Orders and Contracts
All orders are subject to these terms and conditions and must show definite prices, delivery dates, exact quantities, complete product description, and when accepted by Nuttall Gear LLC are considered full commitments.

3. Quotations
Nuttall Gear LLC written quotations are valid for thirty (30) days from date issued unless otherwise stated in the quotation. Verbal quotations expire at the end of the working day.

SHIPPING SCHEDULE
Time of shipment of units subject to this selling policy are set forth in the appropriate shipping schedule. In the event no such shipping schedule is shown please refer to office.

In the absence of delivery schedules submitted with the order, acceptance and credit approval by Nuttall Gear LLC will constitute authorization for Nuttall Gear LLC to proceed with the manufacture of the total quantity of units on order unless specifically stated to the contrary. Delivery in whole or in part shall occur at Nuttall Gear LLC's convenience.

PRICES/TAXES
1. Price Policy
Prices are firm on all sales of Nuttall Gear LLC products with quoted shipment within six months from date of order. For shipments made after six months from date of order, price in effect at time of shipment, unless otherwise negotiated.

Prices are subject to change without notice.

Prices may not include items such as transportation charges, special packaging, etc. Refer to appropriate sections of this selling policy.

2. Taxes
Price does not include Federal, state, local property, license, privilege, sales, use, excise, gross receipts, value-added, or other like taxes which may now or hereafter be applicable to, measure by, imposed upon, or with respect to the transaction, property, its sale, its value, its use, or any services performed in connection therewith. Such taxes are for the account of purchaser and the purchaser agrees to pay or reimburse any such taxes which Nuttall Gear LLC, its contractors, or suppliers are required to pay.

BILLINGS/PAYMENTS
1. Minimum Billing
The minimum billing charge per order shall be **$100.00** plus transportation charges as indicated under delivery.

2. Terms of Payment
a. C.O.D. orders will not be accepted

b. All payments are to be in United States Dollars. Special payment arrangements i.e. letter of credit must be arranged through Nutall Gear LLC.

c. Standard products and normal shipments: Terms of payment are net within thirty (30) days from date of invoice.

d. Non-standard products and/or abnormal shipments: Orders for products that have unusual specifications, requirements, descriptions and/or delivery schedules beyond normal, are subject to progressive payments as quoted in a Nuttall Gear LLC quotation or proposal.

e. U.S. Government: Terms of payment for U.S. Government purchasers for delivery within the Continental United States are payment upon receipt of invoice.

f. Delayed Payments: If payments are not made in accordance with these terms, a service charge will, without prejudice to the right of Nuttall Gear LLC to immediate payment be added to the account of purchaser in an amount equal to the lower 2 percent per month of fraction thereof or the highest legal rate allowed on the unpaid balance.

g. Accelerated Payments: If, in the judgment of Nuttall Gear LLC the financial condition of the purchaser, at any time during the period of the agreement does not justify the terms of payment specified, Nuttall Gear LLC may require full or partial payment in advance.

Should purchaser be adjudged bankrupt or insolvent in any legal proceeding, Nuttall Gear LLC shall have the right at its election and throughout the period allowed in such proceeding for filing claim against the purchaser's estate, to cancel the order, and to recover its proper cancellation charges from purchaser's estate.

h. If shipments are delayed by purchaser, payments shall become due from the date Nuttall Gear LLC is prepared to make shipment. If manufacture is delayed by purchaser, payment shall be based on the contract price, as adjusted for price in effect at time of shipment and percent of completion, and the purchaser shall reimburse Nuttall Gear LLC for any additional costs resulting from such delay.

SECURITY AGREEMENT – TITLE/RISK OF LOSS

The product sold shall remain the property of Nuttall Gear LLC and shall remain personal property until fully paid for in cash. The purchaser agrees to perform all acts necessary to protect and assure retention of title to such product by Nuttall Gear LLC and to perform all acts necessary to provide a fully perfected security interest in the property in favor of Nuttall Gear LLC. Risk of loss of product or any part of the same shall pass to purchaser at the designated delivery F.O. B. point.

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TRANSPORTATION / SHIPPING

1. Delivery Charges

F.O.B. – P/S-Frt./Ppd. and Not Allowed

Gearing products which are on any single release are delivered F.O.B. point of shipment, freight prepaid and a delivery charge will be added to the invoice.

F.O.B. Destination – Frt./Ppd. and not Allowed

Nuttall Gear LLC will, subject to prior agreement in writing, deliver this product F.O.B. accessible common carrier point nearest first destination for a 2% addition to the net price. Freight will be prepaid and a delivery charge will be added to the invoice.

A single release is defined as a single order with a single destination for shipment at one time and from one location.

Renewal Parts Orders will have a delivery charge of 2% of the sales value, or a minimum of $5.00 per shipment, whichever is greater.

Freight prepaid is defined as:

Area A – Shipment to destination within the United States except Alaska and Hawaii:

To the accessible common carrier point nearest to the first destination, but within the confines of the United States, except Alaska and Hawaiian Islands.

Area B – Shipments to Alaska and Hawaii:

To the accessible common carrier point nearest to the point of departure from Area A as defined above. The purchaser will be responsible for shipment and transportation charges from such point to destinations in Alaska and Hawaii.

2. Cartage to (Store to Door Delivery)

Transportation charges incurred from the nearest accessible common carrier point to final destination or to shipside (in case shipments outside Area A) are the responsibility of the purchaser unless the common carrier furnishes store to door delivery at no extra charge.

3. Origin, Method of Shipment, and Routing

Nuttall Gear LLC will determine the point of origin of shipment, method of transportation, and routing of shipment. Purchasers requiring shipment by a method or routing other than that of Nuttall Gear LLC selection will be billed any excess or premium in transportation charges.

Any charges for special services such as special trains, lighterage, construction, or repair of transportation facilities will be paid or reimbursed by the purchaser.

If shipment is specified by purchaser to one destination and re-forwarded at his request, re-forwarding is entirely at the purchaser's expense.

4. Purchaser Pick-Up

Nuttall Gear LLC must be contacted 48 hours before any purchaser pickup will be authorized.

Delivery charges will apply to purchaser pick-ups other than at the factory.

5. U.S. Government

When U.S. Government specifications require a government bill of lading, quotation will be F.O.B. point of shipment, freight not allowed.

6. Export Packing

a. Standard (Underdeck) Export Packing

When Standard (Underdeck) Export Packing is specified as a requirement by purchaser Nuttall Gear LLC will quote price to supply export crate for below deck shipment.

b. Special Export Packing

When Nuttall Gear LLC standard underdeck export packing will not meet contract requirements covering preparation of product for overseas shipment, etc., special packing specifications involved must be referred to Nuttall Gear LLC during negotiation for examination and acceptance. The charge made for such packing will be based on costs to Nuttall Gear LLC and will be shown as a separate item on invoice.

7. Damage/Risk of Loss

Risk of loss and responsibility for the product is transferred to the purchaser upon departure from the factory. As such the customer is responsible for damage or loss of goods in transition. Nuttall Gear LLC will not participate in any settlement of claims for loss and damage.

In the event of F.O. B. destination shipments agreed to in writing by Nuttall Gear LLC, the purchaser must unpack immediately, inspect the product and, if damage is discovered:

a. Not move the product from the point of examination.
b. Retain shipping container and packing material.
c. Notify the carrier's agent to make an inspection.
d. Notify Nuttall Gear LLC immediately.
e. Send Nuttall Gear LLC a copy of the carrier's inspection report and all other carrier documentation in the possession of purchaser.
f. Cooperate fully with Nuttall Gear LLC in a claim against the carrier for damages.

WARRANTIES / REMEDY

1. Standard Warranty

a. Nuttall Gear LLC warrants that products furnished will be the kind and quality described in the proposal or contract and will be free of defect in workmanship and material. Should any failure to conform to this warranty appear within a period of 18 months from date of shipment to the purchaser, or within 12 months from date of installation, whichever occurs first, Nuttall Gear LLC shall, upon prompt written notification thereof, correct such nonconformity, by repair or replacement F.O.B factory of the defective part or parts.

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b. Apparatus built to purchaser's design: Gearing Products built to the purchaser's design, specification, and application are warranted against defective workmanship and materials for a period of three (3) months from date of shipment from Nuttall Gear LLC. Nuttall Gear LLC will in no event be liable for any defects caused by purchaser's application of the product. Should any failure to conform to this warranty appear within the specified period, Nuttall Gear LLC shall upon prompt written notification thereof, correct such nonconformity by repair or replacement F.O.B. factory of the defective part or parts.

c. Nuttall Gear LLC warrants that parts and equipment supplied will be delivered free of any and all rightful claims, demands, liens, or encumbrances. In the event of breach of this warranty, purchaser shall promptly notify Nuttall Gear LLC and Nuttall Gear LLC, at its expense, will defend the title to any such material or part, and if unsuccessful will promptly provide to purchaser at no cost, replacement parts, or equipment which complies with this warranty.

2. Warranty Qualifications

a. The industrial motors and gearing upon shipment, are free from serious critical speeds, torsional vibration, and electrical transients. When they become part of a motor gear driven equipment system, the calculations required to check all parts of the complete system and the success of operation based on such calculations are the responsibility of purchaser.

b. Purchaser applications may require installation of safety features. Purchaser is responsible for furnishing and installing guards or other safety equipment needed to protect operating personnel even though such equipment may not have been furnished by Nuttall Gear LLC with the equipment purchased.

c. Products furnished must be stored, installed, operated, and maintained in accordance with Nuttall Gear LLC recommendation's and industry standard practices.

d. Equipment supplied by Nuttall Gear LLC but manufactured by others is warranted only to the extent of the original manufacturer's warranty.

3. Deferred Warranty

The standard warranty, including warranty qualifications, shall apply subject to the following modification:

For a 5% addition to the net price of unit, the warranty period on unit will be for a period of one year from date of initial operation, but not in excess of 60 months from date of shipment subject to the following conditions.

a. That within thirty days prior to initial operation an authorized Service Engineer be hired by customer to thoroughly inspect unit to ascertain that unit is in "as shipped" condition. This inspection will include but not be limited to:

(1) Inspect gears and bearings to ensure they are free from damage.
(2) Megger test and internal inspection of motor windings.
(3) External inspection to determine that no damage has been done.

b. Make any corrections which this inspection shows to be needed because the unit has been in storage or standing idle.

c. An affidavit certifying that unit has successfully passed inspection and is in "as shipped" condition be supplied to Nuttall Gear LLC by purchaser. Failure to provide Nuttall Gear LLC with the affidavit certifying that unit has passed inspection and is in "as shipped" condition will result in voiding the warranty.

All corrections to unit will be made at customer's expense if corrections are required due to storage conditions.

4. Exclusive Warranty and Remedy

a. THE WARRANTIES SENT FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES WHETHER STATUTORY, EXPRESS OR IMPLIED (INCLUDING ALL WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE AND ALL WARRANTIES ARISING FROM COURSE OF DEALING OR USAGE OF TRADE), EXCEPT PATENT INFRINGEMENT.

b. The remedies provided above are the purchaser's sole remedies for any failure of Nuttall Gear LLC to comply with its obligations. Correction of any nonconformity in the manner and for the period of time provided above shall constitute complete fulfillment of all liabilities of Nuttall Gear LLC whether claims of the purchase are based in contract, in tort (including negligence or strict liability), or otherwise with respect to or arising out of the product furnished hereunder.

PATENT INFRINGEMENT

Subject to the following provisions, Nuttall Gear LLC shall, at its own expense, defend or at its option settle any claim, suit or proceeding brought against the purchaser and/or its vendees mediate any immediate so far as based on an allegation that any goods, material, equipment, device or article (hereinafter referred to as product) or any part thereof furnished hereunder constitutes a defect or a contributory infringement of any claim of any patent of the United States. This obligation shall be effective only if purchaser shall have made all payments when due hereunder, and if Nuttall Gear LLC is notified promptly in writing and given authority, information and assistance for the defense of said claim or suit or proceeding. Nuttall Gear LLC shall pay all damages and costs awarded in such suit or proceeding so defended in case the product or part thereof furnished hereunder becomes the subject of any claim, suit or proceeding for infringement of any United States patent or in the event of any adjudication that such product or part infringes any United States patent, or if the use or sale of such product or part is enjoined. Nuttall Gear LLC shall at its option and its own expense, either:

a. procure for the purchaser the right to continue using said product or part thereof, or

b. replace it with a non-infringing product, or

c. modify it so it becomes non-infringing, or

d. as a last resort, remove it and refund the purchase price and the transportation and installation costs thereof.

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The foregoing indemnity does not apply to the following:

1. Patented processes performed by the product or another product produced thereof.

2. Product supplied according to a design other than that of Nuttall Gear LLC and which is required by the purchaser.

3. Combination of the product with another product not furnished hereunder unless Nuttall Gear LLC is a contributory infringer.

4. Any settlements of a suit or proceeding made without Nuttall Gear LLC's written consent.

The foregoing states the entire liability of Nuttall Gear LLC with respect of patent infringement by said product or any part thereof.

If a suit or proceeding is brought against Nuttall Gear LLC solely on account of activities enumerated in paragraphs 1, 2, or 3 above, the purchaser agrees to indemnify Nuttall Gear LLC in the manner and to the extent Nuttall Gear LLC indemnified purchaser in the first paragraph of this provision insofar as the terms hereof are appropriate.

LIMITATION OF LIABILITY/ EXCLUSIVITY OF REMEDY

1. Limitation of Liability

Nuttall Gear LLC, its contractors and suppliers of any tier, shall not be liable in contract, in tort (including strict liability or negligence), or otherwise for damage or loss of other property or equipment, loss of profits or revenue, loss of use of equipment or power system, cost of capital, cost of purchased or replacement power, temporary equipment (including additional expenses incurred in using existing facilities), claims of customers of the purchaser, or for any special, indirect, incidental or consequential damages whatsoever.

2. Exclusive Remedies

The remedies of the purchaser set forth herein are exclusive and the liability of Nuttall Gear LLC, its contractors and suppliers of any tier, with respect to any contract, or anything done in connection therewith such as the performance or breach thereof, or from the manufacture, sale, delivery, resale, or use of any equipment covered by or furnished under the contract, whether in contract, in tort (including strict liability or negligence) or otherwise, shall not exceed the price of the equipment or part on which such liability is based.

REMOVAL OR TRANSFER

Prior to the removal of any equipment, material, or product furnished hereunder from the project site (except temporarily for repair work or permanently for disposal), or the transfer of any interest therein, the purchaser shall at its option, either:

(I) obtain for Nuttall Gear LLC written assurance from the transferee that Nuttall Gear LLC and its subcontractors and suppliers protection against liability following the transfer is equal to that provided by this contract, or

(II) Indemnify Nuttall Gear LLC against any liability it may incur in excess of that which would have been incurred by it had purchaser obtained the above assurance from the transferee.

FORCE MAJEURE

Nuttall Gear LLC shall not be liable for failure to perform or for delay in performance due to fire, flood, strike or other labor difficulty, act of God, act of any governmental authority, or of purchaser, riot, embargo, fuel or energy shortage, car shortage, faulty castings or forgings, wrecks or delay in transportation, inability to obtain necessary labor, materials, or manufacturing facilities from usual sources, or due to any cause beyond its reasonable control.

In the event of delay in performance due to any such cause, the date of delivery or time for completion will be extended by a period of time reasonably necessary to overcome the effect of such delay.

CONTRACT ORDER VARIATIONS

1. Termination/Cancellation

Any order or contract may be terminated by the purchaser only on written notice to Nuttall Gear LLC and upon payment of reasonable and proper termination charges.

Termination charges shall include:

a. The price provided in the order for all products completed prior to termination.

b. Actual costs incurred by Nuttall Gear LLC in connection with the uncompleted portion of the order.

c. Reasonable profits as estimated by Nuttall Gear LLC on the incomplete portion of the order.

Nuttall Gear LLC shall have the right to cancel any order or contract at any time by written notice for any material breach of the order or contract by the purchaser.

2. Held Orders

a. After order entry but prior to completion of manufacture, orders and contracts may not be held subject to customer rescheduling. Such orders must be cancelled and new orders placed. A cancellation charge will be assessed pursuant to the termination provisions set forth above. A new order or contract will be required to begin delayed manufacture and such reorder shall be subject to all terms and conditions, including pricing, in effect at the time of entry.

b. When shipping holds are placed on units completed in manufacture or when a product is ready for shipment and shipment cannot be made because of reasons beyond Nuttall Gear LLC control, Nuttall Gear LLC shall submit an invoice for such product payable under terms and conditions of payment set forth, and upon written notice to purchaser, store such products in the event of storage, the following conditions apply:

(I) Risk of loss of the product shall pass to purchaser upon moving such product to storage whether or not such storage is at Nuttall Gear LLC facilities.

(II) All expenses incurred by Nuttall Gear LLC in connection with storage of product, including transportation, demurrage, cost of preparation for storage, storage charges, insurance if placed, and handling charges shall be payable by purchaser upon submission of invoices thereof by Nuttall Gear LLC.

3. Additions/Changes to Orders

Any addition to a previously entered order will be accepted only at prices, conditions of sale, etc. which prevail on the date the addition is made.

Changes in specifications of orders released for manufacturing or engineering will be subject to charges in line with processing, engineering, or manufacture completed at the time the change is specified.

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4. Returning Products
Authorization and shipping instructions for the return of any product must be obtained by purchaser from Nuttall Gear LLC before returning any product.

The product must be returned with complete identification in accordance with Nuttall Gear LLC instructions or it will not be accepted. Where purchaser requests authorization to return product for reasons on his own, charges will be assessed for placing returned goods in a salable condition (restocking charge) and for outgoing and incoming transportation paid by Nuttall Gear LLC. In no event will Nuttall Gear LLC be responsible for product returned without proper authorization or identification.

5. Inspection
Purchaser inspection of completed units and purchaser witness of factory tests can be provided for additional costs to purchaser. The purchaser will make inspection or witness personnel available upon forty-eight (48) hours notice by Nuttall Gear LLC. If purchaser personnel cannot be made available within this period of time Nuttall Gear LLC reserves the right to reschedule at our earliest convenience. A charge for additional costs incurred due to purchaser delay will be borne by purchaser.

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Moduline®

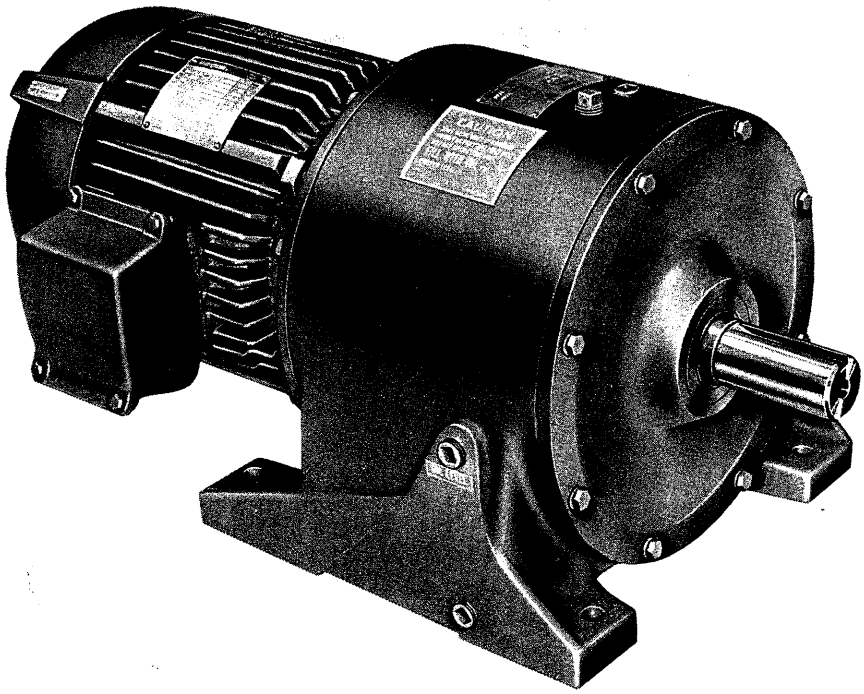
Integral Gearmotors
Type G

INDEX

In the early 1920's, after many years of experience in the field of industrial gearing, Nuttall Gear pioneered the gearmotor concept. Continued development, utilizing advances in both materials and methods, has resulted in the present line of tough compact gearmotors unequalled in field proved reliability.

The **Moduline Type G** integral gearmotor utilizes a standardized motor flange and rabbet fit for built-in alignment of the motor and gear, assuring long gear life and minimum maintenance, as well as single source responsibility for performance of both the gearing and the motor.

Many modifications, both mechanical and electrical, such as brakes, special motor insulation, various enclosures, special oil seals and marine duty are all available to make the Nuttall **Type G Moduline** gearmotor the right drive for your application.



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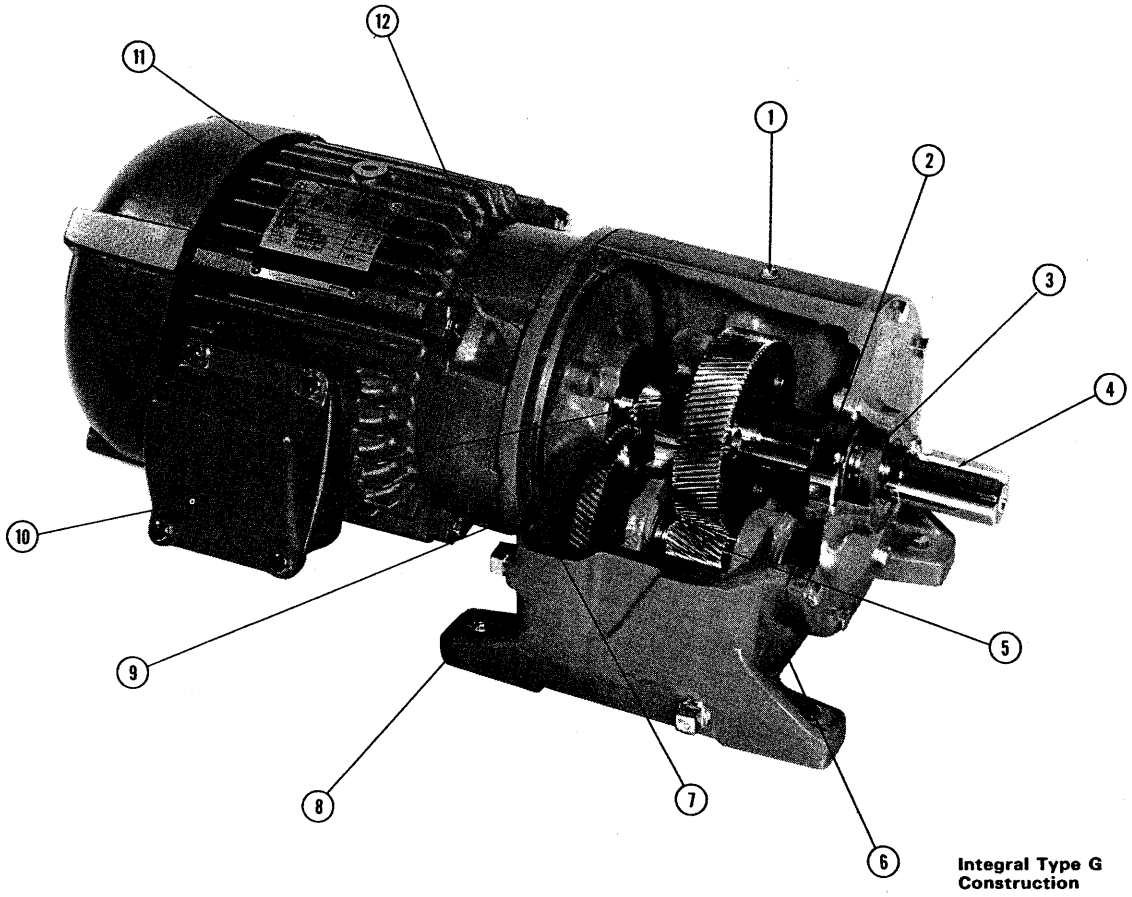
Effective: 1, May 1984
Supersedes: New

Integral Gearmotors
Type G
Moduline®

CONSTRUCTION FEATURES



Integral Type G Construction

① A combination breather – filler plug keeps overall height at a minimum.

② Single row tapered roller bearings are used on all gear unit shafts. These bearings are conservatively selected in accordance with bearing manufacturers' recommendations to provide maximum load carring capacity and reliability.

③ Dual lip seals are used exclusively by Nuttall Gear to retain oil effectively and to protect against entry of contaminants. This assures long, trouble-free life.

④ Output shaft of chrome-moly steel supported on a wide bearing span provides generous overhung load capacity.

⑤ Helical gears, pioneered by Nuttall Gear, permits more than one gear tooth face to carry the load, and allow gradual progressive transmission of the load from tooth to tooth.

⑥ A sturdy one-piece cast iron housing with integrally cast and precision machined bearing supports provides proper internal alignment of components. The inherent corrosion resistance of cast iron allows placement of the unit in many severe atmospheres without special finishes.

⑦ Large oil reservoir and splash system provide positive lubrication of all gears and bearings.

⑧ Rugged feet are integrally cast to provide maximum strength. Foot pads are accurately milled to assure ease of alignment.

⑨ All gears and pinions are made of high quality chrome-moly steel generated on Pfauter hobbers, and then heat treated by a special ion nitriding process. This assures gears of consistent accuracy, resulting in long trouble free life and quiet operation.

⑩ The high speed pinion and gear are mounted on splined shafts. The splines are cold rolled and the major diameter ground to close tolerances to assure concentricity of the gear and pinion with the shaft. This design permits easy change in the high speed gear set.

⑪ A standardized motor flange and rabbet fit provide accurate, built in alignment of motor and gear, on Integral Type G units, assuring longer gear life and minimum maintenance.

⑫ The standard Nuttall Gearmotor is totally enclosed; however, a wide variety of motor enclosures and designs are available in both AC and DC types. High efficiency, Mill and Chemical duty, multi-speed, high torque and high slip are among the selections available to assure you of single source responsibility, regardless of your requirements.

Moduline® Integral Gearmotors Type G

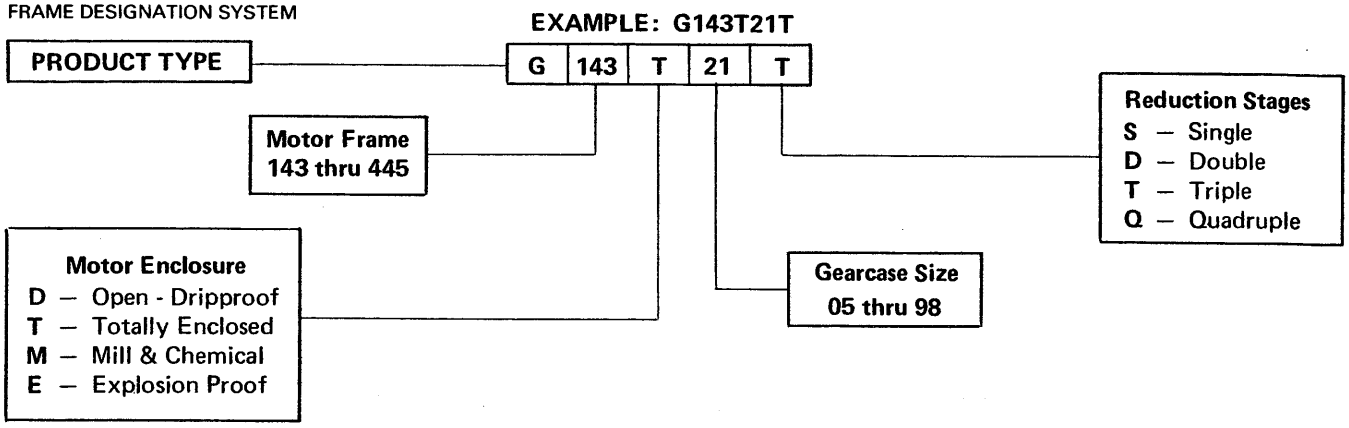
SELECTION AND ORDERING

1. REQUIRED APPLICATION INFORMATION.
   A. **Horsepower**
   B. **Output speed**
   C. **Motor characteristics**
      1. Design - B, C, D
      2. Enclosure (TEFC standard)
      3. AC or DC (for DC refer to office)
      4. Voltage, frequency, phase
   D. **AGMA load classification** (Refer to section 217, pages 4 and 5)
   E. **Thrust** and **overhung load** requirements, if any. (See section 217, pages 2 and 3.)
   F. **Mounting position** (see section 215, page 1)

2. SELECTION PROCEDURE
   A. Locate required horsepower. Refer to Section 210, pages 4 thru 10.
      1. Read down column to the desired output speed.
      2. **Locate required service class** (I, II or III).
      3. Note list price and frame designation.
   B. **Check overhung load** and/or **thrust capacities** of the selected unit in the engineering data (section 217, pages 2 and 3) against application requirements.
   C. Select required options and modifications from section 215. Add (or deduct) list prices to (from) basic unit list price.
   D. Use N-1 multiplier for appropriate customer class to obtain net price.

   Note: **Brake motors** – When the torque rating of a brake exceeds the torque rating of the motor, the rating of the brake should be considered in selecting the proper gearmotor service class.

3. FRAME DESIGNATION SYSTEM



4. SELECTION & PRICING EXAMPLES

Example I:
A gearmotor is required for a uniformly loaded belt conveyor running at 37 rpm, 24 hours a day with steady torque requirements. The motor is to be 10 HP, AC, 3 phase, 60 Hertz, 230/460 volts NEMA design B with totally enclosed fan cooled enclosure. The gearmotor will be horizontal, floor mounted, and direct coupled to the conveyor.

Solution I:
1. All information required to use the selection and pricing tables is known except for the AGMA load classification. Turn to Section 217, page 4. Find "conveyors, belt, uniform load," 24 hours per day service, and note that Class II gearing is required.
2. Turn to Section 210, page 7 and locate the Class II table. In the first column find 37 rpm. Read across the 37 rpm column and select gear frame size - G215T54T, at $4,010 list.
3. No modifications are involved.
4. Mounting is standard. Overhung and thrust loads are not involved since direct connection is used.
5. Use N-1 multiplier.

Example II:
Repeat example I, except the conveyor is not uniformly fed but has 20 load peaks per hour with a 5-second duration on each peak and a peak load 200% of full load. The conveyor operates 8 hours per day.

Solution II:
1. The AGMA load classification table in Section 217, page 4 carries an introductory statement that the table does not cover duty cycle applications and to refer to page 5. On page 5 allowable peak load curves are provided to permit selection of the proper AGMA load class.
2. 20 peaks per hour at 200% of full load at 5 seconds each exceeds the AGMA Class I table. From the AGMA Class II table, 20 peaks per hour at 200% of full load is permissable, with a 10-second duration on the peak load. Since the application involves only 5-second duration, Class II gearing is adequate and the gearmotor previously selected is also correct for this situation.
3. Note that increasing the peak load to 250% of full load would necessitate use of Class III gearing.

5. ORDERING:
The following information must be provided for each order to permit the manufacture and assembly of the correct gearmotor.
1. Quantity
2. Motor characteristics:
   - Horsepower
   - Type
   - Enclosure
   - Phase
   - Hertz
   - Voltage
   - Modifications (describe in detail)
3. Gearmotor characteristics:
   - Type (integral type G)
   - Output rpm
   - AGMA class (I, II, III)
   - Designation (e.g., G184T21T)
   - Mounting position
   - Modification (describe in detail)
   - Overhung load and thrust load requirements, if applicable
4. Pricing:
   - Gearmotor list price
   - Modifications
   - Discount (multiplier)
   - Net price
5. Shipment required.

Note: List prices in examples are subject to change without notice.

Integral Gearmotors
Type G
Moduline®

ATINGS - PRICES
-1-1/2 HP

1 HORSEPOWER

RPM	CLASS I List Price	CLASS I Frame	CLASS II List Price	CLASS II Frame	CLASS III List Price	CLASS III Frame
1430	1,140	G143T10S	1,140	G143T10S	1,140	G143T10S
1170	1,140	G143T10S	1,140	G143T10S	1,140	G143T10S
950	1,140	G143T10S	1,140	G143T10S	1,140	G143T10S
780	1,140	G143T10S	1,140	G143T10S	1,140	G143T10S
640	1,140	G143T10S	1,140	G143T10S	1,140	G143T10S
520	1,140	G143T10S	1,140	G143T10S	1,140	G143T10S
420	985	G143T05D	985	G143T05D	985	G143T05D
350	985	G143T05D	985	G143T05D	985	G143T05D
280	985	G143T05D	985	G143T05D	985	G143T05D
230	985	G143T05D	985	G143T05D	985	G143T05D
190	985	G143T05D	985	G143T05D	985	G143T05D
155	985	G143T05D	985	G143T05D	985	G143T05D
125	985	G143T05D	985	G143T05D	985	G143T05D
100	985	G143T05D	985	G143T05D	985	G143T05D
84	985	G143T05D	985	G143T05D	985	G143T05D
68	985	G143T05D	985	G143T05D	1,210	G143T10D
56	985	G143T05D	1,210	G143T10D	1,210	G143T10D
45	1,520	G143T21D	1,520	G143T21D	1,520	G143T21D
37	1,675	G143T21T	1,675	G143T21T	1,675	G143T21T
30	1,675	G143T21T	1,675	G143T21T	1,675	G143T21T
25	1,675	G143T21T	1,675	G143T21T	1,675	G143T21T
20	1,675	G143T21T	1,675	G143T21T	1,675	G143T21T
16.5	1,675	G143T21T	1,675	G143T21T	2,110	G143T32T
13.5	1,675	G143T21T	1,675	G143T21T	2,110	G143T32T
11.0	2,110	G143T32T	2,110	G143T32T	2,790	G143T43T
9.0	2,110	G143T32T	2,980	G143T32Q	3,485	G143T43Q
7.5	2,980	G143T32Q	3,485	G143T43Q	3,485	G143T43Q
6.0	2,980	G143T32Q	3,485	G143T43Q	3,715	G145T54T*
5.0	3,485	G143T43Q	3,485	G143T43Q	4,150	G143T54Q
4.0	3,485	G143T43Q	4,150	G143T54Q	5,185	G143T64Q
3.2	4,150	G143T54Q	4,150	G143T54Q	5,185	G143T64Q
2.7	4,150	G143T54Q	5,185	G143T64Q	6,850	G143T76Q
2.2	6,850	G143T76Q	6,850	G143T76Q	6,850	G143T76Q
1.8	12,180	G143T88Q	12,180	G143T88Q	12,180	G143T88Q
1.5	12,215	G145T88Q*	12,215	G145T88Q*	12,215	G145T88Q*
1.2	12,215	G145T88Q*	12,215	G145T88Q*	12,215	G145T88Q*

1-1/2 HORSEPOWER

CLASS I List Price	CLASS I Frame	CLASS II List Price	CLASS II Frame	CLASS III List Price	CLASS III Frame	RPM
1,165	G145T10S	1,165	G145T10S	1,165	G145T10S	1430
1,165	G145T10S	1,165	G145T10S	1,165	G145T10S	1170
1,165	G145T10S	1,165	G143T10S	1,165	G145T10S	950
1,165	G145T10S	1,165	G145T10S	1,165	G145T10S	780
1,165	G145T10S	1,165	G145T10S	1,165	G145T10S	640
1,165	G145T10S	1,165	G145T10S	1,165	G145T10S	520
1,015	G145T05D	1,015	G145T05D	1,015	G145T05D	420
1,015	G145T05D	1,015	G145T05D	1,015	G145T05D	350
1,015	G145T05D	1,015	G145T05D	1,015	G145T05D	280
1,015	G145T05D	1,015	G145T05D	1,015	G145T05D	230
1,015	G145T05D	1,015	G145T05D	1,015	G145T05D	190
1,015	G145T05D	1,015	G145T05D	1,015	G145T05D	155
1,015	G145T05D	1,015	G145T05D	1,015	G145T05D	125
1,015	G145T05D	1,015	G145T05D	1,245	G145T10D	100
1,015	G145T05D	1,245	G145T10D	1,245	G145T10D	84
1,015	G145T05D	1,245	G145T10D	1,245	G145T10D	68
1,245	G145T10D	1,245	G145T10D	1,245	G145T10D	56
1,550	G145T21D	1,550	G145T21D	1,550	G145T21D	45
1,695	G145T21T	1,695	G145T21T	1,695	G145T21T	37
1,695	G145T21T	1,695	G145T21T	1,695	G145T21T	30
1,695	G145T21T	1,695	G145T21T	2,130	G145T32T	25
1,695	G145T21T	1,695	G145T21T	2,130	G145T32T	20
1,695	G145T21T	2,130	G145T32T	2,835	G145T43T	16.5
1,695	G145T21T	2,130	G145T32T	2,835	G145T43T	13.5
2,280	G182T32T*	2,835	G145T43T	2,985	G182T43T*	11.0
2,280	G184T32T*	3,520	G145T43Q	3,715	G145T54T	9.0
2,985	G182T43T*	3,715	G145T54T	3,820	G182T54T*	7.5
3,520	G145T32Q	3,820	G182T54T*	5,235	G145T64Q	6.0
3,820	G182T54T*	4,190	G145T54Q	5,640	G182T64Q*	5.0
4,190	G145T54Q	5,235	G145T64Q	6,920	G145T76Q	4.0
4,190	G145T54Q	5,235	G145T64Q	6,920	G145T76Q	3.2
5,235	G145T64Q	6,920	G145T76Q	6,920	G145T76Q	2.7
6,920	G145T76Q	6,920	G145T76Q	12,215	G145T88Q	2.2
12,215	G145T88Q	12,215	G145T88Q	12,215	G145T88Q	1.8
12,320	G182T88Q*	12,320	G182T88Q*	12,320	G182T88Q*	1.5
12,320	G182T88Q*	12,320	G182T88Q*	12,320	G182T88Q*	1.2

* Denotes 1170 RPM Motor Supplied. All other ratings are supplied with 1750 RPM motors. Listed price includes the appropriate TEFC motor.

DISCOUNT N-1

Your Total Drive Source

Integral Gearmotors

Moduline®

Type G

RATINGS – PRICES
2 – 3 HP

2 HORSEPOWER

RPM	CLASS I List Price	CLASS I Frame	CLASS II List Price	CLASS II Frame	CLASS III List Price	CLASS III Frame
1430	1,185	G145T10S	1,185	G145T10S	1,185	G145T10S
1170	1,185	G145T10S	1,185	G145T10S	1,185	G145T10S
950	1,185	G145T10S	1,185	G145T10S	1,185	G145T10S
780	1,185	G145T10S	1,185	G145T10S	1,185	G145T10S
640	1,185	G145T10S	1,185	G145T10S	1,185	G145T10S
520	1,185	G145T10S	1,185	G145T10S	1,185	G145T10S
420	1,040	G145T05D	1,040	G145T05D	1,040	G145T05D
350	1,040	G145T05D	1,040	G145T05D	1,040	G145T05D
280	1,040	G145T05D	1,040	G145T05D	1,040	G145T05D
230	1,040	G145T05D	1,040	G145T05D	1,040	G145T05D
190	1,040	G145T05D	1,040	G145T05D	1,040	G145T05D
155	1,040	G145T05D	1,040	G145T05D	1,330	G145T10D
125	1,040	G145T05D	1,040	G145T05D	1,330	G145T10D
100	1,040	G145T05D	1,330	G145T10D	1,330	G145T10D
84	1,040	G145T05D	1,330	G145T10D	1,330	G145T10D
68	1,330	G145T10D	1,575	G145T21D	1,575	G145T21D
56	1,330	G145T10D	1,575	G145T21D	1,715	G145T21T
45	1,575	G145T21D	1,575	G145T21D	1,715	G145T21T
37	1,715	G145T21T	1,715	G145T21T	2,150	G145T32T
30	1,715	G145T21T	1,715	G145T21T	2,150	G145T32T
25	1,715	G145T21T	2,150	G145T32T	2,880	G145T43T
20	1,715	G145T21T	2,150	G145T32T	2,880	G145T43T
16.5	2,150	G145T32T	2,150	G145T32T	2,880	G145T43T
13.5	2,150	G145T32T	2,880	G145T43T	3,790	G145T54T
11.0	2,880	G145T43T	3,040	G184T43T*	3,790	G145T54T
9.0	2,880	G145T43T	3,790	G145T54T	3,880	G184T54T*
7.5	3,540	G145T43Q	3,880	G184T54T*	4,515	G184T64T*
6.0	3,880	G184T54T*	5,440	G145T64Q	7,215	G145T76Q
5.0	4,230	G145T54Q	5,440	G145T64Q	7,215	G145T76Q
4.0	5,540	G145T64Q	7,215	G145T76Q	7,215	G145T76Q
3.2	5,540	G145T64Q	7,215	G145T76Q	12,520	G145T88Q
2.7	7,215	G145T76Q	7,215	G145T76Q	12,520	G145T88Q
2.2	7,215	G145T76Q	12,520	G145T88Q	12,520	G145T88Q
1.8	12,520	G145T88Q	12,520	G145T88Q	–	–
1.5	12,610	G184T88Q*	12,610	G184T88Q*	–	–

3 HORSEPOWER

CLASS I List Price	CLASS I Frame	CLASS II List Price	CLASS II Frame	CLASS III List Price	CLASS III Frame	RPM
1,245	G182T10S	1,245	G182T10S	1,245	G182T10S	1430
1,245	G182T10S	1,245	G182T10S	1,245	G182T10S	1170
1,245	G182T10S	1,245	G182T10S	1,245	G182T10S	950
1,245	G182T10S	1,245	G182T10S	1,245	G182T10S	780
1,245	G182T10S	1,245	G182T10S	1,245	G182T10S	640
1,345	G182T21S	1,345	G182T21S	1,345	G182T21S	520
1,105	G182T05D	1,105	G182T05D	1,105	G182T05D	420
1,105	G182T05D	1,105	G182T05D	1,105	G182T05D	350
1,105	G182T05D	1,105	G182T05D	1,105	G182T05D	280
1,105	G182T05D	1,105	G182T05D	1,330	G182T10D	230
1,105	G182T05D	1,105	G182T05D	1,330	G182T10D	190
1,105	G182T05D	1,330	G182T10D	1,330	G182T10D	155
1,105	G182T05D	1,330	G182T10D	1,330	G182T10D	125
1,330	G182T10D	1,330	G182T10D	1,635	G182T21D	100
1,330	G182T10D	1,635	G182T21D	1,635	G182T21D	84
1,635	G182T21D	1,635	G182T21D	1,985	G182T32D	68
1,635	G182T21D	1,925	G182T21T	1,985	G182T32D	56
1,635	G182T21D	1,925	G182T21T	2,280	G182T32T	45
1,925	G182T21T	2,280	G182T32T	2,985	G182T43T	37
1,925	G182T21T	2,280	G182T32T	2,985	G182T43T	30
2,280	G182T32T	2,985	G182T43T	2,985	G182T43T	25
2,280	G182T32T	2,985	G182T43T	3,820	G182T54T	20
2,985	G182T43T	2,985	G182T43T	3,820	G182T54T	16.5
2,985	G182T43T	3,820	G182T54T	3,820	G182T54T	13.5
3,820	G182T54T	3,940	G213T54T*	4,455	G182T64T	11.0
3,940	G213T54T*	4,730	G213T64T*	4,730	G213T64T*	9.0
4,265	G182T54Q	4,730	G213T64T*	5,720	G213T76T*	7.5
5,640	G182T64Q	7,300	G182T76Q	7,300	G182T76Q	6.0
5,640	G182T64Q	7,300	G182T76Q	12,610	G182T88Q	5.0
7,300	G182T76Q	7,300	G182T76Q	12,610	G182T88Q	4.0
7,300	G182T76Q	12,610	G182T88Q	12,610	G182T88Q	3.2
7,300	G182T76Q	12,610	G182T88Q	12,960	G182T92Q	2.7
12,610	G182T88Q	12,610	G182T88Q	–	–	2.2
–	–	–	–	–	–	1.8
–	–	–	–	–	–	1.5

* Denotes 1170 RPM Motor Supplied. All other ratings are supplied with 1750 RPM motors. Listed price includes the appropriate TEFC motor.

DISCOUNT N-1

Integral Gearmotors
Type G
Moduline®

RATINGS – PRICES
5 – 7-1/2 HP

5 HORSEPOWER

RPM	CLASS I List Price	CLASS I Frame	CLASS II List Price	CLASS II Frame	CLASS III List Price	CLASS III Frame
1430	1,290	G184T10S	1,290	G184T10S	1,290	G184T10S
1170	1,290	G184T10S	1,290	G184T10S	1,290	G184T10S
950	1,290	G184T10S	1,290	G184T10S	1,395	G184T21S
780	1,290	G184T10S	1,290	G184T10S	1,395	G184T21S
640	1,290	G184T10S	1,395	G184T21S	1,665	G184T32S
520	1,395	G184T21S	1,395	G184T21S	1,665	G184T32S
420	1,160	G184T05D	1,160	G184T05D	1,160	G184T05D
350	1,160	G184T05D	1365	G18410D	1,365	G184T10D
280	1,160	G184T05D	1,365	G184T10D	1,365	G184T10D
230	1,160	G184T05D	1,365	G184T10D	1,365	G184T10D
190	1,365	G184T10D	1,365	G184T10D	1,365	G184T10D
155	1,365	G184T10D	1,365	G184T10D	1,655	G184T21D
125	1,365	G184T10D	1,655	G184T21D	1,655	G184T21D
100	1,365	G184T10D	1,655	G184T21D	2,055	G184T32D
84	1,655	G184T21D	1,655	G184T21D	2,055	G184T32D
68	1,655	G184T21D	2,055	G184T32D	2,220	G184T43D
56	2,055	G184T32D	2,335	G184T32T	3,040	G184T43T
45	2,055	G184T32D	2,335	G184T32T	3,040	G184T43T
37	2,335	G184T32T	3,040	G184T43T	3,880	G184T54T
30	3,040	G184T43T	3,040	G184T43T	3,880	G184T54T
25	3,040	G184T43T	3,880	G184T54T	3,880	G184T54T
20	3,040	G184T43T	3,880	G184T54T	4,515	G184T64T
16.5	3,880	G184T54T	3,880	G184T54T	4,515	G184T64T
13.5	3,880	G184T54T	4,515	G184T64T	5,625	G184T76T
11.0	3,880	G184T54T	4,515	G184T64T	5,625	G184T76T
9.0	4,910	G215T64T*	6,030	G215T76T*	7,580	G184T88T
7.5	4,910	G215T64T*	6,030	G215T76T*	7,580	G184T88T
6.0	7,365	G184T76Q	7,990	G215T88T*	12,680	G184T88Q
5.0	7,365	G184T76Q	12,680	G184T88Q	13,580	G215T92Q*
4.0	12,680	G184T88Q	12,680	G184T88Q	16,140	G184T98Q
3.2	12,680	G184T88Q	13,035	G184T92Q	16,140	G184T98Q
2.7	12,680	G184T88Q	13,035	G184T92Q	–	–

7-1/2 HORSEPOWER

CLASS I List Price	CLASS I Frame	CLASS II List Price	CLASS II Frame	CLASS III List Price	CLASS III Frame	RPM
1,500	G213T21S	1,500	G213T21S	1,500	G213T21S	1430
1,500	G213T21S	1,500	G213T21S	1,500	G213T21S	1170
1,500	G213T21S	1,500	G213T21S	1,765	G213T32S	950
1,765	G213T32S	1,765	G213T32S	1,765	G213T32S	780
1,765	G213T32S	1,765	G213T32S	1,765	G213T32S	640
1,765	G213T32S	1,765	G213T32S	2,090	G213T43S	520
1,740	G213T21D	1,740	G213T21D	1,740	G213T21D	420
1,740	G213T21D	1,740	G213T21D	1,740	G213T21D	350
1,740	G213T21D	1,740	G213T21D	1,740	G213T21D	280
1,740	G213T21D	1,740	G213T21D	1,740	G213T21D	230
1,740	G213T21D	1,740	G213T21D	1,740	G213T21D	190
1,740	G213T21D	1,740	G213T21D	2,080	G213T32D	155
1,740	G213T21D	1,740	G213T21D	2,080	G213T32D	125
1,740	G213T21D	2,080	G213T32D	2,305	G213T43D	100
2,080	G213T32D	2,080	G213T32D	2,305	G213T43D	84
2,080	G213T32D	2,305	G213T43D	2,305	G213T43D	68
2,305	G213T43D	3,100	G213T43T	3,120	G213T54D	56
2,305	G213T43D	3,100	G213T43T	3,940	G213T54T	45
3,100	G213T43T	3,940	G213T54T	3,940	G213T54T	37
3,100	G213T43T	3,940	G213T54T	4,730	G213T64T	30
3,940	G213T54T	3,940	G213T54T	4,730	G213T64T	25
3,940	G213T54T	4,730	G213T64T	5,720	G213T76T	20
4,730	G213T64T	4,730	G213T64T	5,720	G213T76T	16.5
4,730	G213T64T	5,720	G213T76T	7,820	G213T88T	13.5
5,720	G213T76T	5,720	G213T76T	7,820	G213T88T	11.0
7,505	G213T76Q	7,820	G213T88T	8,215	G254T88T*	9.0
7,505	G213T76Q	10,610	G213T92T	10,610	G213T92T	7.5
12,820	G213T88Q	12,820	G213T88Q	16,280	G213T98Q	6.0
12,820	G213T88Q	13,180	G213T92Q	16,280	G213T98Q	5.0
12,820	G213T88Q	16,280	G213T98Q	–	–	4.0
13,180	G213T92Q	16,280	G213T98Q	–	–	3.2

* Denotes 1170 RPM Motor Supplied. All other ratings are supplied with 1750 RPM motors. Listed price includes the appropriate TEFC motor.

DISCOUNT N-1

Your Total Drive Source

Integral Gearmotors

Moduline®

Type G

RATINGS – PRICES
10 – 15 HP

10 HORSEPOWER

RPM	CLASS I List Price	CLASS I Frame	CLASS II List Price	CLASS II Frame	CLASS III List Price	CLASS III Frame
1430	1,650	G215T21S	1,650	G215T21S	1,650	G215T21S
1170	1,650	G215T21S	1,650	G215T21S	1,880	G215T32S
950	1,650	G215T21S	1,880	G215T32S	1,880	G215T32S
780	1,880	G215T32S	1,880	G215T32S	2,205	G215T43S
640	1,880	G215T32S	2,205	G215T43S	2,205	G215T43S
520	1,880	G215T32S	2,205	G215T43S	2,205	G215T43S
420	1,800	G215T21D	1,800	G215T21D	2,140	G215T32D
350	1,800	G215T21D	1,800	G215T21D	2,140	G215T32D
280	1,800	G215T21D	1,800	G215T21D	2,140	G215T32D
230	1,800	G215T21D	1,800	G215T21D	2,140	G215T32D
190	1,800	G215T21D	1,800	G215T21D	2,140	G215T32D
155	1,800	G215T21D	1,800	G215T21D	2,140	G215T32D
125	1,800	G215T21D	2,140	G215T32D	2,615	G215T43D
100	2,140	G215T32D	2,140	G215T32D	2,615	G215T43D
84	2,140	G215T32D	2,615	G215T43D	3,295	G215T54D
68	2,615	G215T43D	2,615	G215T43D	3,295	G215T54D
56	3,360	G215T43T	3,360	G215T43T	4,010	G215T54T
45	4,010	G215T54T	4,010	G215T54T	4,910	G215T64T
37	4,010	G215T54T	4,010	G215T54T	4,910	G215T64T
30	4,010	G215T54T	4,910	G215T64T	6,030	G215T76T
25	4,910	G215T64T	4,910	G215T64T	6,030	G215T76T
20	4,910	G215T64T	6,030	G215T76T	7,990	G215T88T
16.5	6,030	G215T76T	6,030	G215T76T	7,990	G215T88T
13.5	6,030	G215T76T	6,030	G215T76T	7,990	G215T88T
11.0	7,990	G215T88T	7,990	G215T88T	10,850	G215T92T
9.0	13,215	G215T88Q	7,990	G215T88T	10,850	G215T92T
7.5	13,215	G215T88Q	13,215	G215T88Q	16,870	G215T98Q
6.0	13,580	G215T92Q	16,870	G215T98Q	16,870	G215T98Q
5.0	13,580	G215T92Q	16,870	G215T98Q	–	–
4.0	16,870	G215T98Q	16,870	G215T98Q	–	–

15 HORSEPOWER

CLASS I List Price	CLASS I Frame	CLASS II List Price	CLASS II Frame	CLASS III List Price	CLASS III Frame	RPM
2,100	G254T32S	2,100	G254T32S	2,100	G254T32S	1430
2,100	G254T32S	2,100	G254T32S	2,285	G254T43S	1170
2,100	G254T32S	2,285	G254T43S	2,285	G254T43S	950
2,100	G254T32S	2,285	G254T43S	2,285	G254T43S	780
2,285	G254T43S	2,285	G254T43S	2,605	G254T54S	640
2,285	G254T43S	2,605	G254T54S	2,605	G254T54S	520
2,325	G254T32D	2,325	G254T32D	2,325	G254T32D	420
2,325	G254T32D	2,325	G254T32D	2,325	G254T32D	350
2,325	G254T32D	2,325	G254T32D	2,325	G254T32D	280
2,325	G254T32D	2,325	G254T32D	2,325	G254T32D	230
2,325	G254T32D	2,325	G254T32D	2,700	G254T43D	190
2,325	G254T32D	2,325	G254T32D	2,700	G254T43D	155
2,325	G254T32D	2,700	G254T43D	3,400	G254T54D	125
2,700	G254T43D	2,700	G254T43D	3,400	G254T54D	100
2,700	G254T43D	3,400	G254T54D	3,400	G254T54D	84
3,400	G254T54D	3,400	G254T54D	4,045	G254T64D	68
3,400	G254T54D	4,185	G254T54T	5,125	G254T64T	56
4,185	G254T54T	5,125	G254T64T	6,215	G254T76T	45
4,185	G254T54T	5,125	G254T64T	6,215	G254T76T	37
5,125	G254T64T	6,215	G254T76T	8,215	G254T88T	30
5,125	G254T64T	6,215	G254T76T	8,215	G254T88T	25
6,215	G254T76T	8,215	G254T88T	8,215	G254T88T	20
6,215	G254T76T	8,215	G254T88T	11,095	G254T92T	16.5
8,215	G254T88T	11,095	G254T92T	11,095	G254T92T	13.5
8,215	G254T88T	11,095	G254T92T	15,945	G254T98T	11.0
13,520	G254T88Q	17,125	G254T98Q	17,125	G254T98Q	9.0
13,870	G254T92Q	17,125	G254T98Q	–	–	7.5
17,125	G254T98Q	17,125	G254T98Q	–	–	6.0
17,125	G254T98Q	–	–	–	–	5.0

* Denotes 1170 RPM Motor Supplied. All other ratings are supplied with 1750 RPM motors. Listed price includes the appropriate TEFC motor.

DISCOUNT N-1

Integral Gearmotors
Type G
Moduline®

RATINGS – PRICES
20 – 25 HP

20 HORSEPOWER

RPM	CLASS I List Price	CLASS I Frame	CLASS II List Price	CLASS II Frame	CLASS III List Price	CLASS III Frame
1430	2,275	G256T32S	2,275	G256T32S	2,275	G256T32S
1170	2,275	G256T32S	2,430	G256T43S	2,430	G256T43S
950	2,275	G256T32S	2,430	G256T43S	2,775	G256T54S
780	2,430	G256T43S	2,430	G256T43S	2,775	G256T54S
640	2,430	G256T43S	2,775	G256T54S	3,280	G256T76S
520	2,430	G256T43S	2,775	G256T54S	3,280	G256T76S
420	2,470	G256T32D	2,470	G256T32D	2,825	G256T43D
350	2,470	G256T32D	2,470	G256T32D	2,825	G256T43D
280	2,470	G256T32D	2,470	G256T32D	2,825	G256T43D
230	2,470	G256T32D	2,470	G256T32D	2,825	G256T43D
190	2,470	G256T32D	2,825	G256T43D	2,825	G256T43D
155	2,470	G256T32D	2,825	G256T43D	3,490	G256T54D
125	2,825	G256T43D	3,490	G256T54D	3,490	G256T54D
100	2,825	G256T43D	3,490	G256T54D	4,125	G256T64D
84	3,490	G256T54D	3,490	G256T54D	4,125	G256T64D
68	3,490	G256T54D	4,125	G256T64D	5,275	G256T76D
56	4,640	G256T54T	5,245	G256T64T	6,300	G256T76T
45	5,245	G256T64T	6,300	G256T76T	6,300	G256T76T
37	5,245	G256T64T	6,300	G256T76T	8,360	G256T88T
30	6,300	G256T76T	6,300	G256T76T	8,360	G256T88T
25	6,300	G256T76T	8,360	G256T88T	8,360	G256T88T
20	8,360	G256T88T	8,360	G256T88T	11,310	G256T92T
16.5	8,360	G256T88T	11,310	G256T92T	16,125	G256T98T
13.5	8,360	G256T88T	11,310	G256T92T	16,125	G256T98T
11.0	11,310	G256T92T	16,125	G256T98T	16,125	G256T98T
9.0	11,310	G256T92T	17,840	G256T98Q	–	–
7.5	17,840	G256T98Q	–	–	–	–
6.0	17,840	G256T98Q	–	–	–	–

25 HORSEPOWER

CLASS I List Price	CLASS I Frame	CLASS II List Price	CLASS II Frame	CLASS III List Price	CLASS III Frame	RPM
2,760	G284T43S	2,760	G284T43S	2,760	G284T43S	1430
2,760	G284T43S	2,760	G284T43S	2,760	G284T43S	1170
2,760	G284T43S	2,760	G284T43S	3,040	G284T54S	950
2,760	G284T43S	3,040	G284T54S	3,685	G284T76S	780
2,760	G284T43S	3,040	G284T54S	3,685	G284T76S	640
3,040	G284T54S	3,685	G284T76S	3,685	G284T76S	520
2,800	G284T32D	2,800	G284T32D	3,695	G284T54D	420
2,800	G284T32D	2,800	G284T32D	3,695	G284T54D	350
2,800	G284T32D	2,800	G284T32D	3,695	G284T54D	280
2,800	G284T32D	3,120	G284T43D	3,695	G284T54D	230
2,800	G284T32D	3,120	G284T43D	3,695	G284T54D	190
3,120	G284T43D	3,695	G284T54D	3,695	G284T54D	155
3,120	G284T43D	3,695	G284T54D	4,355	G284T64D	125
3,695	G284T54D	3,695	G284T54D	4,355	G284T64D	100
3,695	G284T54D	4,355	G284T64D	5,595	G284T76D	84
4,355	G284T64D	4,355	G284T64D	5,595	G284T76D	68
5,685	G284T64T	6,510	G284T76T	8,305	G284T88D	56
5,685	G284T64T	6,510	G284T76T	8,305	G284T88D	45
6,510	G284T76T	8,690	G284T88T	8,690	G284T88T	37
6,510	G284T76T	8,690	G284T88T	11,595	G284T92T	30
8,690	G284T88T	8,690	G284T88T	11,595	G284T92T	25
8,690	G284T88T	11,595	G284T92T	16,465	G284T98T	20
8,690	G284T88T	11,595	G284T92T	16,465	G284T98T	16.5
11,595	G284T92T	16,465	G284T98T	16,465	G284T98T	13.5
11,595	G284T92T	16,465	G284T98T	–	–	11.0
18,190	G284T98Q	–	–	–	–	9.0
18,190	G284T98Q	–	–	–	–	7.5

* Denotes 1170 RPM Motor Supplied. All other ratings are supplied with 1750 RPM motors. Listed price includes the appropriate TEFC motor.

DISCOUNT N-1

Your Total Drive Source

Integral Gearmotors

Moduline®

Type G

RATINGS – PRICES
30 – 60 HP

30 HORSEPOWER

RPM	CLASS I List Price	CLASS I Frame	CLASS II List Price	CLASS II Frame	CLASS III List Price	CLASS III Frame
1430	3,010	G286T43S	3,010	G286T43S	3,290	G286T54S
1170	3,010	G286T43S	3,010	G286T43S	3,290	G286T54S
950	3,010	G286T43S	3,290	G286T54S	3,970	G286T76S
780	3,010	G286T43S	3,290	G286T54S	3,970	G286T76S
640	3,290	G286T54S	3,970	G286T76S	3,970	G286T76S
520	3,290	G286T54S	3,970	G286T76S	3,970	G286T76S
420	3,370	G286T43D	3,850	G286T54D	3,850	G286T54D
350	3,370	G286T43D	3,850	G286T54D	3,850	G286T54D
280	3,370	G286T43D	3,850	G286T54D	3,850	G286T54D
230	3,370	G286T43D	3,850	G286T54D	3,850	G286T54D
190	3,370	G286T43D	3,850	G286T54D	3,850	G286T54D
155	3,370	G286T43D	3,850	G286T54D	4,545	G286T64D
125	3,850	G286T54D	3,850	G286T54D	4,545	G286T64D
100	3,850	G286T54D	4,545	G286T64D	5,865	G286T76D
84	3,850	G286T54D	4,545	G286T64D	5,865	G286T76D
68	4,545	G286T64D	5,865	G286T76D	8,580	G286T88D
56	6,305	G286T64T	6,625	G286T76T	8,580	G286T88D
45	6,625	G286T76T	8,580	G286T88D	8,580	G286T88D
37	6,625	G286T76T	9,020	G286T88T	11,820	G286T92T
30	9,020	G286T88T	9,020	G286T88T	11,820	G286T92T
25	9,020	G286T88T	11,820	G286T92T	16,735	G286T98T
20	9,020	G286T88T	11,820	G286T92T	16,735	G286T98T
16.5	11,820	G286T92T	16,735	G286T98T	–	–
13.5	11,820	G286T92T	16,735	G286T98T	–	–
11.0	18,310	G286T98Q	–	–	–	–
9.0	18,310	G286T98Q	–	–	–	–

40 HORSEPOWER

CLASS I List Price	CLASS I Frame	CLASS II List Price	CLASS II Frame	CLASS III List Price	CLASS III Frame	RPM
3,800	G324T54S	3,800	G324T54S	3,800	G324T54S	1430
3,800	G324T54S	3,800	G324T54S	4,295	G324T76S	1170
3,800	G324T54S	3,800	G324T54S	4,295	G324T76S	950
3,800	G324T54S	4,295	G324T76S	4,295	G324T76S	780
4,295	G324T76S	4,295	G324T76S	–	–	640
4,295	G324T76S	4,295	G324T76S	–	–	520
4,165	G324T54D	4,165	G324T54D	4,165	G324T54D	420
4,165	G324T54D	4,165	G324T54D	4,165	G324T54D	350
4,165	G324T54D	4,165	G324T54D	4,165	G324T54D	280
4,165	G324T54D	4,165	G324T54D	4,825	G324T64D	230
4,165	G324T54D	4,165	G324T54D	4,825	G324T64D	190
4,165	G324T54D	4,825	G324T64D	6,125	G324T76D	155
4,165	G324T54D	4,825	G324T64D	6,125	G324T76D	125
4,825	G324T64D	6,125	G324T76D	6,125	G324T76D	100
4,825	G324T64D	6,125	G324T76D	8,715	G324T88D	84
6,125	G324T76D	8,715	G324T88D	8,715	G324T88D	68
6,985	G324T76T	8,715	G324T88D	10,915	G324T88T	56
6,985	G324T76T	8,715	G324T88D	11,275	G324T92D	45
10,915	G324T88T	10,915	G324T88T	12,400	G324T92T	37
10,915	G324T88T	12,400	G324T92T	17,250	G324T98T	30
10,915	G324T88T	17,250	G324T98T	17,250	G324T98T	25
12,400	G324T92T	17,250	G324T98T	–	–	20
17,250	G324T98T	17,250	G324T98T	–	–	16.5
18,870	G324T98Q	–	–	–	–	13.5
18,870	G324T98Q	–	–	–	–	11.0

50 HORSEPOWER

RPM	CLASS I List Price	CLASS I Frame	CLASS II List Price	CLASS II Frame	CLASS III List Price	CLASS III Frame
1430	4,780	G326T54S	4,780	G326T54S	4,825	G326T76S
1170	4,780	G326T54S	4,780	G326T54S	4,825	G326T76S
950	4,780	G326T54S	4,825	G326T76S	4,825	G326T76S
780	4,825	G326T76S	4,825	G326T76S	–	–
640	4,825	G326T76S	4,825	G326T76S	–	–
520	4,825	G326T76S	–	–	–	–
420	4,495	G326T54D	4,495	G326T54D	6,355	G326T76D
350	4,495	G326T54D	4,495	G326T54D	5,155	G326T64D
280	4,495	G326T54D	4,495	G326T54D	5,155	G326T64D
230	4,495	G326T54D	4,495	G326T54D	5,155	G326T64D
190	4,495	G326T54D	5,155	G326T64D	6,355	G326T76D
155	4,495	G326T54D	5,155	G326T64D	6,355	G326T76D
125	5,155	G326T64D	6,355	G326T76D	6,355	G326T76D
100	5,155	G326T64D	6,355	G326T76D	8,840	G326T88D
84	6,355	G326T76D	8,840	G326T88D	8,840	G326T88D
68	6,355	G326T76D	8,840	G326T88D	11,715	G326T92D
56	8,840	G326T88D	8,840	G326T88D	11,715	G326T92D
45	8,840	G326T88D	11,520	G326T88T	17,810	G326T98T
37	11,520	G326T88T	12,880	G326T92T	17,810	G326T98T
30	12,880	G326T92T	17,810	G326T98T	17,810	G326T98T
25	12,880	G326T92T	17,810	G326T98T	–	–
20	17,810	G326T98T	17,810	G326T98T	–	–
16.5	17,810	G326T98T	–	–	–	–
13.5	19,550	G326T98Q	–	–	–	–

60 HORSEPOWER

CLASS I List Price	CLASS I Frame	CLASS II List Price	CLASS II Frame	CLASS III List Price	CLASS III Frame	RPM
6,150	G364T76S	6,150	G364T76S	–	–	780
6,150	G364T76S	–	–	–	–	640
6,150	G364T76S	–	–	–	–	520
7,175	G364T76D	7,175	G364T76D	7,175	G364T76D	420
7,175	G364T76D	7,175	G364T76D	7,175	G364T76D	350
5,975	G364T64D	5,975	G364T64D	5,975	G364T64D	280
5,975	G364T64D	5,975	G364T64D	7,175	G364T76D	230
5,975	G364T64D	5,975	G364T64D	7,175	G364T76D	190
5,975	G364T64D	7,175	G364T76D	7,175	G364T76D	155
5,975	G364T64D	7,175	G364T76D	9,660	G364T88D	125
7,175	G364T76D	7,175	G364T76D	9,660	G364T88D	100
7,175	G364T76D	9,660	G364T88D	12,050	G364T92D	84
9,660	G364T88D	9,660	G364T88D	12,050	G364T92D	68
9,660	G364T88D	12,050	G364T92D	16,295	G364T98D	56
9,660	G364T88D	12,050	G364T92D	19,095	G364T98T	45
13,490	G364T92T	19,095	G364T98T	19,095	G364T98T	37
13,490	G364T92T	19,095	G364T98T	–	–	30
19,095	G364T98T	19,095	G364T98T	–	–	25

* Denotes 1170 RPM Motor Supplied. All other ratings are supplied with 1750 RPM motors. Listed price includes the appropriate TEFC motor.

DISCOUNT N-1

Effective: 1, May 1984

Supersedes: New

Integral Gearmotors
Type G
Moduline®

RATINGS – PRICES
75 – 150 HP

75 HORSEPOWER

RPM	CLASS I List Price	CLASS I Frame	CLASS II List Price	CLASS II Frame	CLASS III List Price	CLASS III Frame
780	7,135	G365T76S	–	–	–	–
640	7,135	G365T76S	–	–	–	–
520	–	–	–	–	–	–
420	8,730	G365T76D	8,730	G365T76D	8,730	G365T76D
350	8,730	G365T76D	8,730	G365T76D	8,730	G365T76D
280	8,730	G365T76D	8,730	G365T76D	8,730	G365T76D
230	8,730	G365T76D	8,730	G365T76D	8,730	G365T76D
190	8,730	G365T76D	8,730	G365T76D	8,730	G365T76D
155	8,730	G365T76D	8,730	G365T76D	10,275	G365T88D
125	8,730	G365T76D	10,275	G365T88D	10,275	G365T88D
100	8,730	G365T76D	10,275	G365T88D	12,350	G365T92D
84	10,275	G365T88D	10,275	G365T88D	12,350	G365T92D
68	10,275	G365T88D	12,350	G365T92D	17,400	G365T98D
56	12,350	G365T92D	12,350	G365T92D	17,400	G365T98D
45	12,350	G365T92D	21,220	G365T98T	21,220	G365T98T
37	14,430	G365T92T	21,220	G365T98T	–	–
30	21,220	G365T98T	21,220	G365T98T	–	–
25	21,220	G365T98T	–	–	–	–

100 HORSEPOWER

CLASS I List Price	CLASS I Frame	CLASS II List Price	CLASS II Frame	CLASS III List Price	CLASS III Frame	RPM
10,985	G405T88D	10,985	G405T88D	10,985	G405T88D	420
10,985	G405T88D	10,985	G405T88D	10,985	G405T88D	350
9,660	G405T76D	9,660	G405T76D	9,660	G405T76D	280
9,660	G405T76D	9,660	G405T76D	10,985	G405T88D	230
9,660	G405T76D	9,660	G405T76D	10,985	G405T88D	190
9,660	G405T76D	10,985	G405T88D	10,985	G405T88D	155
9,660	G405T76D	10,985	G405T88D	13,060	G405T92D	125
10,985	G405T88D	13,060	G405T92D	18,640	G405T98D	100
10,985	G405T88D	13,060	G405T92D	18,640	G405T98D	84
13,060	G405T92D	18,640	G405T98D	18,640	G405T98D	68
13,060	G405T92D	18,640	G405T92D	–	–	56
15,460	G405T92T	22,280	G405T98T	–	–	45
22,280	G405T98T	–	–	–	–	37
22,280	G405T98T	–	–	–	–	30

125 HORSEPOWER

REFER
TO
OFFICE

150 HORSEPOWER

REFER
TO
OFFICE

* Denotes 1170 RPM Motor Supplied. All other ratings are supplied with 1750 RPM motors. Listed price includes the appropriate TEFC motor.

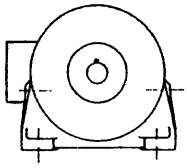
DISCOUNT N-1

Your Total Drive Source

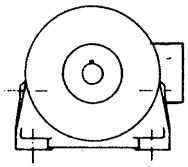
Moduline®

Integral Gearmotors
Type G

MOUNTING POSITIONS

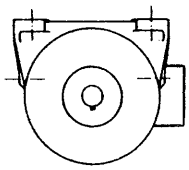


Standard
Position F

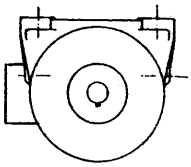


Position FX

Floor Mounted

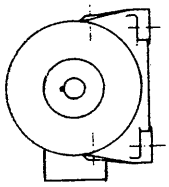


Standard
Position C

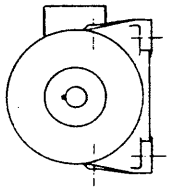


Position CX

Ceiling Mounted

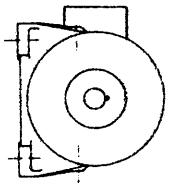


Standard
Position W-R

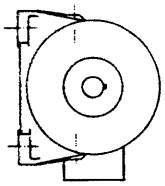


Position W-RX

**Right Hand
Wall Mounting**



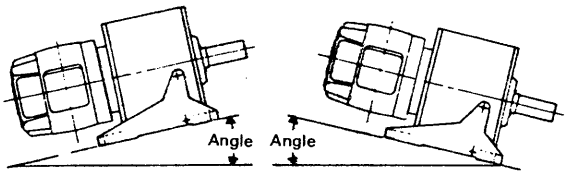
Standard
Position W-L



Position W-LX

For mounting position W-L (and W-LX) on sizes 88, 92, and 98, please contact Nuttall Gear.

**Left Hand
Wall Mounting**



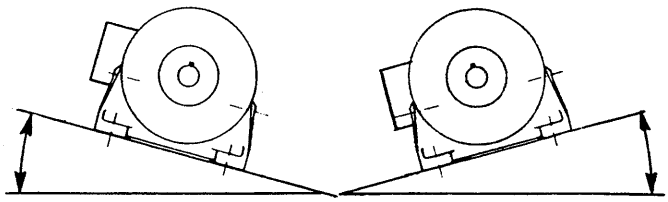
Position F-I

Output shaft up
maximum 10 degrees

Position F-D

Output shaft down
maximum 15 degrees

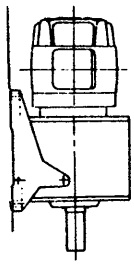
For units with inclines or declines exceeding the above, please contact Nuttall Gear.



Position F-RR

Position F-RL

For units mounted as above, please contact Nuttall Gear.



Position W-D

For foot mounted or flange mounted vertical units, please see modification section.

For vertical units with drywell construction, please see section 600.

Standard Conduit Box Location
When looking at the output shaft, the conduit box will be located on the left side when floor mounted, and on the right side when ceiling mounted.

When other locations are required, use the following suffixes to the assembly position code:

X – opposite standard
T – mounted opposite mounting feet
B – same side as mounting feet

Conduit box location is a no charge option.

UNLESS SPECIFIED BY CUSTOMER, THE CONDUIT BOX WILL BE LOCATED IN THE STANDARD POSITION

Integral Gearmotors

Type G

Moduline®

MODIFICATIONS
GEARCASE

Gear Case Size	05	10	21	32	43	54	64	76	88	92	98
1. Special Shafts											
A. Basic Addition											
1. Any modification up to standard length.											
1 - 5 units	150	150	155	175	185	215	230	260	365	425	485
6 - 25 units	90	90	95	100	110	125	140	155	220	260	300
26 + units	55	55	60	65	70	85	95	105	145	170	195
B. 1. For each 5" or fraction above standard length add –	40	40	55	55	60	75	90	110	150	200	240
2. For special features other than length, add the following charges to the basic addition.											
A. Drilling and tapping end of shaft.	30	30	35	35	40	45	45	55	70	85	100
B. Special Keyway	30	30	35	35	40	45	45	55	70	85	100
C. Splined Shaft	90	90	95	100	110	130	140	155	220	260	300
D. Special Diameter: One special diameter is included in the basic addition. For each **additional** diameter add the following.	30	30	35	35	40	45	45	55	70	85	100
E. Threaded shaft: For each set of threads.	30	30	35	35	40	45	45	55	70	85	100
F. Tapered shaft with threaded end.	70	70	80	85	90	110	120	130	180	210	245
2. Mounting Customer's Equipment Pressing customer's material on output shaft (couplings, sprockets, pinions). NOTE: Customer's material must be delivered to Nuttall Gear transportation prepaid and ready for mounting. Shipment must be marked for application to specific order and item number. Any machining of customer's material must be negotiated with Nuttall Gear in advance of mounting. Nuttall Gear is not responsible for loss or damage to customer's material.	120	120	125	140	145	160	170	185	205	215	225

DISCOUNT N-1

Integral Gearmotors

Moduline® Type G

MODIFICATIONS
GEARCASE

Gear Case Size	05	10	21	32	43	54	64	76	88	92	98
3. Mounting Positions. There is no additional charge for floor, wall, or ceiling mounted units in which the shaft is horizontal, or for floor mounted units whose shaft is inclined up to 10 degrees or declined up to 15 degrees from horizontal.											
1. Vertical shaft down (foot mounted)	110	110	130	165	210	275	335	440	–	–	–
2. Vertical shaft down (flange mounted) Note: Moduline units, other than dry well construction or Veri-dri units, running at 155 rpm or greater may run too hot with the low speed shaft down, therefore the thermal hp capacity should be reduced by approximately 30 percent. (Refer to Nuttall Gear)	265	265	330	400	525	680	835	995	–	–	–
3. Vertical shaft down (dry well construction)	Refer to Veri-Dri Section 600										
4. Shaft - up	REFER TO NUTTALL OFFICE										
5. Horizontal w/rotation about shaft)	REFER TO NUTTALL OFFICE										
4. Mill & chemical features (gearcase only) Note: Mill and chemical features include wet end seals and epoxy paint. (Motor adder listed in motor option listing.)	35	35	40	50	60	85	110	130	180	215	240
5. Special Paint A. Addition for standard commercial paints, available in one gallon units.	85	85	100	110	135	155	155	170	195	195	210
B. Customer supplied paint.	REFER TO NUTTALL OFFICE										
C. Primer only.	25	25	25	25	25	25	25	25	25	25	25
D. Special primers, paints, finish.	REFER TO NUTTALL OFFICE										
6. Special Seals A. Wet end for moisture laden atmospheres such as wet end paper mill drives.	35	35	40	50	60	85	110	130	180	215	265
B. Taconite duty: for taconite, cement or other abrasive dust atmospheres. If dust is not abrasive no modification is needed.	150	150	190	245	300	400	495	600	1005	1280	1475
7. Slide Rails (pair)	REFER TO NUTTALL OFFICE										
8. Oil Sight Gauge	35	35	35	35	35	35	35	35	35	35	35
9. Special Output Speeds 1 - 2 units	615	615	615	615	615	615	615	615	615	615	615
3 - 24 units	325	325	325	325	325	325	325	325	325	325	325
25 + units	No charge.										

DISCOUNT N-1

Integral Gearmotors
Type G
Moduline®

MODIFICATIONS
OPTIONAL MOTORS *

1. For motors with other than the standard enclosure and/or efficiency, make the following list price additions (or deductions).

		Open Dripproof 40°C Ambient		Totally Enclosed Fan-Cooled 40°C Ambient		Explosion Proof Class I - Group D T1 thru T2D 40°C Ambient		Explosion Proof Class I, Group D Class II, Groups F, G T1 thru T3B 40°C Ambient		Mill & Chemical Totally Enclosed Fan Cooled 40°C Ambient		Mill & Chemical Explosion Proof Class I - Group D T1 thru T2D 40°C Ambient	
Motor Efficiency		Normal	High	Normal	High	Normal	High	Normal	High	Normal	High	Normal	High
Motor Insulation		B	B	F	F	B	F	B	B	F	F	F	F
Motor Service Factor		1.15	1.15	1.15	1.15	1.0	1.15	1.0	1.0	1.15	1.15	1.15	1.15
Standard Voltages (See Notes 1-3)		(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(3)	(2)	(3)	(2)
Horsepower	**Frame**												
1	143T	CONTACT NUTTALL GEAR		Standard		CONTACT NUTTALL GEAR							
1-1/2	145T			Standard									
2	145T			Standard									
3	182T			Standard									
5	184T			Standard									
7-1/2	213T			Standard									
10	215T			Standard									
15	254T			Standard									
20	256T			Standard									
25	284T			Standard									
30	286T			Standard									
40	324T			Standard									
50	326T			Standard									
60	364T			Standard									
75	365T			Standard									
100	405T			Standard									
125	444T			Standard									
150													
200													

2. For other motor options such as multi-speed, high slip, high torque, or DC motors, please contact Nuttall Gear.

Notes 1, 2, 3.

Standard Voltages:	(1)	(2)	(3)
Frames 143T - 326T	200, 230, 230/460, 575	200, 230, 230/460, 460, 575	460
Frames 364T - 449T	460, 575	460, 575	460

(4) 100HP Open Dripproof Frame 404T

(5) 125HP Open Dripproof Frame 405T

*All price additions for motor options or modifications are based on 1750 RPM motors. Please contact Nuttall Gear if other motor speeds are required.

DISCOUNT N-1

Moduline® Integral Gearmotors Type G

MODIFICATIONS
MOTOR END*

Horsepower (based on 1750 RPM)	1	1-1/2	2	3	5	7-1/2	10	15	20	25	30	40	50	60	75	100	125	150
1. Basic Motor Modification Adder For motor modifications, other than enclosure (see above), the basic motor modification adder must be added before adding for any of the following allowable modifications listed. The basic modification adder, plus any other modification, is added directly to the tabulated price or is added after the unit is modified for enclosure.	25	25	30	40	60	80	100	130	160	210	250	330	390	490	535	580	725	
2. Insulation																		
A. Class F - Class F insulation with Class B temperature rise.	30	30	30	40	40	75	75	95	95	155	155	210	210	265	385	385	545	
B. Class H - Class H insulation with Class B temperature rise.	①②	①②	①②	①②	①②	150 ②	150 ②	190 ②	190 ②	310	310	420	420	530	770	770	1090	
C. Special service conditions - Premium insulation systems can be supplied for operation in special environments or for conditions too severe for standard insulation.	NOTE: ① Consult office. NOTE: ② Not available on ODP motor.																	
C1. 'Premium insulation in drip proof enclosure is recommended for extra protection in humid or damp locations without long idle periods. When long idle periods will be encountered, space heaters are recommended. 'Premium' insulation in enclosed motors affords utmost in protection against high humidity moisture and where splashing chemicals or vapors are present, including salt spray.	25	25	25	30	30	45	45	60	60	100	100	125	125	155	210	210	270	
C2. Tropical Protection - Premium insulation and fungus protection will apply unless otherwise specified. Price adder includes both. Screens are often required in drip proof motors. Contact Nuttall Gear for price addition. If high ambient conditions exist, contact Nuttall Gear.	30	30	30	40	40	75	75	85	85	150	150	200	200	255	335	335	440	
C3. Fungus protection is recommended where fungi is apt to attack metal, insulation or other material.																		
a. Windings only:	10	10	10	10	10	25	25	25	25	55	55	75	75	100	130	130	170	
b. All internal metal surfaces (including winding).	30	30	30	40	40	75	75	85	85	150	150	200	200	255	335	335	440	
C4. Abrasion resistant system is recommended in gravel plants, and for pulverizers of non-combustible and non-clogging materials.	–	–	–	–	–	–	–	–	–	200	200	250	250	310	410	410	540	
3. Space Heaters Space heaters are recommended for motors installed in damp locations to prevent condensation on the motor windings when the motor is not operating. Price additions shown include space heater with leads brought to the standard conduit box. Space heaters voltage (115, 230, 460) must be specified when order is entered.																		
ODP/TEFC	N/A	N/A	N/A	160	160	160	160	160	160	245	245	245	245	290	355	355	420	
Explosion Proof	325	325	325	325	325	325	325	325	325	485	485	485	485	580	710	710	840	

* All price additions for motor options or modifications are based on 1750 RPM motors. Please contact NUTTALL GEAR if other motor speeds are required.

DISCOUNT N-1

Integral Gearmotors
Type G
Moduline®

MODIFICATIONS
MOTOR END*

Horsepower (based on 1750 RPM)	1	1-1/2	2	3	5	7-1/2	10	15	20	25	30	40	50	60	75	100	125	150
4. Thermal protection using a bi-metalic disc thermostat which may be connected into a holding coil circuit of the motor starter. The sensor opens the control circuit, shutting down the motor, on over temperature. Because of thermal inertia, it does not protect the motor from damage due to locked rotor or phase failure. Standard unit has normally closed contacts.																		
Class B	25	25	25	25	25	35	35	35	35	55	55	75	75	75	75	110	110	
Class F	Refer to Office																	
Class H	N/A	N/A	N/A	N/A	N/A	70	70	70	70	75	75	110	110	110	110	155	155	
5. Brakes - Disc Type - Motor Mounted Magnetic Either Dings of Stearns disc brakes will be supplied at Nuttall option. Stearns are single phase brakes. Dings are single phase to 9 lb-ft, and polyphase in larger sizes. These list price additions apply to disc brakes of the ratings shown. Nuttall Gear reserves the right to supply a brake type and manufacturer of their choice. Specified disc brake models or types will be negotiated at a list price addition. Spring set electrically released - automatic reset: Unless otherwise specified a brake of the same voltage and frequency as the motor will be furnished. In the case of dual-voltage motors, a brake of the lower voltage will be furnished unless specified otherwise. 60 cycles - 200, 230, 460, 575, volts, 50 cycles - 200, 220, 380, 400, 500, 550 volts.																		
Torque Rating of brake in pound feet.	3	6	6	10	15	25	35	50	75	75	105	125	175	230	230	330	440	
A. Standard Enclosure is used for applications with open drip-proof, TENV & TEFC motors, for indoor or semi-protected outdoor installations. Suitable for atmospheres containing chips, non-abrasive, non-conductive, non-explosive dusts and coolants.	275	340	340	375	490	665	750	915	1305	1305	1670	2110	2810	3475	3475	4285	4650	
B. Dust-tight, Waterproof Enclosure is suitable for totally enclosed non-ventilated, and fan cooled motors. Used under conditions of extreme moisture, abrasive or conductive dusts, acid or alkali fumes, or outdoor installation.	485	520	520	630	755	966	1040	1235	1630	1815	2160	2705	3700	4320	4320	5205	5605	
C. Explosion Proof CLI, Group D	815	870	870	1010	1080	1250	1360	1570	1935	2110	2340	–	–	–	–	–	–	
D. Explosion Proof CLII, Group F, G	815	870	870	1115	1245	1370	1515	1925	2420	2570	3000	–	–	–	–	–	–	
Severe Duty																		
Where severe duty cycles are involved, the thermal capacity of the brake must be considered. Refer details to Nuttall office.	DISCOUNT N-1																	

*All price additions for motor options or modifications are based on 1750 RPM motors. Please contact NUTTALL GEAR if other motor speeds are required.

Your Total Drive Source

Integral Gearmotors

Moduline®

Type G

ENGINEERING DATA
EXACT GEAR RATIOS

AGMA Nominal Ratio	Single Reduction Units										Nominal Output Speeds With Input Speed Of	
		10S	21S	32S	43S	54S		76S			1750	1170
1.225		1.271	1.265	1.275	1.271	1.271		1.271			1430	950
1.500		1.535	1.578	1.578	1.535	1.512		1.535			1170	780
1.837		1.868	1.850	1.854	1.868	1.868		1.868			950	640
2.250		2.203	2.257	2.314	2.303	2.303		2.303			780	520
2.756		2.759	2.800	2.806	2.793	2.793		2.793			640	420
3.375		3.360	3.560	3.538	3.542	3.542		3.542			520	350
4.134		4.190	4.227	4.318	4.190	4.190		4.238			420	280

Double Reduction Units

	05D	10D	21D	32D	43D	54D	64D	76D	88D	92D	98D		
4.134	4.12	4.12	4.119	4.125	4.128	4.131	–	4.125	4.099	–	–	420	280
5.06	5.141	5.141	5.079	5.169	5.150	5.154	5.023	5.147	5.017	–	–	350	230
6.20	6.209	6.209	6.386	6.399	6.220	6.130	6.269	6.216	6.145	6.257	6.142	280	190
7.59	7.559	7.559	7.488	7.518	7.572	7.577	7.614	7.567	7.575	7.658	7.528	230	155
9.30	9.317	9.317	9.136	9.386	9.333	9.340	9.327	9.327	9.248	9.418	9.311	190	125
11.39	11.70	11.70	11.33	11.38	11.32	11.33	11.58	11.31	11.35	11.56	11.238	155	100
13.95	14.33	14.33	14.41	14.35	14.35	14.36	14.08	14.34	13.94	14.24	13.767	125	84
17.09	16.95	16.95	17.11	17.51	16.98	16.99	17.48	17.16	16.99	17.30	16.681	100	68
20.93	20.45	20.45	20.45	20.92	20.49	20.50	21.22	20.48	20.90	21.28	20.90	84	56
25.63	25.41	25.41	25.65	25.09	25.40	25.42	25.19	25.15	25.85	26.33	25.40	68	45
31.39	30.65	30.65	30.65	31.25	30.65	30.65	–	–	31.65	32.23	29.95	56	37
38.44	–	–	37.54	37.49	37.99	37.99	–	–	37.93	38.62	–	45	30

Triple Reduction Units

			21T	32T	43T	54T	64T	76T	88T	92T	98T		
31.39			31.83	31.89	32.28	31.89	32.11	31.97	32.16	–	–	56	37
38.44			38.44	38.52	38.98	40.10	39.75	38.61	38.84	–	38.98	45	30
47.08			46.79	46.89	47.45	47.02	46.70	47.00	48.20	49.06	47.45	37	25
57.66			57.68	57.79	58.49	57.37	58.30	57.93	58.21	58.38	58.49	30	20
70.62			72.45	72.59	73.47	71.16	70.70	70.25	70.86	72.15	70.93	25	16.5
86.50			88.70	88.87	89.95	90.48	89.15	89.08	87.35	88.95	89.94	20	13.5
105.9			104.9	105.2	106.4	107.4	108.8	105.4	105.9	107.9	107.6	16.5	11
129.7			126.6	126.9	128.4	128.4	129.9	127.2	134.3	136.8	128.4	13.5	9
158.9			157.3	157.3	159.2	157.3	155.9	157.6	158.9	161.8	157.7	11.0	7.5
194.6			189.8	189.5	192.1	191.9	–	–	191.7	195.3	–	9	6
238.4			–	–	–	235.1	–	–	237.7	–	242.0	7.5	5

Quadruple Reduction Units

				32Q	43Q	54Q	64Q	76Q	88Q	92Q	98Q		
194.6				197.3	199.7	197.6	199.4	200.6	201.8	–	197.06	9	6
238.4				283.3	241.2	243.6	242.8	235.7	237.1	–	239.9	7.5	5
291.9				290.1	293.6	305.9	299.3	294.3	296.1	315.1	295.7	6	4
357.5				357.6	361.9	374.5	375.9	356.9	359.0	382.1	358.6	5	3.2
437.9				449.2	454.6	443.2	460.2	450.0	452.7	484.5	454.7	4	2.7
536.3				549.9	556.5	534.6	544.5	549.1	552.4	573.2	538.0	3.2	2.2
656.8				650.6	658.5	662.5	656.9	655.9	659.8	691.8	649.1	2.7	1.8
804.5				785.0	794.4	799.2	–	786.8	791.5	–	–	2.2	1.5
985.3				973.0	984.8	–	–	–	989.0	–	–	1.8	1.2

Integral Gearmotors

Type G

Moduline®

ENGINEERING DATA
OVERHUNG LOAD, THRUST RATINGS

Output Shaft – Overhung Load and Thrust Capacities
Single Reduction

Gear Size	Pounds	Output Rpm 1400	1165	950	780	640	520	420	350	280
10S	Overhung Load	300	320	360	400	420	450	500	540	580
	Thrust (Down or Out)	130	190	270	340	400	475	525	590	600
	Thrust (Up or In)	130	190	270	340	400	475	525	590	600
21S	Overhung Load	650	720	800	860	930	1000	1075	1140	1200
	Thrust (Down or Out)	540	630	770	880	1000	1120	1160	1190	1210
	Thrust (Up or In)	540	630	770	880	1000	1120	1160	1190	1210
32S	Overhung Load	900	980	1075	1150	1250	1360	1490	1500	1500
	Thrust (Down or Out)	950	1090	1200	1200	1200	1200	1200	1200	1200
	Thrust (Up or In)	950	1090	1200	1200	1200	1200	1200	1200	1200
43S	Overhung Load	920	1000	1080	1170	1180	1300	1400	1500	1500
	Thrust (Down or Out)	500	675	825	900	900	900	900	900	900
	Thrust (Up or In)	500	675	825	900	900	900	900	900	900
54S	Overhung Load	1000	1000	1000	1000	1000	1050	1090	1180	1200
	Thrust (Down or Out)	775	775	775	775	775	775	775	775	775
	Thrust (Up or In)	775	775	775	775	775	775	775	775	775
76S	Overhung Load	1000	1000	1000	1000	1000	1000	1000	1025	1100
	Thrust (Down or Out)	775	775	775	775	775	775	775	775	775
	Thrust (Up or In)	775	775	775	775	775	775	775	775	775

Output Shaft – Overhung Load and Thrust Capacities
Double, Triple and Quadruple Reduction

Gear Size	Pounds	Output Rpm 420	350	280	230	190	155	125	100	84	68	56	45	37 and Below
05	Overhung Load	870	970	1060	1140	1220	1300	1400	1500	1600	1700	1700	....	.....
	Thrust (Down or Out)	640	700	780	830	910	990	1080	1180	1280	1380	1500	....	.....
	Thrust (Up or In)	600	660	720	780	830	900	970	1050	1130	1220	1300	....	.....
10	Overhung Load	1000	1100	1160	1240	1320	1400	1500	1600	1700	1700	1700	1700	.....
	Thrust (Down or Out)	860	920	1000	1050	1130	1210	1300	1400	1500	1600	1720	1850	.....
	Thrust (Up or In)	700	760	820	880	930	1000	1070	1150	1230	1320	1400	1500	.....
21	Overhung Load	1260	1330	1420	1500	1600	1700	1800	1930	2020	2150	2300	2300	2300
	Thrust (Down or Out)	1220	1300	1400	1500	1600	1720	1850	2000	2110	2260	2420	2600	2600
	Thrust (Up or In)	1000	1060	1150	1230	1300	1400	1500	1620	1720	1850	1970	2120	2200
32	Overhung Load	1600	1690	1800	1920	2020	2150	2300	2450	2580	2750	2900	3000	3000
	Thrust (Down or Out)	1640	1750	1880	2000	2150	2300	2470	2660	2820	3020	3250	3500	3500
	Thrust (Up or In)	1430	1520	1640	1750	1870	2000	2150	2320	2450	2630	2810	3000	3000
43	Overhung Load	1950	2050	2200	2340	2480	2620	2800	3000	3150	3370	3570	3800	4000
	Thrust (Down or Out)	2270	2420	2600	2800	2950	3200	3400	3700	3900	4200	4500	4800	5000
	Thrust (Up or In)	2000	2150	2320	2470	2640	2800	3050	3270	3460	3710	3950	4300	4500
54	Overhung Load	3450	3680	3920	4180	4400	4700	5000	5000	5000	5000	5000	5000	5000
	Thrust (Down or Out)	3600	3850	4150	4400	4700	5000	5400	5800	6150	6600	7000	7400	7400
	Thrust (Up or In)	2850	3000	3260	3500	3740	4000	4300	4650	4950	5300	5650	6100	6200
64	Overhung Load	.....	4400	4700	5000	5300	5600	6000	6400	6750	7200	7600	8000	8000
	Thrust (Down or Out)	.....	4600	5000	5300	5700	6000	6500	7000	7400	7900	8500	9000	9000
	Thrust (Up or In)	.....	3600	3900	4200	4500	4800	5200	5600	5900	6400	6800	7300	7500
76	Overhung Load	5200	5450	5850	6200	6600	7000	7450	8000	8400	8950	9500	10000	10000
	Thrust (Down or Out)	5050	5350	5750	6150	6550	7000	7500	8100	8550	9150	9800	10500	11000
	Thrust (Up or In)	4100	4350	4700	5000	5350	5750	6200	6650	7100	7600	8100	8700	9000
88	Overhung Load	10000	10500	11250	12000	13000	14500	15250	16500	17750	19250	20000	20000	20000
	Thrust (Down or Out)	9500	10000	10750	11500	12500	13500	14750	16250	17500	20000	20000	20000	20000
	Thrust (Up or In)	9500	10000	10750	11500	12500	13500	14750	16250	17500	20000	20000	20000	20000
92	Overhung Load	.....	.....	12000	12800	13800	14800	16000	17400	18500	10000	21500	22500	22500
	Thrust (Down or Out)	.....	.....	14000	15000	15800	16900	18000	19500	20500	22000	23400	25000	25000
	Thrust (Up or In)	.....	.....	12750	13600	14500	15500	16500	18000	19000	20500	21500	23000	23000
98	Overhung Load	....	....	12800	13700	14800	16000	17700	19000	20400	22000	22800	22800	22800
	Thrust (Down or Out)	....	....	12400	13000	14000	15100	16900	18000	19200	20000	20400	20400	20400
	Thrust (Up or In)	....	....	12000	12600	13200	14000	15300	16700	17900	18200	18500	18500	18500

Note: The thrust capacities published above are for units with pure thrust loads. Refer to Nuttall Gear when there are combined radial and thrust loads or when loads exceed capacities listed. Indicate direction of rotation of shaft and location and direction of applied load.

Integral Gearmotors

Moduline® Type G

ENGINEERING DATA
OVERHUNG LOAD DETERMINATION

Overhung Load Capacities

Moduline Gearmotors provide generous overhung load capacity which is seldom exceeded; however, when a pulley, sprocket or pinion is to be mounted on the output shaft, the overhung load capacity of the Gearmotor must be checked.

The overhung load capacities listed in Section 217, Page 2 are calculated for a sprocket, pinion or pulley mounted with the centerline of its face at the midpoint of the output shaft extension.

If the sprocket, pinion or pulley is to be mounted at a location other than the above, use the following formula to calculate the overhung load on the shaft after selecting appropriate Lc and Lf factors from the tables below.

If the calculated overhung load for the Gearmotor selected exceeds the capacity listed in the table, select the next larger Gearmotor.

Overhung Load Formula

$$OHL\ (lbs) = \frac{\text{motor hp} \times 126{,}000 \times L_c}{\text{output rpm} \times \text{pitch diameter (inches)} \times L_f}$$

Load Connection Factor, L_c

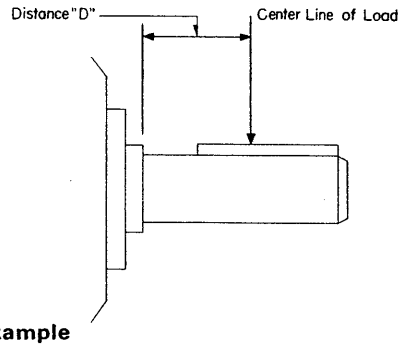
Type of Load Connection	Factor, L_c
Sprocket	1.00
Pinion	1.25
V-Belt	1.50
Flat Belt	2.50

Load Location Factor, L_f

Shaft Dia. Inches	"D" – Distance From Center Line of Load to Gearmotor Shaft Shoulder, Inches															
	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5
.875	1.06	.90	.77	.68	....	....	....	....	...	...	...	...	...	...	...	...
1.125	1.12	.98	.83	.74	....	....	....	....	...	...	...	...	...	...	...	...
1.375	1.15	1.03	.91	.79	.73	....	....	....	...	...	...	...	...	...	...	...
1.500	1.17	1.06	.94	.83	.76	.70	....	....	...	...	...	...	...	...	...	...
1.625	1.18	1.08	.97	.86	.78	.73	.68	....	...	...	...	...	...	...	...	...
1.875	1.22	1.13	1.04	.94	.85	.78	.74	.69	...	...	...	...	...	...	...	...
2.125	1.23	1.14	1.06	.96	.88	.80	.76	.71	.67	...	...	...	...	...	...	...
2.375	1.24	1.17	1.09	1.01	.94	.85	.79	.75	.71	.67	...	...	...	...	...	...
2.625	1.25	1.18	1.11	1.04	.97	.89	.82	.77	.74	.70	.67	...	...	...	...	...
3.125	1.25	1.22	1.15	1.09	1.04	.97	.91	.85	.79	.76	.73	.70	...	...	...	...
3.625	1.25	1.24	1.18	1.13	1.08	1.02	.97	.91	.86	.80	.78	.75	.72	.69	...	...
4.500	1.25	1.25	1.23	1.18	1.14	1.08	1.04	1.00	.96	.92	.87	.83	.79	.77	.74	.72
5.000	1.25	1.25	1.24	1.20	1.16	1.12	1.07	1.04	.99	.95	.91	.87	.83	.79	.77	.75
5.500	1.25	1.25	1.25	1.20	1.17	1.13	1.08	1.05	1.00	.91	.83	.77	.72	.67	.63	.59

Shaft Diameters

Gear Size	Output	
	Single	Double, Triple and Quadruple
05	1.125	1.375
10	1.125	1.375
21	1.500	1.625
32	2.125	1.875
43	2.125	2.125
54	2.375	2.625
64	....	3.125
76	2.375	3.625
88	....	4.500
92	....	5.000
98	....	5.500



Example

A belt conveyor is to be driven by a 5 hp size 21D Moduline Gearmotor, 280 rpm output using a 4" diameter V-belt sheave on the output shaft. The output shaft diameter on a size 21D is 1.625 inches. The centerline of the load is to be placed 1.5 inches from the shaft shoulder.

Procedure – Calculate overhung load

$L_c = 1.50$ and $L_f = 1.08$

$$OHL = \frac{5 \times 126{,}000 \times 1.50}{280 \times 4 \times 1.08} = 781 \text{ lbs.}$$

Refer to overhung load table. Since the overhung load capacity of the gear size 21D at 280 rpm is 1420 lbs., the gear unit has ample capacity.

Integral Gearmotors Type G Moduline®

APPLICATION SERVICE CLASSES

Typical Gearmotor Applications – AGMA Standard Practices

AGMA standard practice recognizes three classes of integral and all-motor gearmotors based on load conditions and service required. The table illustrates the difference between these classes. For load conditions not included in the table, refer to Nuttall Gear. For peak loading applications, refer to curves on page 5.

Class I: For steady loads not exceeding normal rating of motor and 10 hours a day service. Moderate shock loads where service is intermittent.
Class II: For steady loads not exceeding normal rating of motor and 24 hours a day. Moderate shock loads for 10 hours a day.
Class III: Moderate shock loads for 24 hours a day. Heavy shock loads for 10 hours a day.

Table 1: Typical Applications

Application	Hours Service per Day: Over 3 Up to 10 (AGMA Classes)	Hours Service per Day: Over 10 (AGMA Classes)
Agitators		
Pure liquids	I	II
Liquids and solids	II	II
Liquids, variable density	II	II
Semi-liquids	II	II①
Blowers		
Centrifugal	I	II
Lobe	II	II
Vane	I	II
Brewing and Distilling		
Bottling machinery	I	II
Brew kettles, cont. duty	..	II
Cookers, continuous duty	..	II
Mash tube, cont. duty	..	II
Scale hopper, frequent starts	II	II
Car Dumpers	III	..
Can Filling Machines	I	II
Cane Knives	II	II
Car Pullers		
Intermittent duty	I	..
Clarifiers	I	II
Classifiers	II	II
Clay Working Machinery		
Brick press	III	III①
Briquette machine	III	III①
Clay working machinery	II	II
Pug mill	II	II
Compressors		
Centrifugal	I	II
Lobe	II	II
Reciprocating		
Multi-cylinder	II	II①
Single Cylinder	III	III①
Conveyors, Uniformly Loaded or Fed		
Apron	I	II
Assembly	I	II
Belt	I	II
Bucket	I	II
Chain	I	II
Flight	I	II
Oven	I	II
Screw	I	II
Conveyors, Heavy Duty – Not Uniformly Fed		
Apron	II	II
Assembly	II	II
Belt	II	II
Bucket	II	II
Chain	II	II
Flight	II	II
Live roll (package)	I	II
Oven	II	II
Reciprocating	III	III①
Screw	II	II
Shaker	III	III①
Cranes and Hoists		
Main hoists		
Heavy duty	III	III①
Medium duty	II	II
Reversing	II	II
Skip hoists	II	II
Trolley drive	II	II①
Bridge drive	II	II①
Crushers		
Ore	III	III
Stone	III	III
Dredges		
Cable reels	II	..
Conveyors	II	II
Cutter head drives	III	III①
Jig drives	III	III①
Maneuvering winches	II	..
Pumps	II	II
Screen drive	III	III①
Stackers	II	II
Utility winches	II	..
Elevators		
Bucket, uniform load	I	II
Bucket, heavy load	II	II
Bucket, continuous	I	II
Centrifugal discharge	I	II
Escalators	I	I
Freight	II	II
Gravity discharge	I	II
Man lifts	②	②
Passenger	②	②
Service, hand lift	III	..
Fans		
Centrifugal	II	II
Cooling towers		
Induced draft	II	II
Forced draft	②	②
Induced draft	II	II
Large (mine, etc)	II	II①
Large industrial	II	II①
Light (small diameter)	I	II
Feeders		
Apron	II	II
Belt	II	II
Disk	I	II
Reciprocating	III	III①
Screw	II	II
Food industry		
Beet slicer	II	II
Cereal cooker	I	II
Dough mixer	II	II
Meat grinders	II	II
Generators (not Welding)	I	II
Hammer Mills	III	III①
Laundry Tumblers	II	II
Laundry Washers		
Reversing	II	II
Line Shafts		
Heavy shock load	III	III①
Moderate shock load	II	II
Uniform shock load	I	II
Lumber		
Barkers – Spindle Feed	II	III
Barkers – Main Drive	III	III①
Carriage Drive	②	②
Conveyors – Burner	II	III
Conveyors – Main or Heavy Duty	II	III
Conveyors – Main Log	III	III①
Conveyors – Merry-Go-Round	II	III
Conveyors – Slab	III	III①
Conveyors – Transfer	II	III
Conveyors – Waste	II	II
Chains – Floor	II	III
Chains – Green	II	III
Cut-Off Saws – Chain	II	III
Cut-Off Saws – Drag	II	III
Debarking Drums	III	III①
Feeds – Edger	II	III
Feeds – Gang	III	III①
Feeds – Trimmer	II	III
Log Deck	III	III①
Log Hauls – Incline – Well Type	III	III①
Log Turning Devices	III	III①
Planer Feed	II	III
Planer Tilting Hoists	II	III
Rolls – Live- Off Brg. – Roll Cases	III	III①
Sorting Table	II	III
Tipple Hoist	II	III
Transfers – Chain	II	III
Transfers – Craneway	II	III
Tray Drives	II	III
Veneer Lathe Drives	②	②
Machine Tools		
Bending roll	II	II
Notching press, belt driven	②	②
Plate planer	III	III①
Punch press, gear driven	III	III①
Tapping machines	III	III①
Other machine tools		
Main drives	II	II
Auxiliary drives	I	II
Metal Mills		
Bridle Roll Drives	III	III①
Draw bench, carriage	III	III①
Draw bench, main drive	III	III①
Forming machines	III	III①
Pinch dryer and scrubber rolls, reversing	②	②
Slitters	II	II
Table conveyors		
Non-reversing	II	III
Reversing	..	III
Winding reels – strip	..	III
Wire drawing and flattening machine	II	III
Wire winding machine	II	II
Mills, Rotary Type		
Ball	III	III①
Cement kilns	②	②
Dryers and coolers	II	II
Kilns	II	II
Pebble	III	III①
Rod	III	III①
Tumbling barrels	III	III①

① Classes listed are minimum, and normal conditions are assumed. In view of varying load conditions, it is suggested that these applications be carefully reviewed before final selection is made.

② Check safety codes and refer to Nuttall Gear.

Your Total Drive Source

Moduline® Integral Gearmotors Type G

APPLICATION SERVICE CLASSES

Table 1 : Typical Applications Continued

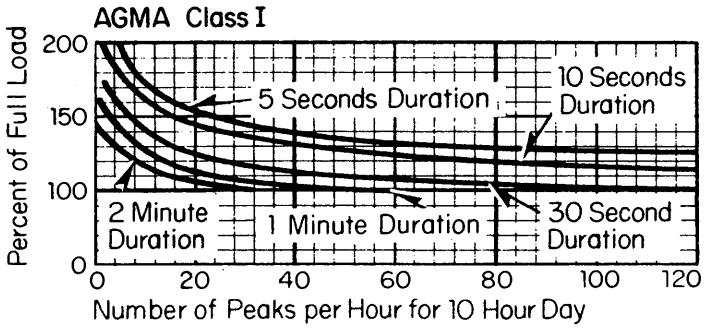
Application	Hours Service per Day: Over 3 Up to 10	Hours Service per Day: Over 10
	AGMA Classes	
Mixers		
Concrete mixers, continuous	II	II
Concrete mixers, intermittent	I	..
Constant density	I	II
Variable density	II	II
Oil Industry		
Chillers	II	II
Oil well pumping	②	②
Paraffin filter press	II	II
Rotary kilns	II	II
Paper Mills		
Aerators	②	②
Agitators (mixers)	II	II
Barker auxiliaries, hydraulic	..	III
Barker, mechanical	..	III
Barking drum	..	III①
Beater and pulper	..	II①
Bleacher	..	II
Calenders	..	II①
Calenders, super	..	II
Converting machines, except cutters, platers	..	II
Conveyors	..	II
Couch	..	II①
Cutters, platers	..	III①
Cylinders	..	II
Dryers	..	II①
Felt stretcher	..	II
Felt whipper	..	III①
Jordans	..	III
Log haul	..	III①
Presses	..	II①
Pulp machines	..	II
Reel	..	II
Stock chests	..	II
Suction roll	..	II①
Washers and thickeners	..	II①
Winders	..	II
Printing Presses	I	II
Pullers		
Barge haul	III	III①
Pumps		
Centrifugal	I	II
Proportioning	II	II①
Reciprocating		
Single acting, 3 or more cylinders	II	II
Double acting, 2 or more cylinders	II	II
Single acting, 1 or 2 cylinders	②	②
Double acting, single cylinder	②	②
Rotary – gear type	I	II
Lobe, vane	I	II
Rubber Industry		
Mixer	III	III①
Rubber calender	II	II①
Rubber mill (2 or more)	II	II①
Sheeter	II	II①
Tire building machines	②	②
Tire and tube press openers	②	②
Tubers and strainers	II	II
Screens		
Air washing	I	II
Rotary – stone or gravel	II	II
Traveling water intake	I	II
Sewage Disposal Equip.		
Aerators	②	②
Bar screens	I	II
Chemical feeders	I	II
Collectors, circuline or straightline	I	II
Dewatering screws	II	II
Grit collectors	I	II
Scum breakers	II	II
Sewage Disposal Equip. (Cont.)		
Slow or rapid mixers	II	II
Sludge collectors	I	II
Thickeners	II	II
Vacuum filters	II	II
Slab Pushers	II	II
Steering Gear	II	II
Stokers	I	II
Textile Industry		
Batchers	II	II
Calenders	II	II
Card machines	II	II①
Cloth finishing machines (washers, pads, tenters, dryers, calenders, etc)	II	II
Dry cans	II	II
Dyeing machinery	II	II
Knitting machines (Looms, etc)	II	II
Looms	II	II
Mangles	II	II
Nappers	II	II
Range drives	②	②
Slashers	II	II
Soapers	II	II
Spinners	II	II
Tenter frames	II	II
Washers	II	II
Winders (other than batchers)	II	II
Yarn preparatory machines (cards, spinners, slashers, etc)	II	II
Windlass	II	II①

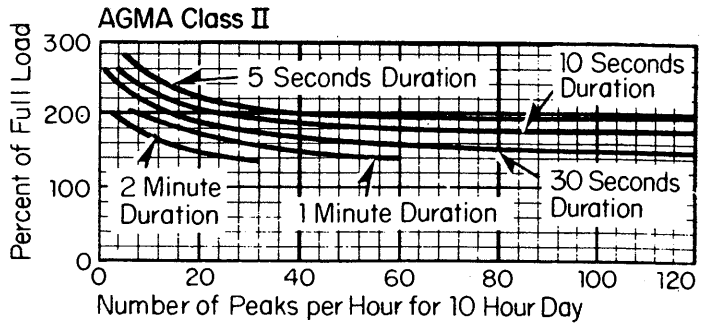
① Classes listed are minimum, and normal conditions are assumed. In view of varying load conditions, it is suggested that these applications be carefully reviewed before final selection is made.

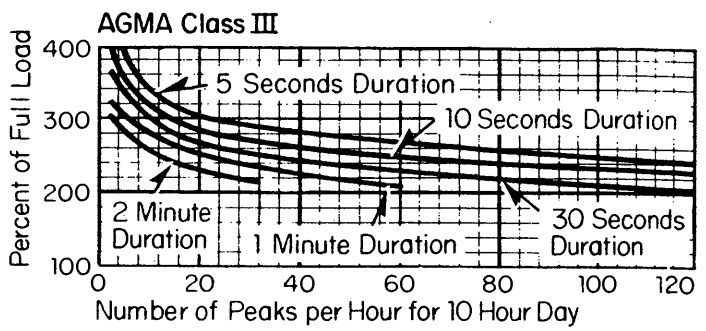
② Check safety codes and refer to Nuttall Gear.

Allowable Peak Loadings

For duty cycle applications, consult the following curves to determine the correct AGMA class.



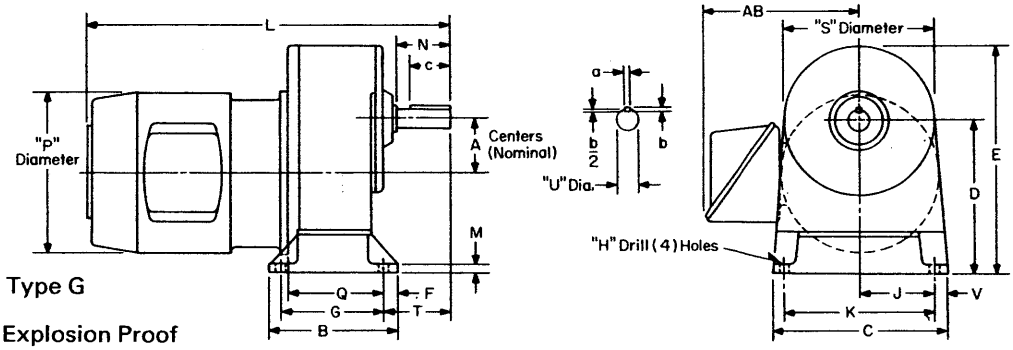




Moduline®

Integral Gearmotors
Type G

DIMENSIONS
SINGLE REDUCTION
10S thru 76S



Single Reduction, Type G
T Frame Motors
Drip-Proof, TEFC, Explosion Proof

Dimensions, Inches Not to be used for construction purposes unless dimensions are approved.

Gear Case Dimensions

Gear Size	U①	Key a	b	c	A	B	C	D②	E	F	G	H	J	K	M	N	Q	S	T	V	Approx. Wt. Lbs. ③
10S	1.125	.25	.25	2.25	3.00	7.0	9.8	8.50	12.5	.8	5.44	.56	4.06	8.12	.5	3.0	5.2	8.0	3.66	.8	60
21S	1.500	.38	.38	2.75	3.50	8.0	12.0	10.25	14.7	.8	6.50	.56	5.25	10.50	.9	3.5	6.1	8.9	4.25	.8	70
32S	2.125	.50	.50	3.25	4.00	9.0	15.0	12.19	19.2	.8	7.50	.69	6.69	13.38	.9	4.2	7.3	13.0	5.06	.8	90
43S	2.125	.50	.50	3.25	5.00	9.0	15.0	13.19	19.2	.8	7.50	.69	6.69	13.38	.9	4.2	7.3	13.0	5.06	.8	100
54S	2.375	.50	.50	3.75	6.00	12.0	19.9	17.00	26.5	.8	10.38	.69	9.19	18.38	1.0	5.0	9.5	16.0	5.88	.8	135
76S	2.375	.50	.50	3.75	7.50	12.0	19.9	18.50	26.5	.8	10.38	.69	9.19	18.38	1.0	5.0	9.5	16.0	5.88	.8	155

AC Motor Dimensions,⑤ T Frame

Motor Frame	Drip-proof, TEFC & Explosion Proof						L Dimension – Drip-proof Motor						L Dimension – TEFC & Expl. Proof Motor					
	AB④		P Dia.		Motor Wt. Lbs.		Gear Size						Gear Size					
	DP	TEFC	DP	TEFC	DP	TEFC	10	21	32	43	54	76	10	21	32	43	54	76
143T	....	8.2	....	7.8	....	70	....	....	....	....	....	....	22.3	23.6	....	....	....	....
145T	....	8.2	....	7.8	....	70	....	....	....	....	....	....	22.3	23.6	....	....	....	....
182T	....	9.4	....	9.6	....	115	....	....	....	....	....	....	22.3	23.6	25.3	25.3	....	....
184T	....	9.4	....	9.6	....	115	....	....	....	....	....	....	22.5	23.8	25.5	25.5	....	....
213T	....	10.3	....	11.2	....	190	....	25.0	....	....	29.2	....	....	26.2	27.9	27.9	30.4	....
215T	8.4	10.3	11.0	11.2	150	190	....	25.0	26.7	26.7	29.2	....	....	27.1	28.3	28.8	31.3	....
254T	10.3	12.4	13.1	13.3	210	290	....	....	29.3	29.3	31.8	31.3	....	....	33.3	33.3	35.8	35.3
256T	10.3	12.4	13.1	13.3	250	290	....	....	31.1	31.1	33.6	33.1	....	....	33.5	33.5	36.0	35.5
284T	12.1	13.3	14.7	14.7	320	370	....	....	....	31.1	33.6	33.1	....	....	....	33.8	36.3	35.8
286T	12.1	13.3	14.7	14.7	390	460	....	....	....	32.6	35.1	34.6	....	....	....	35.3	37.8	37.3
324T	14.3	17.1	16.8	17.0	500	565	....	....	....	....	36.3	35.8	....	....	....	....	39.3	38.8
326T	14.3	17.1	16.8	17.0	550	625	....	....	....	....	37.8	37.3	....	....	....	....	40.8	40.3
364T	17.9	18.8	18.6	19.1	650	855	....	....	....	....	38.6	38.1	....	....	....	....	43.1	42.4
365T	17.9	18.8	18.6	19.1	700	940	....	....	....	....	39.6	39.1	....	....	....	....	43.3	42.8

① Tolerance = +.000 to −.001.
② This dimension will never be exceeded. When exact dimension is required, shims up to .03 inch may be necessary.
③ Weight without motor. To obtain total weight add motor weight.
④ For explosion proof motor AB dimensions, refer to Nuttall Gear.
⑤ All motor dimensions are maximum dimensions, and will not be exceeded.

Note: For Moduline slide bases, see Dimension Sheet Section 220, page 4.

Reproduced from Drawing 5639-D-42

PRELIMINARY ☐ **CERTIFIED** ☐ **PRINT FOR:**

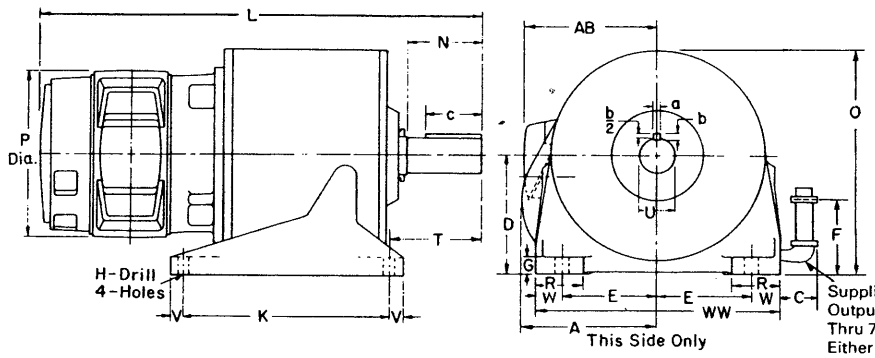
Customer				Customer Order		
G.O.		Cat. No.		Item No.		
Motor Rpm	Output Rpm	AGMA Class	Hp.	Phase	Hz.	Volts
Application		Signed				Date

Integral Gearmotors

Moduline®

Type G

DIMENSIONS
DOUBLE REDUCTION
05D thru 76D



Double Reduction Type G
T Frame Motors
Drip-Proof, TEFC, Explosion Proof

Supplied Only for 125 rpm Output and Higher, Units 05 Thru 76. May be Mounted on Either Side

Dimensions, Inches Not to be used for construction purposes unless dimensions are approved.

Gear Case Dimensions

Gear Size	U①	Key a	b	c	A	C	D②	E	F	G	H	K	N	O	R	T	V	W	WW	Approx. Wt. Lbs. ③
05D	1.375	.31	.31	2.00	5.2	1.7	5.69	4.12	3.4	.8	.4	9.00	2.6	10.1	1.6	3.4	.8	1.0	10.3	53
10D	1.375	.31	.31	2.00	5.2	1.7	5.69	4.12	3.4	.8	.4	9.00	2.6	10.1	1.6	3.4	.8	1.0	10.3	53
21D	1.625	.38	.38	2.50	....	1.7	6.25	4.50	4.0	1.0	.6	9.75	3.4	11.7	2.3	4.3	.7	1.5	12.0	88
32D	1.875	.50	.50	3.00	....	1.7	7.25	5.50	4.6	1.1	.7	13.50	3.8	13.9	2.8	4.8	.8	1.8	14.5	135
43D	2.125	.50	.50	3.25	....	1.7	9.25	7.00	5.7	1.2	.8	15.00	4.4	16.6	3.3	5.3	1.0	2.0	18.0	211
54D	2.625	.62	.62	4.00	....	1.7	10.75	8.00	6.7	1.2	.9	17.25	5.3	20.0	4.0	6.5	1.0	2.4	20.8	382
64D	3.125	.75	.75	5.00	12.3	1.7	10.75	8.00	6.7	1.2	.9	17.25	6.2	20.0	4.0	7.7	1.0	2.4	20.8	550
76D	3.625	.88	.88	6.00	13.4	2.2	12.00	9.25	7.8	1.8	1.1	20.00	7.3	22.8	4.8	8.9	1.4	2.8	24.0	582

AC Motor Dimensions,⑤ T Frame

Motor Frame	Drip-proof, TEFC & Explosion Proof AB④ DP	AB④ TEFC	P Dia. DP	P Dia. TEFC	Motor Wt. Lbs. DP	Motor Wt. Lbs. TEFC	L Dimension – Drip-proof Motor Gear Size 05	10	21	32	43	54	64	76	L Dimension – TEFC & Expl. Proof Motor Gear Size 05	10	21	32	43	54	64	76
143T	....	8.2	....	7.8	....	70	....	....	....	....	....	....	....	....	22.9	22.9	24.6	26.0	27.4	....	....	....
145T	....	8.2	....	7.8	....	70	....	....	....	....	....	....	....	....	22.9	22.9	24.6	26.0	27.4	....	....	....
182T	7.4	9.4	9.4	9.6	80	115	23.6	23.6	25.3	26.7	27.5	30.3	....	....	24.6	24.6	26.3	27.7	28.5	31.3	....	....
184T	7.4	9.4	9.4	9.6	90	115	23.6	23.6	25.3	26.7	27.5	30.3	....	....	24.8	24.8	26.5	27.9	28.7	31.5	....	....
213T	8.4	10.3	11.0	11.2	120	190	....	....	27.4	27.6	28.5	31.2	34.4	....	....	....	28.7	30.4	31.2	34.0	37.1	....
215T	8.4	10.3	11.0	11.2	150	190	....	....	28.9	29.1	30.0	32.7	35.9	....	....	....	29.6	31.3	32.1	34.9	38.0	....
254T	10.3	12.4	13.1	13.3	210	290	....	....	....	31.8	32.6	35.3	37.8	40.3	....	....	....	35.7	36.5	39.3	41.7	44.2
256T	10.3	12.4	13.1	13.3	250	290	....	....	....	33.5	34.3	37.1	39.5	42.0	....	....	....	35.9	36.7	39.5	41.9	44.4
284T	12.1	13.3	14.7	14.7	320	370	....	....	....	33.5	34.3	37.1	39.5	42.0	....	....	....	36.6	37.1	39.8	42.2	44.7
286T	12.1	13.3	14.7	14.7	390	460	....	....	....	35.0	35.8	38.6	41.0	43.5	....	....	....	34.7	38.6	41.3	43.7	45.3
324T	14.3	17.1	16.8	17.0	500	565	....	....	....	....	....	39.8	42.2	44.7	....	....	....	....	....	42.8	45.2	47.7
326T	14.3	17.1	16.8	17.0	550	625	....	....	....	....	....	41.3	43.7	46.2	....	....	....	....	....	44.3	46.7	49.2
364T	17.9	18.8	18.6	19.1	650	855	....	....	....	....	....	42.1	44.5	47.0	....	....	....	....	....	46.6	49.0	51.5
365T	17.9	18.8	18.6	19.1	700	940	....	....	....	....	....	43.1	45.5	48.0	....	....	....	....	....	46.8	49.2	51.7
404T	18.9	20.5	21.1	21.5	830	1155	....	....	....	....	....	....	....	51.0	....	....	....	....	....	....	....	56.6
405T	18.9	20.5	21.1	21.5	920	1270	....	....	....	....	....	....	....	52.5	....	....	....	....	....	....	....	55.4

① Tolerance = +.000 to −.001.
② This dimension will never be exceeded. When exact dimension is required, shims up to 1/32 inch may be necessary.
③ Weight without motor. To obtain total weight add motor weight.
④ For explosion proof motor AB dimensins, refer to Nuttall Gear.
⑤ All motor dimensions are maximum and will not be exceeded.

Note: For Moduline slide bases, see page 4.

Reproduced from Drawing 2731-D-02.

Taconite Seal
Add 1/8 inch to "L" and "T" dimensions for all units except size 64, when Taconite seal is required.

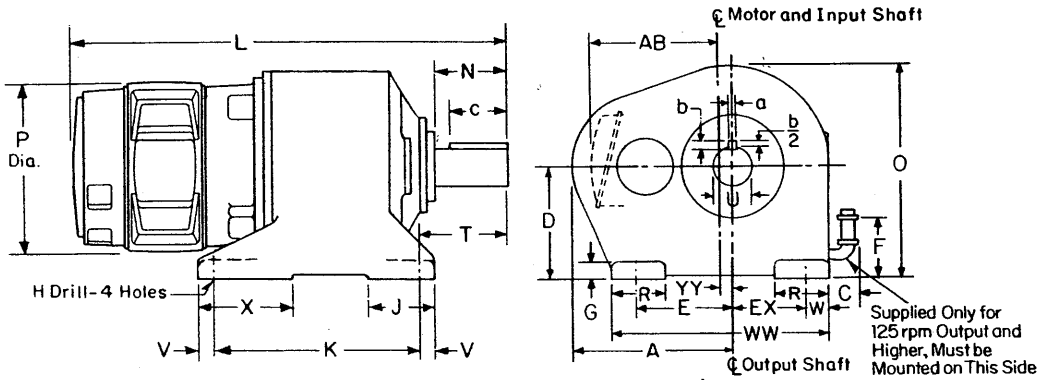
PRELIMINARY ☐ **CERTIFIED** ☐ **PRINT FOR:**

Customer					Customer Order	
G.O.		Cat. No.			Item No.	
Motor Rpm	Output Rpm	AGMA Class	Hp.	Phase	Hz.	Volts
Application		Signed			Date	

Integral Gearmotors
Type G
Moduline®

DIMENSIONS
DOUBLE REDUCTION
88D thru 98D

Double Reduction,
Type G
T Frame Motors
Drip-proof,
TEFC,
Explosion Proof



Dimensions, Inches Not to be used for construction purposes unless dimensions are approved.

Gear Case Dimensions

Gear Size	U①	Key a	Key b	Key c	A	C	D②	E	F max.	EX	G	H	J	K	N	O	R	T	V	W	WW	X	YY	Approx. Wt. Lbs. ③
88D	4.50	1.00	1.00	7.5	19.0	2.2	13.0	11.50	9.1	8.75	2.0	1.63	8.5	25.5	9.0	23.9	6.0	11.4	1.8	3.0	26.3	11.5	....	1042
92D	5.00	1.25	.88	7.5	20.6	2.2	14.5	12.63	10.2	9.38	2.3	1.88	9.0	28.0	9.0	27.5	7.0	11.4	1.8	3.0	28.0	12.5	1.63	1192
98D	5.50	1:25	.88	7.0	23.8	2.2	16.5	14.31	12.5	10.56	2.3	1.88	10.5	28.75	9.0	31.5	7.0	11.5	1.8	3.3	31.38	14.0	1.18	2150

AC Motor Dimensions,⑥ T Frame

Motor Frame	Drip-proof, TEFC & Explosion Proof AB⑤ DP	AB⑤ TEFC	P Dia. DP	P Dia. TEFC	Motor Wt. Lbs. DP	Motor Wt. Lbs. TEFC	L Dimension Drip-proof Motor Gear Size 88	92	98	L Dimension: TEFC & Expl. Proof Motor Gear Size 88	92	98
254T	10.3	12.4	13.1	13.3	210	290	....	....	....	....	....	....
256T	10.3	12.4	13.1	13.3	250	290	....	....	....	....	....	....
284T	12.1	13.3	14.7	14.7	320	370	48.0	....	....	50.7	....	....
286T	12.1	13.3	14.7	14.7	390	460	49.5	....	....	51.2	....	....
324T	14.3	17.1	16.8	17.0	500	565	50.7	50.9	....	53.7	53.9	....
326T	14.3	17.1	16.8	17.0	550	625	52.2	52.4	....	55.2	55.4	....
364T	17.9	18.8	18.6	19.1	650	855	53.0	53.2	52.9	57.5	57.7	57.4
365T	17.9	18.8	18.6	19.1	700	940	54.0	54.2	53.9	57.7	57.9	57.6
404T	18.9	20.5	21.1	21.5	830	1155	57.0	57.2	55.0	62.6	62.8	60.9
405T	18.9	20.5	21.1	21.5	920	1270	57.2	57.4	56.5	61.4	61.6	60.9
444T	21.3	20.3	23.6	23.6	1000	1350	....	....	60.8	....	....	65.8
445T	21.3	20.3	23.6	23.6	1150	1500	....	....	60.8	....	....	65.8

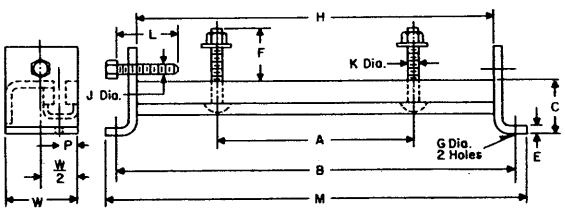
① Tolerance = +.000 to −.001.
② This dimension will never be exceeded. When exact dimension is required, shims up to 1/32 inch may be necessary.
③ Weight without motor. To obtain total weight add motor weight.
④ Tolerance = +.000 to −.125.

⑤ For explosion proof motor AB dimensions refer to Nuttall Gear.
⑥ Maximum motor dimensions which will not be exceeded.

Gearmotors:
Reproduced from Drawings 2731-D-04.

Slide Rails:
Reproduced from Drawing 628-B-660.

Moduline Slide Rails



Gear Size	A	B	C④	E	F	G	H	J	K	L	M	P	W	Total Adj.
05	8.25	15.25	2.00	.25	1.25	.50	13.25	.38	.38	4.00	16.25	.56	2.25	3.00
10	8.25	15.25	2.00	.25	1.25	.50	13.25	.38	.38	4.00	16.25	.56	2.25	3.00
21	9.00	18.25	2.00	.38	1.75	.62	15.50	.50	.50	5.00	19.50	.62	2.62	3.50
32	11.00	22.00	2.50	.50	2.00	.75	18.50	.50	.62	5.00	23.50	.69	3.00	4.00
43	14.00	26.75	3.00	.50	2.00	.88	23.00	.75	.75	6.00	28.50	.88	3.25	5.00
54-64	16.00	30.75	4.00	.50	1.75	1.00	26.75	.75	.88	7.00	32.75	.94	4.38	6.00
76	18.50	37.50	4.00	.75	2.75	1.25	32.00	.88	1.00	9.50	40.00	1.25	4.75	8.00
88	20.25	45.25	4.50	.75	3.75	1.62	39.00	.88	1.50	10.50	48.50	1.50	5.25	9.00
92	22.00	45.25	4.50	.75	3.75	1.62	39.00	.88	1.50	10.50	48.50	1.50	5.25	9.00
98	24.87	45.25	4.50	.75	3.75	1.62	39.00	.88	1 50	10.50	48.50	1.50	5.25	9.00

PRELIMINARY ☐ **CERTIFIED** ☐ **PRINT FOR:**

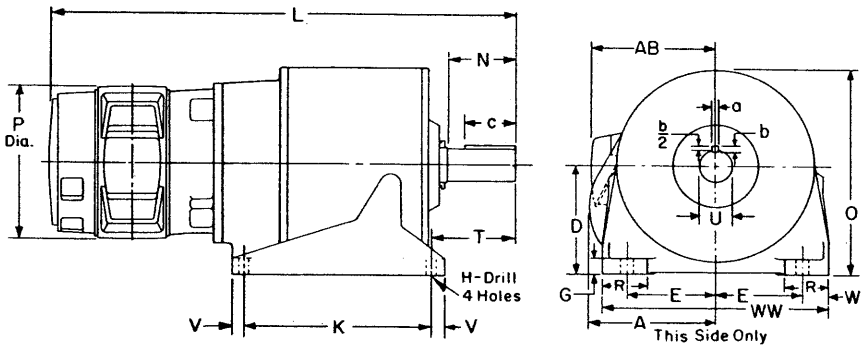
Customer					Customer Order	
G.O.		Cat. No.			Item No.	
Motor Rpm	Output Rpm	AGMA Class	Hp.	Phase	Hz.	Volts
Application		Signed				Date

Your Total Drive Source noc

Moduline®

Integral Gearmotors
Type G

DIMENSIONS
TRIPLE REDUCTION
21T thru 76T



Triple Reduction, Type G
T Frame Motors
Drip-proof, TEFC, Explosion Proof

Dimensions, Inches Not to be used for construction purposes unless dimensions are approved.

Gear Case Dimensions

Gear Size	U①	Key a	Key b	Key c	A	D②	E	G	H	K	N	O	R	T	V	W	WW	Approx. Wt. Lbs. ③
21T	1.625	.38	.38	2.50	....	6.25	4.50	1.0	.6	9.75	3.4	11.7	2.3	4.3	.7	1.5	12.0	106
32T	1.875	.50	.50	3.00	....	7.25	5.50	1.1	.7	13.50	3.8	13.9	2.8	4.8	.8	1.8	14.5	167
43T	2.125	.50	.50	3.25	....	9.25	7.00	1.2	.8	15.00	4.4	16.6	3.3	5.3	1.0	2.0	18.0	243
54T	2.625	.62	.62	4.00	....	10.75	8.00	1.2	.9	17.25	5.3	20.0	4.0	6.5	1.0	2.4	20.8	441
64T	3.125	.75	.75	5.00	12.3	10.75	8.00	1.2	.9	17.25	6.2	20.0	4.0	7.7	1.0	2.4	20.8	570
76T	3.625	.88	.88	6.00	13.4	12.00	9.25	1.8	1.1	20.00	7.3	22.8	4.8	8.9	1.4	2.8	24.0	715

AC Motor Dimensions,⑤ T Frame

Motor Frame	Drip-proof, TEFC & Explosion Proof						L Dimension– Drip-proof Motor						L Dimension– TEFC & Expl. Proof Motor					
	AB④		P Dia.		Motor Wt. Lbs.		Gear Size						Gear Size					
	DP	TEFC	DP	TEFC	DP	TEFC	21	32	43	54	64	76	21	32	43	54	64	76
143T	....	8.2	....	7.8	....	70	....	....	....	....	....	....	27.7	29.9	30.9	35.0	37.5	41.1
145T	....	8.2	....	7.8	....	70	....	....	....	....	....	....	27.7	29.9	30.9	35.0	37.5	41.1
182T	7.4	9.4	9.4	9.6	80	115	26.9	29.1	30.2	34.3	36.8	40.4	29.4	31.6	32.6	36.7	39.2	42.8
184T	7.4	9.4	9.4	9.6	90	115	27.9	30.1	31.2	35.2	37.8	41.4	29.6	31.8	32.8	36.9	39.4	43.0
213T	8.4	10.3	11.0	11.2	120	190	....	31.5	32.5	36.6	39.1	42.7	....	34.2	35.3	39.4	41.8	45.5
215T	8.4	10.3	11.0	11.2	150	190	....	33.0	34.0	38.1	40.6	44.2	....	35.1	36.2	40.3	42.7	46.4
254T	10.3	12.4	13.1	13.3	210	290	....	....	....	40.8	43.2	46.8	....	....	....	44.7	47.1	60.8
256T	10.3	12.4	13.1	13.3	250	290	....	....	....	42.5	44.9	48.6	....	....	....	44.9	47.4	61.0
284T	12.1	13.3	14.7	14.7	320	370	....	....	....	....	45.0	48.6	....	....	....	....	47.7	51.3
286T	12.1	13.3	14.7	14.7	390	460	....	....	....	....	46.5	50.1	....	....	....	....	49.2	52.8
324T	14.3	17.1	16.8	17.0	500	565	....	....	....	....	....	50.7	....	....	....	....	....	53.8
326T	14.3	17.1	16.8	17.0	550	625	....	....	....	....	....	52.2	....	....	....	....	....	55.3
364T	17.9	18.8	18.6	19.1	650	855	....	....	....	....	....	53.1	....	....	....	....	....	57.6
365T	17.9	18.8	18.6	19.1	700	940	....	....	....	....	....	54.1	....	....	....	....	....	57.8

① Tolerance = +.000 to −.001.
② This dimension will never be exceeded. When exact dimension is required, shims, up to 1/32 inch may be necessary.
③ Weight without motor. To obtain total weight add motor weight.
④ For Explosiion proof motor AB dimensions, refer to Nuttall Gear
⑤ Maximum motor dimensions which will not be exceeded.
Note: For Moduline slide bases, see page 6.
Reproduced from Drawing 2731-D-03.

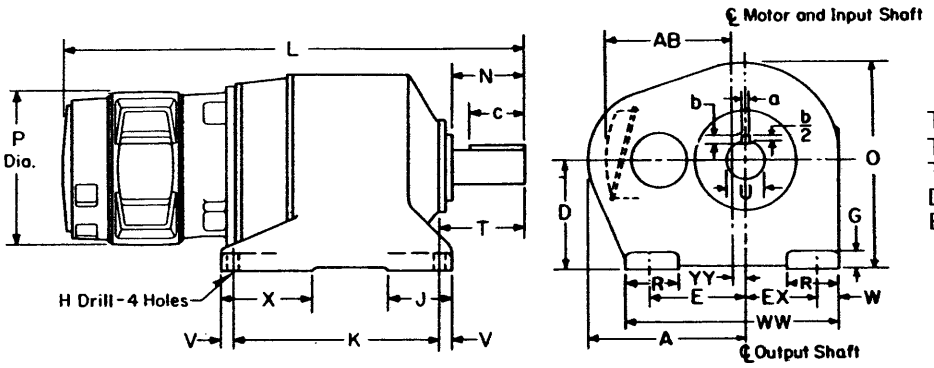
Taconite Seal
Add ½ to "L" and "T" dimensions for all units except size 64, when Taconite seal is required.

PRELIMINARY ☐ **CERTIFIED** ☐ **PRINT FOR:**

Customer				Customer Order		
G.O.		Cat. No.		Item No.		
Motor Rpm	Output Rpm	AGMA Class	Hp.	Phase	Hz.	Volts
Application		Signed				Date

Integral Gearmotors
Type G
Moduline®

DIMENSIONS
TRIPLE REDUCTION
88T thru 98T



Triple Reduction,
Type G
T Frame Motors
Drip-proof, TEFC,
Explosion Proof

Dimensions, Inches Not to be used for construction purposes unless dimensions are approved.

Gear Case Dimensions

Gear Size	U①	Key a	Key b	Key c	A	D②	E	EX	G	H	J	K	N	O	R	T	V	W	WW	X	YY	Approx. Wt. Lbs. ③
88T	4.50	1.00	1.00	7.5	19.0	13.0	11.50	8.75	2.0	1.63	8.5	25.5	9.0	23.9	6.0	11.4	1.8	3.0	26.3	11.5	....	1178
92T	5.00	1.25	.88	7.5	20.6	14.5	12.63	9.38	2.3	1.88	9.0	28.0	9.0	27.5	7.0	11.4	1.8	3.0	28.0	12.5	1.63	1349
98T	5.50	1.25	.88	7.5	23.8	16.5	14.31	10.56	2.3	1.88	10.5	28.75	9.0	31.5	7.0	11.5	1.8	3.3	31.38	14.0	1.18	2300

AC Motor Dimensions,⑥ T Frame

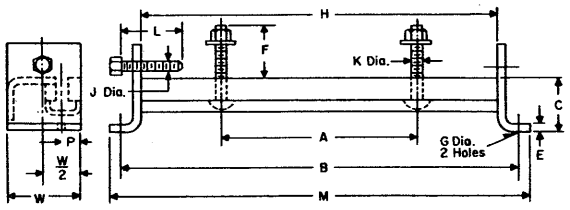
Motor Frame	Drip-proof, TEFC & Explosion Proof AB⑤ DP	AB⑤ TEFC	P Dia. DP	P Dia. TEFC	Motor Wt. Lbs. DP	Motor Wt. Lbs. TEFC	L Dimension Drip-proof Motor Gear Size 88	92	98	L Dimension: TEFC & Expl. Proof Motor Gear Size 88	92	98
143T	....	8.2	....	7.8	....	70	....	....	....	47.1	....	
145T	....	8.2	....	7.8	....	70	....	....	....	47.1	....	....
182T	7.4	9.4	9.4	9.6	80	115	46.4	....	....	48.8	....	....
184T	7.4	9.4	9.4	9.6	90	115	47.4	....	....	49.0	....	....
213T	8.4	10.3	11.0	11.2	120	190	48.7	49.7	....	51.5	52.5	....
215T	8.4	10.3	11.0	11.2	150	190	50.2	50.3	....	52.4	53.4	....
254T	10.3	12.4	13.1	13.3	210	290	52.8	53.9	56.7	56.8	57.8	60.6
256T	10.3	12.4	13.1	13.3	250	290	54.6	55.6	58.5	57.0	58.0	60.8
284T	12.1	13.3	14.7	14.7	320	370	54.6	55.7	58.5	57.3	58.4	61.2
286T	12.1	13.3	14.7	14.7	390	460	56.1	57.2	60.0	58.8	59.9	62.7
324T	14.3	17.1	16.8	17.0	500	565	56.8	58.4	61.1	59.8	61.4	64.0
326T	14.3	17.1	16.8	17.0	550	625	58.3	59.9	62.6	61.3	62.9	65.5
364T	17.9	18.8	18.6	19.1	650	855	59.0	60.6	63.4	63.6	65.4	67.9
365T	17.9	18.8	18.6	19.1	700	940	60.0	61.6	64.4	63.7	65.3	68.1
404T	18.9	20.5	21.1	21.5	830	1155	....	....	67.4	....	....	71.9
405T	18.9	20.5	21.1	21.5	920	1270	....	....	67.4	....	....	71.9

① Tolerance = +.000 to −.001.
② This dimension will never be exceeded. When exact dimension is required, shims up to 1/32 inch may be necessary.
③ Weight without motor. To obtain total weight add motor weight.
④ Tolerance = +.000 to −.125.
⑤ For explosion proof motor AB dimensions, refer to Nuttall Gear.
⑥ Maximum motor dimensions which will not be exceeded.

Gearmotors:
Reproduced from Drawing 2731-D-04,

Slide Rails:
Reproduced from Drawing 628-B-660,

Moduline Slide Rails



Gear Size	A	B	C④	E	F	G	H	J	K	L	M	P	W	Total Adj.
05	8.25	15.25	2.00	.25	1.25	.50	13.25	.38	.38	4.00	16.25	.56	2.25	3.00
10	8.25	15.25	2.00	.25	1.25	.50	13.25	.38	.38	4.00	16.25	.56	2.25	3.00
21	9.00	18.25	2.00	.38	1.75	.62	15.50	.50	.50	5.00	19.50	.62	2.62	3.50
32	11.00	22.00	2.50	.50	2.00	.75	18.50	.50	.62	5.00	23.50	.69	3.00	4.00
43	14.00	26.75	3.00	.50	2.00	.88	23.00	.75	.75	6.00	28.50	.88	3.25	5.00
54-64	16.00	30.75	4.00	.50	1.75	1.00	26.75	.75	.88	7.00	32.75	.94	4.38	6.00
76	18.50	37.50	4.00	.75	2.75	1.25	32.00	.88	1.00	9.50	40.00	1.25	4.75	8.00
88	20.25	45.25	4.50	.75	3.75	1.62	39.00	.88	1.50	10.50	48.50	1.50	5.25	9.00
92	22.00	45.25	4.50	.75	3.75	1.62	39.00	.88	1.50	10.50	48.50	1.50	5.25	9.00
98	24.81	45.25	4.50	.75	3.75	1.62	39.00	.88	1.50	10.50	48.50	1.50	5.25	9.00

PRELIMINARY ☐ **CERTIFIED** ☐ **PRINT FOR:**

Customer					Customer Order	
G.O.		Cat. No.			Item No.	
Motor Rpm	Output Rpm	AGMA Class	Hp.	Phase	Hz.	Volts
Application		Signed				Date

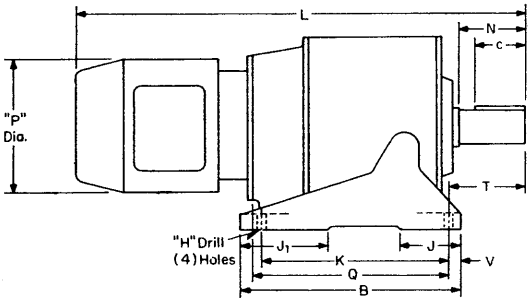
Your Total Drive Source

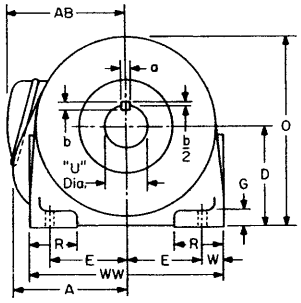
Moduline®

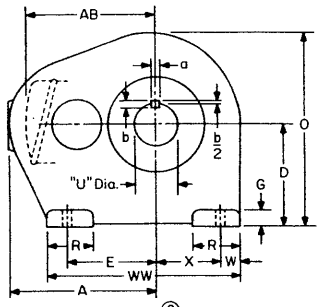
Integral Gearmotors
Type G

DIMENSIONS
QUADRUPLE REDUCTION
32Q thru 98Q

Quadruple Reduction, Type G
T Frame Motors
Drip-proof, TEFC, Explosion Proof







Unit 88, 92, 98 only ⑥

Dimensions, Inches Not to be used for construction purposes unless dimensions are approved.

Gear Case Dimensions

Gear Size	U①	Key a	Key b	Key c	A	B	D②	E	G	H	J	J1	K	N	O	Q	R	T	V	W	WW	X	Approx. Wt. Lbs. ③
32Q	1.875	.50	.50	3.00	....	15.0	7.25	5.50	1.1	.69	4.0	5.0	13.50	3.81	13.9	15.1	2.8	4.75	.75	1.8	14.5	....	195
43Q	2.125	.50	.50	3.25	....	17.0	9.25	7.00	1.2	.81	4.8	6.5	15.00	4.38	16.6	15.3	3.3	5.31	1.00	2.0	18.0	....	265
54Q	2.625	.62	.62	4.00	....	19.2	10.75	8.00	1.2	.94	6.0	7.0	17.25	5.20	20.0	17.8	4.0	6.50	1.00	2.4	20.8	....	485
64Q	3.125	.75	.75	5.00	12.3	19.2	10.75	8.00	1.2	.94	....	....	17.25	6.20	20.0	18.9	4.0	7.75	1.00	2.4	20.8	....	555
76Q	3.625	.88	.88	6.00	13.4	22.8	12.00	9.25	1.8	1.06	4.8	7.4	20.00	7.30	22.8	21.5	4.8	8.94	1.40	2.8	24.0	....	710
88Q	4.500	1.00	1.00	7.50	19.0	29.0	13.00	11.50	2.0	1.63	8.5	11.5	25.50	9.00	23.9	25.0	6.0	11.40	1.80	3.0	26.3	8.75	1170
92Q	5.000	1.25	.88	7.50	20.6	31.6	14.50	12.63	2.3	1.88	9.0	12.5	28.00	9.00	27.5	31.6	7.0	11.40	1.80	3.0	28.0	9.38	
98Q	5.500	1.25	.88	7.50	23.8	32.4	16.50	14.31	2.3	1.88	10.5	14.0	28.75	9.50	31.5	32.25	7.0	11.50	1.80	3.3	31.4	10.56	

AC Motor Dimensions,⑤ T Frame

Motor Frame	Drip-proof, TEFC & Explosion Proof						L Dimension — Drip-proof Motor								L Dimension — TEFC & Expl. Proof Motor							
	AB ④		P Dia.		Motor Wt. Lbs.		Gear Size								Gear Size							
	DP	TEFC	DP	TEFC	DP	TEFC	32	43	54	64	76	88	92	98	32	43	54	64	76	88	92	98
143T	....	8.2	....	7.8	....	70	....	....	....	....	....	....	....	....	31.6	32.4	36.0	38.4	42.2	48.1	....	....
145T	....	8.2	....	7.8	....	70	....	....	....	....	....	....	....	....	31.6	32.4	36.0	38.4	42.2	48.1	....	....
182T	7.4	9.4	9.4	9.6	80	115	....	....	35.3	37.7	41.4	47.4	48.9	51.4	....	....	37.7	40.1	43.9	49.8	51.3	53.8
184T	9.4	9.4	9.4	9.6	90	115	....	....	36.3	38.7	42.4	48.4	49.9	52.4	....	....	37.9	40.3	44.1	50.0	51.6	54.1
213T	8.4	10.3	11.0	11.2	120	190	....	....	....	....	43.5	49.5	51.4	53.9	....	....	....	....	46.3	52.2	51.2	56.7
215T	8.4	10.3	11.0	11.2	150	190	....	....	....	....	45.0	51.0	52.9	55.4	....	....	....	....	47.2	53.1	55.1	57.6
254T	10.3	12.4	13.1	13.3	210	290	....	....	....	....	....	53.3	55.9	58.4	....	....	....	....	....	57.3	59.8	62.2
256T	10.3	12.4	13.1	13.3	250	290	....	....	....	....	....	55.1	57.6	60.1	....	....	....	....	....	57.5	60.0	62.5
284T	....	....	....	....	....	....	....	....	....	....	....	....	....	60.3	....	....	....	....	....	....	....	62.8
286T	....	....	....	....	....	....	....	....	....	....	....	....	....	60.3	....	....	....	....	....	....	....	62.8

① Tolerance = +.000 to −.001.
② This dimension will never be exceeded. When exact dimension is required, shims up to .03 inch may be necessary.
③ Weight without motor. To obtain total weight add motor weight.
④ For Explosion proof motor AB dimensions, refer to Nuttall Gear
⑤ Maximum motor dimensions which will not be exceeded.
⑥ On Units 92Q and 98Q, the input and output shafts are offset 1.63 and 1.18 respectively.

Note: For Moduline slide bases, see Dimension Sheet page 4.
Reproduced from Drawing 5634-D-99.

PRELIMINARY ☐ **CERTIFIED** ☐ **PRINT FOR:**

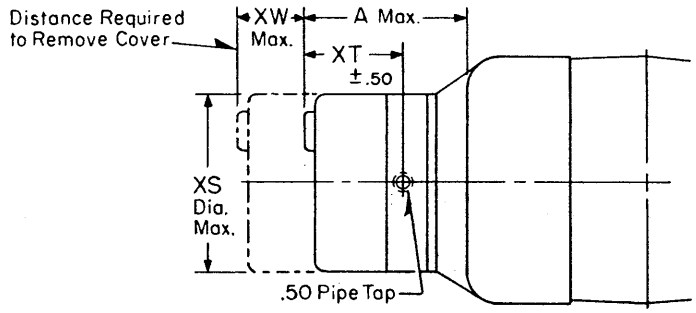
Customer				Customer Order		
G.O.		Cat. No.		Item No.		
Motor Rpm	Output Rpm	AGMA Class	Hp.	Phase	Hz.	Volts
Application		Signed				Date

Moduline®

Integral Gearmotors
Type G

DIMENSIONS
MOTOR MOUNTED
BRAKES

Disc Brakes Standard, Dust Tight/Water Tight, Explosion Proof



Dimensions, Inches Not to be used for construction purposes unless dimensions are approved.

Standard Enclosure For use with Drip-proof and Fan Cooled Motors

Max. Brake Torque Lb. Feet	Wt., Lbs.	XS	XT	XW	A Dim. – Drip-proof Motor				A Dim. – Fan Cooled Motor				
					182-4	213-5	254-6	284-6	143-5	182-4	213-5	254-6	284-6
3	12	6.90	3.90	3.50	5.4	...	...	...	5.9	5.4	...	...	...
6	13	6.90	3.90	3.50	5.4	...	...	...	5.9	5.4	...	...	...
10	14	6.90	4.20	3.50	5.8	...	...	...	6.3	5.9	...	...	...
15	15	6.90	4.50	3.50	6.1	...	...	...	6.6	5.9	...	...	...
15	35	9.00	4.50	4.62	...	6.8	...	...	...	...	7.3	...	...
25	40	9.38	5.50	4.68	7.2	8.4	8.4	...	...	8.2	8.9	9.4	...
35	40	9.38	5.50	4.68	7.2	8.4	8.4	7.7	...	8.2	8.9	9.4	10.3
50	45	9.38	5.50	4.68	...	9.0	8.9	8.2	...	...	9.4	9.9	10.8
75	50	9.38	5.50	4.68	...	9.0	8.9	8.2	...	...	9.4	9.9	10.8
105	68	11.00	5.50	4.68	...	...	9.4	8.7	...	...	...	10.4	11.3

Dust Tight/Water Tight Enclosure For use with Fan Cooled Motors

Max. Brake Torque Lb. Feet	Wt., Lbs.	XS	XT	XW	A Dim. – Fan Cooled Motor				
					143-5	182-4	213-5	254-6	284-6
3	14	6.90	3.80	3.50	6.1	6.1	...	...	...
6	15	6.90	3.80	3.50	6.1	6.1	...	...	...
10	16	6.90	4.10	3.50	6.3	6.5	...	...	...
15	17	6.90	4.40	3.50	6.6	6.5	9.3	...	...
25	47	9.38	5.75	4.68	...	8.5	9.3	9.8	...
35	48	9.38	5.75	4.68	...	8.5	9.3	9.8	...
50	53	9.38	5.75	4.68	...	...	9.8	10.3	10.6
75	55	9.38	5.75	4.68	...	...	9.8	10.3	10.6
105	75	11.00	5.75	4.68	...	...	...	10.8	11.1

Explosion Proof Enclosure For use with Explosion Proof Motors

Max. Brake Torque Lb. Feet	Wt., Lbs.	XS	XT	XW	A Dim. – Expl. Proof Motors				
					143-5	182-4	213-5	254-6	284-6
3	38	7.88	4.80	3.62	8.1	7.5	...	...	...
6	40	7.88	4.80	3.62	8.4	7.9	...	...	...
10	42	7.88	4.80	3.62	8.7	8.2	...	...	...
15	71	9.25	5.44	4.50	...	11.0	10.5	...	...
25	73	9.25	5.44	4.50	...	11.0	10.5	11.1	...
35	75	9.25	5.44	4.50	...	11.0	11.0	11.6	13.3
50	75.5	9.25	5.44	4.50	...	...	11.0	11.6	13.3
75	78	9.25	5.44	4.50	...	...	11.5	12.1	13.8
105	83	9.25	6.19	5.50	...	...	...	12.8	14.6

FOR LARGER SIZES, PLEASE CONTACT NUTTALL GEAR.

Note: Use Dimension Sheet, pages 1 through 8 for basic gearmotor dimensions.

PRELIMINARY ☐ **CERTIFIED** ☐ **PRINT FOR:**

Customer					Customer Order
G.O.		Cat. No.			Item No.
Motor Rpm	Output Rpm	AGMA Class	Hp.	Phase	Hz.	Volts
Application		Signed			Date

Moduline®

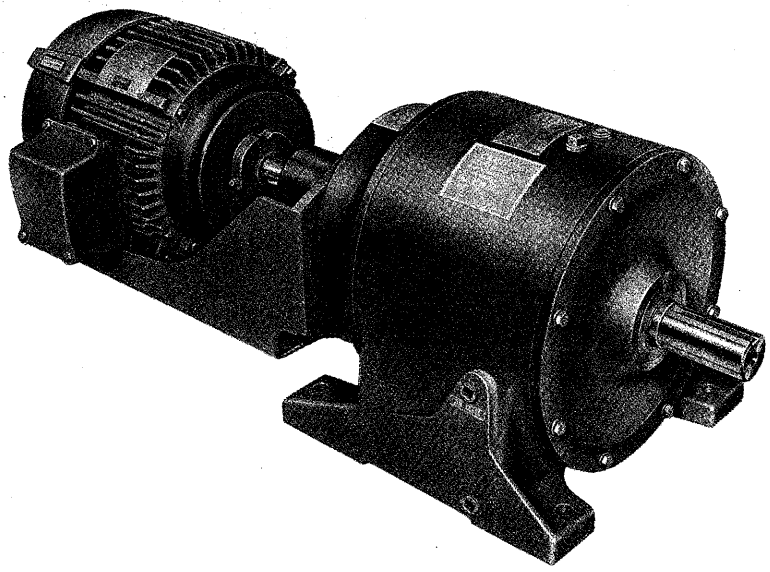
All-Motor Gearmotors Type U

After many years of experience in the concept of gearmotor design, Nuttall Gear Corporation developed the Type U All-Motor Gearmotor.

This unit incorporates a unified mounting base for both the motor and gear box. The All-Motor Gearmotor allows a somewhat wider choice of drive motors in standard NEMA frames.

This arrangement is particularly advantageous where an entire plant is standardized on a particular motor type for interchangeability, or where existing motors must be utilized.

Many modifications, such as brakes, special motor insulation, various mounting positions, special oil seals, backstops, coupling guards and wet end paper mill features are available.



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Mounting Positions	235	1
Gearcase Modifications	235	2-4
Exact Gear Ratios	237	1
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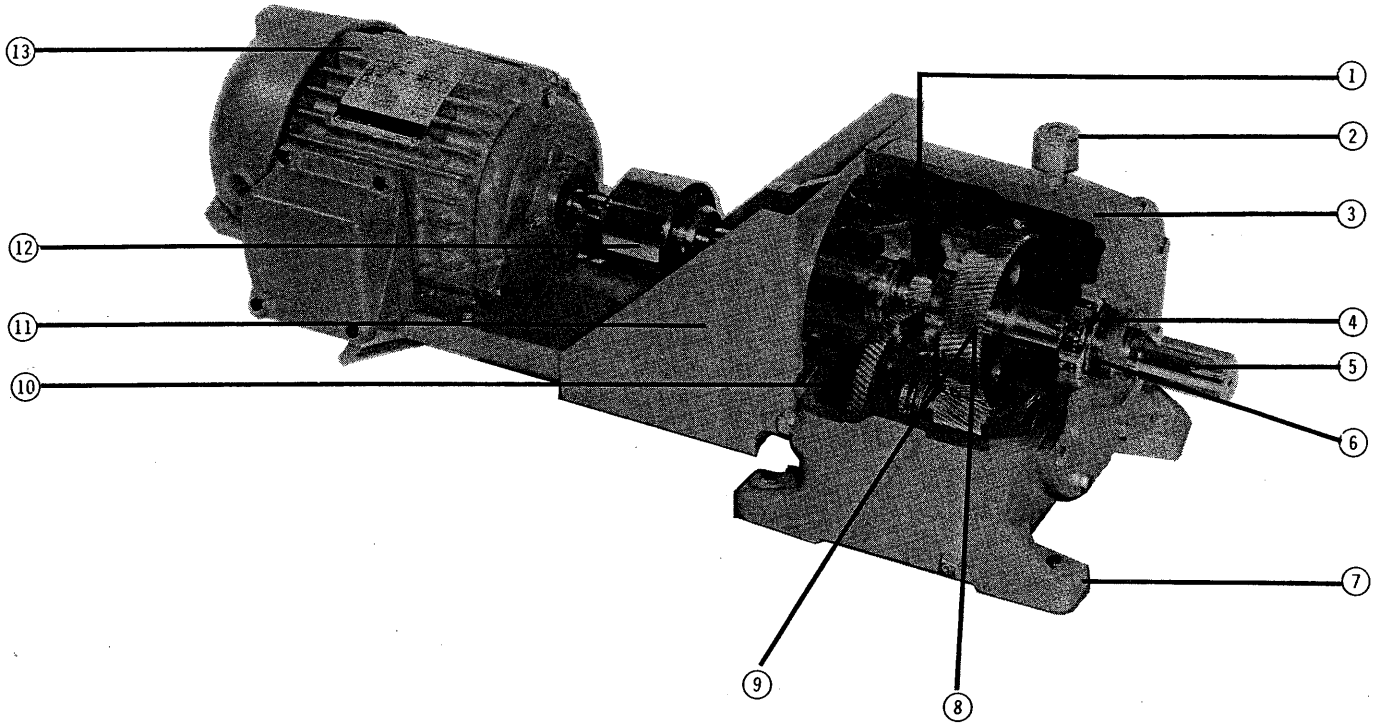
Effective: 15, October 1984
Supersedes: New

All-Motor Gearmotors
Type U
Moduline®



(1) The high speed pinion and gear are mounted on splined shafts. The splines are cold rolled and the major diameters ground to close tolerances to assure concentricity of the gear and pinion with the shaft. This design permits easy change in the high speed gear set.

(2) A combination breather-filler plug keeps overall height at a minimum.

(3) A sturdy-one piece cast iron housing with integrally cast machined bearing supports provides proper internal alignment of components. The inherent corrosion resistance of cast iron allows placement of the unit in many severe atmospheres without special finishes.

(4) Single row tapered roller bearings are used on all shafts. These bearings are conservatively selected in accordance with bearing manufacturers' recommendations to provide maximum load carrying capacity and reliability.

(5) Input and output shafts of chrome-moly steel are supported on wide bearing spans to provide generous overhung load capacity.

(6) Dual-lip seals are used exclusively by Nuttall Gear to retain oil effectively and to protect against entry of contaminants. This assures trouble-free long life.

(7) Rugged feet are integrally cast on double, triple and quadruple reduction units to provide maximum strength. Foot pads are accurately milled to assure ease of alignment.

(8) Helical gears, pioneered by Nuttall Gear, permit more than one gear tooth face to carry the load, and allow gradual progressive transmission of the load from tooth to tooth.

(9) All gears and pinions are made of high quality chrome-moly steel generated on Pfauter hobbers, and then heat treated by a special Ion Nitriding process. This assures gears of consistent accuracy, resulting in long trouble-free life and quiet operation.

(10) Large oil reservoir and splash system provide positive lubrication of all gears and bearings.

(11) The scoop type motor base is designed for strength and rigidity and to provide a simple method to "change-out" motors quickly.

(12) The conservatively rated coupling selected for each motor and gearcase combination will provide a long trouble-free operating life. A coupling guard can also be provided which will meet OSHA requirements.

(13) A wide variety of motor enclosures and designs are available in both AC and DC types. High efficiency, Mill and Chemical duty, multi-speed, high torque and high slip are among the selections available to assure you of single source responsibility, regardless of your requirements.

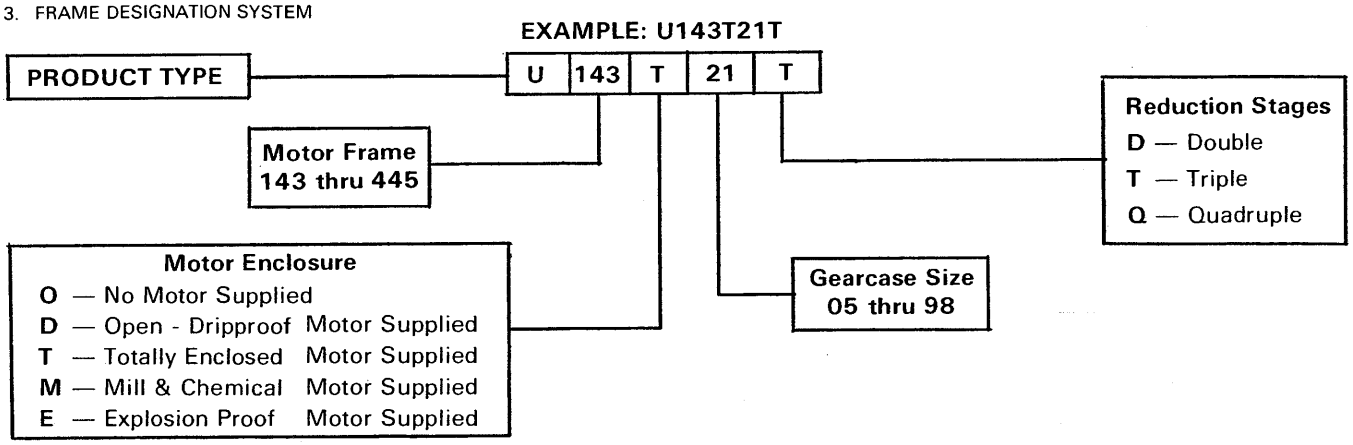
Moduline® All-Motor Gearmotors Type U

1. REQUIRED APPLICATION INFORMATION.
   A. **Horsepower**
   B. **Output speed**
   C. **Motor characteristics** (if motor is to be supplied)
      1. Design - B, C, D
      2. Enclosure
      3. AC or DC (for DC refer to office)
      4. Voltage, frequency, phase
   D. **AGMA load classification** (Refer to section 237, pages 4 and 5)
   E. **Thrust** and **overhung load** requirements, if any. (See section 237, pages 2 and 3.)
   F. **Mounting position** (see section 235, page 1)

2. SELECTION PROCEDURE
   A. Locate required horsepower. Refer to Section 230, pages 4 thru 10.
      1. Read down column to the desired output speed.
      2. **Locate required service class** (I, II or III).
      3. Note list price and frame designation.
   B. **Check overhung load** and/or **thrust capacities** of the selected unit in the engineering data (section 237, pages 2 and 3) against application requirements.
   C. Select required options and modifications from section 235. Add list prices to basic unit price.
   D. Use N-2 multiplier for appropriate customer class to obtain net price.

   Note: **Brake-motors** — When the torque setting of a brake exceeds the torque rating of the motor, the rating of the brake should be considered in selecting the proper gearmotor service class.

3. FRAME DESIGNATION SYSTEM



4. SELECTION & PRICING EXAMPLE

Example

A customer requires a 20 hp AGMA class II, all-motor gearmotor, 56 rpm, shaft to be 5 inches longer than standard, unit to be boxed for export.

Solution

1. Turn to page 8 for All-motor Type U Gearmotor and locate the class II table. Read down to 56 rpm output gear speed. Select gear frame size U256064T, note price, $4960 list.
2. Pricing: Discount symbol N-2.
   Special shaft 5" longer than standard, $230 Basic
   plus $90 — equals $320.
   Export boxed — $316.80
   Total Gear End — $5,596.80 N-2.

5. **Ordering:** The following information must be provided for each order to permit manufacture and assembly of the correct gearmotor.
   A. Quantity
   B. Motor characteristics: (if motor is to be supplied)
      Horsepower
      Type
      Enclosure
      Phase
      Hertz
      Voltage
      Modifications (described in detail)
   C. Gearmotor characteristics
      Type: all-motor type U
      Output rpm
      AGMA class (I, II or III)
      Designation (e.g. U184032D)
      Mounting position
      Modifications (describe in detail)
   C. Pricing:
      Gearmotor list price
      Discount
      Net Price
   E. Shipment required.

All-Motor Gearmotors
Type U
Moduline®

RATINGS - PRICES
1-1½ HP

1 HORSEPOWER

RPM	CLASS I		CLASS II		CLASS III	
	List Price	Frame	List Price	Frame	List Price	Frame
420	995	U143O05D	995	U143O05D	995	U143O05D
350	995	U143O05D	995	U143O05D	995	U143O05D
280	995	U143O05D	995	U143O05D	995	U143O05D
230	995	U143O05D	995	U143O05D	995	U143O05D
190	995	U143O05D	995	U143O05D	995	U143O05D
155	995	U143O05D	995	U143O05D	995	U143O05D
125	995	U143O05D	995	U143O05D	995	U143O05D
100	995	U143O05D	995	U143O05D	995	U143O05D
84	995	U143O05D	995	U143O05D	995	U143O05D
68	995	U143O05D	995	U143O05D	1350	U143O10D
56	995	U143O05D	1350	U143O10D	1350	U143O10D
45	1670	U143O15T	1670	U143O15T	1670	U143O15T
37	1670	U143O15T	1670	U143O15T	1670	U143O15T
30	1670	U143O15T	1670	U143O15T	1670	U143O15T
25	1670	U143O15T	1670	U143O15T	1670	U143O15T
20	1670	U143O15T	1930	U143O21T	1930	U143O21T
16.5	1670	U143O15T	1930	U143O21T	2340	U143O32T
13.5	1930	U143O21T	1930	U143O21T	2340	U143O32T
11.0	2340	U143O32T	2340	U143O32T	2340	U143O32T
9.0	2340	U143O32T	2895	U143O32Q	3395	U143O43Q
7.5	2895	U143O32Q	3395	U143O43Q	3395	U143O43Q
6.0	2895	U143O32Q	3395	U143O43Q	4180	U143O54Q
5.0	3395	U143O43Q	3395	U143O43Q	4180	U143O54Q
4.0	3395	U143O43Q	4180	U143O54Q	5295	U143O64Q
3.2	4180	U143O54Q	4180	U143O54Q	5295	U143O64Q
2.7	4180	U143O54Q	5295	U143O64Q	7035	U143O65Q
2.2	5295	*U145O64Q	5295	*U145O64Q	7035	U143O76Q
1.8	5295	*U145O64Q	7035	*U145O76Q	7035	*U145O76Q
1.5	7035	*U145O76Q	7035	*U145O76Q	11,385	*U145O88Q
1.2	11,385	*U145O88Q	11,385	*U145O88Q	11,385	*U145O88Q

1 - ½ HORSEPOWER

CLASS I		CLASS II		CLASS III		RPM
List Price	Frame	List Price	Frame	List Price	Frame	
995	U145O05D	995	U145O05D	995	U145O05D	420
995	U145O05D	995	U145O05D	995	U145O05D	350
995	U145O05D	995	U145O05D	995	U145O05D	280
995	U145O05D	995	U145O05D	995	U145O05D	230
995	U145O05D	995	U145O05D	995	U145O05D	190
995	U145O05D	995	U145O05D	995	U145O05D	155
995	U145O05D	995	U145O05D	995	U145O05D	125
995	U145O05D	995	U145O05D	1350	U145O10D	100
995	U145O05D	995	U145O05D	1350	U145O10D	84
995	U145O05D	1350	U145O10D	1350	U145O10D	68
1350	U145O10D	1350	U145O10D	1670	U145O15T	56
1670	U145O15T	1670	U145O15T	1715	U145O21D	45
1670	U145O15T	1670	U145O15T	1930	U145O21T	37
1670	U145O15T	1930	U145O21T	1930	U145O21T	30
1670	U145O15T	1930	U145O21T	2340	U145O32T	25
1930	U145O21T	1930	U145O21T	2340	U145O32T	20
1930	U145O21T	2340	U145O32T	2920	U145O43T	16.5
1930	U145O21T	2340	U145O32T	2920	U145O43T	13.5
2340	U145O32T	2920	U145O43T	3260	U145O51T	11.0
2895	U145O32Q	3395	U145O43Q	3880	U145O54T	9.0
3395	U145O43Q	3395	U145O43Q	4180	U145O54Q	7.5
3395	U145O43Q	4180	U145O54Q	5295	U145O64Q	6.0
3395	U145O43Q	4180	U145O54Q	5295	U145O64Q	5.0
3395	U145O43Q	5295	U145O64Q	7035	U145O76Q	4.0
4180	U145O54Q	5295	U145O64Q	7035	U145O76Q	3.2
5295	U145O64Q	7035	U145O76Q	7035	U145O76Q	2.7
5315	*U182O64Q	7055	*U182O76Q	11,385	U145O88Q	2.2
7070	*U182O76Q	11,420	*U182O88Q	11,420	*U182O88Q	1.8
7070	*U182O76Q	11,420	*U182O88Q	11,420	*U182O88Q	1.5
11,420	*U182O88Q	11,420	*U182O88Q	11,420	—	1.2

1. List prices include motor base and appropriate coupling selected by Nuttall Gear. Prices do not include motor; however a wide variety of motors and motor modifications are available from Nuttall Gear. Please see Section 900, or contact your Nuttall Gear Sales Office.
2. Motor frame assignments are based on 1750 RPM, TEFC, 60 Hertz, design B motors unless indicated by asterisk (*) which indicates an 1170 RPM motor is necessary to provide the desired nominal output speed.

DISCOUNT N-2

Your Total Drive Source

Moduline®

All-Motor Gearmotors
Type U

2 HORSEPOWER

RPM	CLASS I		CLASS II		CLASS III	
	List Price	Frame	List Price	Frame	List Price	Frame
420	995	U145O05D	995	U145O05D	995	U145O05D
350	995	U145O05D	995	U145O05D	995	U145O05D
280	995	U145O05D	995	U145O05D	995	U145O05D
230	995	U145O05D	995	U145O05D	995	U145O05D
190	995	U145O05D	995	U145O05D	995	U145O05D
155	995	U145O05D	995	U145O05D	1350	U145O10D
125	995	U145O05D	995	U145O05D	1350	U145O10D
100	995	U145O05D	1350	U145O10D	1350	U145O10D
84	995	U145O05D	1350	U145O10D	1350	U145O10D
68	1350	U145O10D	1715	U145O21D	1715	U145O21D
56	1350	U145O10D	1715	U145O21D	1715	U145O21D
45	1670	U145O15T	1715	U145O21D	1930	U145O21T
37	1670	U145O15T	1930	U145O21T	2340	U145O32T
30	1930	U145O21T	1930	U145O21T	2340	U145O32T
25	1930	U145O21T	2340	U145O32T	2920	U145O43T
20	1930	U145O21T	2340	U145O32T	2920	U145O43T
16.5	2340	U145O32T	2920	U145O43T	2920	U145O43T
13.5	2340	U145O32T	2920	U145O43T	3260	U145O51T
11.0	2340	U145O32T	3260	U145O51T	3880	U145O54T
9.0	3395	U145O43Q	3260	U145O51T	4180	U145O54Q
7.5	3395	U145O43Q	4180	U145O54Q	5295	U145O64Q
6.0	4180	U145O54Q	5295	U145O64Q	5295	U145O64Q
5.0	4180	U145O54Q	5295	U145O64Q	7035	U145O76Q
4.0	5295	U145O64Q	7035	U145O76Q	7035	U145O76Q
3.2	5295	U145O64Q	7035	U145O76Q	11,385	U145O88Q
2.7	7035	U145O76Q	7035	U145O76Q	11,385	U145O88Q
2.2	7035	U145O76Q	11,385	U145O88Q	11,420	*U182O88Q
1.8	7035	U145O76Q	11,420	*U184O88Q	13,185	*U182092Q
1.5	11,420	*U184O88Q	11,420	*U184O88Q	—	—
1.2	11,420	*U184O88Q	—	—	—	—

3 HORSEPOWER

RPM	CLASS I		CLASS II		CLASS III	
	List Price	Frame	List Price	Frame	List Price	Frame
420	1015	U182O05D	1015	U182O05D	1015	U182O05D
350	1015	U182O05D	1015	U182O05D	1015	U182O05D
280	1015	U182O05D	1015	U182O05D	1015	U182O05D
230	1015	U182O05D	1015	U182O05D	1015	U182O05D
190	1015	U182O05D	1015	U182O05D	1370	U182O10D
155	1015	U182O05D	1370	U182O10D	1370	U182O10D
125	1015	U182O05D	1370	U182O10D	1370	U182O10D
100	1370	U182O10D	1370	U182O10D	1735	U182O21D
84	1370	U182O10D	1370	U182O10D	1735	U182O21D
68	1735	U182O21D	1735	U182O21D	2140	U182O32D
56	1735	U182O21D	1735	U182O21D	2140	U182O32D
45	1735	U182O21D	1950	U182O21T	2360	U182O32T
37	1950	U182O21T	2360	U182O32T	2940	U182O43T
30	1950	U182O21T	2360	U182O32T	2940	U182O43T
25	2360	U182O32T	2940	U182O43T	2940	U182O43T
20	2360	U182O32T	2940	U182O43T	3280	U182O51T
16.5	2940	U182O43T	2940	U182O43T	3900	U182O54T
13.5	2940	U182O43T	3280	U182O51T	3900	U182O54T
11.0	3280	U182O51T	3900	U182O54T	4920	U182O64T
9.0	3900	U182O54T	4200	U182O54Q	5315	U182O64Q
7.5	4200	U182O54Q	5315	U182O64Q	7055	U182O76Q
6.0	5315	U182O64Q	7055	U182O76Q	7055	U182O76Q
5.0	5315	U182O64Q	7055	U182O76Q	11,420	U182O88Q
4.0	7055	U182O76Q	7055	U182O76Q	11,420	U182O88Q
3.2	7055	U182O76Q	11,420	U182O88Q	11,420	U182O88Q
2.7	7055	U182O76Q	11,420	U182O88Q	13,185	U182092Q
2.2	11,420	U182O88Q	11,420	U182O88Q	16,990	U182098Q
1.8	11,420	*U213O88Q	16,990	U182098Q	16,990	U182098Q
1.5	11,420	*U213O88Q	—	—	—	—
1.2	—	—	—	—	—	—

1. List prices include motor base and appropriate coupling selected by Nuttall Gear. Prices do not include motor; however a wide variety of motors and motor modifications are available from Nuttall Gear. Please see Section 900, or contact your Nuttall Gear Sales Office.
2. Motor frame assignments are based on 1750 RPM, TEFC, 60 Hertz, design B motors unless indicated by asterisk (*) which indicates an 1170 RPM motor is necessary to provide the desired nominal output speed.

DISCOUNT N-2

All-Motor Gearmotors
Type U
Moduline®

RATINGS—PRICES
5 — 7 ½ HP

5 HORSEPOWER

RPM	CLASS I		CLASS II		CLASS III	
	List Price	Frame	List Price	Frame	List Price	Frame
420	1015	U184O05D	1015	U184O05D	1370	U184O10D
350	1015	U184O05D	1370	U184O10D	1370	U184O10D
280	1015	U184O05D	1370	U184O10D	1370	U184O10D
230	1015	U184O05D	1370	U184O10D	1370	U184O10D
190	1015	U184O05D	1370	U184O10D	1370	U184O10D
155	1370	U184O10D	1370	U184O10D	1735	U184O21D
125	1370	U184O10D	1735	U184O21D	1735	U184O21D
100	1370	U184O10D	1735	U184O21D	2140	U184O32D
84	1735	U182O21D	1735	U184O21D	2140	U184O32D
68	1735	U182O21D	2140	U184O32D	2525	U184O43D
56	1950	U184O21T	2360	U184O32T	2940	U184O43T
45	2140	U184O32D	2360	U184O32T	2940	U184O43T
37	2360	U184O32T	2940	U184O43T	3280	U184O51T
30	2940	U184O43T	2940	U184O43T	3900	U184O54T
25	2940	U184O43T	3280	U184O51T	3900	U184O54T
20	2940	U184O43T	3900	U184O54T	4920	U184O64T
16.5	3280	U184O51T	3900	U184O54T	4920	U184O64T
13.5	3900	U184O54T	4920	U184O64T	6325	U184O76T
11.0	3900	U184O54T	4920	U184O64T	6325	U184O76T
9.0	5315	U184O64Q	7055	U184O76Q	8115	U184O85T
7.5	7055	U184O76Q	7055	U184O76Q	8115	U184O85T
6.0	7055	U184O76Q	11,385	U184O88Q	11,385	U184O88Q
5.0	7055	U184O76Q	11,385	U184O88Q	13,185	U184O92Q
4.0	11,385	U184O88Q	11,385	U184O88Q	16,190	U184O98Q
3.2	11,385	U184O88Q	13,185	U184O92Q	16,190	U184O98Q
2.7	11,385	U184O88Q	16,190	U184O98Q	16,190	U184O98Q
2.2	17,005	*U215O98Q	17,005	*U215O98Q	—	—
1.8	17,005	*U215O98O	—	—	—	—
1.5	—	—	—		—	—

7½ HORSEPOWER

CLASS I		CLASS II		CLASS III		RPM
List Price	Frame	List Price	Frame	List Price	Frame	
1370	U213O10D	1370	U213O10D	1750	U213O21D	420
1370	U213O10D	1370	U213O10D	1750	U213O21D	350
1370	U213O10D	1370	U213O10D	1750	U213O21D	280
1370	U213O10D	1370	U213O10D	1750	U213O21D	230
1370	U213O10D	1750	U213O21D	1750	U213O21D	190
1750	U213O21D	1750	U213O21D	2155	U213O32D	155
1750	U213O21D	1750	U213O21D	2155	U213O32D	125
1750	W213021D	2155	U213O32D	2540	U213O43D	100
2155	U213O32D	2155	U213O32D	2540	U213O43D	84
2155	U213O32D	2540	U213O43D	2540	U213O43D	68
2360	U213O32T	2955	U213O43T	2985	U213O51D	56
2540	U213O43D	2955	U213O43T	3915	U213O54T	45
2955	U213O43T	3295	U213O51T	3915	U213O54T	37
2955	U213O43T	3915	U213O54T	4935	U213O64T	30
3295	U213O51T	3915	U213O54T	4935	U213O64T	25
3915	U213O54T	4935	U213O64T	6340	U213O76T	20
3915	U213O54T	4935	U213O64T	6340	U213O76T	16.5
4935	U213O64T	6340	U213O76T	8135	U213O85T	13.5
6340	U213O76T	6340	U213O76T	8135	U213O85T	11.0
7070	U213O76Q	8135	U213O85T	11,440	U213O88Q	9.0
7070	U213O76Q	9365	U213O88T	11,175	U213O92T	7.5
11,440	U213O88Q	11,440	U213O88Q	17,005	U213O98Q	6.0
11,440	U213O88Q	13,200	U213O92Q	17,005	U213O98Q	5.0
11,440	U213O88Q	17,005	U213O98Q	—	—	4.0
17,005	U213O98Q	17,005	U213O98Q	—	—	3.2
17,005	U213O98Q	17,005	—	—	—	2.7
—	—	—	—	—	—	2.2
—	—	—	—	—	—	1.8
—	—	—	—	—	—	1.5

1. List prices include motor base and appropriate coupling selected by Nuttall Gear. Prices do not include motor; however a wide variety of motors and motor modifications are available from Nuttall Gear. Please see Section 900, or contact your Nuttall Gear Sales Office.
2. Motor frame assignments are based on 1750 RPM, TEFC, 60 Hertz, design B motors unless indicated by asterisk (*) which indicates an 1170 RPM motor is necessary to provide the desired nominal output speed.

DISCOUNT N-2

Moduline®

All-Motor Gearmotors
Type U

10 HORSEPOWER

RPM	CLASS I		CLASS II		CLASS III	
	List Price	Frame	List Price	Frame	List Price	Frame
420	1370	U215O10D	1750	U215O21D	2155	U215O32D
350	1370	U215O10D	1750	U215O21D	2155	U215O32D
280	1370	U215O10D	1750	U215O21D	2155	U215O32D
230	1370	U215O10D	1750	U215O21D	2155	U215O32D
190	1370	U215O10D	1750	U215O21D	2155	U215O32D
155	1750	U215O21D	2155	U215O32D	2155	U215O32D
125	1750	U215O21D	2155	U215O32D	2540	U215O43D
100	2155	U215O32D	2540	U215O43D	2540	U215O43D
84	2155	U215O32D	2540	U215O43D	2985	U215O51D
68	2540	U215O43D	2540	U215O43D	2985	U215O51D
56	2955	U215O43T	2985	U215O51D	3450	U215O54D
45	2955	U215O43T	3915	U2155054T	4935	U215O64T
37	3295	U215O51T	3915	U215O54T	4935	U215O64T
30	3915	U215O54T	4935	U215O64T	6340	U215O76T
25	3915	U215O54T	4935	U215O64T	6340	U215O76T
20	4935	U215O64T	6340	U215O76T	6340	U215O76T
16.5	4935	U215O64T	6340	U215O76T	8135	U215O85T
13.5	6340	U215O76T	8135	U215O85T	9365	U215O88T
11.0	6340	U215O76T	8135	U215O85T	11,440	U215O88Q
9.0	8135	U215O85T	11,440	U215O88Q	11,175	U215O92T
7.5	8135	U215O85T	11,175	U215O92T	17,005	U215O98Q
6.0	11,440	U215O88Q	17,005	U215O98Q	17,005	U215O98Q
5.0	13,200	U215O92Q	17,005	U215O98Q	—	—
4.0	17,050	U215098Q	17,050	U215098Q	—	—
3.2	17,050	U215098Q	—	—	—	—
2.7	17,050	U215098Q	—	—	—	—

15 HORSEPOWER

CLASS I		CLASS II		CLASS III		RPM
List Price	Frame	List Price	Frame	List Price	Frame	
2170	U254O32D	2170	U254O32D	2170	U254O32D	420
2170	U254O32D	2170	U254O32D	2170	U254O32D	350
2170	U254O32D	2170	U254O32D	2170	U254O32D	280
2170	U254O32D	2170	U254O32D	2170	U254O32D	230
2170	U254O32D	2170	U254O32D	2555	U254O43D	190
2170	U254O32D	2170	U254O32D	2555	U254O43D	155
2170	U254O32D	2555	U254O43D	3010	U254O51D	125
2555	U254O43D	2555	U254O43D	3450	U254O54D	100
2555	U254O43D	3010	U254O51D	3450	U254O54D	84
2555	U254O43D	3010	U254O51D	3880	U254O64D	68
3010	U254O51D	3940	U254O54T	4960	U254O64T	56
3940	U254O54T	4960	U254O64T	6365	U254O76T	45
3940	U254O54T	4960	U254O64T	6365	U254O76T	37
4960	U254O64T	6365	U254O76T	8175	U254O85T	30
4960	U254O64T	6365	U254O76T	8175	U254O85T	25
6365	U254O76T	8175	U254O85T	9405	U254O88T	20
6365	U254O76T	8175	U254O85T	11,220	U254O92T	16.5
8175	U254O85T	9405	U254O88T	14,870	U254O98T	13.5
8175	U254O85T	11,480	U254O88Q	14,870	U254O98T	11.0
11,480	U254O88Q	17,050	U254O98Q	17,050	U254O98Q	9.0
11,220	U254O92T	17,050	U254O98Q	—	—	7.5
17,050	U254O98Q	17,050	U254O98Q	—	—	6.0
17,050	U254O98Q	—	—	—	—	5.0
17,115	*U284O98Q	—	—	—	—	4.0
—	—	—	—	—	—	3.2
—	—	—	—	—	—	2.7

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DISCOUNT N-2

All-Motor Gearmotors
Type U
Moduline®

RATINGS — PRICES
20 — 25 HP

20 HORSEPOWER							25 HORSEPOWER						
RPM	CLASS I		CLASS II		CLASS III		CLASS I		CLASS II		CLASS III		RPM
	List Price	Frame	List Price	Frame	List Price	Frame	List Price	Frame	List Price	Frame	List Price	Frame	
420	2170	U256O32D	2170	U256O32D	2555	U256O43D	2195	U284O32D	2195	U284O32D	3045	U284O51D	420
350	2170	U256O32D	2170	U256O32D	2555	U256O43D	2195	U284O32D	2195	U284O32D	3045	U284O51D	350
280	2170	U256O32D	2170	U256O32D	2555	U256O43D	2195	U284O32D	2195	U284O32D	3045	U284O51D	280
230	2170	U256O32D	2170	U256O32D	2555	U256O43D	2195	U284O32D	2580	U284O43D	3045	U284O51D	230
190	2170	U256O32D	2555	U256O43D	2555	U256O43D	2195	U284O32D	2580	U284O43D	3485	U284O54D	190
155	2170	U256O32D	2555	U256O43D	3010	U256O51D	2580	U284O43D	3045	U284O51D	3485	U284O54D	155
125	2555	U256O43D	3010	U256O51D	3450	U256O54D	2580	U284O43D	3045	U284O51D	3915	U284O64D	125
100	2555	U256O43D	3450	U256O54D	3880	U256O64D	3045	U284O51D	3484	U284O54D	3915	U284O64D	100
84	3010	U256O51D	3450	U256O54D	3880	U256O64D	3485	U284O54D	3915	U284064D	5145	U284O76D	84
68	3010	U256O51D	3880	U256O64D	5110	U256O76D	3485	U284O54D	3915	U284064D	5145	U284O76D	68
56	3940	U256O54T	4960	U256O64T	6365	U256O76T	4995	U284O64T	6400	U284O76T	6795	U284O85D	56
45	4960	U256O64T	6365	U256O76T	6365	U256O76T	4995	U284O64T	6400	U284O76T	6795	U284O85D	45
37	4960	U256O64T	6365	U256O76T	8175	U256O85T	6400	U284O76T	8195	U284O85T	9425	U284O88T	37
30	6365	U256O76T	6365	U256O76T	9405	U256O88T	6400	U284O76T	8195	U284O85T	11,285	U284O92T	30
25	6365	U256O76T	8175	U256O85T	9405	U256O88T	8195	U284O85T	9425	U284O88T	11,285	U284O92T	25
20	6365	U256O76T	9405	U256O88T	11,220	U256O92T	8195	U284O85T	11,285	U284O92T	14,935	U284O98T	20
16.5	8175	U256O85T	11,220	U256O92T	14,870	U256O98T	9425	U284O88T	11,285	U284O92T	14,935	U284O98T	16.5
13.5	9405	U256O88T	11,220	U256O92T	17,050	U256O98Q	11,285	U284O92T	14,935	U284O98T	14,935	U284O98T	13.5
11.0	11,480	U256O88Q	14,870	U256O98T	17,050	U256O98Q	14,935	U284O98T	14,935	U284O98T	—	—	11.0
9.0	11,220	U256O92T	17,050	U256O98Q	—	—	17,115	U284O98Q	—	—	—	—	9.0
7.5	14,935	*U286O98T	—	—	—	—	17,115	U284O98Q	—	—	—	—	7.5
6.0	14,935	*U286O98T	—	—	—	—	—	—	—	—	—	—	6.0

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DISCOUNT N-2

Moduline®

All-Motor Gearmotors
Type U

RATINGS — PRICES
30—60 HP

30 HORSEPOWER

RPM	CLASS I		CLASS II		CLASS III		RPM
	List Price	Frame	List Price	Frame	List Price	Frame	
420	2195	U286O32D	2580	U286O43D	3045	U286O51D	420
350	2195	U286O32D	3045	U286O51D	3045	U286O51D	350
280	2195	U286O32D	3045	U286O51D	3045	U286O51D	280
230	2195	U286O32D	3045	U286O51D	3485	U286O54D	230
190	2580	U286O43D	3045	U286O51D	3485	U286O54D	190
155	2580	U286O43D	3485	U286O54D	3915	U286O64D	155
125	3045	U286O51D	3485	U286O54D	3915	U286O64D	125
100	3485	U286O54D	3915	U286O64D	5145	U286O76D	100
84	3485	U286O54D	3915	U286O64D	5145	U286O76D	84
68	3915	U286O64D	5145	U286O76D	5145	U286O76D	68
56	4995	U286O64T	6400	U286O76T	6795	U286O85D	56
45	6400	U286O76T	6795	U286O85D	7790	U286O88D	45
37	6400	U286O76T	8195	U286O85T	11,285	U286O92T	37
30	8195	U286O85T	9425	U286O88T	11,285	U286O92T	30
25	8195	U286O85T	11,285	U286O92T	14,935	U286O98T	25
20	9425	U286O88T	11,285	U286O92T	14,935	U286O98T	20
16.5	11,285	U286O92T	14,935	U286O98T	—	—	16.5
13.5	14,935	U286O98T	14,935	U286O98T	—	—	13.5
11.0	14,935	U286O98T	—	—	—	—	11.0
9.0	17,115	U286O98Q	—	—	—	—	9.0

40 HORSEPOWER

CLASS I		CLASS II		CLASS III		RPM
List Price	Frame	List Price	Frame	List Price	Frame	
2615	U324O43D	3045	U324O51D	3485	U324O54D	420
2615	U324O43D	3045	U324O51D	3485	U324O54D	350
2615	U324O43D	3045	U324O51D	3485	U324O54D	280
2615	U324O43D	3045	U324O51D	3485	U324O54D	230
2615	U324O43D	3485	U324O54D	3915	U324O64D	190
3045	U324O51D	3915	U324O64D	5145	U324O76D	155
3485	U324O54D	3915	U324O64D	5145	U324O76D	125
3915	U324O64D	3915	U324O64D	5145	U324O76D	100
3915	U324O64D	5145	U324O76D	6795	U324O85D	84
5145	U324O76D	5145	U324O76D	7790	U324O88D	68
6400	U324O76T	6795	U324O85D	9425	U324O88T	56
6400	U324O76T	7790	U324O88D	10,040	U324O92D	45
8195	U324O85T	9425	U324O88T	14,935	U324O98T	37
9425	U324O88T	11,285	U324O92T	14,935	U324O98T	30
9425	U324O88T	14,935	U324O98T	14,935	U324O98T	25
11,285	U324O92T	14,935	U324O98T	—	—	20
14,935	U324O98T	14,935	U324O98T	—	—	16.5
14,935	U324O98T	—	—	—	—	13.5
14,935	U324O98T	—	—	—	—	11.0
—	—	—	—	—	—	9.0
—	—	—	—	—	—	7.5
—	—	—	—	—	—	6.0

50 HORSEPOWER

RPM	CLASS I		CLASS II		CLASS III		RPM
	List Price	Frame	List Price	Frame	List Price	Frame	
420	3045	U326O51D	3485	U326O54D	3915	U326O64D	420
350	3045	U326O51D	3485	U326O54D	3915	U326O64D	350
280	3045	U326O51D	3485	U326O54D	3915	U326O64D	280
230	3045	U326O51D	3485	U326O54D	3915	U326O64D	230
190	3485	U326O54D	3915	U326O64D	5145	U326O76D	190
155	3485	U326O54D	3915	U326O64D	5145	U326O76D	155
125	3915	U326O64D	5145	U326O76D	5145	U326O76D	125
100	3915	U326O64D	5145	U326O76D	6795	U326O85D	100
84	5145	U326O76D	6795	U326O85D	7790	U326O88D	84
68	5145	U326O76D	6795	U326O85D	10,040	U326O92D	68
56	6795	U326O85D	7790	U326O88D	10,040	U326O92D	56
45	6795	U326O85D	9425	U326O88T	14,935	U326O98T	45
37	9425	U326O88T	11,285	U326O92T	14,935	U326O98T	37
30	11,285	U326O92T	14,935	U326O98T	14,935	U326O98T	30
25	11,285	U326O92T	14,935	U326O98T	—	—	25
20	14,935	U326O98T	14,935	U326O98T	—	—	20
16.5	14,935	U326O98T	—	—	—	—	16.5
13.5	14,935	U326O98T	—	—	—	—	13.5

60 HORSEPOWER

CLASS I		CLASS II		CLASS III		RPM
List Price	Frame	List Price	Frame	List Price	Frame	
3095	U364O51D	5240	U364O76D	5240	U364O76D	420
3535	U364O54D	4010	U364O64D	4010	U364O64D	350
3535	U364O54D	4010	U364O64D	4010	U364O64D	280
3535	U364O54D	4010	U364O64D	5240	U364O76D	230
3535	U364O54D	4010	U364O64D	5240	U364O76D	190
4010	U364O64D	5240	U364O76D	5240	U364O76D	155
4010	U364O64D	5240	U364O76D	6890	U364O85D	125
5240	U364O76D	5240	U364O76D	7805	U364O88D	100
5240	U364O76D	6890	U364O85D	10,130	U364O92D	84
5240	U364O76D	7805	U364O88D	10,130	U364O92D	68
6890	U364O85D	9520	U364O88T	12,865	U364O98D	56
7805	U364O88D	10,130	U364O92D	15,025	U364O98T	45
11,375	U364O92T	15,025	U364O98T	15,025	U364O98T	37
11,375	U364O92T	15,025	U364O98T	—	—	30
15,025	U364O98T	15,025	U364O98T	—	—	25
15,025	U364O98T	—	—	—	—	20
—	—	—	—	—	—	16.5
—	—	—	—	—	—	13.5

1. List prices include motor base and appropriate coupling selected by Nuttall Gear. Prices do not include motor; however a wide variety of motors and motor modifications are available from Nuttall Gear. Please see Section 900, or contact your Nuttall Gear Sales Office.
2. Motor frame assignments are based on 1750 RPM, TEFC, 60 Hertz, design B motors unless indicated by asterisk (*) which indicates an 1170 RPM motor is necessary to provide the desired nominal output speed.

DISCOUNT N-2

All-Motor Gearmotors
Type U
Moduline®

75 HORSEPOWER

RPM	CLASS I		CLASS II		CLASS III	
	List Price	Frame	List Price	Frame	List Price	Frame
420	5240	U365O76D	5240	U365O76D	5240	U365O76D
350	4010	U365O64D	4010	U365O64D	4010	U365O64D
280	4010	U365O64D	4010	U365O64D	5240	U365O76D
230	4010	U365O64D	4010	U365O64D	5240	U365O76D
190	4010	U365O64D	5240	U365O76D	5240	U365O76D
155	4010	U365O64D	5240	U365O76D	6890	U365O85D
125	5240	U365O76D	6890	U365O85D	7805	U365O88D
100	5240	U365O76D	6890	U365O85D	10,130	U365O92D
84	6890	U365O85D	7805	U365O88D	10,130	U365O92D
68	6890	U365O85D	10,130	U365O92D	12,865	U365O98D
56	9520	U365O88T	12,865	U365O98D	12,865	U365O98D
45	10,130	U365O92D	15,025	U365O98T	15,025	U365O98T
37	15,025	U365O98T	15,025	U365O98T	—	—
30	15,025	U365O98T	15,025	U365O98T	—	—
25	15,025	U365O98T	—	—	—	—
20	—	—	—	—	—	—
16.5	—	—	—	—	—	—
13.5	—	—	—	—	—	—

100 HORSEPOWER

CLASS I		CLASS II		CLASS III		RPM
List Price	Frame	List Price	Frame	List Price	Frame	
7805	U405O88D	7805	U405O88D	7805	U405O88D	420
7805	U405O88D	7805	U405O88D	7805	U405O88D	350
6890	U405O85D	6890	U405O85D	6890	U405O85D	280
6890	U405O85D	6890	U405O85D	6890	U405O85D	230
6890	U405O85D	6890	U405O85D	7805	U405O88D	190
6890	U405O85D	6890	U405O85D	7805	U405O88D	155
5240	U405O76D	7805	U405O88D	10,130	U405O92D	125
6890	U405O85D	10,130	U405O92D	12,865	U405O98D	100
7805	U405O88D	10,130	U405O92D	12,865	U405O98D	84
10,130	U405O92D	12,865	U405O98D	12,865	U405O98D	68
10,130	U405O92D	12,865	U405O98D	—	—	56
15,025	U405O98T	15,025	U405O98T	—	—	45
15,025	U405O98T	—	—	—	—	37
15,025	U405O98T	—	—	—	—	30
						25
						20
						16.5
						13.5

125 HORSEPOWER

RPM	CLASS I		CLASS II		CLASS III	
	List Price	Frame	List Price	Frame	List Price	Frame
420	7805	U444O88D	7805	U444O88D	7805	U444O88D
350	7805	U444O88D	7805	U444O88D	7805	U444O88D
280	6890	U444O85D	6890	U444O85D	6890	U444O85D
230	6890	U444O85D	6890	U444O85D	6890	U444O85D
190	6890	U444O85D	6890	U444O85D	6890	U444O85D
155	6890	U444O85D	6890	U444O85D	6890	U444O85D
125	6890	U444O85D	10,130	U444O92D	12,865	U444O98D
100	7805	U444O88D	10,130	U444O92D	12,865	U444O98D
84	10,130	U444O92D	12,865	U444O98D	12,865	U444O98D
68	10,130	U444O92D	12,865	U444O98D	—	—
56	12,865	U444O98D	—	—	—	—
45	15,025	U444O98T	—	—	—	—
37	15,025	U444O98T	—	—	—	—
30	—	—	—	—	—	—

150 HORSEPOWER

CLASS I		CLASS II		CLASS III		RPM
List Price	Frame	List Price	Frame	List Price	Frame	
—	—	—	—	—	—	420
—	—	—	—	—	—	350
10,130	U445O92D	10,130	U445O92D	10,130	U445O92D	280
10,130	U445O92D	10,130	U445O92D	10,130	U445O92D	230
10,130	U445O92D	10,130	U445O92D	10,130	U445O92D	190
10,130	U445O92D	10,130	U445O92D	10,130	U445O92D	155
10,130	U445O92D	10,130	U445O92D	12,865	U445O98D	125
10,130	U445O92D	12,865	U445O98D	12,865	U445O98D	100
10,130	U445O92D	12,865	U445O98D	—	—	84
12,865	U445O98D	—	—	—	—	68
12,865	U445O98D	—	—	—	—	56
—	—	—	—	—	—	45
—	—	—	—	—	—	37
—	—	—	—	—	—	30

1. List prices include motor base and appropriate coupling selected by Nuttall Gear. Prices do not include motor; however a wide variety of motors and motor modifications are available from Nuttall Gear. Please see Section 900, or contact your Nuttall Gear Sales Office.
2. Motor frame assignments are based on 1750 RPM, TEFC, 60 Hertz, design B motors unless indicated by asterisk (*) which indicates an 1170 RPM motor is necessary to provide the desired nominal output speed.

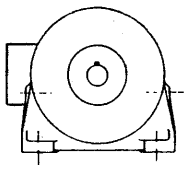
DISCOUNT N-2

Your Total Drive Source

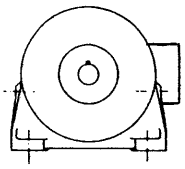
Moduline®

All-Motor Gearmotors
Type U

MOUNTING POSITIONS

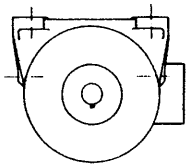


Standard
Position F

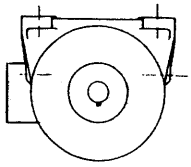


Position FX

Floor Mounted

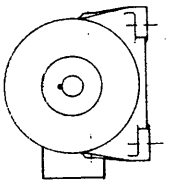


Standard
Position C

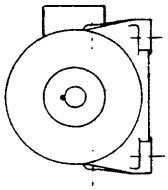


Position CX

Ceiling Mounted

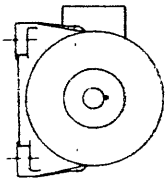


Standard
Position W-R

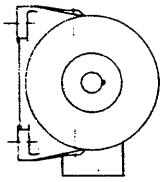


Position W-RX

Right Hand Wall Mounting



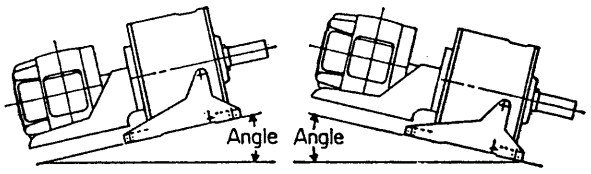
Standard
Position W-L



Position W-LX

For mounting position W-L (and W-LX) on sizes 85-98, please contact Nuttall Gear.

Left Hand Wall Mounting



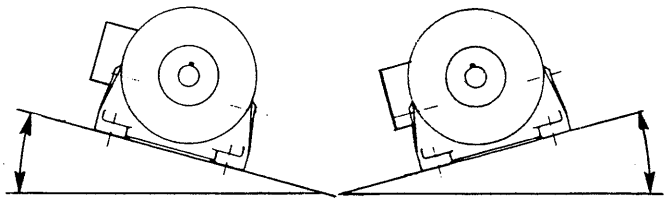
Position F-I

Output shaft up
maximum 10 degrees

Position F-D

Output shaft down
maximum 15 degrees

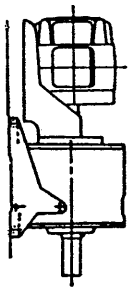
For units with inclines or declines exceeding the above, please contact Nuttall Gear.



Position F-RR

Position F-RL

For units mounted as above, please contact Nuttall Gear.



Position W-D

For foot mounted or flange mounted vertical units, please see modification section.

For vertical units with drywell construction, please see section. 600

Standard Conduit Box Location
When looking at the output shaft, the conduit box will be located on the left side when floor mounted, and on the right side when ceiling mounted.

When other locations are required, use the following suffixes to the assembly position code:

X – opposite standard
T – mounted opposite mounting feet
B – same side as mounting feet

Conduit box location is a no charge option.

WHEN NUTTALL GEAR SUPPLIES OR MOUNTS THE MOTOR, THE CONDUIT BOX WILL BE LOCATED IN THE STANDARD POSITION, UNLESS OTHERWISE SPECIFIED BY CUSTOMER.

Effective: 1, October 1984
Supersedes: New

All-Motor Gearmotors
Type U
Moduline®

MODIFICATIONS

Gear Case Size	05	10	15/21	32	43	51/54	64	76	85/88	92	98
1. Special Shafts											
A. Basic Addition											
1. Any modification up to standard length.											
1 - 5 units	150	150	155	175	185	215	230	260	365	425	485
6 - 25 units	90	90	95	100	110	125	140	155	220	260	300
26 + units	55	55	60	65	70	85	95	105	145	170	195
B. 1. For each 5" or fraction above standard length add –	40	40	55	55	60	75	90	110	150	200	240
2. For special features other than length, add the following charges to the basic addition.											
A. Drilling and tapping end of shaft.	30	30	35	35	40	45	45	55	70	85	100
B. Special Keyway	30	30	35	35	40	45	45	55	70	85	100
C. Splined Shaft	90	90	95	100	110	130	140	155	220	260	300
D. Special Diameter: One special diameter is included in the basic addition. For each **additional** diameter add the following.	30	30	35	35	40	45	45	55	70	85	100
E. Threaded shaft: For each set of threads.	30	30	35	35	40	45	45	55	70	85	100
F. Tapered shaft with threaded end.	70	70	80	85	90	110	120	130	180	210	245
2. Mounting Customer's Equipment There is no charge for Mounting Equipment purchased thru Nuttall Gear. Pressing customer's material on output shaft (couplings, sprockets, pinions). NOTE: Customer's material must be delivered to Nuttall Gear transportation prepaid and ready for mounting. Shipment must be marked for application to specific order and item number. Any machining of customer's material must be negotiated with Nuttall Gear in advance of mounting. Nuttall Gear is not responsible for loss or damage to customer's material.	120	120	125	140	145	160	170	185	205	215	225

DISCOUNT N-2

Moduline® All-Motor Gearmotors Type U

Gear Case Size	05	10	15/21	32	43	51/54	64	76	85/88	92	98
3. Mounting Positions. There is no additional charge for floor, wall, or ceiling mounted units in which the shaft is horizontal, or for floor mounted units whose shaft is inclined up to 10 degrees or declined up to 15 degrees from horizontal.											
A. Vertical shaft down (foot mounted)	110	110	130	165	210	275	335	440	–	–	–
B. Vertical shaft down (flange mounted) Note: Moduline units, other than dry well construction or veri-dri units, running at 155 rpm or greater may run too hot with the low speed shaft down, therefore the thermal hp capacity should be reduced by approximately 30 percent. (Refer to Nuttall Gear)	265	265	330	400	525	680	835	995	–	–	–
C. Vertical shaft down (dry well construction)	Refer to Veri-Dri Section - 600 -										
D. Shaft - up	REFER TO NUTTALL OFFICE										
E. Horizontal (with rotation about shaft)	REFER TO NUTTALL OFFICE										
4. Mill & Chemical Features (gearcase only) Note: Mill and chemical features include wet end seals and epoxy paint.	35	35	40	50	60	85	110	130	180	215	240
5. Special Paint A. Addition for standard commercial paints, available in one gallon units.	85	85	100	110	135	155	155	170	195	195	210
B. Customer supplied paint.	REFER TO NUTTALL OFFICE										
C. Primer only.	25	25	25	25	25	25	25	25	25	25	25
D. Special primers, paints, finish.	REFER TO NUTTALL OFFICE										
6. Special Seals A. Wet end for moisture laden atmosheres such as wet end paper mill drives.	35	35	40	50	60	85	110	130	180	215	265
B. Taconite duty: for taconite, cement or other abrasive dust atmospheres. If dust is not abrasive no modification is needed.	150	150	190	245	300	400	495	600	1005	1280	1475
7. Slide Rails (pair)	REFER TO NUTTALL OFFICE										
8. Oil Sight Gauge	35	35	35	35	35	35	35	35	35	35	35
9. Special Output Speeds 1 - 2 units	615	615	615	615	615	615	615	615	615	615	615
3 - 24 units	325	325	325	325	325	325	325	325	325	325	325
25 + units	No charge.										
10. Backstops (factory installed) The Largest built-in backstop has a maximum rating of 215 ft. lbs. at service factor 1.0. Backstops requiring higher capacity must be externally mounted on a longer than standard H.S. shaft. Refer to Nuttall Gear for selection and pricing.	322	365	400	400	490	555	555	975	1520	2130	2130

DISCOUNT N-2

All-Motor Gearmotors
Type U
Moduline®

MODIFICATIONS

Gear Case Size	05	10	15/21	32	43	51/54	64	76	85/88	92	98
11. **Couplings**											
A. Omission of standard input shaft coupling - deduct.	15	15	25	25	35	35	65	110	110	110	110
B. Substitution of customer specified coupling.	Please refer to Nuttall Office.										
C. Mounting of customer supplied coupling - add.	120	120	125	140	145	160	170	185	205	215	225
12. **Mounting customer supplied motor.**	85	85	85	85	85	85	85	85	115	115	190
13. **Coupling Guards** These coupling guards are designed to meet **OSHA** standards when used with **MODULINE** Reducers and Nuttall supplied couplings.	100	100	115	140	155	175	175	190	220	220	240
14. **Export Boxing:** Under Deck - Overseas Packing.	Add 6% Net to Unit price (Minimum $100.00 Net Per Unit).										

DISCOUNT N-2

Moduline®

All-Motor Gearmotors
Type U

ENGINEERING DATA
EXACT GEAR RATIOS

AGMA Nominal Ratio	Double Reduction Units										Nominal Output Speeds With Input Speed Of			
	05D/10D	21D	32D	43D	51/54D	64D	76D	85/88D	92D	98D	1750	1430	1170	870
4.134	4.12	4.119	4.125	4.128	4.131	–	4.125	4.099	–	–	420	350	280	210
5.06	5.141	5.079	5.169	5.150	5.154	5.023	5.147	5.017	–	–	350	280	230	115
6.20	6.209	6.386	6.399	6.220	6.130	6.269	6.216	6.145	6.257	6.142	280	230	190	140
7.59	7.559	7.488	7.518	7.572	7.577	7.614	7.567	7.575	7.658	7.528	230	190	155	115
9.30	9.317	9.136	9.386	9.333	9.340	9.327	9.327	9.248	9.418	9.311	190	155	125	95
11.39	11.70	11.33	11.38	11.32	11.33	11.58	11.31	11.35	11.56	11.238	155	125	100	77
13.95	14.33	14.41	14.35	14.35	14.36	14.08	14.34	13.94	14.24	13.767	125	100	84	62
17.09	16.95	17.11	17.51	16.98	16.99	17.48	17.16	16.99	17.30	16.681	100	84	68	50
20.93	20.45	20.45	20.92	20.49	20.50	21.22	20.48	20.90	21.28	20.90	84	68	56	42
25.63	25.41	25.65	25.09	25.40	25.42	25.19	25.15	25.85	26.33	25.40	68	56	45	34
31.39	30.65	30.65	31.25	30.65	30.65	–	–	31.65	32.23	29.95	56	45	37	28
38.44	–	37.54	37.49	37.99	37.99	–	–	37.93	38.62	–	45	37	30	22

Triple Reduction Units

		15/21T	32T	43T	51/54T	64T	76T	85/88T	92T	98T				
31.39		31.83	31.89	32.28	31.89	32.11	31.97	32.16	–	–	56	45	37	28
38.44		38.44	38.52	38.98	40.10	39.75	38.61	38.84	–	38.98	45	37	30	22
47.08		46.79	46.89	47.45	47.02	46.70	47.00	48.20	49.06	47.45	37	30	25	18
57.66		57.68	57.79	58.49	57.37	58.30	57.93	58.21	58.38	58.49	30	25	20	15
70.62		72.45	72.59	73.47	71.16	70.70	70.25	70.86	72.15	70.93	25	20	16.5	12.5
86.50		88.70	88.87	89.95	90.48	89.15	89.08	87.35	88.95	89.94	20	16.5	13.5	10
105.9		104.9	105.2	106.4	107.4	108.8	105.4	105.9	107.9	107.6	16.5	13.5	11	8.3
129.7		126.6	126.9	128.4	128.4	129.9	127.2	134.3	136.8	128.4	13.5	11	9	6.8
158.9		157.3	157.3	159.2	157.3	155.9	157.6	158.9	161.8	157.7	11.0	9	7.5	5.5
194.6		189.8	189.5	192.1	191.9	–	–	191.7	195.3	–	9	7.5	6	4.5
238.4		–	–	–	235.1	–	–	237.7	–	242.0	7.5	6	5	3.8

Quadruple Reduction Units

			32Q	43Q	54Q	64Q	76Q	88Q	92Q	98Q				
194.6			197.3	199.7	197.6	199.4	200.6	201.8	–	197.06	9	7.5	6	4.5
238.4			283.3	241.2	243.6	242.8	235.7	237.1	–	239.9	7.5	6	5	3.8
291.9			290.1	293.6	305.9	299.3	294.3	296.1	315.1	295.7	6	5	4	3.0
357.5			357.6	361.9	374.5	375.9	356.9	359.0	382.1	358.6	5	4	3.2	2.5
437.9			449.2	454.6	443.2	460.2	450.0	452.7	484.5	454.7	4	3.2	2.7	2.0
536.3			549.9	556.5	534.6	544.5	549.1	552.4	573.2	538.0	3.2	2.7	2.2	1.6
656.8			650.6	658.5	662.5	656.9	655.9	659.8	691.8	649.1	2.7	2.2	1.8	1.3
804.5			785.0	794.4	799.2	–	786.8	791.5	–	–	2.2	1.8	1.5	1.1
985.3			973.0	984.8	–	–	–	989.0	–	–	1.8	1.5	1.2	.90

All-Motor Gearmotors

ENGINEERING DATA
OVERHUNG LOAD, THRUST RATINGS

Type U

Moduline®

Output Shaft – Overhung Load and Thrust Capacities
Double, Triple and Quadruple Reduction

Gear Size	Pounds	Output Rpm												
		420	350	280	230	190	155	125	100	84	68	56	45	37 and Below
05	Overhung Load	870	970	1060	1140	1220	1300	1400	1500	1600	1700	1700	....	.....
	Thrust (Down or Out)	640	700	780	830	910	990	1080	1180	1280	1380	1500	....	.....
	Thrust (Up or In)	600	660	720	780	830	900	970	1050	1130	1220	1300	....	.....
10	Overhung Load	1000	1100	1160	1240	1320	1400	1500	1600	1700	1700	1700	1700	.....
	Thrust (Down or Out)	860	920	1000	1050	1130	1210	1300	1400	1500	1600	1720	1850	.....
	Thrust (Up or In)	700	760	820	880	930	1000	1070	1150	1230	1320	1400	1500	.....
15/21	Overhung Load	1260	1330	1420	1500	1600	1700	1800	1930	2020	2150	2300	2300	2300
	Thrust (Down or Out)	1220	1300	1400	1500	1600	1720	1850	2000	2110	2260	2420	2600	2600
	Thrust (Up or In)	1000	1060	1150	1230	1300	1400	1500	1620	1720	1850	1970	2120	2200
32	Overhung Load	1600	1690	1800	1920	2020	2150	2300	2450	2580	2750	2900	3000	3000
	Thrust (Down or Out)	1640	1750	1880	2000	2150	2300	2470	2660	2820	3020	3250	3500	3500
	Thrust (Up or In)	1430	1520	1640	1750	1870	2000	2150	2320	2450	2630	2810	3000	3000
43	Overhung Load	1950	2050	2200	2340	2480	2620	2800	3000	3150	3370	3570	3800	4000
	Thrust (Down or Out)	2270	2420	2600	2800	2950	3200	3400	3700	3900	4200	4500	4800	5000
	Thrust (Up or In)	2000	2150	2320	2470	2640	2800	3050	3270	3460	3710	3950	4300	4500
51/54	Overhung Load	3450	3680	3920	4180	4400	4700	5000	5000	5000	5000	5000	5000	5000
	Thrust (Down or Out)	3600	3850	4150	4400	4700	5000	5400	5800	6150	6600	7000	7400	7400
	Thrust (Up or In)	2850	3000	3260	3500	3740	4000	4300	4650	4950	5300	5650	6100	6200
64	Overhung Load	.....	4400	4700	5000	5300	5600	6000	6400	6750	7200	7600	8000	8000
	Thrust (Down or Out)	.....	4600	5000	5300	5700	6000	6500	7000	7400	7900	8500	9000	9000
	Thrust (Up or In)	.....	3600	3900	4200	4500	4800	5200	5600	5900	6400	6800	7300	7500
76	Overhung Load	5200	5450	5850	6200	6600	7000	7450	8000	8400	8950	9500	10000	10000
	Thrust (Down or Out)	5050	5350	5750	6150	6550	7000	7500	8100	8550	9150	9800	10500	11000
	Thrust (Up or In)	4100	4350	4700	5000	5350	5750	6200	6650	7100	7600	8100	8700	9000
85/88	Overhung Load	10000	10500	11250	12000	13000	14500	15250	16500	17750	19250	20000	20000	20000
	Thrust (Down or Out)	9500	10000	10750	11500	12500	13500	14750	16250	17500	20000	20000	20000	20000
	Thrust (Up or In)	9500	10000	10750	11500	12500	13500	14750	16250	17500	20000	20000	20000	20000
92	Overhung Load	.....	.....	12000	12800	13800	14800	16000	17400	18500	10000	21500	22500	22500
	Thrust (Down or Out)	.....	.....	14000	15000	15800	16900	18000	19500	20500	22000	23400	25000	25000
	Thrust (Up or In)	.....	.....	12750	13600	14500	15500	16500	18000	19000	20500	21500	23000	23000
98	Overhung Load	....	....	12800	13700	14800	16000	17700	19000	20400	22000	22800	22800	22800
	Thrust (Down or Out)	....	....	12400	13000	14000	15100	16900	18000	19200	20000	20400	20400	20400
	Thrust (Up or In)	....	....	12000	12600	13200	14000	15300	16700	17900	18200	18500	18500	18500

Note: The thrust capacities published above are for units with pure thrust loads. Refer to Nuttall Gear when there are combined radial and thrust loads or when loads exceed capacities listed. Indicate direction of rotation of shaft and location and direction of applied load.

Your Total Drive Source

All-Motor Gearmotors

Moduline® Type U

ENGINEERING DATA
OVERHUNG LOAD DETERMINATION

Overhung Load Capacities

Moduline Gearmotors provide generous overhung load capacity which is seldom exceeded; however, when a pulley, sprocket or pinion is to be mounted on the output shaft, the overhung load capacity of the Gearmotor must be checked.

The overhung load capacities listed in Section 237, Page 2 are calculated for a sprocket, pinion or pulley mounted with the centerline of its face at the midpoint of the output shaft extension.

If the sprocket, pinion or pulley is to be mounted at a location other than the above, use the following formula to calculate the overhung load on the shaft after selecting appropriate Lc and Lf factors from the tables below.

If the calculated overhung load for the Gearmotor selected exceeds the capacity listed in the table, select the next larger Gearmotor.

Overhung Load Formula

$$OHL\ (lbs) = \frac{\text{motor hp} \times 126{,}000 \times L_c}{\text{output rpm} \times \text{pitch diameter (inches)} \times L_f}$$

Load Connection Factor, L_c

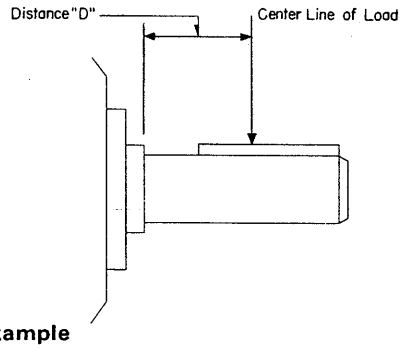
Type of Load Connection	Factor, L_c
Sprocket	1.00
Pinion	1.25
V-Belt	1.50
Flat Belt	2.50

Load Location Factor, L_f

Shaft Dia. Inches	"D" – Distance From Center Line of Load to Gearmotor Shaft Shoulder, Inches															
	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5
.875	1.06	.90	.77	.68	....	....	....	....	...	...	...	...	...	...	...	...
1.125	1.12	.98	.83	.74	....	....	....	....	...	...	...	...	...	...	...	...
1.375	1.15	1.03	.91	.79	.73	....	....	....	...	...	...	...	...	...	...	...
1.500	1.17	1.06	.94	.83	.76	.70	....	....	...	...	...	...	...	...	...	...
1.625	1.18	1.08	.97	.86	.78	.73	.68	....	...	...	...	...	...	...	...	...
1.875	1.22	1.13	1.04	.94	.85	.78	.74	.69	...	...	...	...	...	...	...	...
2.125	1.23	1.14	1.06	.96	.88	.80	.76	.71	.67	...	...	...	...	...	...	...
2.375	1.24	1.17	1.09	1.01	.94	.85	.79	.75	.71	.67	...	...	...	...	...	...
2.625	1.25	1.18	1.11	1.04	.97	.89	.82	.77	.74	.70	.67	...	...	...	...	...
3.125	1.25	1.22	1.15	1.09	1.04	.97	.91	.85	.79	.76	.73	.70	...	...	...	...
3.625	1.25	1.24	1.18	1.13	1.08	1.02	.97	.91	.86	.80	.78	.75	.72	.69	...	...
4.500	1.25	1.25	1.23	1.18	1.14	1.08	1.04	1.00	.96	.92	.87	.83	.79	.77	.74	.72
5.000	1.25	1.25	1.24	1.20	1.16	1.12	1.07	1.04	.99	.95	.91	.87	.83	.79	.77	.75
5.500	1.25	1.25	1.25	1.20	1.17	1.13	1.08	1.05	1.00	.91	.83	.77	.72	.67	.63	.59

Output Shaft Diameters

Gear Size	Double, Triple and Quadruple
05	1.375
10	1.375
15/21	1.625
32	1.875
43	2.125
51/54	2.625
64	3.125
76	3.625
85/88	4.500
92	5.000
98	5.500



Example

A belt conveyor is to be driven by a 5 hp size 21D Moduline Gearmotor, 280 rpm output using a 4" diameter V-belt sheave on the output shaft. The output shaft diameter on a size 21D is 1.625 inches. The centerline of the load is to be placed 1.5 inches from the shaft shoulder.

Procedure – Calculate overhung load
$L_c = 1.50$ and $L_f = 1.08$

$$OHL = \frac{5 \times 126{,}000 \times 1.50}{280 \times 4 \times 1.08} = 781 \text{ lbs.}$$

Refer to overhung load table. Since the overhung load capacity of the gear size 21D at 280 rpm is 1420 lbs., the gear unit has ample capacity.

All-Motor Gearmotors
Type U
Moduline®

APPLICATION SERVICE CLASSES

Typical Gearmotor Applications – AGMA Standard Practices
AGMA standard practice recognizes three classes of integral and all-motor gearmotors based on load conditions and service required. The table illustrates the difference between these classes. For load conditions not included in the table, refer to Nuttall Gear. For peak loading applications, refer to curves on page 5.

Class I: For steady loads not exceeding normal rating of motor and 10 hours a day service. Moderate shock loads where service is intermittent.
Class II: For steady loads not exceeding normal rating of motor and 24 hours a day. Moderate shock loads for 10 hours a day.
Class III: Moderate shock loads for 24 hours a day. Heavy shock loads for 10 hours a day.

Table 1: Typical Applications

Application	Hours Service per Day: Over 3 Up to 10 (AGMA Class)	Hours Service per Day: Over 10 (AGMA Class)
Agitators		
Pure liquids	I	II
Liquids and solids	II	II
Liquids, variable density	II	II
Semi-liquids	II	II①
Blowers		
Centrifugal	I	II
Lobe	II	II
Vane	I	II
Brewing and Distilling		
Bottling machinery	I	II
Brew kettles, cont. duty	..	II
Cookers, continuous duty	..	II
Mash tube, cont. duty	..	II
Scale hopper, frequent starts	II	II
Car Dumpers	III	..
Can Filling Machines	I	II
Cane Knives	II	II
Car Pullers		
Intermittent duty	I	..
Clarifiers	I	II
Classifiers	II	II
Clay Working Machinery		
Brick press	III	III①
Briquette machine	III	III①
Clay working machinery	II	II
Pug mill	II	II
Compressors		
Centrifugal	I	II
Lobe	II	II
Reciprocating		
Multi-cylinder	II	II①
Single Cylinder	III	III①
Conveyors, Uniformly Loaded or Fed		
Apron	I	II
Assembly	I	II
Belt	I	II
Bucket	I	II
Chain	I	II
Flight	I	II
Oven	I	II
Screw	I	II
Conveyors, Heavy Duty – Not Uniformly Fed		
Apron	II	II
Assembly	II	II
Belt	II	II
Bucket	II	II
Chain	II	II
Flight	II	II
Live roll (package)	I	II
Oven	II	II
Reciprocating	III	III①
Screw	II	II
Shaker	III	III①
Cranes and Hoists		
Main hoists		
Heavy duty	III	III①
Medium duty	II	II
Reversing	II	II
Skip hoists	II	II
Trolley drive	II	II①
Bridge drive	II	II①
Crushers		
Ore	III	III
Stone	III	III
Dredges		
Cable reels	II	..
Conveyors	II	II
Cutter head drives	III	III①
Jig drives	III	III①
Maneuvering winches	II	..
Pumps	II	II
Screen drive	III	III①
Stackers	II	II
Utility winches	II	..
Elevators		
Bucket, uniform load	I	II
Bucket, heavy load	II	II
Bucket, continuous	I	II
Centrifugal discharge	I	II
Escalators	I	I
Freight	II	II
Gravity discharge	I	II
Man lifts	②	②
Passenger	②	②
Service, hand lift	III	..
Fans		
Centrifugal	II	II
Cooling towers		
Induced draft	II	II
Forced draft	②	②
Induced draft	II	II
Large (mine, etc)	II	II①
Large industrial	II	II①
Light (small diameter)	I	II
Feeders		
Apron	II	II
Belt	II	II
Disk	I	II
Reciprocating	III	III①
Screw	II	II
Food industry		
Beet slicer	II	II
Cereal cooker	I	II
Dough mixer	II	II
Meat grinders	II	II
Generators (not Welding)	I	II
Hammer Mills	III	III①
Laundry Tumblers	II	II
Laundry Washers		
Reversing	II	II
Line Shafts		
Heavy shock load	III	III①
Moderate shock load	II	II
Uniform shock load	I	II
Lumber		
Barkers – Spindle Feed	II	III
Barkers – Main Drive	III	III①
Carriage Drive	②	②
Conveyors – Burner	II	III
Conveyors – Main or Heavy Duty	II	III
Conveyors – Main Log	III	III①
Conveyors – Merry-Go-Round	II	III
Conveyors – Slab	III	III①
Conveyors – Transfer	II	III
Conveyors – Waste	II	II
Chains – Floor	II	III
Chains – Green	II	III
Cut-Off Saws – Chain	II	III
Cut-Off Saws – Drag	II	III
Debarking Drums	III	III①
Feeds – Edger	II	III
Feeds – Gang	III	III①
Feeds – Trimmer	II	III
Log Deck	III	III①
Log Hauls – Incline – Well Type	III	III①
Log Turning Devices	III	III①
Planer Feed	II	III
Planer Tilting Hoists	II	III
Rolls – Live- Off Brg. – Roll Cases	III	III①
Sorting Table	II	III
Tipple Hoist	II	III
Transfers – Chain	II	III
Transfers – Craneway	II	III
Tray Drives	II	III
Veneer Lathe Drives	②	②
Machine Tools		
Bending roll	II	II
Notching press, belt driven	②	②
Plate planer	III	III①
Punch press, gear driven	III	III①
Tapping machines	III	III①
Other machine tools		
Main drives	II	II
Auxiliary drives	I	II
Metal Mills		
Bridle Roll Drives	III	III①
Draw bench, carriage	III	III①
Draw bench, main drive	III	III①
Forming machines	III	III①
Pinch dryer and scrubber rolls, reversing	②	②
Slitters	II	II
Table conveyors		
Non-reversing	II	III
Reversing	..	III
Winding reels – strip	..	III
Wire drawing and flattening machine	II	III
Wire winding machine	II	II
Mills, Rotary Type		
Ball	III	III①
Cement kilns	②	②
Dryers and coolers	II	II
Kilns	II	II
Pebble	III	III①
Rod	III	III①
Tumbling barrels	III	III①

① Classes listed are minimum, and normal conditions are assumed. In view of varying load conditions, it is suggested that these applications be carefully reviewed before final selection is made.

② Check safety codes and refer to Nuttall Gear.

Your Total Drive Source

Moduline® All-Motor Gearmotors Type U

APPLICATION SERVICE CLASSES

Table 1: Typical Applications Continued

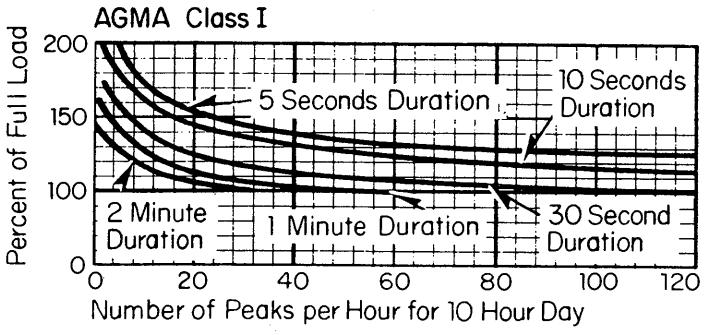
Application	Hours Service per Day: Over 3 Up to 10	Hours Service per Day: Over 10
	AGMA Classes	
Mixers		
Concrete mixers, continuous	II	II
Concrete mixers, intermittent	I	..
Constant density	I	II
Variable density	II	II
Oil Industry		
Chillers	II	II
Oil well pumping	②	②
Paraffin filter press	II	II
Rotary kilns	II	II
Paper Mills		
Aerators	②	②
Agitators (mixers)	II	II
Barker auxiliaries, hydraulic	..	III
Barker, mechanical	..	III
Barking drum	..	III①
Beater and pulper	..	II①
Bleacher	..	II
Calenders	..	II①
Calenders, super	..	II
Converting machines, except cutters, platers	..	II
Conveyors	..	II
Couch	..	II①
Cutters, platers	..	III①
Cylinders	..	II
Dryers	..	II①
Felt stretcher	..	II
Felt whipper	..	III①
Jordans	..	III
Log haul	..	III①
Presses	..	II①
Pulp machines	..	II
Reel	..	II
Stock chests	..	II
Suction roll	..	II①
Washers and thickeners	..	II①
Winders	..	II
Printing Presses	I	II
Pullers		
Barge haul	III	III①
Pumps		
Centrifugal	I	II
Proportioning	II	II①
Reciprocating		
Single acting, 3 or more cylinders	II	II
Double acting, 2 or more cylinders	II	II
Single acting, 1 or 2 cylinders	②	②
Double acting, single cylinder	②	②
Rotary – gear type	I	II
Lobe, vane	I	II
Rubber Industry		
Mixer	III	III①
Rubber calender	II	II①
Rubber mill (2 or more)	II	II①
Sheeter	II	II①
Tire building machines	②	②
Tire and tube press openers	②	②
Tubers and strainers	II	II
Screens		
Air washing	I	II
Rotary – stone or gravel	II	II
Traveling water intake	I	II
Sewage Disposal Equip.		
Aerators	②	②
Bar screens	I	II
Chemical feeders	I	II
Collectors, circuline or straightline	I	II
Dewatering screws	II	II
Grit collectors	I	II
Scum breakers	II	II
Sewage Disposal Equip. (Cont.)		
Slow or rapid mixers	II	II
Sludge collectors	I	II
Thickeners	II	II
Vacuum filters	II	II
Slab Pushers	II	II
Steering Gear	II	II
Stokers	I	II
Textile Industry		
Batchers	II	II
Calenders	II	II
Card machines	II	II①
Cloth finishing machines (washers, pads, tenters, dryers, calenders, etc)	II	II
Dry cans	II	II
Dyeing machinery	II	II
Knitting machines (Looms, etc)	II	II
Looms	II	II
Mangles	II	II
Nappers	II	II
Range drives	②	②
Slashers	II	II
Soapers	II	II
Spinners	II	II
Tenter frames	II	II
Washers	II	II
Winders (other than batchers)	II	II
Yarn preparatory machines (cards, spinners, slashers, etc)	II	II
Windlass	II	II①

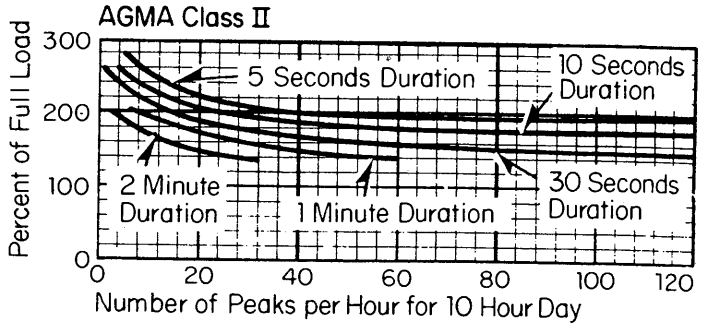
① Classes listed are minimum, and normal conditions are assumed. In view of varying load conditions, it is suggested that these applications be carefully reviewed before final selection is made.

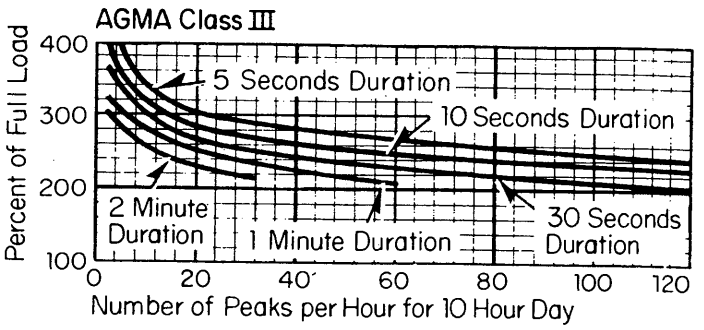
② Check safety codes and refer to Nuttall Gear.

Allowable Peak Loadings

For duty cycle applications, consult the following curves to determine the correct AGMA class.



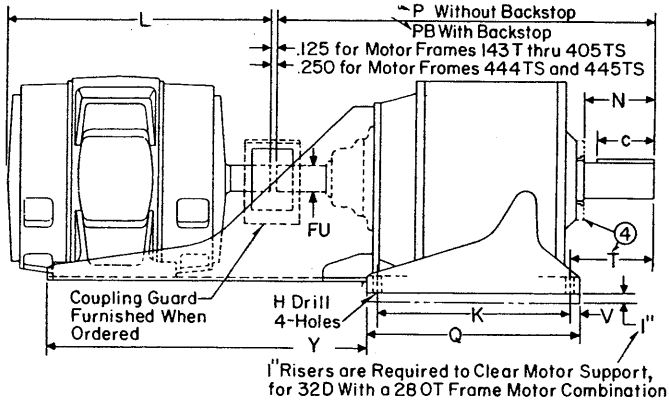


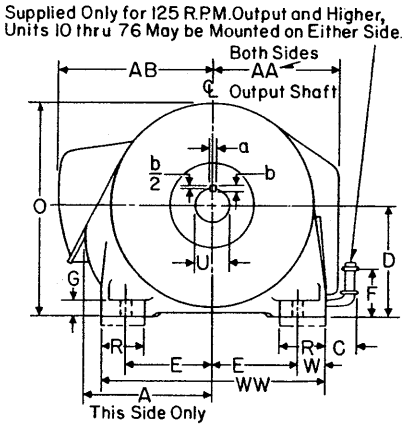


All-Motor Gearmotors

Moduline® Type U

DIMENSIONS
DOUBLE REDUCTION
05D thru 76D





Dimensions, Inches Not to be used for construction purposes unless dimensions are approved.

Unit Size	U①	Key a	b	c	FU①	Key a	b	c	A	C	D②	E	F	G	H	J	K	N	O	PB④	P④	Q
5/10D	1.375	.31	.31	2.00	.875	.19	.19	1.8	5.2	1.7	5.68	4.12	3.4	.8	.438	2.8	9.00	2.6	10.1	19.1	18.1	10.5
21D	1.625	.38	.38	2.50	1.125	.25	.25	2.3	...	1.7	6.25	4.50	4.0	1.0	.562	3.5	9.75	3.4	11.7	21.6	20.5	11.1
32D	1.875	.50	.50	3.00	1.375	.31	.31	2.5	...	1.7	7.25	5.50	4.6	1.1	.688	4.0	13.50	3.8	13.9	24.7	23.2	15.0
43D	2.125	.50	.50	3.25	1.625	.38	.38	2.5	...	1.7	9.25	7.00	5.7	1.3	.812	4.8	15.00	4.4	16.6	25.8	24.3	17.0
51/54D	2.625	.62	.62	4.00	1.625	.38	.38	2.8	...	1.7	10.75	8.00	6.7	1.3	.938	6.0	17.25	5.3	20.0	29.0	27.6	19.3
64D	3.125	.75	.75	5.00	1.875	.50	.50	1.8	12.3	1.7	10.75	8.00	6.7	1.3	.938	...	17.25	6.3	20.0	30.4	29.4	19.3
76D	3.625	.88	.88	6.00	2.125	.50	.50	3.3	13.4	2.2	12.00	9.25	7.8	1.3	1.062	4.8	20.00	7.3	22.8	35.9	34.2	22.8

Unit Size	R	T④	V	W	WW	Approx. Wt. Lbs.③
5/10D	1.6	3.4	.8	1.0	10.2	77
21D	2.2	4.3	.7	1.5	12.0	132
32D	2.8	4.8	.8	1.8	14.5	194
43D	3.2	5.3	1.0	2.0	18.0	270
51/54D	4.0	6.5	1.0	2.4	20.8	484
64D	4.0	7.8	1.0	2.4	20.8	550
76D	4.8	8.9	1.4	2.8	24.0	767

① Tolerance = + .000 to —.001.
② This dimension will never be exceeded. When exact dimension is required, shims up to .03 may be necessary.
③ Approximate weight without motor.
④ When special seal for hazardous dust conditions is used, add .50 inches to T, P, and PB Dimensions.
⑤ Motor Dimensions will never be exceeded.

AC Motor Dimensions ⑤

Motor Frame	Drip-proof, TEFC & Explosion Proof AA	AB		L Dim.		Motor Wt. Lbs.		Y Dimensions Gear Size						
	DP & TEFC	DP	TEFC	DP	TEFC	DP	TEFC	5/10D	21D	32D	43D	51/54D	64D	76D
143T	4.1	5.6	8.2	12.6	13.5	40	55	16.1	19.1	17.2	....	....	....	....
145T	4.1	5.6	8.2	12.6	13.5	45	60	16.1	19.1	17.2	....	....	....	....
182T	5.4	7.4	9.4	14.1	14.6	70	85	16.4	19.4	17.6	16.1	15.6	....	....
184T	5.4	7.4	9.4	14.1	15.7	88	100	16.4	19.4	17.6	16.1	15.6	....	....
213T	6.0	8.4	10.3	15.8	17.7	110	145	19.4	22.4	20.6	19.1	18.6	....	....
215T	6.0	8.4	10.3	17.3	19.2	130	175	19.4	22.4	20.6	19.1	18.6	....	....
254T	7.3	10.3	12.4	20.5	23.0	230	230	....	....	23.6	22.1	24.4	25.6	24.9
256T	7.3	10.3	12.4	22.3	24.8	265	270	....	....	23.6	22.1	24.4	25.6	24.9
284TS	8.4	12.1	13.3	22	25.8	330	360	....	....	25.6	24.1	26.4	27.6	26.9
286TS	8.4	12.1	13.3	23.5	26.1	370	390	....	....	25.6	24.1	26.4	27.6	26.9
324TS	9.3	14.3	17.1	24.5	27.5	475	550	....	....	....	26.3	28.6	29.8	29.1
326TS	9.3	14.3	17.1	27.4	28.8	525	610	....	....	....	26.3	28.6	29.8	29.1
364TS	10.4	17.9	18.8	26.6	31.5	672	835	....	....	....	....	25.6	26.8	28.4
365TS	10.4	17.9	18.8	27.6	30.5	716	920	....	....	....	....	25.6	26.8	28.4
404TS	11.9	18.9	20.5	29.6	33.8	960	1145	....	....	....	....	....	....	29.6
405TS	11.9	18.9	20.5	31.1	35.3	1010	1260	....	....	....	....	....	....	29.6

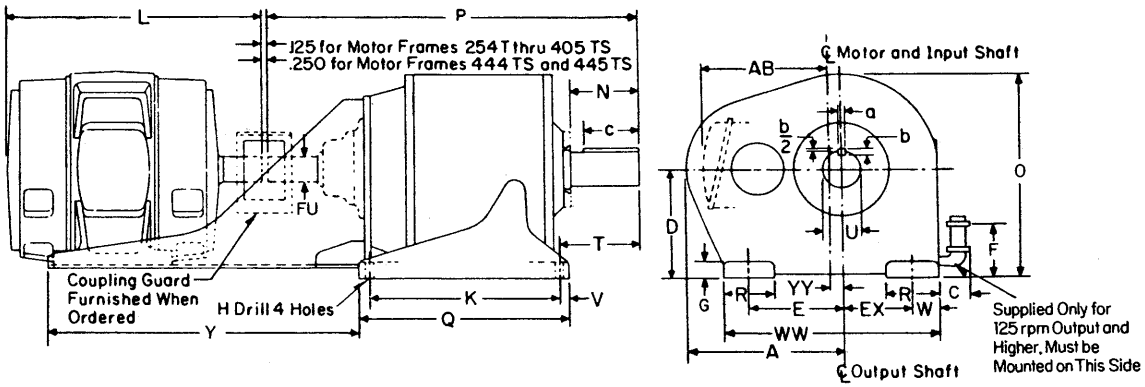
PRELIMINARY ☐ **CERTIFIED** ☐ **PRINT FOR:**

Reproduced from Drawing 2731-D-01

Customer				Customer Order
G.O.		Cat. No.		Item No.
Motor Rpm	Output Rpm	Service Factor	Service Hp	Gear Ratio
Application		Signed		Date

All-Motor Gearmotors
Type U
Moduline®

DIMENSIONS
DOUBLE REDUCTION
85D thru 98D



Dimensions, Inches Not to be used for construction purposes unless dimensions are approved

Unit Size	U①	Key a	Key b	Key c	FU①	Key a	Key b	Key c	A	C	D②	E	EX	F max.	G	H	K	N	O	P④
85/88D	4.500	1.00	1.00	7.5	2.125	.50	.50	3.3	19.0	2.2	13.00	11.50	8.75	9.1	2.0	1.625	25.50	9.0	23.9	40.1
92D	5.000	1.25	.88	7.5	2.125	.50	.50	3.3	20.6	2.2	14.50	12.62	9.38	10.2	2.3	1.875	28.00	9.0	27.5	43.5
98D	5.500	1.25	.88	7.0	3.000	.75	.75	3.7	23.82	2.2	16.50	14.30	10.57	12.5	2.3	1.875	28.75	9.0	31.5	46.6

Unit Size	Q	R	T④	V	W	WW	YY	Approx. Wt. Lbs. ③
85/88D	29.0	6.0	11.4	1.8	3.0	26.3	...	1227
92D	31.5	7.0	11.4	1.8	3.0	28.0	1.62	1300
98D	33.8	7.0	11.5	1.8	3.3	31.4	1.18	2350

① Tolerance = + .000 to —.001.
② This dimension will never be exceeded. When exact dimension is required, shims up to .03 may be necessary.
③ Approximate weight without motor.
④ When Taconite oil seal is required, add .50 inches to dimensions P, and T.
⑤ Motor dimensions will never be exceeded.

AC Motor Dimensions ⑤

Motor Frame	Drip-proof, TEFC & Explosion Proof AB DP	AB TEFC	L Dim. DP	L Dim. TEFC	Motor Wt. Lbs DP	Motor Wt. Lbs TEFC	Y Dimensions Gear Size 85/88D	92D	98D
284TS	12.1	13.3	22	25.8	330	360	24.5	....	21.6
286TS	12.1	13.3	23.5	26.1	370	450	24.5	....	21.6
324TS	14.3	17.1	24.5	27.5	475	550	26.7	27.5	23.3
326TS	14.3	17.1	27.4	28.8	525	610	26.7	27.5	23.3
364TS	17.9	18.8	26.6	30.5	672	835	26.0	27.0	23.3
365TS	17.9	18.8	27.6	31.5	716	920	26.0	27.0	23.3
404TS	18.9	20.5	29.6	33.8	960	1145	27.2	31.0	27.3
405TS	18.9	20.5	31.1	35.3	1010	1260	27.2	31.0	27.3
444TS	21.4	26.3	34.1	38.9	1338	1515	....	....	27.3
445TS	21.4	26.3	36.1	40.9	1448	1785	....	....	27.3
447TS	....	21.5	....	43.9	....	2510	....	....	27.3
449TS	20.5	21.5	44.6	48.9	1850	2510	....	. ..	27.3

PRELIMINARY ☐ **CERTIFIED** ☐ **PRINT FOR:**

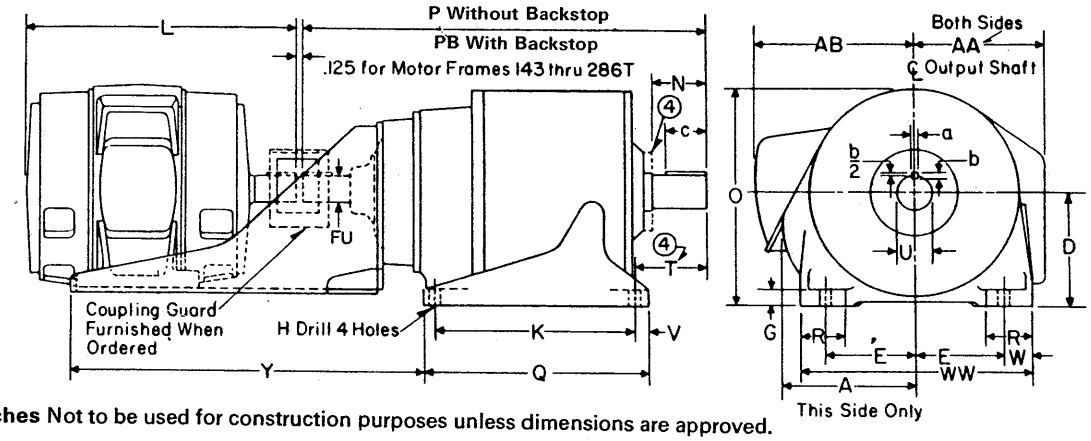
Customer			Customer Order	
G.O.		Cat. No.	Item No.	
Motor Rpm	Output Rpm	Service Factor	Service Hp	Gear Ratio
Application		Signed		Date

Your Total Drive Source

Moduline®

All-Motor Gearmotors
Type U

DIMENSIONS
TRIPLE REDUCTION
15T thru 76T



Dimensions, Inches Not to be used for construction purposes unless dimensions are approved.

Unit Size	U①	Key a	b	c	FU①	Key a	b	c	A	C	D②	E	G	H	K	N	O	PB④	P④
15/21T	1.625	.38	.38	2.50	.875	.19	.19	1.8	....	1.7	6.25	4.50	1.0	.562	9.75	3.4	11.7	23.8	22.8
32T	1.875	.50	.50	3.00	.875	.19	.19	1.8	....	1.7	7.25	5.50	1.1	.688	13.50	3.8	13.9	25.9	24.9
43T	2.125	.50	.50	3.25	1.125	.25	.25	2.3	....	1.7	9.25	7.00	1.3	.812	15.00	4.4	16.6	27.9	26.8
51/54T	2.625	.62	.62	4.00	1.375	.31	.31	2.5	....	1.7	10.75	8.00	1.3	.938	17.25	5.3	20.0	33.7	32.2
64T	3.125	.75	.75	5.00	1.375	.31	.31	2.5	12.3	1.7	10.75	8.00	1.3	.938	17.25	6.3	20.0	36.1	34.6
76T	3.625	.88	.88	6.00	1.625	.38	.38	2.5	13.4	2.2	12.00	9.25	1.8	1.062	20.00	7.3	22.8	40.0	38.5

Unit Size	Q	R	T④	V	W	WW	Approx. Wt. Lbs. ③
15/21T	11.1	2.3	4.3	.7	1.5	12.0	130
32T	15.0	2.8	4.8	.8	1.8	14.5	191
43T	17.0	3.3	5.3	1.0	2.0	18.0	287
51/54T	19.3	4.0	6.5	1.0	2.4	20.8	499
64T	19.3	4.0	7.8	1.0	2.4	20.8	570
76T	22.8	4.8	8.9	1.4	2.8	24.0	773

① Tolerance = + .000 to —.001
② This dimension will never be exceeded. When exact dimension is required, shims up to .03 may be necessary.
③ Approximate weight without motor.
④ When special seal for hazardous dust conditions is used, add .50 inches to T, P, and PB Dimensions.
⑤ Motor Dimensions will never be exceeded.

Ac Motor Dimensions

Motor Frame	Drip-proof, TEFC & Explosion Proof							Y Dimensions					
	AA	AB		L Dim.		Motor Wt. Lbs.		Gear Size					
	DP & TEFC	DP	TEFC	DP	TEFC	DP	TEFC	15/21T	32T	43T	51/54T	64T	76T
143T	4.1	5.6	8.2	12.6	13.5	40	55	19.3	17.1	18.8	20.4	....	....
145T	4.1	5.6	8.2	12.6	13.5	45	60	19.3	17.1	18.8	20.4	....	....
182T	5.4	7.4	9.4	14.1	14.6	70	85	19.7	17.5	19.1	20.8	22.0	21.3
184T	5.4	7.4	9.4	14.1	15.7	88	100	19.7	17.5	19.1	20.8	22.0	21.3
213T	6.0	8.4	10.3	15.8	17.7	110	145	....	....	22.1	23.8	25.0	24.3
215T	6.0	8.4	10.3	17.3	19.2	130	175	....	....	22.1	23.8	25.0	24.3
254T	7.3	10.3	12.4	20.5	23.0	230	230	....	....	....	26.8	28.0	27.3
256T	7.3	10.3	12.4	22.3	24.8	265	270	....	....	....	26.8	28.0	27.3
284TS	8.4	12.1	13.3	22.0	24.5	330	360	....	....	....	....	30.0	29.3
286TS	8.4	12.1	13.3	23.5	25.9	370	370	....	....	....	....	30.0	29.3
324TS	9.3	14.3	17.1	24.6	26.1	475	550	....	....	....	....	....	31.5
326TS	9.3	14.3	17.1	27.4	27.5	525	610	....	....	....	....	....	31.5

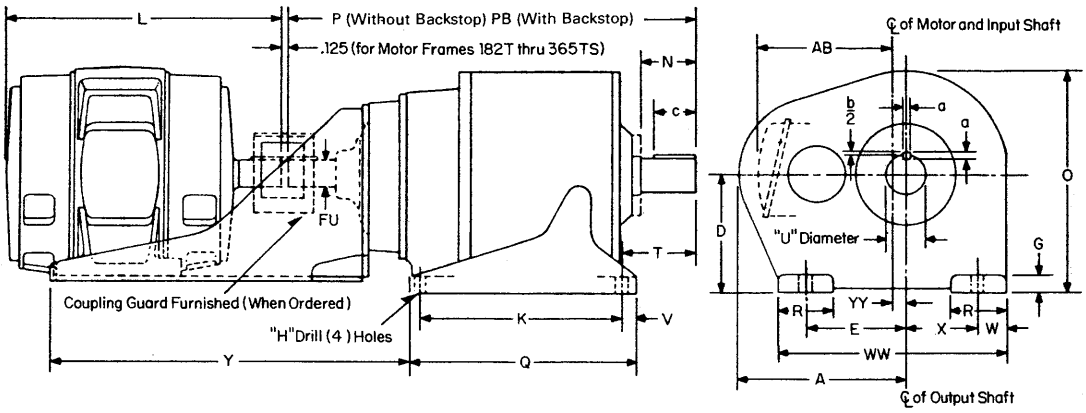
Reproduced from Drawing 2731-D-01

PRELIMINARY ☐ **CERTIFIED** ☐ **PRINT FOR:**

Customer			Customer Order	
G.O.		Cat. No.	Item No.	
Motor Rpm	Output Rpm	Service Factor	Service Hp	Gear Ratio
Application		Signed		Date

All-Motor Gearmotors
Type U
Moduline®

DIMENSIONS
TRIPLE REDUCTION
85T thru 98T



Dimensions, Inches Not to be used for construction purposes unless dimensions are approved.

Unit Size	U①	Key a	b	c	FU①	Key a	b	c	A	D②	E	G	H	K	N	O	PB④	P④	Q	R	T④
85/88T	4.500	1.00	1.00	7.5	1.625	.38	.38	2.5	19.0	13.00	11.50	2.0	1.62	25.50	9.0	23.9	46.0	44.5	29.0	6.0	11.4
92T	5.000	1.25	.88	7.5	1.625	.38	.38	2.5	20.6	14.50	12.62	2.2	1.88	28.00	9.0	27.5	47.6	46.2	31.5	7.0	11.4
98T	5,500	1.25	.88	7.0	2.125	.50	.50	3.2	23.82	16.50	14.30	2.3	1.875	28.75	9.0	31.5	52.3	50.6	33.8	7.0	11.5

Unit Size	V	W	WW	X	YY	Approx Wt. Lbs. ③
85/88T	1.8	3.0	26.3	8.75	...	1236
92T	1.8	3.0	28.0	9.38	1.62	1450
98T	1.8	3.3	31.4	10.56	1.18	2400

① Tolerance = + .000 to —.001
② This dimension will never be exceeded. When exact dimension is required, shims up to .03 may be necessary.
③ Approximate weight without motor.
④ When Taconite oil seal is required, add .50 inch to dimensions P, PB, and T.
⑤ Motor Dimensions will never be exceeded.

Ac Motor Dimensions ⑤

Motor Frame	Drip-proof, TEFC & Explosion Proof AB DP	AB TEFC	L Dim. DP	L Dim. TEFC	Motor Wt. Lbs. DP	Motor Wt. Lbs. TEFC	Y Dimensions Gear Size 85/88T	92T	98T
182T	7.4	9.4	14.1	14.6	70	85	19.0	....	....
184T	7.4	9.4	14.1	15.7	88	100	19.0	....	....
213T	8.4	10.3	15.8	17.7	110	145	22.0	20.8	....
215T	8.4	10.3	17.3	19.2	130	175	22.0	20.8	....
254T	10.3	12.4	20.5	23.0	230	230	25.0	26.6	31.0
256T	10.3	12.4	22.3	24.8	265	270	25.0	26.6	31.0
284TS	12.1	13.3	22.0	24.4	330	360	27.0	28.6	31.0
286TS	12.1	13.3	23.5	25.9	370	390	27.0	28.6	31.0
324TS	14.3	17.1	24.6	26.1	475	550	29.3	30.8	33.2
326TS	14.3	17.1	27.4	27.5	525	610	29.3	30.8	33.2
364TS	17.9	18.8	26.6	30.5	672	835	....	27.8	32.5
365TS	17.9	18.8	27.6	31.5	716	920	....	27.8	32.5

Reproduced from Drawing 2731-D-01

PRELIMINARY ☐ **CERTIFIED** ☐ **PRINT FOR:**

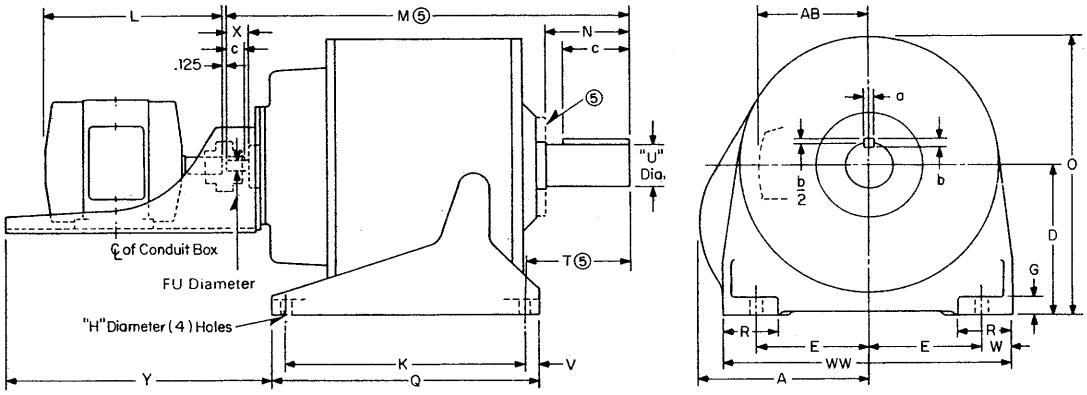
Customer			Customer Order	
G.O.		Cat. No.	Item No.	
Motor Rpm	Output Rpm	Service Factor	Service Hp	Gear Ratio
Application		Signed		Date

Your Total Drive Source

Moduline®

All-Motor Gearmotors
Type U

DIMENSIONS
QUADRUPLE REDUCTION
32Q thru 76Q



Dimensions, Inches Not to be used for construction purposes unless dimensions are approved.

Unit Size	U①	Key (Low Speed) a	b	c	FU ①	Key (High Speed) a	b	c	A	D②	E	G	H	K	M⑤	N	O	Q	R
32Q	1.875	.50	.50	3.00	.875	.19	.19	1.5	....	7.25	5.50	1.1	.69	13.50	23.75	3.81	13.9	15.0	2.8
43Q	2.125	.50	.50	3.25	.875	.19	.19	1.5	....	9.25	7.00	1.2	.81	15.00	24.56	4.38	16.6	17.0	3.3
54Q	2.625	.62	.62	4.00	.875	.19	.19	1.5	....	10.75	8.00	1.2	.94	17.25	28.19	5.20	20.0	19.2	4.0
64Q	3.125	.75	.75	5.00	.875	.19	.19	1.5	12.3	10.75	8.00	1.2	.94	17.25	30.63	6.20	20.0	19.2	4.0
76Q	3.625	.88	.88	6.00	1.125	.25	.25	2.0	13.4	12.00	9.25	1.8	1.06	20.00	36.85	7.30	22.8	22.8	4.8

Unit Size	T⑤	V	W	WW	X	Approx. Wt. Lbs. ③
32Q	4.75	.75	1.8	14.5	2.0	210
43Q	5.31	1.00	2.0	18.0	2.0	280
54Q	6.50	1.00	2.4	20.8	2.0	499
64Q	7.75	1.00	2.4	20.8	2.0	570
76Q	8.94	1.40	2.8	24.0	2.5	775

① Tolerance = +.000 to −.001.
② This dimension will never be exceeded. When exact dimension is required, shims up to .03 inch may be necessary.
③ Approximate weight without motor.
④ Maximum dimension.
⑤ When special seal for hazardous dust condition is used, add .50 to "T" and "M" dimensions for all units except gear size 64Q.

Ac Motor Dimensions ④

Motor Frame	Drip-proof, TEFC & Explosion Proof						Y Dimensions				
	AB④		L④		Motor Wt. Lbs		Gear Size				
	DP	TEFC	DP	TEFC	DP	TEFC	32	43	54	64	76
143T	5.5	8.2	12.6	13.5	40	55	14.1	17.4	17.5	18.7	20.1
145T	5.5	8.2	12.6	13.5	45	60	14.1	17.4	17.5	18.7	20.1
182T	7.4	9.4	14.1	14.6	70	85	....	....	17.9	19.1	20.5
184T	7.4	9.4	14.1	15.7	88	100	....	....	17.9	19.1	20.5

Reproduced from Drawing 2733-D-46

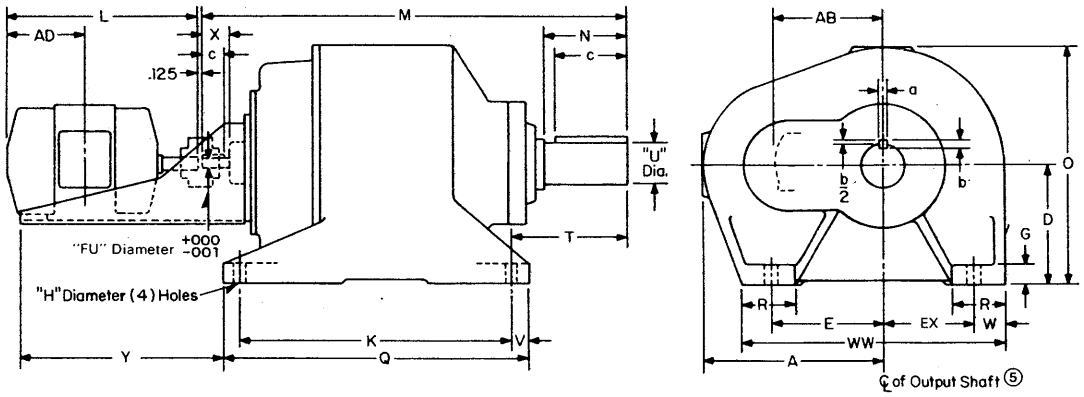
PRELIMINARY ☐ **CERTIFIED** ☐ **PRINT FOR:**

Customer			Customer Order	
G.O.		Cat. No.	Item No.	
Motor Rpm	Output Rpm	Service Factor	Service Hp	Gear Ratio
Application		Signed		Date

DIMENSIONS
QUADRUPLE REDUCTION
88Q thru 98Q

All-Motor Gearmotors
Type U

Moduline®



Dimensions, Inches Not to be used for construction purposes unless dimensions are approved.

Unit Size	UQ	Key (Low Speed) a	b	c	FU①	Key (High Speed) a	b	c	A	D②	E	EX	G	H
88Q	4.500	1.00	1.00	7.5	1.125	.25	.25	2.0	19.0	13.00	11.50	8.75	2.0	1.63
92Q	5.000	1 25	88	7 5	1 625	375	375	2 5	20 6	14 50	12 62	9 38	2 2	1 88
98Q	5.500	1 25	88	7 0	1 625	375	375	2 5	23 5	16 50	14 30	10 56	2 3	1 88

Unit Size	K	M	N	O	Q	R	T	V	W	WW	X	Approx. Wt. Lbs. ③
88Q	25.50	42.15	9.0	23.9	29.0	6.0	11.4	1.8	3.0	26.3	2.5	1250
92Q	28.00	45 87	9 0	27 5	31 6	7 0	11 4	1 8	3 0	28 0	3 0	1540
98Q	28 75	48 13	9 3	31 5	32 4	7 0	11 5	1 8	3.3	31.4	3.0	2630

① Tolerance = + .000 to —.001.
② This dimension will never be exceeded. When exact dimension is required, shims up to .03 may be necessary.
③ Approximate weight without motor.
④ Maximum dimensions.
⑤ On Units 92Q and 98Q, the input shafts are offset 1.62 and 1.18 respectively.

Ac Motor Dimensions

Motor Frame	Drip-proof, TEFC & Explosion Proof AB DP	AB TEFC	L DP	L TEFC	Motor Wt. Lbs. DP	Motor Wt. Lbs. TEFC	Y Dimensions Gear Size 88Q	92Q	98Q
143T	5.5	8.2	12.6	13.5	40	55	16.4	19.8	20.6
145T	5.5	8.2	12.6	13.5	45	60	16.4	19.8	20.6
182T	7.4	9.4	14.1	14.6	70	85	16.8	19.8	20.6
184T	7.4	9.4	14.1	15.7	88	100	16.8	19.8	20.6
213T	8.4	10.3	15.8	17.7	110	145	19.8	19.8	20.6
215T	8.4	10.3	17.3	19.2	130	175	19.8	19.8	20.6

Reproduced from Drawing 5646-D-19

PRELIMINARY ☐ **CERTIFIED** ☐ **PRINT FOR:**

Customer				Customer Order	
G.O.		Cat. No.		Item No.	
Motor Rpm	Output Rpm	Service Factor	Service Hp		Gear Ratio
Application		Signed			Date

Your Total Drive Source

noc

Moduline®

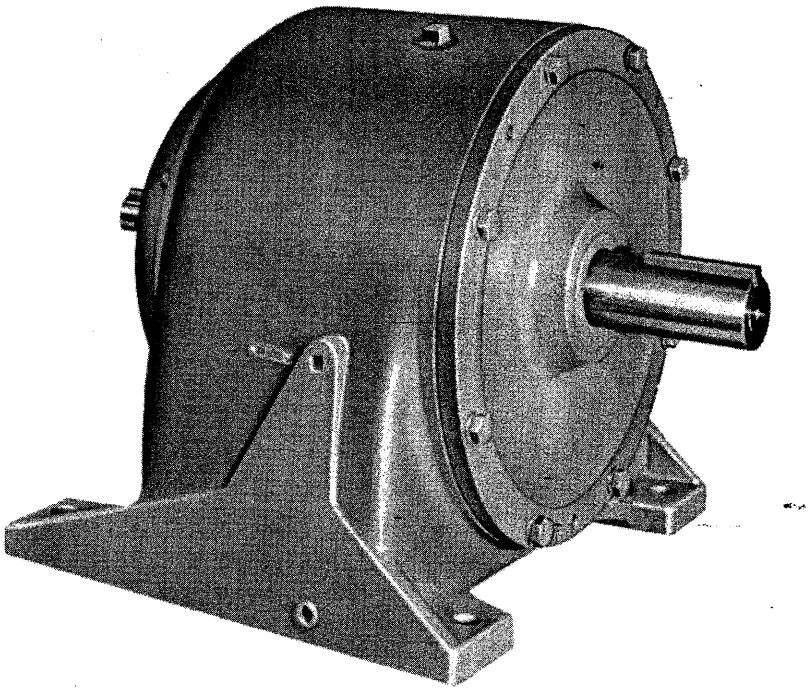
In-Line Speed Reducers
Type R

Moduline Type R concentric shaft speed reducers reflect many years of experience in gearing products utilizing the flexibility of the modular concept to provide readily available drives, closely tailored to the popular horsepower selections for actual application requirements.

Moduline speed reducers are designed in accordance with all applicable AGMA Standards and Nuttall Gear's traditionally conservative design criteria. Standard ratios are used which provide a broad range of output speeds to fit most applications. A removable high speed end facilitates ratio changes or other servicing.

Moduline Type R Speed Reducers can be driven by electric motors, gasoline engines, diesel engines, power take-off shafts and line shafts. They may be direct-connected by a coupling or offset-connected by means of a chain and sprocket or belt and pulley.

Moduline Speed Reducers can be arranged for floor, wall or vertical mounting. Accessories and modifications include bedplates, outboard bearings, backstops, cooling fans, motor mounts, C-Flange adaptors, flexible couplings, taconite seals, OSHA approved coupling guards and special Marine duty features.



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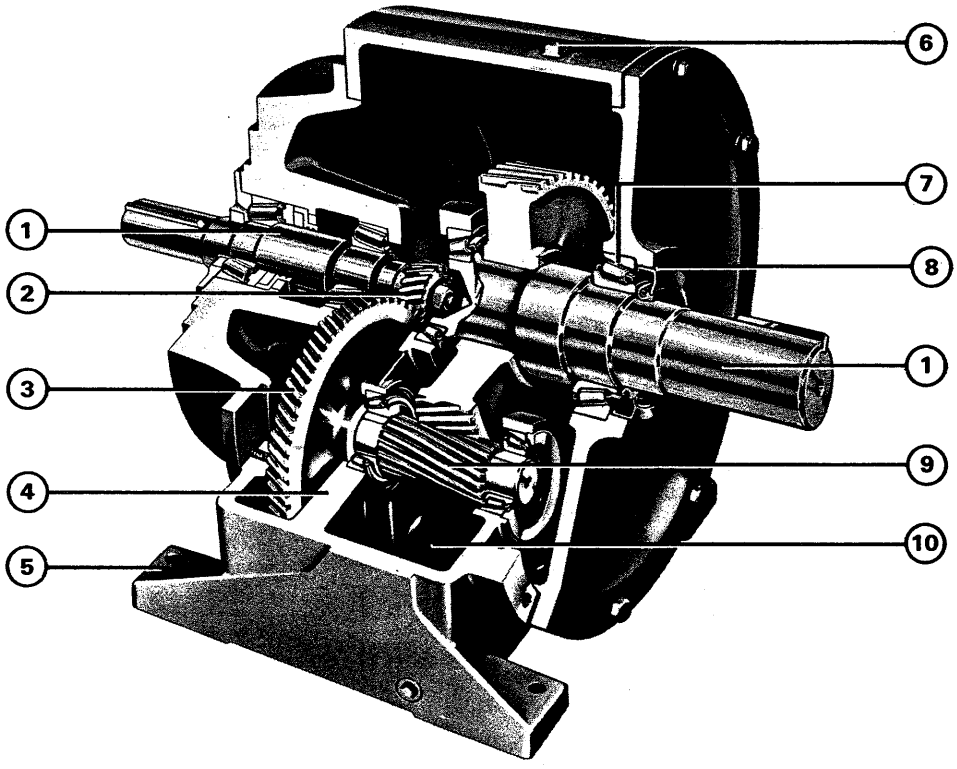
Effective: 1, August 1984

Supersedes: New

In-Line Speed Reducers
Type R

Moduline®



(1) Input and output shafts of chrome-moly steel are supported on wide bearing spans to provide generous overhung load capacity.

(2) The high speed pinion and gear are mounted on splined shafts. The splines are cold rolled and the major diameters ground to close tolerances to assure concentricity of the gear and pinion with the shaft. This design permits easy change in the high speed gear set.

(3) All gears and pinions are made of high quality chrome-moly steel generated on Pfauter hobbers, and then heat treated by a special Ion Nitriding process. This assures gears of consistent accuracy, resulting in long trouble-free life and quiet operation.

(4) A sturdy-one piece cast iron housing with integrally cast machined bearing supports provides proper internal alignment of components. The inherent corrosion resistance of cast iron allows placement of the unit in many severe atmospheres without special finishes.

(5) Rugged feet are integrally cast on double, triple and qualdruple reduction units to provide maximum strength. Foot pads are accurately milled to assure ease of alignment.

(6) A combination breather-filler plug keeps overall height at a minimum.

(7) Single row tapered roller bearings are used on all shafts. These bearings are conservatively selected in accordance with bearing manufacturers' recommendations to provide maximum load carrying capacity and reliability.

(8) Dual-lip seals are used exclusively by Nuttall Gear to retain oil effectively and to protect against entry of contaminants. This assures trouble-free long life.

(9) Helical gears, pioneered by Nuttall Gear, permit more than one gear tooth face to carry the load, and allow gradual progressive transmission of the load from tooth to tooth.

(10) Large oil reservoir and splash system provide positive lubrication of all gears and bearings.

Moduline® In-Line Speed Reducers Type R

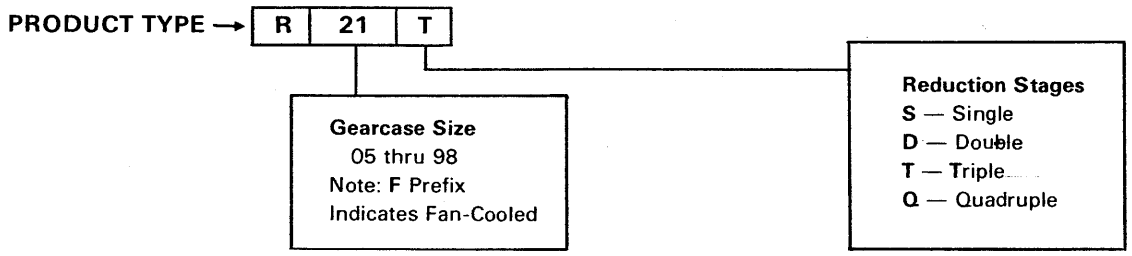
SELECTION AND ORDERING

1. REQUIRED APPLICATION INFORMATION
   A. Type of prime mover (motor, engine, diesel).
   B. Actual Horsepower or output torque (in inch-pounds) required for application.
   C. Determine **AGMA** Service Factor. (Section 257, pages 4-5
   D. Determine **Equivalent** Horsepower or Torque by multiplying actual horsepower or torque by service factor.
   E. Determine input speed, and desired output speed or gear ratio.
   F. Determine thrust and overhung load requirements (if any).
   G. Determine mounting position.

2. SELECTION PROCEDURE
   A. Use rating and pricing Section 250, pages 4 thru 19. Find desired input speed in rating charts. Use either desired output speed or nominal gear ratio column. Read across page to either torque or horsepower rating which exceeds the equivalent horsepower or torque that is required. The top of the column shows the size and type of reducer to use, the line below the case designation indicates the list price of that unit.
   B. Certain output speeds designated with an asterisk (e.g., 420*) indicate transition ratios which are an overlap of gear ratios available in both single and double, double and triple, and triple and quadruple reduction units. In most cases the single reduction unit will be more expensive than a comparably rated double reduction unit. Size, weight, and rotational orientation may be significant selection factors in some applications, while cost and additional capacity will be significant in others.
   C. Ratings listed in shaded boxes indicate that there is a thermal limitation that is lower than the mechanical capacity listed. Check thermal capacity values against **actual** horsepower required (thermal capacity is **not** service factored). If a higher thermal rating is required:
      1. Use a fan cooled unit designated with an **F** prefex (if available);
      2. Use a larger standard unit with adequate thermal capacity; or
      3. Contact the Nuttall office for price and availability of externally cooled units.
   D. Check overhung load and thrust load requirements (if any) against the ratings for the units listed in Section 257, pages 2, 3.
   E. Add modifications required from Section 255.

3. FRAME DESIGNATIONS

EXAMPLE: R21T



4. SELECTION AND PRICING EXAMPLES

Example A - Horsepower Method

Select a **Moduline** Reducer to drive a reciprocating single cylinder compressor 10 hours per day, requiring 27 actual horsepower. Compressor is to operate at 420 rpm. The prime mover is a 30HP electric motor at 1750 RPM.

Solution A - Horsepower Method

1. Actual HP required 27
2. AGMA Service Factor 1.75 (Sect. 257, pg. 4,5)
3. Equivalent HP: 27 x 1.75 = 47.25HP
4. Input 1750, output 420
5. See Section 250, page 5. The 76S has a 48.8 HP capacity which is adequate; however, because 420 RPM is a transition speed a 51D has more capacity with a lower cost. Selection can be either a 76S or a 51D depending upon whether weight and size, or cost is the key factor.
6. Check allowable overhung load and thrust ratings against application requirements (if any), Section 257, pages 2 and 3.

Example B - Torque Method

Select a **Moduline** reducer to drive a uniformly loaded chain conveyor 18 hours per day, at 37 RPM, and requiring 20,000 inch pounds of torque. The prime mover is an adjustable speed DC motor with a 1750 RPM base speed.

Solution B - Torque Method

1. 1750 base speed electric motor
2. Required torque 20,000 inch pounds.
3 AGMA service factor 1.25.
4. Equivalent torque 20,000 x 1.25 = 25,000 inch pounds.
5. See Section 250, page 5, 37 RPM line:
   selection is at 54T rated at 27,100 inch pounds.
6. Check allowable overhung load and thrust ratings against application requirements.

5. ORDERING

The following information must be provided for each order to permit the manufacturer and assembly of the correct reducer.

   A. Quantity
   B. Prime mover, type, HP, speed
   C. Reducer size/type designation (R21T)
   D. Output RPM
   E. AGMA service class
   F. Mounting position
   G. Description of modifications
   H. Overhung load and thrust requirements
   I. Pricing:
      1. List price of unit.
      2. Adders for modifications
      3. Multiplier
   J. Shipment required

In-Line Speed Reducers
Type R
Moduline®

RATINGS/PRICING
1750 INPUT

Output Speed	Nominal Gear Ratio	SIZE/TYPE	10S	21S	05D	32S	10D	15T	43S	21D	21T	54S	32D
		LIST PRICE	1135	1180	810	1420	1165	1485	1605	1530	1745	2110	1935
1430	1.225	MECH. HP TORQUE (1000 " #)	12.8 .59	20.3 .90		30.0 1.34			53.3 2.44			82.1 3.75	
1170	1.500	MECH. HP TORQUE (1000 " #)	10.6 .59	15.8 .90		23.5 1.34			44.1 2.44			69.0 3.76	
950	1.837	MECH. HP TORQUE (1000 " #)	8.77 .59	13.5 .90		20.0 1.34			36.2 2.44			55.9 3.76	
780	2.250	MECH. HP TORQUE (1000 " #)	7.11 .59	11.0 .90		16.0 1.34			29.4 2.44			46.3 3.76	
640	2.756	MECH. HP TORQUE (1000 " #)	5.66 .59	8.92 .90		13.2 1.34			24.2 2.44			37.3 3.76	
520	3.375	MECH. HP TORQUE (1000 " #)	4.62 .59	7.02 .90		10.5 1.34			19.1 2.44			29.4 3.76	
420*	4.134	MECH. HP TORQUE (1000 " #)	3.91 .59	5.91 .90	7.10 1.0	8.62 1.34	12.5 1.8		16.1 2.44	18.8 2.8		25.0 3.76	34.3 5.1
350	5.06	MECH. HP TORQUE (1000 " #)			6.4 1.0		11.8 2.2			18.9 3.3			35.0 6.5
280	6.20	MECH. HP TORQUE (1000 " #)			6.2 1.5		11.1 2.5			18.2 4.2			36.0 8.3
230	7.59	MECH. HP TORQUE (1000 " #)			6.1 1.6		10.5 3.3			18.9 5.1			31.0 8.4
190	9.30	MECH. HP TORQUE (1000 " #)			5.1 1.6		10.1 3.4			17.0 5.6			25.4 8.6
155	11.39	MECH. HP TORQUE (1000 " #)			3.8 1.6		8.0 3.4			13.9 5.7			21.4 8.8
125	13.95	MECH. HP TORQUE (1000 " #)			3.0 1.6		6.39 3.3			11.1 5.8			17.2 8.9
100	17.09	MECH. HP TORQUE (1000 " #)			2.5 1.6		5.4 3.3			9.25 5.7			13.9 8.8
84	20.93	MECH. HP TORQUE (1000 " #)			2.1 1.5		4.2 3.1			7.11 5.3			11.0 8.3
68	25.63	MECH. HP TORQUE (1000 " #)			1.4 1.2		2.6 2.4			5.3 4.9			8.4 7.6
56*	31.39	MECH. HP TORQUE (1000 " #)			1.2 1.2		2.3 2.5	3.3 3.56		4.21 4.5	5.32 6.1		6.1 6.9
45*	38.44	MECH. HP TORQUE (1000 " #)						2.8 3.67		3.4 4.6	4.55 6.3		5.3 7.1
37	47.08	MECH. HP TORQUE (1000 " #)						2.2 3.73			3.79 6.4		
30	57.60	MECH. HP TORQUE (1000 " #)						1.8 3.80			3.13 6.5		
25	70.62	MECH. HP TORQUE (1000 " #)						1.5 3.8			2.51 6.5		
20	86.50	MECH. HP TORQUE (1000 " #)						1.2 3.8			2.13 6.5		
16.5	105.9	MECH. HP TORQUE (1000 " #)						1.0 3.9			1.77 6.7		
13.5	129.7	MECH. HP TORQUE (1000 " #)						.82 4.0			1.5 6.8		
11.0	158.9	MECH. HP TORQUE (1000 " #)						.67 3.0			.9 5.1		
9.0	194.6	MECH. HP TORQUE (1000 " #)						.55 3.0			.76 5.1		
7.5	238.4	MECH. HP TORQUE (1000 " #)											
6.0	291.9	MECH. HP TORQUE (1000 " #)											
5.0	357.5	MECH. HP TORQUE (1000 " #)											
4.0	437.9	MECH. HP TORQUE (1000 " #)											
3.2	536.3	MECH. HP TORQUE (1000 " #)											
2.7	656.8	MECH. HP TORQUE (1000 " #)											
2.2	804.5	MECH. HP TORQUE (1000 " #)											
1.8	985.3	MECH. HP TORQUE (1000 " #)				DISCOUNT N-3							

Your Total Drive Source noC

In-Line Speed Reducers

Moduline® Type R

RATINGS/PRICING
1750 INPUT

32T	32Q	43D	43T	43Q	76S	51D	51T	54D	54T	54Q	SIZE/TYPE	Nominal Gear Ratio	Output Speed
2155	2710	2320	2735	3210	3335	2735	3045	3175	3665	3965	LIST PRICE		
					162 7.45						MECH. HP TORQUE (1000 " #)	1.225	1430
					134 7.45						MECH. HP TORQUE (1000 " #)	1.500	1170
					110 7.45						MECH. HP TORQUE (1000 " #)	1.837	950
					89.8 7.45						MECH. HP TORQUE (1000 " #)	2.250	780
					74.0 7.45						MECH. HP TORQUE (1000 " #)	2.756	640
					58.4 7.45						MECH. HP TORQUE (1000 " #)	3.375	520
		41.0 6.1			48.8 7.45	60.0 8.9		80.6 12.0			MECH. HP TORQUE (1000 " #)	4.134	420*
		40.3 7.3				61.0 11.3		82.4 15.3			MECH. HP TORQUE (1000 " #)	5.06	350
		40.1 9.0				60.0 13.0		79.7 17.6			MECH. HP TORQUE (1000 " #)	6.20	280
		40.3 11.0				57.5 15.7		77.7 21.2			MECH. HP TORQUE (1000 " #)	7.59	230
		40.2 13.3				48.0 16.1		64.8 21.8			MECH. HP TORQUE (1000 " #)	9.30	190
		33.1 13.5				40.3 16.4		54.4 22.2			MECH. HP TORQUE (1000 " #)	11.39	155
		26.5 13.7				32.5 16.4		43.9 22.2			MECH. HP TORQUE (1000 " #)	13.95	125
		22.9 14.0				27.9 17.0		37.6 23.0			MECH. HP TORQUE (1000 " #)	17.09	100
		19.2 14.2				23.5 17.3		31.7 23.4			MECH. HP TORQUE (1000 " #)	20.93	84
		15.0 13.6				20.1 17.6		26.0 23.8			MECH. HP TORQUE (1000 " #)	25.63	68
8.18 9.4		9.6 10.6	12.6 14.7			15.6 16.5		17.0 18.8	23.0 26.5		MECH. HP TORQUE (1000 " #)	31.39	56*
7.1 9.8		7.8 10.7	11.6 14.9			12.4 17.1		13.8 19.0	18.6 26.9		MECH. HP TORQUE (1000 " #)	38.44	45*
5.8 9.8			8.9 15.2				11.4 19.4		16.0 27.1		MECH. HP TORQUE (1000 " #)	47.08	37
4.8 10.0			7.6 15.5				9.4 19.6		13.2 27.4		MECH. HP TORQUE (1000 " #)	57.66	30
3.8 10.0			6.1 15.7				7.7 19.8		10.8 27.7		MECH. HP TORQUE (1000 " #)	70.62	25
3.1 10.0			5.05 15.7				6.1 20.0		8.6 28.0		MECH. HP TORQUE (1000 " #)	86.50	20
2.7 10.4			4.2 16.2				5.2 20.1		7.6 28.2		MECH. HP TORQUE (1000 " #)	105.9	16.5
2.3 10.6			3.6 16.5				4.4 20.3		6.1 28.4		MECH. HP TORQUE (1000 " #)	129.7	13.5
2.0 11.1			2.2 12.7				3.6 20.4		5.1 28.6		MECH. HP TORQUE (1000 " #)	158.9	11.0
1.1 7.6	1.6 11.1		1.8 12.7	2.5 18.2			2.8 19.6		3.2 22.4	4.0 28.7	MECH. HP TORQUE (1000 " #)	194.6	9.0
	1.3 11.1			2.1 18.3			2.3 19.2		2.7 22.5	3.3 28.9	MECH. HP TORQUE (1000 " #)	238.4	7.5
	1.1 11.2			1.7 18.4						2.6 29.0	MECH. HP TORQUE (1000 " #)	291.9	6.0
	.9 11.2			1.4 18.4						2.2 29.2	MECH. HP TORQUE (1000 " #)	357.5	5.0
	.7 11.3			1.1 18.5						1.8 29.3	MECH. HP TORQUE (1000 " #)	437.9	4.0
	.6 11.3			.9 18.6						1.5 29.4	MECH. HP TORQUE (1000 " #)	536.3	3.2
	.5 11.3			.8 18.6						1.0 24.3	MECH. HP TORQUE (1000 " #)	656.8	2.7
	.4 11.3			.7 18.7						.8 24.3	MECH. HP TORQUE (1000 " #)	804.5	2.2
	.3 11.4			.5 19.7		DISCOUNT N-3					MECH. HP TORQUE (1000 " #)	985.3	1.8

Shaded boxes indicate a thermal limitation. Please see Thermal Ratings, Section 257 Page 6.

In-Line Speed Reducers
Type R
Moduline®

RATINGS/PRICING
1750 INPUT

Output Speed	Nominal Gear Ratio	SIZE/TYPE	64D	64T	64Q	76D	F76D	76T	76Q	85D	F85D	85T	88D	F88D
		LIST PRICE	3605	4685	5080	4835	5195	6090	6820	6405	6845	7805	7400	7840
1430	1.225	MECH. HP TORQUE (1000 " #)												
1170	1.500	MECH. HP TORQUE (1000 " #)												
950	1.837	MECH. HP TORQUE (1000 " #)												
780	2.250	MECH. HP TORQUE (1000 " #)												
640	2.756	MECH. HP TORQUE (1000 " #)												
520	3.375	MECH. HP TORQUE (1000 " #)												
420	4.134	MECH. HP TORQUE (1000 " #)				303 45.0	170 45.0						329 48.6	240 48.6
350	5.06	MECH. HP TORQUE (1000 " #)	161.0 29.2			250 46.5	170 46.5						323 58.5	240 58.5
280	6.20	MECH. HP TORQUE (1000 " #)	133 30.1			212 47.5	174 47.5			263 58.4	250 58.4		329 73.0	250 73.0
230	7.59	MECH. HP TORQUE (1000 " #)	112 30.9			181 49.4	181 49.4			238 65.2	238 65.2		300 81.5	253 81.5
190	9.30	MECH. HP TORQUE (1000 " #)	94.4 31.7			148 50.0	148 50.0			196 65.6	196 65.6		250 82.0	250 82.0
155	11.39	MECH. HP TORQUE (1000 " #)	77.9 32.5			125 51.0	125 51.0			161 66.0	161 66.0		201 82.5	201 82.5
125	13.95	MECH. HP TORQUE (1000 " #)	65.3 33.1			100 52.0				132 66.4			165 83.0	165 83
100	17.09	MECH. HP TORQUE (1000 " #)	53.7 33.8			85.7 53.0				111 68.0			138 85.0	
84	20.93	MECH. HP TORQUE (1000 " #)	45.0 34.4			67.8 50.0				92.1 69.3			115 86.7	
68	25.63	MECH. HP TORQUE (1000 " #)	38.4 34.9			50.0 45.6				75.0 68.0			91.3 85.0	
56	31.39	MECH. HP TORQUE (1000 " #)		33.3 38.5				48.0 55.3		61.0 65.7			71.0 81.0	
45	38.44	MECH. HP TORQUE (1000 " #)		27.3 39.1				41.2 57.3		52.0 68.3			60.0 82.0	
37	47.08	MECH. HP TORQUE (1000 " #)		23.4 39.5				34.6 58.7				45.5 79.2		
30	57.66	MECH. HP TORQUE (1000 " #)		19.0 40.0				28.7 60.0				38.5 80.8		
25	70.62	MECH. HP TORQUE (1000 " #)		15.8 40.4				24.0 60.7				31.9 81.6		
20	86.50	MECH. HP TORQUE (1000 " #)		12.7 40.9				20.0 61.1				26.2 82.4		
16.5	105.9	MECH. HP TORQUE (1000 " #)		10.6 41.2				16.2 61.5				21.8 83.2		
13.5	129.7	MECH. HP TORQUE (1000 " #)		8.8 41.5				14.1 63.0				17.3 84.0		
11.0	158.9	MECH. HP TORQUE (1000 " #)		7.4 41.8				11.4 65.0				15.1 84.0		
9.0	194.6	MECH. HP TORQUE (1000 " #)			6.1 41.6				9.5 68.6			12.1 80.7		
7.5	238.4	MECH. HP TORQUE (1000 " #)			4.8 42.3				8.1 68.9			10.2 83.2		
6.0	291.9	MECH. HP TORQUE (1000 " #)			4.0 42.6				6.5 69.3					
5.0	357.5	MECH. HP TORQUE (1000 " #)			3.2 42.8				5.4 69.6					
4.0	437.9	MECH. HP TORQUE (1000 " #)			2.6 43.0				4.3 70.0					
3.2	536.3	MECH. HP TORQUE (1000 " #)			2.2 43.1				3.6 70.3					
2.7	656.8	MECH. HP TORQUE (1000 " #)			1.8 43.3				3.0 70.5					
2.2	804.5	MECH. HP TORQUE (1000 " #)							2.5 70.8					
1.8	985.3	MECH. HP TORQUE (1000 " #)				DISCOUNT N-3								

Shaded boxes indicate a thermal limitation. Please see Thermal Ratings, Section 257 Page 6.

Your Total Drive Source

In-Line Speed Reducers

Moduline® Type R

RATINGS/PRICING
1750 INPUT

88T	88Q	92D	F92D	92T	92Q	98D	F98D	98T	98Q	SIZE/TYPE	Nominal Gear Ratio	Output Speed
9035	11110	9540	9980	10785	12810	12275	12850	14435	16615	LIST PRICE		
										MECH. HP TORQUE (1000 " #)	1.225	1430
										MECH. HP TORQUE (1000 " #)	1.500	1170
										MECH. HP TORQUE (1000 " #)	1.837	950
										MECH. HP TORQUE (1000 " #)	2.250	780
										MECH. HP TORQUE (1000 " #)	2.756	640
										MECH. HP TORQUE (1000 " #)	3.375	520
										MECH. HP TORQUE (1000 " #)	4.134	420
										MECH. HP TORQUE (1000 " #)	5.06	350
		364 82	282 82			717 158	300 158			MECH. HP TORQUE (1000 " #)	6.20	280
		355 98	284 98			604 164	300 164			MECH. HP TORQUE (1000 " #)	7.59	230
		300 102	286 102			504 167	300 167			MECH. HP TORQUE (1000 " #)	9.30	190
		254 106	254 106			429 174	300 174			MECH. HP TORQUE (1000 " #)	11.39	155
		210 108	210 108			357 177	300 177			MECH. HP TORQUE (1000 " #)	13.95	125
		179 112	179 112			300 182	300 182			MECH. HP TORQUE (1000 " #)	17.09	100
		150 114				248 186	248 186			MECH. HP TORQUE (1000 " #)	20.93	84
		125 117				200 182	200 182			MECH. HP TORQUE (1000 " #)	25.63	68
82.9 96.0		103 120				159 173				MECH. HP TORQUE (1000 " #)	31.39	56
70.5 98.0		89.1 124						150 208		MECH. HP TORQUE (1000 " #)	38.44	45
57.0 99.0				73.5 130				125 212		MECH. HP TORQUE (1000 " #)	47.08	37
48.1 101.0				62.8 132				106 214		MECH. HP TORQUE (1000 " #)	57.66	30
40.1 102				51.5 134				86 216		MECH. HP TORQUE (1000 " #)	70.62	25
32.7 103				42.3 135				68 214		MECH. HP TORQUE (1000 " #)	86.50	20
27.2 104				35.8 136				58 220		MECH. HP TORQUE (1000 " #)	105.9	16.5
21.7 105				28.2 137				50 225		MECH. HP TORQUE (1000 " #)	129.7	13.5
18.3 105	20.7 122			23.8 139				40 225		MECH. HP TORQUE (1000 " #)	158.9	11.0
14.2 98	16.9 123			20 141					32 224	MECH. HP TORQUE (1000 " #)	194.6	9.0
11.4 98	14.5 124			16.4 143					27 226	MECH. HP TORQUE (1000 " #)	238.4	7.5
	11.6 124				13 136				22 231	MECH. HP TORQUE (1000 " #)	291.9	6.0
	9.7 125				11 138				18 226	MECH. HP TORQUE (1000 " #)	357.5	5.0
	7.7 126				9 141				14 220	MECH. HP TORQUE (1000 " #)	437.9	4.0
	6.3 126				7 138				12 232	MECH. HP TORQUE (1000 " #)	536.3	3.2
	5.3 127				6 140				10 233	MECH. HP TORQUE (1000 " #)	656.8	2.7
	4.5 127									MECH. HP TORQUE (1000 " #)	804.5	2.2
	2.9 103			DISCOUNT N-3						MECH. HP TORQUE (1000 " #)	985.3	1.8

Shaded boxes indicate a thermal limitation. Please see Thermal Ratings, Section 257 Page 6.

In-Line Speed Reducers
Type R
Moduline®

RATINGS/PRICING
1430 INPUT

Output Speed	Nominal Gear Ratio	SIZE/TYPE	10S	21S	05D	32S	10D	15T	43S	21D	21T	54S	32D
		LIST PRICE	1135	1180	810	1420	1165	1485	1605	1530	1745	2110	1935
1170	1.225	MECH. HP TORQUE (1000 " #)	10.5 .59	16.2 .9		23.8 1.34			43.5 2.44			67.1 3.76	
950	1.500	MECH. HP TORQUE (1000 " #)	8.72 .59	12.9 .9		19.2 1.34			36.0 2.44			56.4 3.8	
780	1.837	MECH. HP TORQUE (1000 " #)	7.16 .59	11.0 .9		16.4 1.34			30.0 2.44			45.6 3.8	
640	2.250	MECH. HP TORQUE (1000 " #)	5.81 .59	9.0 .9		13.1 1.34			24.0 2.44			37.0 3.8	
520	2.756	MECH. HP TORQUE (1000 " #)	4.62 .59	7.2 .9		10.8 1.34			20.4 2.44			30.5 3.8	
420	3.375	MECH. HP TORQUE (1000 " #)	3.78 .59	5.7 .9		8.59 1.34			15.6 2.44			24.0 3.8	
350*	4.134	MECH. HP TORQUE (1000 " #)	3.19 .59	4.8 .9	5.8 1.0	7.04 1.34	12.1 2.2		13.2 2.44	18.1 3.3		20.3 3.8	35.7 6.5
280	5.06	MECH. HP TORQUE (1000 " #)			5.3 1.2		11.9 2.7			18.7 4.2			36.4 8.3
230	6.20	MECH. HP TORQUE (1000 " #)			5.1 1.3		12.0 3.3			18.1 5.1			30.2 8.4
190	7.59	MECH. HP TORQUE (1000 " #)			5.0 1.6		10.2 3.4			16.9 5.6			25.9 8.6
155	9.30	MECH. HP TORQUE (1000 " #)			4.2 1.6		8.28 3.4			14.1 5.7			21.2 8.8
125	11.39	MECH. HP TORQUE (1000 " #)			3.1 1.6		6.79 3.5			11.6 5.8			17.7 8.9
100	13.95	MECH. HP TORQUE (1000 " #)			2.5 1.6		5.54 3.5			9.1 5.7			13.9 8.8
84	17.09	MECH. HP TORQUE (1000 " #)			2.1 1.5		4.41 3.3			7.1 5.3			10.7 8.3
68	20.93	MECH. HP TORQUE (1000 " #)			1.7 1.5		3.44 3.1			5.4 4.9			8.24 7.6
56	25.63	MECH. HP TORQUE (1000 " #)			1.2 1.2		2.14 2.4			4.2 4.7			7.1 7.8
45*	31.39	MECH. HP TORQUE (1000 " #)			1.0 1.2		1.9 2.5	2.7 3.6		3.3 4.4	4.5 6.3		5.1 7.0
37	38.44	MECH. HP TORQUE (1000 " #)						2.2 3.7		2.84 4.7	3.8 6.4		4.4 7.2
30	47.08	MECH. HP TORQUE (1000 " #)						1.8 3.7			3.2 6.5		
25	57.66	MECH. HP TORQUE (1000 " #)						1.5 3.8			2.6 6.5		
20	70.62	MECH. HP TORQUE (1000 " #)						1.2 3.8			2.03 6.5		
16.5	86.50	MECH. HP TORQUE (1000 " #)						1.0 3.8			1.7 6.7		
13.5	105.9	MECH. HP TORQUE (1000 " #)						.81 3.9			1.5 6.8		
11.0	129.7	MECH. HP TORQUE (1000 " #)						.67 4.0			1.3 7.2		
9.0	158.9	MECH. HP TORQUE (1000 " #)						.55 3.2			.75 5.1		
7.5	194.6	MECH. HP TORQUE (1000 " #)						.45 3.2			.62 5.2		
6.0	238.4	MECH. HP TORQUE (1000 " #)											
5.0	291.9	MECH. HP TORQUE (1000 " #)											
4.0	357.5	MECH. HP TORQUE (1000 " #)											
3.2	437.9	MECH. HP TORQUE (1000 " #)											
2.7	536.3	MECH. HP TORQUE (1000 " #)											
2.2	656.8	MECH. HP TORQUE (1000 " #)											
1.8	804.5	MECH. HP TORQUE (1000 " #)											
1.5	985.3	MECH. HP TORQUE (1000 " #)				DISCOUNT N-3							

Your Total Drive Source

In-Line Speed Reducers

Moduline® Type R

RATINGS/PRICING
1430 INPUT

32T	32Q	43D	43T	43Q	76S	51D	51T	54D	54T	54Q	SIZE/TYPE	Nominal Gear Ratio	Output Speed
2155	2710	2320	2735	3210	3335	2735	3045	3175	3665	3965	LIST PRICE		
					133 7.5						MECH. HP TORQUE (1000 " #)	1.225	1170
					110 7.5						MECH. HP TORQUE (1000 " #)	1.500	950
					90.5 7.5						MECH. HP TORQUE (1000 " #)	1.837	780
					73.4 7.5						MECH. HP TORQUE (1000 " #)	2.250	640
					60.5 7.5						MECH. HP TORQUE (1000 " #)	2.756	520
					47.7 7.5						MECH. HP TORQUE (1000 " #)	3.375	420
		40.1 7.3			40.4 7.5	59.7 8.9		79.6 15.3			MECH. HP TORQUE (1000 " #)	4.134	350*
		39.6 9.0				58.2 11.3		77.5 17.6			MECH. HP TORQUE (1000 " #)	5.06	280
		40.1 11.0				58.9 13.0		78.5 21.2			MECH. HP TORQUE (1000 " #)	6.20	230
		39.8 13.3				50.2 15.7		65.3 21.8			MECH. HP TORQUE (1000 " #)	7.59	190
		32.8 13.5				41.1 16.1		53.9 22.2			MECH. HP TORQUE (1000 " #)	9.30	155
		27.4 13.7				32.3 16.4		45.4 22.7			MECH. HP TORQUE (1000 " #)	11.39	125
		22.1 14.0				26.5 16.4		36.3 23.0			MECH. HP TORQUE (1000 " #)	13.95	100
		18.9 14.2				21.2 17.0		31.2 23.4			MECH. HP TORQUE (1000 " #)	17.09	84
		15.0 13.6				17.8 17.3		26.3 23.8			MECH. HP TORQUE (1000 " #)	20.93	68
		12.0 13.5				16.2 17.6		21.6 24.2			MECH. HP TORQUE (1000 " #)	25.63	56
7.0 9.8		7.9 10.7	10.4 14.9			13.5 16.5		16.0 19.0	19.1 26.9		MECH. HP TORQUE (1000 " #)	31.39	45 *
5.8 9.8		6.5 10.8	8.9 15.2			10.8 17.1		11.7 19.2	15.3 27.1		MECH. HP TORQUE (1000 " #)	38.44	37*
4.8 10.0			7.5 15.5				10.3 19.4		13.2 27.4		MECH. HP TORQUE (1000 " #)	47.08	30
3.9 10.0			6.1 15.7				8.5 19.6		10.9 27.7		MECH. HP TORQUE (1000 " #)	57.66	25
3.1 10.0			4.9 15.9				7.1 19.8		8.9 28.0		MECH. HP TORQUE (1000 " #)	70.62	20
2.7 10.4			4.1 16.2				5.9 20.0		7.1 28.2		MECH. HP TORQUE (1000 " #)	86.50	16.5
2.3 10.6			3.5 16.5				4.9 20.1		6.0 28.4		MECH. HP TORQUE (1000 " #)	105.9	13.5
1.9 10.9			3.0 16.8				4.1 20.3		5.1 28.6		MECH. HP TORQUE (1000 " #)	129.7	11.0
1.1 7.6			1.8 12.7				3.4 20.4		4.1 28.7		MECH. HP TORQUE (1000 " #)	158.9	9.0
.9 7.7	1.3 11.1		1.5 12.8	2.1 18.3			2.6 19.6		2.7 22.5	3.3 28.9	MECH. HP TORQUE (1000 " #)	194.6	7.5
	1.3 11.2			1.7 18.4			2.0 19.2		2.2 22.6	2.7 29.0	MECH. HP TORQUE (1000 " #)	238.4	6.0
	1.1 11.2			1.4 18.4						2.2 29.2	MECH. HP TORQUE (1000 " #)	291.9	5.0
	.7 11.3			1.2 18.5						1.8 29.3	MECH. HP TORQUE (1000 " #)	357.5	4.0
	.6 11.3			.9 18.6						1.5 29.4	MECH. HP TORQUE (1000 " #)	437.9	3.2
	.5 11.3			.8 18.6						1.2 29.4	MECH. HP TORQUE (1000 " #)	536.3	2.7
	.4 11.3			.6 18.7						.8 24.3	MECH. HP TORQUE (1000 " #)	656.8	2.2
	.3 11.4			.5 18.7						.7 24.3	MECH. HP TORQUE (1000 " #)	804.5	1.8
	.27 11.4			.4 18.7		DISCOUNT N-3					MECH. HP TORQUE (1000 " #)	985.3	1.5

Shaded boxes indicate a thermal limitation. Please see Thermal Ratings, Section 257 Page 6.

In-Line Speed Reducers
Type R
Moduline®

RATINGS/PRICING
1430 INPUT

Output Speed	Nominal Gear Ratio	SIZE/TYPE	64D	64T	64Q	76D	F76D	76T	76Q	85D	F85D	85T	88D	F88D
		LIST PRICE	3605	4685	5080	4835	5195	6090	6820	6405	6845	7805	7400	7840
1170	1.225	MECH. HP TORQUE (1000 " #)												
950	1.500	MECH. HP TORQUE (1000 " #)												
780	1.837	MECH. HP TORQUE (1000 " #)												
640	2.250	MECH. HP TORQUE (1000 " #)												
520	2.756	MECH. HP TORQUE (1000 " #)												
420	3.375	MECH. HP TORQUE (1000 " #)												
350	4.134	MECH. HP TORQUE (1000 " #)				255 46.5	139 46.5						323 58.5	203 58.5
280	5.06	MECH. HP TORQUE (1000 " #)	136 30.1			209 47.5	141 47.5			264 58.4	205 58.4		330 73.0	205 73.0
230	6.20	MECH. HP TORQUE (1000 " #)	111 30.9			180 49.4	145 49.4			240 65.2	208 65.2		301 81.5	208 81.5
190	7.59	MECH. HP TORQUE (1000 " #)	94.5 31.7			150 50.0	145 50.0			200 65.6	200 65.6		250 82.0	211 82.0
155	9.30	MECH. HP TORQUE (1000 " #)	79.0 32.6			125 51.0	125 51.0			161 66.0	161 66.0		202 82.5	202 82.5
125	11.39	MECH. HP TORQUE (1000 " #)	64.8 33.1			104 52.0	104 52.0			132 66.4			165 83.0	165 83.0
100	13.95	MECH. HP TORQUE (1000 " #)	54.4 33.8			83.8 53.0				110 68.0			138 85.0	
84	17.09	MECH. HP TORQUE (1000 " #)	44.6 34.4			66.1 50.0				92.0 69.4			115 86.7	
68	20.93	MECH. HP TORQUE (1000 " #)	37.3 34.9			50.5 45.6				74.2 68.4			92.8 85.5	
56	25.63	MECH. HP TORQUE (1000 " #)	31.3 35.4			41.5 48.0				60.0 68.4			75.0 85.5	
45 *	31.39	MECH. HP TORQUE (1000 " #)		27.6 39.1				40.6 57.3		50.8 65.7			60.2 82.0	
37 *	38.44	MECH. HP TORQUE (1000 " #)		22.5 39.5				34.5 58.7		43.3 68.3			50.4 82.5	
30	47.08	MECH. HP TORQUE (1000 " #)		20.0 40.0				30.0 60.0				38.0 80.8		
25	57.66	MECH. HP TORQUE (1000 " #)		15.7 40.4				23.7 60.7				31.8 81.6		
20	70.62	MECH. HP TORQUE (1000 " #)		13.1 40.9				20.0 61.1				26.3 82.4		
16.5	86.50	MECH. HP TORQUE (1000 " #)		10.4 41.2				15.6 61.5				21.6 83.2		
13.5	105.9	MECH. HP TORQUE (1000 " #)		8.7 41.5				13.5 63.0				18.0 84.0		
11.0	129.7	MECH. HP TORQUE (1000 " #)		7.3 41.8				11.6 65.3				14.3 84.8		
9.0	158.9	MECH. HP TORQUE (1000 " #)		6.1 42.1				9.6 66.5				12.2 85.6		
7.5	194.6	MECH. HP TORQUE (1000 " #)			4.8 42.3				7.8 68.9					
6.0	238.4	MECH. HP TORQUE (1000 " #)			4.0 42.6				6.7 69.3					
5.0	291.9	MECH. HP TORQUE (1000 " #)			3.2 42.8				5.4 69.6					
4.0	357.5	MECH. HP TORQUE (1000 " #)			2.6 43.0				4.5 70.0					
3.2	437.9	MECH. HP TORQUE (1000 " #)			2.1 43.1				3.5 70.3					
2.7	536.3	MECH. HP TORQUE (1000 " #)			1.8 43.3				2.9 70.5					
2.2	656.8	MECH. HP TORQUE (1000 " #)			1.5 43.4				2.5 70.8					
1.8	804.5	MECH. HP TORQUE (1000 " #)							2.0 71.0					
1.5	985.3	MECH. HP TORQUE (1000 " #)				DISCOUNT N-3								

Shaded boxes indicate a thermal limitation. Please see Thermal Ratings, Section 257 Page 6.

Your Total Drive Source

In-Line Speed Reducers

Moduline® Type R

RATINGS/PRICING
1430 INPUT

88T	88Q	92D	F92D	92T	92Q	98D	F98D	98T	98Q	SIZE/TYPE	Nominal Gear Ratio	Output Speed
9035	11110	9540	9980	10785	12810	12275	12850	14435	16615	LIST PRICE		
										MECH. HP TORQUE (1000 " #)	1.225	1170
										MECH. HP TORQUE (1000 " #)	1.500	950
										MECH. HP TORQUE (1000 " #)	1.837	780
										MECH. HP TORQUE (1000 " #)	2.250	640
										MECH. HP TORQUE (1000 " #)	2.756	520
										MECH. HP TORQUE (1000 " #)	3.375	420
										MECH. HP TORQUE (1000 " #)	4.134	350
										MECH. HP TORQUE (1000 " #)	5.06	280
		355 98.0	240 98.0			600.0 164	280 164			MECH. HP TORQUE (1000 " #)	6.20	230
		302 102	242 102			504.0 167	280 167			MECH. HP TORQUE (1000 " #)	7.59	190
		255 106	243 106			420 174	280 174			MECH. HP TORQUE (1000 " #)	9.30	155
		212 108	212 108			350 177	280 177			MECH. HP TORQUE (1000 " #)	11.39	125
		178 112	178 112			294 182	280 182			MECH. HP TORQUE (1000 " #)	13.95	100
		150 114				247 186	247 186			MECH. HP TORQUE (1000 " #)	17.09	84
		125 117				205 187	205 182			MECH. HP TORQUE (1000 " #)	20.93	68
		103 120				170 173				MECH. HP TORQUE (1000 " #)	25.63	56
		87.3 124				141 164				MECH. HP TORQUE (1000 " #)	31.39	45
		75.0 126.0						125 212		MECH. HP TORQUE (1000 " #)	38.44	37
47.5 101				61.0 132				105 214		MECH. HP TORQUE (1000 " #)	47.08	30
40.1 102				52.0 134				87 216		MECH. HP TORQUE (1000 " #)	57.66	25
32.9 103				42.4 135				71.6 214		MECH. HP TORQUE (1000 " #)	70.62	20
27.0 104				35.1 136				59.7 220		MECH. HP TORQUE (1000 " #)	86.50	16.5
22.5 105				28.8 137				49.7 225		MECH. HP TORQUE (1000 " #)	105.9	13.5
17.9 106				23.0 139				41.4 225		MECH. HP TORQUE (1000 " #)	129.7	11.0
15.2 107	17.1 123			19.7 141				34.5 225		MECH. HP TORQUE (1000 " #)	158.9	9.0
11.5 97.7	13.9 124			16.6 143					26.7 226	MECH. HP TORQUE (1000 " #)	194.6	7.5
11.1 97.8	11.4 124			13.6 145					22.2 231	MECH. HP TORQUE (1000 " #)	238.4	6.0
	9.6 125				10.8 138				18.5 226	MECH. HP TORQUE (1000 " #)	291.9	5.0
	8.0 126				9.0 141				15.4 220	MECH. HP TORQUE (1000 " #)	357.5	4.0
	6.3 126				7.5 138				12.8 232	MECH. HP TORQUE (1000 " #)	437.9	3.2
	5.21 127				6.3 140				10.7 233	MECH. HP TORQUE (1000 " #)	536.3	2.7
	4.4 127				5.2 138				8.9 223	MECH. HP TORQUE (1000 " #)	656.8	2.2
	3.6 127									MECH. HP TORQUE (1000 " #)	804.5	1.8
	2.4 103			DISCOUNT N-3						MECH. HP TORQUE (1000 " #)	985.3	1.5

Shaded boxes indicate a thermal limitation. Please see Thermal Ratings, Section 257 Page 6.

In-Line Speed Reducers
Type R

Moduline®

RATINGS/PRICING
1170 INPUT

Output Speed	Nominal Gear Ratio	SIZE/TYPE	10S	21S	05D	32S	10D	15T	43S	21D	21T	54S	32D
		LIST PRICE	1135	1180	810	1420	1165	1485	1605	1530	1745	2110	1935
950	1.225	MECH. HP TORQUE (1000 " #)	8.6 .6	13.3 .9		19.5 1.3			35.6 2.4			54.9 3.8	
780	1.500	MECH. HP TORQUE (1000 " #)	7.1 .6	10.5 .9		15.7 1.3			29.5 2.4			46.1 3.8	
640	1.837	MECH. HP TORQUE (1000 " #)	5.9 .6	9.0 .9		13.4 1.3			24.2 2.4			37.3 3.8	
520	2.250	MECH. HP TORQUE (1000 " #)	4.8 .6	7.4 .9		10.7 1.3			20.1 2.4			30.3 3.8	
420	2.756	MECH. HP TORQUE (1000 " #)	3.8 .6	6.0 .9		8.9 1.3			16.2 2.4			25.0 3.8	
350	3.375	MECH. HP TORQUE (1000 " #)	3.1 .6	4.7 .9		7.0 1.3			12.7 2.4			20.2 3.8	
280*	4.134	MECH. HP TORQUE (1000 " #)	2.6 .6	4.0 .9	4.7 1.5	5.8 1.3	12.1 2.7		10.8 2.4	18.0 4.2		16.6 3.8	37.3 8.3
230	5.06	MECH. HP TORQUE (1000 " #)			3.9 1.6		11.9 3.3			18.6 5.1			30.1 8.4
190	6.20	MECH. HP TORQUE (1000 " #)			3.3 1.6		10.1 3.4			16.2 5.6			24.9 8.6
155	7.59	MECH. HP TORQUE (1000 " #)			2.7 1.6		8.4 3.4			14.1 5.7			21.7 8.8
125	9.30	MECH. HP TORQUE (1000 " #)			2.3 1.6		7.0 3.5			11.7 5.8			17.6 8.9
100	11.39	MECH. HP TORQUE (1000 " #)			1.9 1.6		5.6 3.5			9.3 5.7			14.3 8.8
84	13.95	MECH. HP TORQUE (1000 " #)			1.6 1.5		4.3 3.3			6.8 5.3			10.7 8.3
68	17.09	MECH. HP TORQUE (1000 " #)			1.3 1.2		3.4 3.1			5.3 4.9			8.1 7.6
56	20.93	MECH. HP TORQUE (1000 " #)			1.1 1.2		2.9 3.2			4.5 5.0			7.0 7.9
45	25.63	MECH. HP TORQUE (1000 " #)					1.8 2.5			3.3 4.6			5.2 7.0
37	31.39	MECH. HP TORQUE (1000 " #)					1.5 2.5	2.2 3.6		2.8 4.7	3.7 6.4		4.3 7.2
30	38.44	MECH. HP TORQUE (1000 " #)						1.9 3.8		2.4 4.8	3.1 6.5		3.6 7.3
25	47.08	MECH. HP TORQUE (1000 " #)						1.5 3.8			2.6 6.5		
20	57.66	MECH. HP TORQUE (1000 " #)						1.2 3.8			2.1 6.5		
16.5	70.62	MECH. HP TORQUE (1000 " #)						1.0 3.8			1.7 6.7		
13.5	86.50	MECH. HP TORQUE (1000 " #)						.8 3.8			1.4 6.8		
11.0	105.9	MECH. HP TORQUE (1000 " #)						.7 3.9			1.3 7.2		
9.0	129.7	MECH. HP TORQUE (1000 " #)						.5 4.0			1.1 7.2		
7.5	158.9	MECH. HP TORQUE (1000 " #)						.4 3.0			.6 5.1		
6.0	194.6	MECH. HP TORQUE (1000 " #)						.4 3.0			.5 5.1		
5.0	238.4	MECH. HP TORQUE (1000 " #)											
4.0	291.9	MECH. HP TORQUE (1000 " #)											
3.2	357.5	MECH. HP TORQUE (1000 " #)											
2.7	437.9	MECH. HP TORQUE (1000 " #)											
2.2	536.3	MECH. HP TORQUE (1000 " #)											
1.8	656.8	MECH. HP TORQUE (1000 " #)											
1.5	804.5	MECH. HP TORQUE (1000 " #)											
1.2	985.3	MECH. HP TORQUE (1000 " #)			DISCOUNT N-3								

Your Total Drive Source

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In-Line Speed Reducers

Moduline® Type R

RATINGS/PRICING
1170 INPUT

32T	32Q	43D	43T	43Q	76S	51D	51T	54D	54T	54Q	SIZE/TYPE	Nominal Gear Ratio	Output Speed
2155	2710	2320	2735	3210	3335	2735	3045	3175	3665	3965	LIST PRICE		
					108 7.5						MECH. HP TORQUE (1000 " #)	1.225	950
					90.1 7.5						MECH. HP TORQUE (1000 " #)	1.500	780
					74.0 7.5						MECH. HP TORQUE (1000 " #)	1.837	640
					60.0 7.5						MECH. HP TORQUE (1000 " #)	2.250	520
					49.5 7.5						MECH. HP TORQUE (1000 " #)	2.756	420
					39.0 7.5						MECH. HP TORQUE (1000 " #)	3.375	350
		40.4 9.0			32.6 7.5	42.0 8.9		79.1 17.6			MECH. HP TORQUE (1000 " #)	4.134	280
		40.2 11.0				41.1 11.3		76.3 21.2			MECH. HP TORQUE (1000 " #)	5.06	230
		40.1 13.3				41.0 14.0		66.0 21.8			MECH. HP TORQUE (1000 " #)	6.20	190
		33.1 13.5				38.4 15.7		54.4 22.2			MECH. HP TORQUE (1000 " #)	7.59	155
		27.2 13.7				36.0 16.1		46.1 22.7			MECH. HP TORQUE (1000 " #)	9.30	125
		22.9 14.0				26.8 16.4		37.7 23.0			MECH. HP TORQUE (1000 " #)	11.39	100
		18.3 14.2				26.8 16.4		30.2 23.4			MECH. HP TORQUE (1000 " #)	13.95	84
		14.8 13.6				21.7 16.4		26.0 23.8			MECH. HP TORQUE (1000 " #)	17.09	68
		12.6 14.0				18.6 17.0		21.8 24.1			MECH. HP TORQUE (1000 " #)	20.93	56
		7.8 10.7				13.8 17.3		15.7 19.0			MECH. HP TORQUE (1000 " #)	25.63	45
5.7 9.9		6.5 10.8	8.7 15.2			11.6 17.6		13.4 19.2	15.7 27.1		MECH. HP TORQUE (1000 " #)	31.39	37
4.8 10.0		5.3 10.9	7.4 15.5			9.5 16.5		10.4 19.4	12.6 27.4		MECH. HP TORQUE (1000 " #)	38.44	30
4.0 10.0			6.1 15.7			8.3 17.1			10.9 27.7		MECH. HP TORQUE (1000 " #)	47.08	25
3.2 10.0			5.0 15.9				7.6 19.4		9.1 28		MECH. HP TORQUE (1000 " #)	57.66	20
2.7 10.4			4.1 16.2				6.3 19.6		7.4 28.2		MECH. HP TORQUE (1000 " #)	70.62	16.5
2.2 10.6			3.4 16.5				5.1 19.8		5.8 28.4		MECH. HP TORQUE (1000 " #)	86.50	13.5
1.9 10.9			2.9 16.8				4.1 20.0		4.9 28.6		MECH. HP TORQUE (1000 " #)	105.9	11.0
1.6 11.2			2.5 17.1				3.5 20.1		4.2 28.7		MECH. HP TORQUE (1000 " #)	129.7	9.0
.9 7.7			1.5 12.6				2.9 20.3		3.4 28.8		MECH. HP TORQUE (1000 " #)	158.9	7.5
.8 7.7	1.1 11.2		1.2 12.8	1.7 18.4			2.4 20.4		2.2 22.6	2.7 29.0	MECH. HP TORQUE (1000 " #)	194.6	6.0
	.9 11.2			1.4 18.4			1.9 19.6		1.8 22.6	2.2 29.2	MECH. HP TORQUE (1000 " #)	238.4	5.0
	.7 11.3			1.2 18.5			1.5 19.2			1.8 29.3	MECH. HP TORQUE (1000 " #)	291.9	4.0
	.6 11.3			1.0 18.6						1.5 29.4	MECH. HP TORQUE (1000 " #)	357.5	3.2
	.5 11.3			.8 18.6						1.2 29.4	MECH. HP TORQUE (1000 " #)	437.9	2.7
	.4 11.3			.6 18.7						1.0 29.5	MECH. HP TORQUE (1000 " #)	536.3	2.2
	.3 11.4			.5 18.7						.7 24.3	MECH. HP TORQUE (1000 " #)	656.8	1.8
	.3 11.4			.4 18.7						.6 24.4	MECH. HP TORQUE (1000 " #)	804.5	1.5
	.2 11.4			.4 18.7	DISCOUNT N-3						MECH. HP TORQUE (1000 " #)	985.3	1.2

Shaded boxes indicate a thermal limitation. Please see Thermal Ratings, Section 257 Page 6.

In-Line Speed Reducers
Type R
Moduline®

RATINGS/PRICING
1170 INPUT

Output Speed	Nominal Gear Ratio	SIZE/TYPE	64D	64T	64Q	76D	F76D	76T	76Q	85D	F85D	85T	88D	F88D
		LIST PRICE	3605	4685	5080	4835	5195	6090	6820	6405	6845	7805	7400	7840
950	1.225	MECH. HP TORQUE (1000 " #)												
780	1.500	MECH. HP TORQUE (1000 " #)												
640	1.837	MECH. HP TORQUE (1000 " #)												
520	2.250	MECH. HP TORQUE (1000 " #)												
420	2.756	MECH. HP TORQUE (1000 " #)												
350	3.375	MECH. HP TORQUE (1000 " #)												
280	4.134	MECH. HP TORQUE (1000 " #)				213 47.5	125 47.5						330 73	180 73
230	5.06	MECH. HP TORQUE (1000 " #)	114 30.9			178 49.4	127 49.4			240 65.2	182 65.2		301 81.5	182 81.5
190	6.20	MECH. HP TORQUE (1000 " #)	94 31.7			150 50	129 50			200 65.6	184 65.6		250 82.0	184 82.0
155	7.59	MECH. HP TORQUE (1000 " #)	79.2 32.5			125 51	125 51			161 68	161 68		202 82.5	188 82.5
125	9.30	MECH. HP TORQUE (1000 " #)	65.9 33.1			103 52				132 66.4			166 83	
100	11.39	MECH. HP TORQUE (1000 " #)	54.2 33.8			87.0 53				111 68			139 85	
84	13.95	MECH. HP TORQUE (1000 " #)	45.3 34.4			64.7 50				92 69.4			115 86.7	
68	17.09	MECH. HP TORQUE (1000 " #)	37.0 34.9			50.1 45.6				75.4 68.4			93.4 85.5	
56	20.93	MECH. HP TORQUE (1000 " #)	31.0 35.5			43.3 47.8				63.8 71.8			79.7 89.7	
45	25.63	MECH. HP TORQUE (1000 " #)	26.4 35.9			33.5 50.0				50.2 68.8			61.7 86.0	
37*	31.39	MECH. HP TORQUE (1000 " #)		22.8 39.5				34.0 58.7		40.9 65.7			50.1 82.5	
30*	38.44	MECH. HP TORQUE (1000 " #)		18.6 40.0				30.0 60.0		35.1 68.3			40.6 83.0	
25	47.08	MECH. HP TORQUE (1000 " #)		16.0 40.4				23.9 60.7				31.4 81.6		
20	57.66	MECH. HP TORQUE (1000 " #)		13.0 40.9				20.1 61.1				26.2 82.4		
16.5	70.62	MECH. HP TORQUE (1000 " #)		10.8 41.2				16.2 61.5				21.8 83.2		
13.5	86.50	MECH. HP TORQUE (1000 " #)		8.6 41.5				13.1 63.0				17.8 84.0		
11.0	105.9	MECH. HP TORQUE (1000 " #)		7.1 41.8				11.5 65.3				14.8 84.8		
9.0	129.7	MECH. HP TORQUE (1000 " #)		6.0 42.0				9.7 66.5				11.8 85.6		
7.5	158.9	MECH. HP TORQUE (1000 " #)		5.0 42.3				7.7 65.0				10.0 85.6		
6.0	194.6	MECH. HP TORQUE (1000 " #)			4.0 42.6				6.4 69.3					
5.0	238.4	MECH. HP TORQUE (1000 " #)			3.3 42.8				5.5 69.6					
4.0	291.9	MECH. HP TORQUE (1000 " #)			2.7 43.0				4.4 70.0					
3.2	357.5	MECH. HP TORQUE (1000 " #)			2.1 43.1				3.7 70.3					
2.7	437.9	MECH. HP TORQUE (1000 " #)			1.7 43.3				2.9 70.5					
2.2	536.3	MECH. HP TORQUE (1000 " #)			1.5 43.4				2.4 70.8					
1.8	656.8	MECH. HP TORQUE (1000 " #)			1.2 43.6				2.0 71.0					
1.5	804.5	MECH. HP TORQUE (1000 " #)							1.7 71.2					
1.2	985.3	MECH. HP TORQUE (1000 " #)				DISCOUNT N-3								

Shaded boxes indicate a thermal limitation. Please see Thermal Ratings, Section 257 Page 6.

Your Total Drive Source

Moduline® In-Line Speed Reducers Type R

RATINGS/PRICING
1170 INPUT

88T	88Q	92D	F92D	92T	92Q	98D	F98D	98T	98Q	SIZE/TYPE	Nominal Gear Ratio	Output Speed
9035	11110	9540	9980	10785	12810	12275	12850	14435	16615	LIST PRICE		
										MECH. HP TORQUE (1000 " #)	1.225	950
										MECH. HP TORQUE (1000 " #)	1.500	780
										MECH. HP TORQUE (1000 " #)	1.837	640
										MECH. HP TORQUE (1000 " #)	2.250	520
										MECH. HP TORQUE (1000 " #)	2.756	420
										MECH. HP TORQUE (1000 " #)	3.375	350
										MECH. HP TORQUE (1000 " #)	4.134	280
										MECH. HP TORQUE (1000 " #)	5.06	230
		302 102	212 102			480 158	220 158			MECH. HP TORQUE (1000 " #)	6.20	190
		257 106	214 106			405 164	220 164			MECH. HP TORQUE (1000 " #)	7.59	155
		212 108	212 108			338 167	220 167			MECH. HP TORQUE (1000 " #)	9.30	125
		179 112	179 112			287 174	220 174			MECH. HP TORQUE (1000 " #)	11.39	100
		148 114				239 177				MECH. HP TORQUE (1000 " #)	13.95	84
		125 117				201 182				MECH. HP TORQUE (1000 " #)	17.09	68
		104 120				166 186				MECH. HP TORQUE (1000 " #)	20.93	56
		87.4 124				134 182				MECH. HP TORQUE (1000 " #)	25.63	45
55.6 96		72.6 126				107 173				MECH. HP TORQUE (1000 " #)	31.39	37
47 98		62.5 130						101 208		MECH. HP TORQUE (1000 " #)	38.44	30
39.3 102				50.7 134				84 212		MECH. HP TORQUE (1000 " #)	47.08	25
32.8 103				42.9 135				68 214		MECH. HP TORQUE (1000 " #)	57.66	20
27.2 104				35.0 136				57.6 216		MECH. HP TORQUE (1000 " #)	70.62	16.5
22.3 105				28.6 137				45.7 214		MECH. HP TORQUE (1000 " #)	86.50	13.5
18.5 106				23.7 138				38.9 220		MECH. HP TORQUE (1000 " #)	105.9	11.0
14.7 107				19.1 141				33.5 225		MECH. HP TORQUE (1000 " #)	129.7	9.0
12.5 107	14.1 124			16.4 143				26.8 225		MECH. HP TORQUE (1000 " #)	158.9	7.5
9.5 97.8	11.4 124			13.7 145					21.4 224	MECH. HP TORQUE (1000 " #)	194.6	6.0
7.6 97.8	9.8 125			11.2 146					18.1 226	MECH. HP TORQUE (1000 " #)	238.4	5.0
	7.9 126				8.7 136				15.1 231	MECH. HP TORQUE (1000 " #)	291.9	4.0
	6.5 126				7.4 138				12.1 226	MECH. HP TORQUE (1000 " #)	357.5	3.2
	5.2 127				6.0 141				9.4 220	MECH. HP TORQUE (1000 " #)	437.9	2.7
	4.3 127				4.7 138				8.0 232	MECH. HP TORQUE (1000 " #)	536.3	2.2
	3.6 127				4.0 140				6.7 233	MECH. HP TORQUE (1000 " #)	656.8	1.8
	3.0 127									MECH. HP TORQUE (1000 " #)	804.5	1.5
	2.0 103			DISCOUNT N-3						MECH. HP TORQUE (1000 " #)	985.3	1.2

Shaded boxes indicate a thermal limitation. Please see Thermal Ratings, Section 257 Page 6.

In-Line Speed Reducers
Type R
Moduline®

RATINGS/PRICING
870 INPUT

Output Speed	Nominal Gear Ratio	SIZE/TYPE	10S	21S	05D	32S	10D	15T	43S	21D	21T	54S	32D
		LIST PRICE	1135	1180	810	1420	1165	1485	1605	1530	1745	2110	1935
700	1.225	MECH. HP TORQUE (1000 " #)	6.4 .6	9.9 .9		14.5 1.3			26.5 2.4			40.8 3.8	
580	1.500	MECH. HP TORQUE (1000 " #)	5.3 .6	7.9 .9		11.7 1.3			21.9 2.4			34.3 3.8	
470	1.837	MECH. HP TORQUE (1000 " #)	4.4 .6	6.7 .9		10.0 1.3			18.0 2.4			27.8 3.8	
390	2.250	MECH. HP TORQUE (1000 " #)	3.5 .6	5.5 .9		8.0 1.3			15.0 2.4			22.5 3.8	
320	2.756	MECH. HP TORQUE (1000 " #)	2.8 .6	4.4 .9		6.6 1.3			12.0 2.4			18.5 3.8	
260	3.375	MECH. HP TORQUE (1000 " #)	2.3 .6	3.5 .9		5.2 1.3			9.5 2.4			15.0 3.8	
210*	4.134	MECH. HP TORQUE (1000 " #)	1.9 .6	2.9 .9	3.6 1.0	4.3 1.3	10.7 3.2		8.0 2.4	18.7 5.6		12.3 3.8	28.4 8.5
175	5.06	MECH. HP TORQUE (1000 " #)			3.2 1.0		8.9 3.3			15.4 5.7			23.2 8.7
140	6.20	MECH. HP TORQUE (1000 " #)			3.1 1.5		7.6 3.4			12.5 5.8			19.2 8.9
115	7.59	MECH. HP TORQUE (1000 " #)			3.1 1.6		6.4 3.5			10.6 5.8			16.5 9.0
95	9.30	MECH. HP TORQUE (1000 " #)			2.6 1.6		5.2 3.5			8.9 5.9			13.3 9.1
77	11.39	MECH. HP TORQUE (1000 " #)			1.9 1.6		4.2 3.6			7.3 6.0			11.1 9.2
62	13.95	MECH. HP TORQUE (1000 " #)			1.5 1.6		3.5 3.6			5.8 6.1			9.0 9.4
50	17.09	MECH. HP TORQUE (1000 " #)			1.3 1.6		2.9 3.5			4.9 6.1			7.5 9.5
42	20.93	MECH. HP TORQUE (1000 " #)			1.1 1.5		2.2 3.3			4.2 6.2			6.3 9.5
34	25.63	MECH. HP TORQUE (1000 " #)			.7 1.2		1.4 2.6			2.6 4.9			5.3 9.6
28	31.39	MECH. HP TORQUE (1000 " #)			.6 1.2		1.2 2.6	1.7 3.6		2.1 4.7	3.0 7.0		3.2 7.2
22	38.44	MECH. HP TORQUE (1000 " #)						1.4 3.7		1.8 4.7	2.5 7.0		2.7 7.3
18	47.08	MECH. HP TORQUE (1000 " #)						1.1 3.7			2.1 7.1		
15	57.66	MECH. HP TORQUE (1000 " #)						.9 3.80			1.7 7.1		
12.5	70.62	MECH. HP TORQUE (1000 " #)						.8 3.8			1.4 7.1		
10	86.50	MECH. HP TORQUE (1000 " #)						.6 3.8			1.1 7.2		
8.3	105.9	MECH. HP TORQUE (1000 " #)						.5 3.9			.95 7.2		
6.8	129.7	MECH. HP TORQUE (1000 " #)						.4 4.0			.8 7.2		
5.5	158.9	MECH. HP TORQUE (1000 " #)						.34 3.0			.5 5.2		
4.5	194.6	MECH. HP TORQUE (1000 " #)						.3 3.0			.4 5.2		
3.8	238.4	MECH. HP TORQUE (1000 " #)											
3.0	291.9	MECH. HP TORQUE (1000 " #)											
2.5	357.5	MECH. HP TORQUE (1000 " #)											
2.0	437.9	MECH. HP TORQUE (1000 " #)											
1.6	536.3	MECH. HP TORQUE (1000 " #)											
1.3	656.8	MECH. HP TORQUE (1000 " #)											
1.1	804.5	MECH. HP TORQUE (1000 " #)											
.9	985.3	MECH. HP TORQUE (1000 " #)				DISCOUNT N-3							

Your Total Drive Source

In-Line Speed Reducers

Moduline® Type R

RATINGS/PRICING
870 INPUT

32T	32Q	43D	43T	43Q	76S	51D	51T	54D	54T	54Q	SIZE/TYPE	Nominal Gear Ratio	Output Speed
2155	2710	2320	2735	3210	3335	2735	3045	3175	3665	3965	LIST PRICE		
					80.9 7.5						MECH. HP TORQUE (1000 " #)	1.225	700
					67.0 7.5						MECH. HP TORQUE (1000 " #)	1.500	580
					55.0 7.5						MECH. HP TORQUE (1000 " #)	1.837	470
					44.6 7.5						MECH. HP TORQUE (1000 " #)	2.250	390
					36.8 7.5						MECH. HP TORQUE (1000 " #)	2.756	320
					29.0 7.5						MECH. HP TORQUE (1000 " #)	3.375	260
		40.4 12.1			24.2 7.5	30.0 8.9		71.8 21.5			MECH. HP TORQUE (1000 " #)	4.134	210
		36.4 13.6				30.5 11.3		60.1 22.0			MECH. HP TORQUE (1000 " #)	5.06	175
		31.7 14.3				30.0 13.0		50.4 22.4			MECH. HP TORQUE (1000 " #)	6.20	140
		26.6 14.6				29.0 15.7		41.5 22.8			MECH. HP TORQUE (1000 " #)	7.59	115
		21.8 14.8				24.0 16.1		34.3 23.2			MECH. HP TORQUE (1000 " #)	9.30	95
		18.2 15.0				20.2 16.4		28.7 23.6			MECH. HP TORQUE (1000 " #)	11.39	77
		15.1 15.3				16.3 16.4		23.0 24.0			MECH. HP TORQUE (1000 " #)	13.95	62
		12.5 15.4				15.0 17.0		19.7 24.3			MECH. HP TORQUE (1000 " #)	17.09	50
		10.5 15.6				11.7 17.3		16.5 24.6			MECH. HP TORQUE (1000 " #)	20.93	42
		8.5 15.7				10.2 17.6		13.5 24.9			MECH. HP TORQUE (1000 " #)	25.63	34
4.3 10.0		5.0 11.0	7.5 17.5			7.9 16.5		8.8 19.5	12.0 27.6		MECH. HP TORQUE (1000 " #)	31.39	28 *
3.7 10.3		4.0 11.1	6.3 17.7			6.5 17.1		7.2 19.7	9.6 27.9		MECH. HP TORQUE (1000 " #)	38.44	22 *
3.1 10.5			5.2 17.8				5.7 19.4		8.2 28.0		MECH. HP TORQUE (1000 " #)	47.08	18
2.5 10.5			4.3 18.0				5.1 19.6		6.8 28.3		MECH. HP TORQUE (1000 " #)	57.66	15
2.0 10.6			3.4 18.1				3.9 19.8		5.5 28.5		MECH. HP TORQUE (1000 " #)	70.62	12.5
1.7 10.7			2.8 18.2				3.2 20.0		4.4 28.7		MECH. HP TORQUE (1000 " #)	86.50	10
1.5 11.1			2.4 18.3				2.7 20.1		3.7 28.8		MECH. HP TORQUE (1000 " #)	105.9	8.3
1.2 11.2			2.0 18.4				2.2 20.3		3.1 29.0		MECH. HP TORQUE (1000 " #)	129.7	6.8
.7 7.8			1.1 13.0				1.8 20.4		2.6 29.1		MECH. HP TORQUE (1000 " #)	158.9	5.5
.6 7.8	.8 11.2		.9 13.0	1.3 18.4			1.4 19.6		1.6 22.8	2.0 29.2	MECH. HP TORQUE (1000 " #)	194.6	4.5
	.7 11.3			1.1 18.5			1.2 19.2		1.3 22.9	1.7 29.3	MECH. HP TORQUE (1000 " #)	238.4	3.8
	.5 11.3			.9 18.6						1.3 29.4	MECH. HP TORQUE (1000 " #)	291.9	3.0
	.5 11.3			.7 18.6						1.1 29.4	MECH. HP TORQUE (1000 " #)	357.5	2.5
	.4 11.3			.6 18.7						.9 29.5	MECH. HP TORQUE (1000 " #)	437.9	2.0
	.3 11.4			.5 18.7						.8 29.7	MECH. HP TORQUE (1000 " #)	536.3	1.6
	.25 11.4			.4 18.7						.5 24.4	MECH. HP TORQUE (1000 " #)	656.8	1.3
	.2 11.4			.3 18.7						.4 24.5	MECH. HP TORQUE (1000 " #)	804.5	1.1
	.16 11.5			.25 18.8	DISCOUNT N-3						MECH. HP TORQUE (1000 " #)	985.3	.9

Shaded boxes indicate a thermal limitation. Please see Thermal Ratings, Section 257 Page 6.

In-Line Speed Reducers
Type R
Moduline®

RATINGS/PRICING
870 INPUT

Output Speed	Nominal Gear Ratio	SIZE/TYPE	64D	64T	64Q	76D	F76D	76T	76Q	85D	85T	88D	F88D
		LIST PRICE	3605	4685	5080	4835	5195	6090	6820	6405	7805	7400	7840
700	1.225	MECH. HP TORQUE (1000 " #)											
580	1.500	MECH. HP TORQUE (1000 " #)											
470	1.837	MECH. HP TORQUE (1000 " #)											
390	2.250	MECH. HP TORQUE (1000 " #)											
320	2.756	MECH. HP TORQUE (1000 " #)											
260	3.375	MECH. HP TORQUE (1000 " #)											
210	4.134	MECH. HP TORQUE (1000 " #)				150.0 44.6	109 44.6					163 48.6	155 48.4
175	5.06	MECH. HP TORQUE (1000 " #)	87.9 32.0			140 51.0	110 51.0					161 58.5	157 58.5
140	6.20	MECH. HP TORQUE (1000 " #)	72.2 32.8			118 52.7	111 52.7			131 58.4		164 73.0	159 73.0
115	7.59	MECH. HP TORQUE (1000 " #)	60.5 33.4			101 55.2				123 68		154 85	154 85
95	9.30	MECH. HP TORQUE (1000 " #)	50.3 34.0			82.3 55.6				101 68.4		127 85.5	
77	11.39	MECH. HP TORQUE (1000 " #)	41.3 34.7			68.9 56.5				84 69.2		105 86.5	
62	13.95	MECH. HP TORQUE (1000 " #)	34.5 35.2			55.4 57.6				68.8 69.6		86.1 87.0	
50	17.09	MECH. HP TORQUE (1000 " #)	28.2 35.8			46.9 58.3				56.9 70.0		71.1 87.5	
42	20.93	MECH. HP TORQUE (1000 " #)	23.5 36.2			40.1 59.0				46.5 70.4		60.0 88.0	
34	25.63	MECH. HP TORQUE (1000 " #)	20.0 36.6			25.0 59.8				37.8 70.8		47.2 88.5	
28	31.39	MECH. HP TORQUE (1000 " #)		17.2 40.2				25.4 59.0		31.5 65.7		37.3 85.5	
22	38.44	MECH. HP TORQUE (1000 " #)		14.1 40.7				22.5 63.0		26.0 68.3		31.1 85.5	
18	47.08	MECH. HP TORQUE (1000 " #)		12.1 41.0				18.5 63.0			23.8 83.2		
15	57.66	MECH. HP TORQUE (1000 " #)		10.1 41.3				15.0 63.0			20.1 84.0		
12.5	70.62	MECH. HP TORQUE (1000 " #)		8.1 41.6				12.5 64.0			16.5 84.8		
10	86.50	MECH. HP TORQUE (1000 " #)		6.5 42.0				10.0 65.0			13.4 84.8		
8.3	105.9	MECH. HP TORQUE (1000 " #)		5.4 42.2				8.6 66.0			11.1 86.6		
6.8	129.7	MECH. HP TORQUE (1000 " #)		4.5 42.5				7.3 67.0			8.9 86.4		
5.5	158.9	MECH. HP TORQUE (1000 " #)		3.8 42.7				5.9 67.0			7.5 86.4		
4.5	194.6	MECH. HP TORQUE (1000 " #)			3.0 42.8				4.8 69.6				
3.8	238.4	MECH. HP TORQUE (1000 " #)			2.4 43.0				4.1 70.0				
3.0	291.9	MECH. HP TORQUE (1000 " #)			2.0 43.1				3.3 70.3				
2.5	357.5	MECH. HP TORQUE (1000 " #)			1.6 43.3				2.7 70.5				
2.0	437.9	MECH. HP TORQUE (1000 " #)			1.3 43.4				2.2 70.8				
1.6	536.3	MECH. HP TORQUE (1000 " #)			1.1 43.6				1.8 71.0				
1.3	656.8	MECH. HP TORQUE (1000 " #)			.9 43.7				1.5 71.2				
1.1	804.5	MECH. HP TORQUE (1000 " #)							1.3 71.4				
.9	985.3	MECH. HP TORQUE (1000 " #)			DISCOUNT N-3								

Shaded boxes indicate a thermal limitation. Please see Thermal Ratings, Section 257 Page 6.

Your Total Drive Source

noc

In-Line Speed Reducers

Moduline®

Type R

RATINGS/PRICING
870 INPUT

88T	88Q	92D	F92D	92T	92Q	98D	F98D	98T	98Q	SIZE/TYPE	Nominal Gear Ratio	Output Speed
9035	11110	9540	9980	10785	12810	12275	12850	14435	16615	LIST PRICE		
										MECH. HP TORQUE (1000 " #)	1.225	700
										MECH. HP TORQUE (1000 " #)	1.500	580
										MECH. HP TORQUE (1000 " #)	1.837	470
										MECH. HP TORQUE (1000 " #)	2.250	390
										MECH. HP TORQUE (1000 " #)	2.756	320
										MECH. HP TORQUE (1000 " #)	3.375	260
										MECH. HP TORQUE (1000 " #)	4.134	210
										MECH. HP TORQUE (1000 " #)	5.06	175
		180 82.0	180 82.0			359 158	200 158			MECH. HP TORQUE (1000 " #)	6.20	140
		176 98	176 98			302 164	200 164			MECH. HP TORQUE (1000 " #)	7.59	115
		164 112	164 112			252 167	200 167			MECH. HP TORQUE (1000 " #)	9.30	95
		136 114				215 174	200 174			MECH. HP TORQUE (1000 " #)	11.39	77
		113 117				179 177				MECH. HP TORQUE (1000 " #)	13.95	62
		95.7 120				150 182				MECH. HP TORQUE (1000 " #)	17.09	50
		80.4 124				124 186				MECH. HP TORQUE (1000 " #)	20.93	42
		66.0 126				100 182				MECH. HP TORQUE (1000 " #)	25.63	34
42.0 96.0		55.7 130				159 173				MECH. HP TORQUE (1000 " #)	31.39	28
35.0 98.0		47.5 133						75 208		MECH. HP TORQUE (1000 " #)	38.44	22
29.7 104				37.9 135				63 212		MECH. HP TORQUE (1000 " #)	47.08	18
25.1 105				32.1 136				51 214		MECH. HP TORQUE (1000 " #)	57.66	15
20.8 106				26.2 137				43 216		MECH. HP TORQUE (1000 " #)	70.62	12.5
16 106				21.5 139				34 214		MECH. HP TORQUE (1000 " #)	86.50	10
13 107				18.0 141				29 220		MECH. HP TORQUE (1000 " #)	105.9	8.3
11 108				14.4 143				25 225		MECH. HP TORQUE (1000 " #)	129.7	6.8
9.6 108	10.5 124			12.3 145				20 225		MECH. HP TORQUE (1000 " #)	158.9	5.5
7.3 101	8.6 125			10.3 146					16 224	MECH. HP TORQUE (1000 " #)	194.6	4.5
5.9 101	7.3 126			8.4 147					13.5 226	MECH. HP TORQUE (1000 " #)	238.4	3.8
	5.9 126				6.5 136				11 231	MECH. HP TORQUE (1000 " #)	291.9	3.0
	4.9 127				5.5 138				9 226	MECH. HP TORQUE (1000 " #)	357.5	2.5
	3.9 127				4.5 141				7 220	MECH. HP TORQUE (1000 " #)	437.9	2.0
	3.2 127				3.5 138				6 232	MECH. HP TORQUE (1000 " #)	536.3	1.6
	2.7 127				3 140				5 233	MECH. HP TORQUE (1000 " #)	656.8	1.3
	2.2 128									MECH. HP TORQUE (1000 " #)	804.5	1.1
	1.4 103			DISCOUNT N-3						MECH. HP TORQUE (1000 " #)	985.3	.9

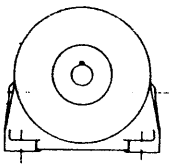
Shaded boxes indicate a thermal limitation. Please see Thermal Ratings, Section 257 Page 6.

Moduline®

In-Line Speed Reducers
Type R

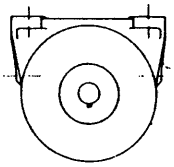
Mounting Positions (viewed from output end.)

Floor Mounted



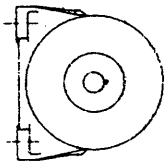
Standard
Position F

Ceiling Mounted



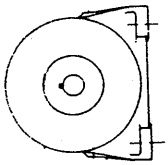
Standard
Position C

Left Hand Wall Mounting



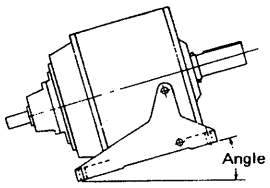
Standard
Position W-L

Right Hand Wall Mounting



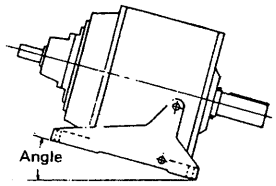
Standard
Position W-R

For mounting position W-L on sizes 85, 88, 92 and 98, please contact Nuttall Gear.



Position F-I

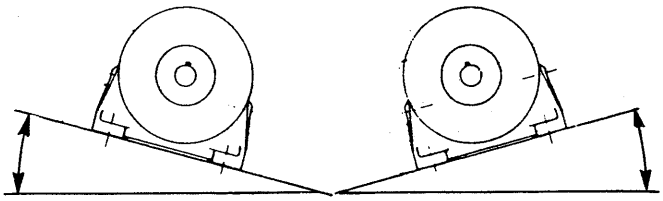
Output shaft up
maximum 10 degrees



Position F-D

Output shaft down
maximum 15 degrees

For units with inclines or declines exceeding the above, please contact Nuttall Gear.

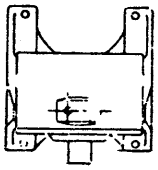


Position F-RR

Position F-RL

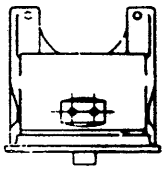
For units mounted as above, please contact Nuttall Gear.

Vertical Mounting



Position W-D

Vertical wall mtg. shaft down



Position VF-D

Vertical flange mounting shaft down

For foot mounted or flange mounted vertical units, please see modification section.

For vertical units with drywell construction, please see section 600.

In-Line Speed Reducers
Type R
Moduline®

Gear Case Size	05	10	15/21	32	43	51/54	64	76	85/88	92	98
1. Special Shafts (Input or Output)											
A. Basic Addition											
1. Any modification up to standard length.											
1 - 5 units	150	150	155	175	185	215	230	260	365	425	485
6 - 25 units	90	90	95	100	110	125	140	155	220	260	300
26 + units	55	55	60	65	70	85	95	105	145	170	195
B. 1. For each 5" or fraction above standard length add –	40	40	55	55	60	75	90	110	150	200	240
2. For special features other than length, add the following charges to the basic addition.											
A. Drilling and tapping end of shaft.	30	30	35	35	40	45	45	55	70	85	100
B. Special Keyway	30	30	35	35	40	45	45	55	70	85	100
C. Splined Shaft	90	90	95	100	110	130	140	155	220	260	300
D. Special Diameter: One special diameter is included in the basic addition. For each **additional** diameter add the following.	30	30	35	35	40	45	45	55	70	85	100
E. Threaded shaft: For each set of threads.	30	30	35	35	40	45	45	55	70	85	100
F. Tapered shaft with threaded end.	70	70	80	85	90	110	120	130	180	210	245
2. Mounting Customer's Equipment There is no charge for Mounting Equipment purchased thru Nuttall Gear. Pressing customer's material on output shaft (couplings, sprockets, pinions). NOTE: Customer's material must be delivered to Nuttall Gear transportation prepaid and ready for mounting. Shipment must be marked for application to specific order and item number. Any machining of customer's material must be negotiated with Nuttall Gear in advance of mounting. Nuttall Gear is not responsible for loss or damage to customer's material.	120	120	125	140	145	160	170	185	205	215	225

DISCOUNT N-3

In-Line Speed Reducers

Moduline® Type R

Gear Case Size	05	10	15/21	32	43	51/54	64	76	85/88	92	98
3. Mounting Positions. There is no additional charge for floor, wall, or ceiling mounted units in which the shaft is horizontal, or for floor mounted units whose shaft is inclined up to 10 degrees or declined up to 15 degrees from horizontal.											
A. Vertical shaft down (foot mounted)	110	110	130	165	210	275	335	440	–	–	–
B. Vertical shaft down (flange mounted) Note: Moduline units, other than dry well construction or veri-dri units, running at 155 rpm or greater may run too hot with the low speed shaft down, therefore the thermal hp capacity should be reduced by approximately 30 percent.	265	265	330	400	525	680	835	995	–	–	–
C. Vertical shaft down (dry well construction)	Refer to Veri-Dri Section - 600 -										
D. Shaft - up	**REFER TO NUTTALL OFFICE**										
E. Horizontal (with rotation about shaft)	**REFER TO NUTTALL OFFICE**										
4. Mill & Chemical Features (gearcase only) Note: Mill and chemical features include wet end seals and epoxy paint.	35	35	40	50	60	85	110	130	180	215	240
5. Special Paint A. Addition for standard commercial paints, available in one gallon units.	85	85	100	110	135	155	155	170	195	195	210
B. Customer supplied paint.	**REFER TO NUTTALL OFFICE**										
C. Primer only.	25	25	25	25	25	25	25	25	25	25	25
D. Special primers, paints, finish.	**REFER TO NUTTALL OFFICE**										
6. Special Seals A. Wet end for moisture laden atmosheres such as wet end paper mill drives.	35	35	40	50	60	85	110	130	180	215	265
B. Taconite duty: for taconite, cement or other abrasive dust atmospheres. If dust is not abrasive no modification is needed.	150	150	190	245	300	400	495	600	1005	1280	1475
7. Slide Rails (pair)	**REFER TO NUTTALL OFFICE**										
8. Oil Sight Gauge	35	35	35	35	35	35	35	35	35	35	35
9. Special Output Speeds 1 - 2 units	615	615	615	615	615	615	615	615	615	615	615
3 - 24 units	325	325	325	325	325	325	325	325	325	325	325
25 + units	No charge.										
10. Backstops (factory installed) The Largest built-in backstop has a maximum rating of 215 ft. lbs. at service factor 1.0. Backstops requiring higher capacity must be externally mounted on a longer than standard H.S. shaft. Refer to Nuttall Gear for selection and pricing.	322	365	400	400	490	555	555	975	1520	2130	2130
11. Bed Plate Only Prices are based on bedplates of standard dimensions suitable for mounting the speed reducer and motor only. Refer to section 260 page 2 for outline dimensions.	660	660	660	830	830	1125	1125	1125	1425	1830	1830
12. Piggyback Motor Mount (does not include sheaves, belts, or belt guard) See dimensions Section 260 pages 7 and 8.	350	350	350	350	410	475	475	475	690	870	870
	DISCOUNT N-3										

In-Line Speed Reducers
Type R
Moduline®

Gear Case Size		05	10	15/21	32	43	51/54	64	76	85/88	92	98
13. **C—Flange Motor Adaptors** are available to accommodate standard NEMA motor mounting, using standard motor flange and shaft dimensions. (includes standard coupling) **PLEASE REFER TO NUTTALL OFFICE FOR PRICE & AVAILABILITY**	Motor Frames											
	56/140											
	180											
	210											
	250											
	280											
	320											
	360											
	400											
	440											
14. **Scoop Mounted** Motor Brackets, including coupling, to accommodate standard NEMA foot mounted motors. (Double, triple and quadruple reduction only)	Motor Frames				For Quick Selection of Scoop Mounted Type U All-Motor Gearmotors See Section 230							
	140	185	185	185	185	185	215	215	215	275	310	310
	180	205	205	205	205	205	235	235	235	310	375	375
	210		205	220	220	220	250	250	250	330	390	390
	250				235	235	275	275	275	370	435	435
	280				260	260	310	310	310	390	500	500
	320					295	310	310	310	390	500	500
	360						360	405	405	485	590	590
	400								405	485	590	590
	440									485	590	590
15. **Coupling Guards (High Speed End)** A. For use with reducer and motor mounted on bedplate.		300	300	300	300	320	320	320	360	360	360	360
B. For use with motor mounted on scoop.		100	100	115	140	155	175	175	190	220	220	240
These coupling guards are designed to meet **OSHA** standards when used with **MODULINE** Reducers and Nuttall supplied couplings.												
16. **Coupling Guards (Low Speed End)**		**REFER TO NUTTALL OFFICE**										
17. **Export Boxing:** Under Deck - Overseas Packing		Add 6% Net to Unit price (Minimum $100.00 Net Per Unit).										

DISCOUNT N-3

In-Line Speed Reducers

Moduline® Type R

ENGINEERING DATA
EXACT GEAR RATIOS

AGMA Nominal Ratio	Single Reduction Units										Nominal Output Speeds With Input Speed Of			
		10S	21S	32S	43S	54S		76S			1750	1430	1170	870
1.225		1.271	1.265	1.275	1.271	1.271		1.271			1430	1170	950	700
1.500		1.535	1.578	1.578	1.535	1.512		1.535			1170	950	780	580
1.837		1.868	1.850	1.854	1.868	1.868		1.868			950	780	640	470
2.250		2.203	2.257	2.314	2.303	2.303		2.303			780	640	520	390
2.756		2.759	2.800	2.806	2.793	2.793		2.793			640	520	420	320
3.375		3.360	3.560	3.538	3.542	3.542		3.542			520	420	350	260
4.134		4.190	4.227	4.318	4.190	4.190		4.238			420	350	280	210

Double Reduction Units

	05D	10D	21D	32D	43D	51/54D	64D	76D	85/88D	92D	98D				
4.134	4.12	4.12	4.119	4.125	4.128	4.131	–	4.125	4.099	–	–	420	350	280	210
5.06	5.141	5.141	5.079	5.169	5.150	5.154	5.023	5.147	5.017	–	–	350	280	230	115
6.20	6.209	6.209	6.386	6.399	6.220	6.130	6.269	6.216	6.145	6.257	6.142	280	230	190	140
7.59	7.559	7.559	7.488	7.518	7.572	7.577	7.614	7.567	7.575	7.658	7.528	230	190	155	115
9.30	9.317	9.317	9.136	9.386	9.333	9.340	9.327	9.327	9.248	9.418	9.311	190	155	125	95
11.39	11.70	11.70	11.33	11.38	11.32	11.33	11.58	11.31	11.35	11.56	11.238	155	125	100	77
13.95	14.33	14.33	14.41	14.35	14.35	14.36	14.08	14.34	13.94	14.24	13.767	125	100	84	62
17.09	16.95	16.95	17.11	17.51	16.98	16.99	17.48	17.16	16.99	17.30	16.681	100	84	68	50
20.93	20.45	20.45	20.45	20.92	20.49	20.50	21.22	20.48	20.90	21.28	20.90	84	68	56	42
25.63	25.41	25.41	25.65	25.09	25.40	25.42	25.19	25.15	25.85	26.33	25.40	68	56	45	34
31.39	30.65	30.65	30.65	31.25	30.65	30.65	–	–	31.65	32.23	29.95	56	45	37	28
38.44	–	–	37.54	37.49	37.99	37.99	–	–	37.93	38.62	–	45	37	30	22

Triple Reduction Units

			15/21T	32T	43T	51/54T	64T	76T	85/88T	92T	98T				
31.39			31.83	31.89	32.28	31.89	32.11	31.97	32.16	–	–	56	45	37	28
38.44			38.44	38.52	38.98	40.10	39.75	38.61	38.84	–	38.98	45	37	30	22
47.08			46.79	46.89	47.45	47.02	46.70	47.00	48.20	49.06	47.45	37	30	25	18
57.66			57.68	57.79	58.49	57.37	58.30	57.93	58.21	58.38	58.49	30	25	20	15
70.62			72.45	72.59	73.47	71.16	70.70	70.25	70.86	72.15	70.93	25	20	16.5	12.5
86.50			88.70	88.87	89.95	90.48	89.15	89.08	87.35	88.95	89.94	20	16.5	13.5	10
105.9			104.9	105.2	106.4	107.4	108.8	105.4	105.9	107.9	107.6	16.5	13.5	11	8.3
129.7			126.6	126.9	128.4	128.4	129.9	127.2	134.3	136.8	128.4	13.5	11	9	6.8
158.9			157.3	157.3	159.2	157.3	155.9	157.6	158.9	161.8	157.7	11.0	9	7.5	5.5
194.6			189.8	189.5	192.1	191.9	–	–	191.7	195.3	–	9	7.5	6	4.5
238.4			–	–	–	235.1	–	–	237.7	–	242.0	7.5	6	5	3.8

Quadruple Reduction Units

				32Q	43Q	54Q	64Q	76Q	88Q	92Q	98Q				
194.6				197.3	199.7	197.6	199.4	200.6	201.8	–	197.06	9	7.5	6	4.5
238.4				283.3	241.2	243.6	242.8	235.7	237.1	–	239.9	7.5	6	5	3.8
291.9				290.1	293.6	305.9	299.3	294.3	296.1	315.1	295.7	6	5	4	3.0
357.5				357.6	361.9	374.5	375.9	356.9	359.0	382.1	358.6	5	4	3.2	2.5
437.9				449.2	454.6	443.2	460.2	450.0	452.7	484.5	454.7	4	3.2	2.7	2.0
536.3				549.9	556.5	534.6	544.5	549.1	552.4	573.2	538.0	3.2	2.7	2.2	1.6
656.8				650.6	658.5	662.5	656.9	655.9	659.8	691.8	649.1	2.7	2.2	1.8	1.3
804.5				785.0	794.4	799.2	–	786.8	791.5	–	–	2.2	1.8	1.5	1.1
985.3				973.0	984.8	–	–	–	989.0	–	–	1.8	1.5	1.2	90

In-Line Speed Reducers
Type R
Moduline®

ENGINEERING DATA
OVERHUNG LOAD, THRUST RATINGS

Output Shaft – Overhung Load and Thrust Capacities
Single Reduction

Gear Size	Pounds	Output Rpm								
		1430	1170	950	780	640	520	420	350	280
10S	Overhung Load	300	320	360	400	420	450	500	540	580
	Thrust (Down or Out)	130	190	270	340	400	475	525	590	600
	Thrust (Up or In)	130	190	270	340	400	475	525	590	600
21S	Overhung Load	650	720	800	860	930	1000	1075	1140	1200
	Thrust (Down or Out)	540	630	770	880	1000	1120	1160	1190	1210
	Thrust (Up or In)	540	630	770	880	1000	1120	1160	1190	1210
32S	Overhung Load	900	980	1075	1150	1250	1360	1490	1500	1500
	Thrust (Down or Out)	950	1090	1200	1200	1200	1200	1200	1200	1200
	Thrust (Up or In)	950	1090	1200	1200	1200	1200	1200	1200	1200
43S	Overhung Load	920	1000	1080	1170	1180	1300	1400	1500	1500
	Thrust (Down or Out)	500	675	825	900	900	900	900	900	900
	Thrust (Up or In)	500	675	825	900	900	900	900	900	900
54S	Overhung Load	1000	1000	1000	1000	1000	1050	1090	1180	1200
	Thrust (Down or Out)	775	775	775	775	775	775	775	775	775
	Thrust (Up or In)	775	775	775	775	775	775	775	775	775
76S	Overhung Load	1000	1000	1000	1000	1000	1000	1000	1025	1100
	Thrust (Down or Out)	775	775	775	775	775	775	775	775	775
	Thrust (Up or In)	775	775	775	775	775	775	775	775	775

Output Shaft – Overhung Load and Thrust Capacities
Double, Triple and Quadruple Reduction

Gear Size	Pounds	Output Rpm												
		420	350	280	230	190	155	125	100	84	68	56	45	37 and Below
05	Overhung Load	870	970	1060	1140	1220	1300	1400	1500	1600	1700	1700	....	.....
	Thrust (Down or Out)	640	700	780	830	910	990	1080	1180	1280	1380	1500	....	.....
	Thrust (Up or In)	600	660	720	780	830	900	970	1050	1130	1220	1300	....	.....
10	Overhung Load	1000	1100	1160	1240	1320	1400	1500	1600	1700	1700	1700	1700	.....
	Thrust (Down or Out)	860	920	1000	1050	1130	1210	1300	1400	1500	1600	1720	1850	.....
	Thrust (Up or In)	700	760	820	880	930	1000	1070	1150	1230	1320	1400	1500	.....
15/21	Overhung Load	1260	1330	1420	1500	1600	1700	1800	1930	2020	2150	2300	2300	2300
	Thrust (Down or Out)	1220	1300	1400	1500	1600	1720	1850	2000	2110	2260	2420	2600	2600
	Thrust (Up or In)	1000	1060	1150	1230	1300	1400	1500	1620	1720	1850	1970	2120	2200
32	Overhung Load	1600	1690	1800	1920	2020	2150	2300	2450	2580	2750	2900	3000	3000
	Thrust (Down or Out)	1640	1750	1880	2000	2150	2300	2470	2660	2820	3020	3250	3500	3500
	Thrust (Up or In)	1430	1520	1640	1750	1870	2000	2150	2320	2450	2630	2810	3000	3000
43	Overhung Load	1950	2050	2200	2340	2480	2620	2800	3000	3150	3370	3570	3800	4000
	Thrust (Down or Out)	2270	2420	2600	2800	2950	3200	3400	3700	3900	4200	4500	4800	5000
	Thrust (Up or In)	2000	2150	2320	2470	2640	2800	3050	3270	3460	3710	3950	4300	4500
51/54	Overhung Load	3450	3680	3920	4180	4400	4700	5000	5000	5000	5000	5000	5000	5000
	Thrust (Down or Out)	3600	3850	4150	4400	4700	5000	5400	5800	6150	6600	7000	7400	7400
	Thrust (Up or In)	2850	3000	3260	3500	3740	4000	4300	4650	4950	5300	5650	6100	6200
64	Overhung Load	.....	4400	4700	5000	5300	5600	6000	6400	6750	7200	7600	8000	8000
	Thrust (Down or Out)	.....	4600	5000	5300	5700	6000	6500	7000	7400	7900	8500	9000	9000
	Thrust (Up or In)	.....	3600	3900	4200	4500	4800	5200	5600	5900	6400	6800	7300	7500
76	Overhung Load	5200	5450	5850	6200	6600	7000	7450	8000	8400	8950	9500	10000	10000
	Thrust (Down or Out)	5050	5350	5750	6150	6550	7000	7500	8100	8550	9150	9800	10500	11000
	Thrust (Up or In)	4100	4350	4700	5000	5350	5750	6200	6650	7100	7600	8100	8700	9000
85/88	Overhung Load	10000	10500	11250	12000	13000	14500	15250	16500	17750	19250	20000	20000	20000
	Thrust (Down or Out)	9500	10000	10750	11500	12500	13500	14750	16250	17500	20000	20000	20000	20000
	Thrust (Up or In)	9500	10000	10750	11500	12500	13500	14750	16250	17500	20000	20000	20000	20000
92	Overhung Load	.....	.....	12000	12800	13800	14800	16000	17400	18500	10000	21500	22500	22500
	Thrust (Down or Out)	.....	.....	14000	15000	15800	16900	18000	19500	20500	22000	23400	25000	25000
	Thrust (Up or In)	.....	.....	12750	13600	14500	15500	16500	18000	19000	20500	21500	23000	23000
98	Overhung Load	....	....	12800	13700	14800	16000	17700	19000	20400	22000	22800	22800	22800
	Thrust (Down or Out)	....	....	12400	13000	14000	15100	16900	18000	19200	20000	20400	20400	20400
	Thrust (Up or In)	....	....	12000	12600	13200	14000	15300	16700	17900	18200	18500	18500	18500

Note: The thrust capacities published above are for units with pure thrust loads. Refer to Nuttall Gear when there are combined radial and thrust loads or when loads exceed capacities listed. Indicate direction of rotation of shaft and location and direction of applied load.

Your Total Drive Source

In-Line Speed Reducers

Moduline® Type R

ENGINEERING DATA
OVERHUNG LOAD DETERMINATION

Overhung Load Capacities

Moduline Reducers provide generous overhung load capacity which is seldom exceeded; however, when a pulley, sprocket or pinion is to be mounted on the output shaft, the overhung load capacity of the Reducers must be checked.

The overhung load capacities listed in Section 257, Page 2 are calculated for a sprocket, pinion or pulley mounted with the centerline of its face at the midpoint of the output shaft extension.

If the sprocket, pinion or pulley is to be mounted at a location other than the above, use the following formula to calculate the overhung load on the shaft after selecting appropriate Lc and Lf factors from the tables below.

If the calculated overhung load for the Reducer selected exceeds the capacity listed in the table, select the next larger Reducer.

Overhung Load Formula

$$OHL\ (lbs) = \frac{\text{motor hp} \times 126{,}000 \times L_c}{\text{output rpm} \times \text{pitch diameter (inches)} \times L_f}$$

Load Connection Factor, L_c

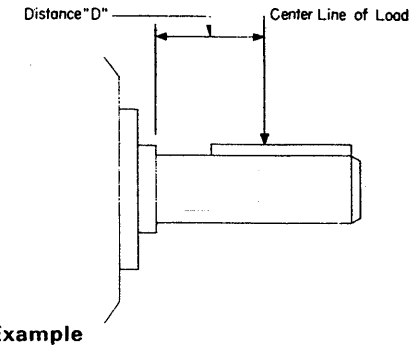
Type of Load Connection	Factor, L_c
Sprocket	1.00
Pinion	1.25
V-Belt	1.50
Flat Belt	2.50

Load Location Factor, L_f

Shaft Dia. Inches	"D" — Distance From Center Line of Load to Reducer Shaft Shoulder, Inches															
	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5
.875	1.06	.90	.77	.68	....	....	....	....	...	...	...	...	...	...	...	...
1.125	1.12	.98	.83	.74	....	....	....	....	...	...	...	...	...	...	...	...
1.375	1.15	1.03	.91	.79	.73	....	....	....	...	...	...	...	...	...	...	...
1.500	1.17	1.06	.94	.83	.76	.70	....	....	...	...	...	...	...	...	...	...
1.625	1.18	1.08	.97	.86	.78	.73	.68	....	...	...	...	...	...	...	...	...
1.875	1.22	1.13	1.04	.94	.85	.78	.74	.69	...	...	...	...	...	...	...	...
2.125	1.23	1.14	1.06	.96	.88	.80	.76	.71	.67	...	...	...	...	...	...	...
2.375	1.24	1.17	1.09	1.01	.94	.85	.79	.75	.71	.67	...	...	...	...	...	...
2.625	1.25	1.18	1.11	1.04	.97	.89	.82	.77	.74	.70	.67	...	...	...	...	...
3.125	1.25	1.22	1.15	1.09	1.04	.97	.91	.85	.79	.76	.73	.70	...	...	...	...
3.625	1.25	1.24	1.18	1.13	1.08	1.02	.97	.91	.86	.80	.78	.75	.72	.69	...	...
4.500	1.25	1.25	1.23	1.18	1.14	1.08	1.04	1.00	.96	.92	.87	.83	.79	.77	.74	.72
5.000	1.25	1.25	1.24	1.20	1.16	1.12	1.07	1.04	.99	.95	.91	.87	.83	.79	.77	.75
5.500	1.25	1.25	1.25	1.20	1.17	1.13	1.08	1.05	1.00	.91	.83	.77	.72	.67	.63	.59

Shaft Diameters

Gear Size	Output		Input			
	Single	Double, Triple & Quadruple	Single	Double	Triple	Quadruple
5/10	1.125	1.375	.875	.875	....	....
15/21	1.500	1.625	1.125	1.125	.875	....
32	2.125	1.875	1.375	1.375	.875	.875
43	2.125	2.125	1.625	1.625	1.125	.875
51/54	2.375	2.625	1.625	1.625	1.375	.875
64	....	3.125	....	1.875	1.375	.875
76	2.375	3.625	1.625	2.125	1.625	1.125
85/88	....	4.500	....	2.125	1.625	1.125
92	....	5.000	....	2.125	1.625	1.625
98	....	5.500	....	3.00	2.125	1.625



Example

A belt conveyor is to be driven by a 5 hp size 21 D Moduline Reducer, 280 rpm output using a 4" diameter V-belt sheave on the output shaft. The output shaft diameter on a size 21D is 1.625 inches. The centerline of the load is to be placed 1.5 inches from the shaft shoulder.

Procedure – Calculate overhung load

$L_c = 1.50$ and $L_f = 1.08$

$$OHL = \frac{5 \times 126{,}000 \times 1.50}{280 \times 4 \times 1.08} = 781 \text{ lbs.}$$

Refer to overhung load table. Since the overhung load capacity of the gear size 21D at 280 rpm is 1420 lbs., the gear unit has ample capacity.

Input Shafts, Allowable Overhung Load Capacities

Input Rpm	Unit Size 5/10	15/21	32	43	51/54	64	76	85/88	92	98
Single and Double Reduction										
1750	150	200	250	350	500	575	650	650	700	750
1430	160	210	265	370	530	615	700	700	740	800
1170	170	230	290	400	570	655	740	740	800	860
870	185	250	320	430	620	710	800	800	870	930
720	195	260	340	460	650	750	850	850	910	950
580	210	280	360	490	700	800	900	900	980	1050
Triple Reduction										
1750	...	150	150	200	250	250	350	350	500	550
1340	...	160	160	210	265	265	370	370	530	600
1170	...	170	170	230	290	290	400	400	570	630
870	...	185	185	250	320	320	430	430	620	680
720	...	195	195	260	340	340	460	460	650	715
580	...	210	210	280	360	360	490	490	700	770
Quadruple Reduction										
1750	...	...	150	150	150	150	200	200	200	250
1430	...	...	160	160	160	160	210	210	210	265
1170	...	...	170	170	170	170	230	230	230	290
870	...	...	185	185	185	185	250	250	250	310
720	...	...	195	195	195	195	260	260	260	325
580	...	...	210	210	210	210	280	280	280	350

In-Line Speed Reducers
Type R
Moduline®

ENGINEERING DATA
SERVICE FACTORS

Service Factors

To provide long life and reliability for any given application, a suitable service factor must be applied to the gear drive rating.

The required equivalent horsepower or equivalent torque necessary to select a reducer from the rating tables is found by multiplying the load horsepower or torque by the service factor.

The gear drive selected will require a rating equal to or in excess of the equivalent horsepower or equivalent torque.

Table 1 shows the recommended minimum service factors for various load characteristics and duration of service with common types of prime movers.

Table 2 lists "Application Classification" for many common speed reducer applications, according to the nature of the load and the usual duty cycle. The three types of load classifications shown: uniform, moderate shock and heavy shock, are used in conjunction with Table I to arrive at a numerical value. It is not possible to list all possible applications requiring gear drives, but a sufficient variety of types is covered to serve as a guide for other applications.

It should be noted that the values given in the tables are based on field experience of average operating conditions for each class of equipment and may not be correct in all cases, due to unique operating conditions or design of the driving or driven equipment.

Proper service factors can be determined if full operating conditions are known, and it is necessary to have this data before a final gear drive selection is made. Any drive for use under abnormal conditions must be referred to Nuttall Gear.

Basic conditions to be observed before applying service factors are as follows:

1. Excessive Overloads
The maximum momentary or starting load must not exceed 200 percent of rated load (100% overload). Rated load is defined as the unit rating with a service factor of 1.0. Driven equipment with high inertia loading, sleeve bearings, etc., may require higher service factors than indicated because of the high momentary torque required for breakaway. Expected breakaway and shock load torques must not exceed 200% rated gear torque.

2. Oversize Prime Mover The practice of using oversize motors for motor standardization or starting conditions must be given special attention due to the potential high starting torque available.

Selecting reducers on the basis of calculated or brake horsepower is satisfactory provided the available motor does not have a starting torque which exceeds the capacity of the reducer. For cases where the motor rating exceeds the calculated HP by a considerable amount, it is advisable to have at least a service factor of 1.0 of the motor rating for standard Nema 'B' motors.

3. Braking Conditions When the rating of a shaft mounted or motor mounted brake exceeds the motor rating, the rating of the brake must be used in selection of the reducer.

4. Drive-Train Vibrations Gear reducers are sold with the understanding that the entire system of rotating parts is free from serious critical speeds or torsional vibrations. Calculation required to check entire system is the responsibility of the systems builder, however details of reducer rotating parts sufficient for such calculations, are available on request at time of order.

5. Pulsating Loading The responsibility for satisfactory operating of reducers driving or driven by pulsating or reciprocating apparatus such as compressors, pumps, internal combustion engines is assumed by Nuttall Gear provided that:

a. The gears are not operated with torque reversals at the gear mesh, except when starting or stopping.

b. When loaded, the torque variation at the gear mesh does not exceed ±25% of average transmitted torque.

c. When unloaded, the torque variation at the gear mesh does not exceed ±15% of rated torque with no negative torque.

Thermal Ratings
The thermal horsepower rating represents the actual horsepower that a gear drive will transmit continually for more than three (3) hours without overheating. Maximum sump temperature is not to exceed 200°F.

It is not necessary to check thermal horsepower ratings when the continuous operating period is three (3) hours or less, and the shutdown time equals or exceeds the running time. If however, the running time exceeds the shutdown time selection must be made on the basis of an adequate thermal rating.

It is important that the thermal horsepower be checked prior to application, for if the unit develops heat at a faster rate than can be dissipated, premature failure may occur.

Thermal ratings are shown in the rating table for all instances where the thermal rating is less than the mechanical rating at service factor 1.0 condition.

Note: Service factors do not apply to thermal rating. Only the actual transmitted horsepower is subject to thermal horsepower consideration.

In cases where transmitted horsepower exceeds the thermal rating horsepower, artificial cooling by means of shaft mounted fans or an oil to water heat exchanger will be necessary at added cost. It should be noted that fan cooling may not be effective in high ambient conditions and all such applications must be referred to the factory.

The area in which the reducer is located should allow adequate air circulation. Also, the housing should be free from dust or other material which can become an insulator. Gear drives operating outdoors should be provided with a sun shielding roof structure to eliminate the effects of solar heating. If these precautions are not taken, overheating with premature failure may occur.

Environmental Conditions
Standard speed reducers are basically designed for horizontal floor mounted operation in a heated building where reasonably clean and dry conditions exist. For conditions other than this, special features may be required. Full data should be provided to insure that the gear drive will be adequate.

Some of the more commonly used special features, such as seals for abrasive dust atmosphere, high humidity and special paint are covered in this catalog.
Other conditions such as corrosive or explosive atmospheres, mounting position other than horizontal, high altitude location, etc., must be given careful consideration.

Particular attention is required for operation at high or low temperatures.

Low Temperature Operation
Starting and operating gear drives at temperatures below 40°F could result in damage to the gears and bearings if the pour point of the lubricant is higher than the ambient temperature. This is of particular concern when controlled splash lubrication or circulating lube oil systems with pump and piping are employed. In such cases, it may be necessary to provide immersion heaters in the oil sump also, so as to provide a method of heating the external oil pump and piping at start-up.

High Temperature Operation
Operation at sustained ambient temperatures in excess of 100°F will greatly affect thermal modifications required to provide a reasonable operating temperature. High oil sump temperatures will drastically reduce the life of most lubricants and require frequent oil changes.

Table 1: Recommended Service Factors

Prime Mover	Duration of Service	Driven Machine Load Classification		
		Uniform	Moderate Shock	Heavy Shock
Electric Motor, Steam Turbine, Hydraulic Motor	Occasional ½ hr./day	.50	.80	1.25
	Intermittent 3 hrs./day	.80	1.00	1.50
	Over 3 through 10 hrs./day	1.00	1.25	1.75
	Over 10 hrs./day	1.25	1.50	2.00
Multi-Cylinder Internal Combustion Engine	Occasional ½ hr./day	.80	1.00	1.50
	Intermittent 3 hrs./day	1.00	1.25	1.75
	Over 3 through 10 hrs./day	1.25	1.50	2.00
	Over 10 hrs./day	1.50	1.75	2.25
Single Cylinder Internal Combustion Engine	Occasional ½ hr./day	1.00	1.25	1.75
	Intermittent 3 hrs./day	1.25	1.50	2.00
	Over 3 through 10 hrs./day	1.50	1.75	2.25
	Over 10 hrs./day	1.75	2.00	2.50

Your Total Drive Source

Moduline® In-Line Speed Reducers Type R

ENGINEERING DATA
SERVICE CLASSES

Table 2: Application Classification Loads: U = Uniform, M = Moderate Shock, H = Heavy Shock

Application	Load
Agitators	
Pure liquids	U
Liquids and solids	M
Liquids, variable density	M
Blowers	
Centrifugal	U
Lobe	M
Vane	U
Brewing and Distilling	
Bottling machinery	U
Brew kettles, cont. duty	U
Cookers, continuous duty	U
Mash tubs, cont. duty	U
Scale hopper, frequent starts	M
Can Filling Machines	U
Cane Knives①	M
Car Dumpers	H
Car Pullers	M
Clarifiers	U
Classifiers	M
Clay Working Machinery	
Brick press	H
Briquette machine	H
Clay working machinery	M
Pug mill	M
Compressors	
Centrifugal	U
Lobe	M
Reciprocating	
Multi-cylinder	M
Single cylinder	H
Conveyors, Uniformly Loaded or Fed	
Apron	U
Assembly	U
Belt	U
Bucket	U
Chain	U
Flight	U
Oven	U
Screw	U
Conveyers, Heavy Duty-Not Uniformly Fed	
Apron	M
Assembly	M
Belt	M
Bucket	M
Chain	M
Flight	M
Live roll②	
Oven	M
Reciprocating	H
Screw	M
Shaker	H
Cranes and Hoists	
Dry dock cranes, see Table 3.	
Main hoists	U
Bridge travel②	
Trolley travel②	
Crushers	
Ore	H
Stone	H
Sugar①	M
Dredges	
Cable reels	M
Conveyors	M
Cutter head drives	H
Jig drives	H
Maneuvering winches	M
Pumps	M
Screen drive	H
Stackers	M
Utility winches	M
Elevators	
Bucket, uniform load	U
Bucket, heavy load	M
Bucket, continuous	U
Centrifugal discharge	U
Escalators	U
Freight	M
Gravity discharge	U
Man lifts②	
Passenger②	
Extruders (Plastic)①	
Film	U
Sheet	U
Coating	U
Rods	U
Pipe	U
Tubing	U
Blow molders	M
Pre-plasticizers	M
Fans	
Centrifugal	U
Cooling towers	
Induced draft②	
Forced draft①	U
Induced draft	M
Large (mine, etc)	M
Large industrial	M
Light (small diameter)	U
Feeders	
Apron	M
Belt	M
Disk	U
Reciprocating	H
Screw	M
Food Industry	
Beet slicer	M
Cereal cooker	U
Dough mixer	M
Meat grinders	M
Generators (not Welding)	U
Hammer Mills	H
Hoists	
Heavy duty	H
Medium duty	M
Skip hoists	M
Laundry Tumblers	M
Laundry Washers	
Reversing	M
Line Shafts	
Driving processing equipment	M
Light	U
Other line shafts	U
Lumber Industry	
Barkers-hydraulic-mech'l	H
Burner conveyor	M
Chain saw and drag saw	H
Chain transfer	H
Craneway transfer	H
De-barking drum	H
Edger feed	M
Gang feed	M
Green chain	M
Live rolls	H
Log deck	H
Log haul – incline	H
Log haul – well type	H
Log turning device	H
Main log conveyor	H
Off bearing rolls	M
Planer feed chains	M
Planer floor chains	M
Planer tilting hoist	M
Re-saw merry-go-round conveyor	M
Roll cases	H
Slab conveyor	H
Small waste conveyor-Belt	U
Small waste conveyor-Chain	M
Sorting table	M
Tipple hoist conveyor	M
Tipple hoist drive	M
Transfer conveyor	M
Transfer rolls	M
Tray drive	M
Trimmer feed	M
Waste conveyor	M
Machine Tools	
Bending roll	M
Notching press, belt driven②	
Plate planer	H
Punch press, gear driven	H
Tapping machines	H
Other machine tools	
Main drives	M
Auxiliary drives	U
Metal Mills	
Draw bench, carriage	M
Draw bench, main drive	M
Forming machines	H
Pinch dryer and scrubber rolls, reversing②	
Slitters	M
Table conveyors	
Non-reversing	
Group drives	M
Individual Drives	H
Reversing②	
Wire drawing and flattening machine	M
Wire winding machine	M
Mills, Rotary Type	
Ball and Rod	
Spurring gear①	H
Helical ring gear①	M
Direct connected①	H
Cement kilns①	M
Dryers and coolers①	M
Kilns	M
Pebble①	M
Plain and wedge bar①	M
Tumbling barrels	H
Mixers	
Concrete mixers, continuous	M
Concrete mixers, intermittent	M
Constant density	U
Variable density	M
Oil Industry	
Chillers	M
Oil well pumping②	
Paraffin filter press	M
Rotary kilns	M
Paper Mills①③	
Agitator (mixer)	M
Agitator (pure liquors)	U
Barkers, mechanical	H
Barking drum	H
Beaters	M
Breaker stack	U
Calender	U
Chip feeder	M
Chipper	H
Coating rolls	U
Conveyors:	
Chip, bark, chem.	U
Log (incl. slab)	H
Couch roll	U
Cutter	H
Cylinder mold	U
Dryers, paper machine and conveyor type	U
Embosser	U
Extruder	M
Fourdrinier rolls	U
Jordan	M
Kiln drive	M
Mt. Hope rolls	U
Paper rolls	U
Platter	M
Presses, felt & suction	U
Pulper	H
Pumps, vacuum	M
Reel, surface type	U
Screens, chip and rotary	M
Screens, vibrating	H
Size press	U
Super calender	U
Thickener, ac drive	M
Thickener, dc drive	U
Washer, ac drive	M
Washer, dc drive	U
Wind and unwind stands, core type	U
Winders, surface type	U
Yankee dryer	U
Plastics Industry	
Intensive Internal Mixers	
(a) Batch Mixers	SF=1.75
(b) Continuous mixers	SF=1.50
Batch Drop Mill-2 smooth rolls	SF=1.25
Continuous feed, holding & blend mill	SF=1.25
Compounding mills	SF=1.25
Calenders	SF=1.50
Extruders	SF=1.50
(a) Variable speed drive	SF=1.50
(b) Fixed speed drive	SF=1.75
Printing Presses②	
Pullers	
Barge haul	H
Pumps	
Centrifugal	U
Proportioning	M
Reciprocating	
Single acting, 3 or more cylinders	M
Double acting, 2 or more cylinders	M
Single acting, 1 or 2 cylinders②	
Double acting, single cylinder②	
Rotary – gear type	U
Rotary – lobe, vane	U
Rubber Industry	
Intensive Internal Mixers	
(a) Batch Mixers	SF=1.75
(b) Continuous mixers	SF=1.50
Mixing Mill-2 smooth rolls- (if corrugated rolls are used, then use the same service factors that are used for a Cracker Warmer)	SF=1.50
Batch drop mill-2 smooth rolls	SF=1.50
Cracker warmer-2 roll; 1 corrugated roll	SF=1.75
Cracker 2 corrugated roll	SF=2.00
Holding, feed and blend mill-2 roll	SF=1.25
Refiner-2 roll	SF=1.50
Calenders	SF=1.50
Extruders	
(a) Continuous Screw Operation	SF=1.50
(b) Intermittent screw Operation	SF=1.75
Sand Muller	M
Screens	
Air washing	U
Rotary – stone or gravel	M
Traveling water intake	U
Sewage Disposal Equipment	
Bar screens	U
Chemical feeders	U
Collectors, circuline or Straightline	U
Dewatering screws	M
Grit collectors	U
Scum breakers	M
Slow or rapid mixers	M
Sludge collectors	U
Thickeners	M
Vacuum filters	M
Slab Pushers	M
Steering Gear②	
Stokers	U
Sugar Industry	
Cane knives①	M
Crushers①	M
Mills①	H
Textile Industry	
Batchers	M
Calenders	M
Cards	M
Dry cans	M
Dryers	M
Dyeing machinery	M
Knitting machines②	
Looms	M
Mangles	M
Nappers	M
Pads	M
Range drives②	
Slashers	M
Soapers	M
Spinners	M
Tenter frames	M
Washers	M
Winders	M
Windlass②	

① To be selected on basis of 24 hr. service only.
② Refer to Nuttall Gear.
③ Apply service factors to motor rated hp. at base speed.

Table 3: Application for Dry Dock Cranes

(Hammerhead, Rotating and Whirler, Stationary or Moving)
Due to the nature of these crane drives, the following service factors are to be used for any duration of service.

Application	Load Classification
Main Hoist	1.00
Auxiliary Hoist	1.00
Boom (Luffing)	1.00
Rotating (Swing or Slow)	1.25
Tracking (Drive Wheels)	1.50

In-Line Speed Reducers
Type R
Moduline®

The ratings shown in shaded boxes in Section 250 are the full mechanical ratings which should be used in applying service factors; however certain ratings are thermally limited and those limits are listed in the table below.

The thermal capacity is the actual horsepower that a reducer will transmit for more than three (3) hours without overheatings. Values are only given if the thermal horsepower capacity is **less** than the mechanical horsepower capacity. If the thermal capacity of the standard unit is not sufficient, check the thermal capacity of a unit with fan-cooling, indicated by an 'F' prefix.

Thermal Horsepower Ratings are based on the following conditions:

1. Ambient temperatures must not exceed 100° F.
2. Adequate air circulation around gear unit.
3. Gear unit must not be covered with any foreign material (coal, cement, grain dust, etc.) which will prevent proper heat dissipation.
4. Use of proper gear lubricating oil.
5. Correct coupling alignment.

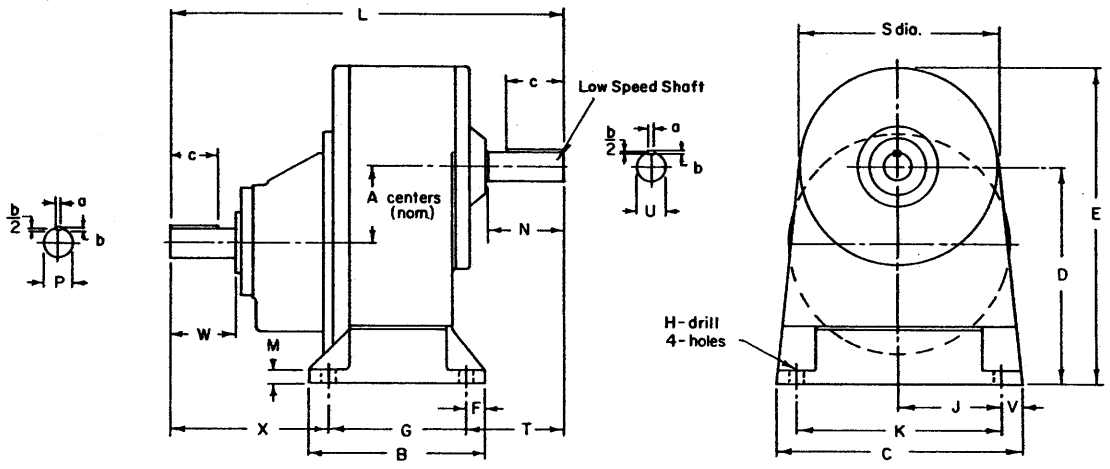
Input Speed	Nominal Gear Ratio	Nominal Output Speed	CASE SIZE AND TYPE											
			54D	64D	76S	76D	F76D	85D	F85D	88D	F88D	92D	F92D	98D	F98D
1750	1.225	1430			100										
	1.500	1165			100										
	1.837	950			100										
	4.134	420	65			87	170			125	240				
	5.06	350	65	76		87	170			125	240				
	6.20	280	66	76		90	174	125	250	127	250			180	300
	7.59	230	66	77		92	①	127	①	128	253	150	282	180	300
	9.30	190		77		100	①	128	①	130	①	150	284	182	300
	11.39	155				100	①	130	①	132	①	151	286	184	300
	13.95	125								135	①	152	①	186	300
	17.09	100										153	①	188	①
	20.93	84										155	①	188	①
	25.63	68												188	①
1430	1.225	1170			100										
	1.500	950			100										
	4.134	350	66			89	139			127	203				
	5.06	280	66	76		92	141	128	205	128	205				
	6.20	230	67	77		100	145	130	208	130	208	150	240	180	280
	7.59	190		77		100	145	132	①	132	211	151	242	181	280
	9.30	155				101	①	133	①	133	①	152	243	183	280
	11.39	125				104	①			135	①	154	①	185	280
	13.95	100										156	①	186	280
	17.09	84												188	①
	20.93	68												190	①
1170	1.225	950			100										
	4.134	280	67			100	125			128	180				
	5.06	230	67	77		100	127	130	182	130	182	152	212	184	220
	6.20	190		78		101	129	132	184	132	184	153	214	186	220
	7.59	155				104	①	134	①	134	188	155	①	190	220
	9.30	125								136	①	156	①	194	220
	11.39	100													
870	4.134	210	68			100	109			129	155				
	5.06	175		78		102	110			131	157				
	6.20	140				106	111			133	159	154	①	184	200
	7.59	115								135	①	155	①	186	200
	9.30	95										156	①	190	200
	11.39	77												194	200

① These fan-cooled ratings are **not** thermally limited. The ratings shown for fan-cooled units in Section 250 are the **lower** of **either** mechanical or thermal capacity. The mechanical capacity of fan-cooled units is identical to the non-fan-cooled units, and should be used to apply service factors.

Your Total Drive Source

Moduline® In-Line Speed Reducers Type R

DIMENSIONS
SINGLE REDUCTION
10S THRU 76S



Dimensions, Inches Not to be used for construction purposes unless dimensions are approved.

Unit Size	U①	Key a	Key b	Key c	A	B	C	D②	E	F	G	H	J	K	L	M	N
10	1.125	.25	.25	2.25	3.0	7	9.75	8.50	12.50	.75	5.44	.56	4.06	8.12	15.69	.50	3.00
21	1.500	.38	.38	2.75	3.5	8	12.00	10.25	14.69	.75	6.50	.56	5.25	10.50	17.75	.88	3.50
32	2.125	.50	.50	3.25	4.0	9	15.00	12.19	19.19	.75	7.50	.69	6.69	13.38	20.75	.88	4.25
43	2.125	.50	.50	3.25	5.0	9	15.00	13.19	19.19	.75	7.50	.69	6.69	13.38	21.00	.88	4.25
54	2.375	.50	.50	3.75	6.0	12	19.88	17.00	26.50	.75	10.38	.69	9.19	18.38	24.12	1.00	5.00
76	2.375	.50	.50	3.75	7.5	12	19.88	18.50	26.50	.75	10.38	.69	9.19	18.38	24.12	1.00	5.00

Unit Size	P①	Key a	Key b	Key c	S	T	V	W	X	Approx. Wt. Lbs
10	.875	.19	.19	1.75	8.00	3.66	.81	2.44	6.59	70
21	1.125	.25	.25	2.25	8.88	4.25	.75	2.94	7.00	110
32	1.375	.31	.31	2.50	13.00	5.06	.81	3.31	8.19	180
43	1.625	.38	.38	2.50	13.00	5.06	.81	3.56	8.44	200
54	1.625	.38	.38	2.75	16.00	5.88	.75	3.81	7.88	350
76	1.625	.38	.38	2.75	16.00	5.88	.75	3.81	7.88	350

① Tolerance = +.000 to −.001.
② This dimension will never be exceeded. When exact dimension is required, shims up to .03 inch may be necessary.

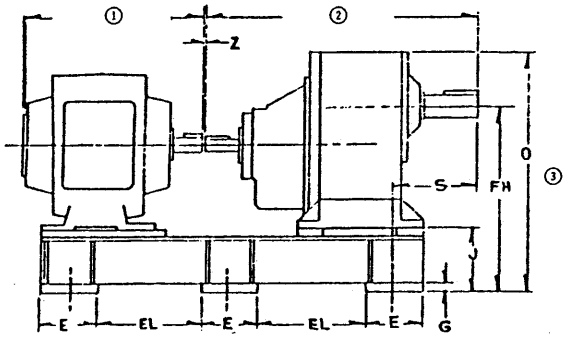
Reproduced from Drawing 834-D-185

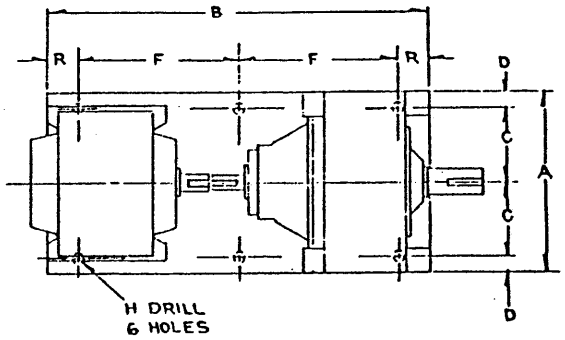
PRELIMINARY ☐ **CERTIFIED** ☐ **PRINT FOR:**

Customer			Customer Order	
G.O.		Cat. No.	Item No.	
Motor Rpm	Output Rpm	Service Factor	Service Hp	Gear Ratio
Application		Signed		Date

In-Line Speed Reducers
Type R
Moduline®

DIMENSIONS
BEDPLATES





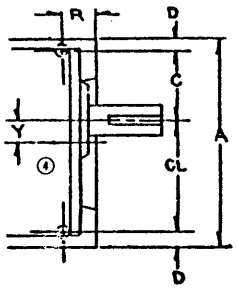
NOTES:
① = See motor dimension sheet
② = See speed reducer dimension sheet
③ = This dimension will never be exceeded. When exact dimension is required, shims up to .125 inches may be necessary.

Single Reduction

UNIT SIZE	A	B	C	D	E	EL	F	FH③	G	H	J	③ O MAX	R	S	Z
10	10.50	31.00	4.50	.75	4.00	9.50	13.50	12.50	.50	.56	4.00	18.0	2.00	4.91	.12
21	12.50	34.00	5.50	.75	4.00	11.00	15.00	14.25	.50	.56	4.00	20.19	2.00	5.50	.12
32	16.00	39.00	7.00	1.00	5.00	12.00	17.00	17.69	.75	.81	5.50	26.19	2.50	6.81	.12
43	16.00	42.00	7.00	1.00	5.00	13.50	18.50	18.69	.75	.81	5.50	26.19	2.50	6.81	.12
54	20.00	47.00	8.75	1.25	7.00	13.00	20.00	24.00	1.0	1.06	7.00	35.0	3.50	8.62	.12
76	20.00	50.00	8.75	1.25	7.00	14.50	21.50	25.50	1.0	1.06	7.00	35.0	3.50	8.62	.12

Double, Triple, Quadruple Reduction

UNIT SIZE	A	B	C	CL	D	E	EL	F	FH③	G	H	J	③ O MAX	R	S	Y④	Z
5/10	10.25	26.00	4.38		.75	4.00	7.00	11.00	9.69	.50	.56	4.0	15.6	2.00	4.63		.12
15/21	12.00	32.00	5.25		.75	4.00	10.00	14.00	10.25	.50	.56	4.0	17.2	2.00	5.56		.12
32	14.50	38.00	6.25		1.00	5.00	11.50	16.50	12.75	.75	.81	5.5	20.9	2.50	6.50		.12
43	18.00	40.00	8.00		1.00	5.00	12.50	17.50	14.75	.75	.81	5.5	23.6	2.50	6.81		.12
51/54	20.75	46.00	9.12		1.25	7.00	12.50	19.50	17.75	1.00	1.06	7.0	28.5	3.50	9.00		.12
64	20.75	50.00	9.12		1.25	7.00	14.50	21.50	17.75	1.00	1.06	7.0	28.5	3.50	10.25		.12
76	24.00	56.00	10.75		1.25	7.00	17.50	24.50	19.00	1.00	1.06	7.0	31.3	3.50	11.06		.12
85/88	26.25	60.00	10.00	12.75	1.75	8.00	18.00	26.00	21.50	1.25	1.38	8.5	33.9	4.00	13.62		.12
92	28.00	68.00	10.62	13.88	1.75	8.00	22.00	30.00	23.00	1.25	1.38	8.5	37.5	4.00	13.62	1.63	.12
98																	



NOTES:
① = See motor dimension sheet
② = See speed reducer dimension sheet
③ = This dimension will never be exceeded. When exact dimension is required, shims up to .125 inches may be necessary.
④ = Offset from centerline, sizes 92, 98 only.

PRELIMINARY ☐ **CERTIFIED** ☐ **PRINT FOR:**

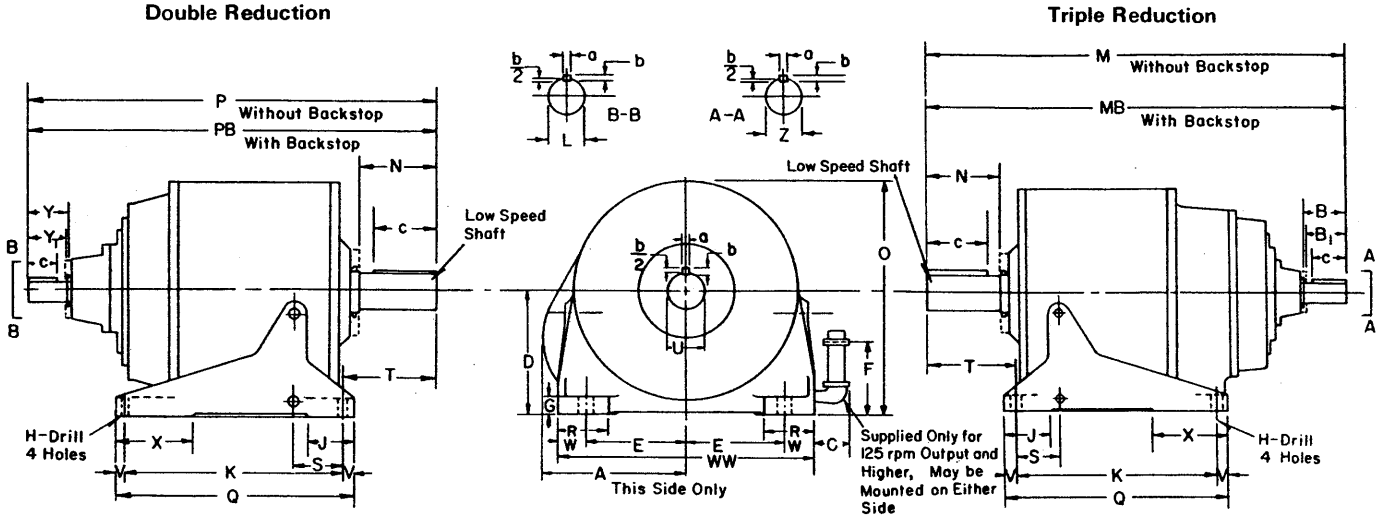
Purchaser		Purch. Order No.		Item No.	Dated
No. Req'd.	Unit Size	Assembly Fig.	Motor Bed		H.S. Shaft Rpm
Motor Make	Hp	Frame No.	Furnish by	Mtd. by	L.S. Shaft Rpm
Coupling, Pinion, Sprocket Pulley			Furnish by	Mtd. by	Ratio
G.O.	Size H.S. Cplg.	Mtd. by		Service Rating Hp	Catalog Rating Hp
Remarks		Date	Signed		S.F. (AGMA)

Your Total Drive Source

Moduline®

In-Line Speed Reducers
Type R

DIMENSIONS
DOUBLE AND TRIPLE REDUCTION
05 THRU 76



Dimensions, Inches Not to be used for construction purposes unless dimensions are approved

Dimensions Common to Double and Triple Reduction Units

Unit Size	U①	Key a	Key b	Key c	A	C	D②	E	F	G	H	J	K	N	O	Q	R	S	T	V	W	WW	X
5/10	1.375	.31	.31	2.00	5.2	1.7	5.69	4.12	3.4	.8	.438	2.8	9.00	2.6	10.1	10.5	1.6	2.7	3.4	.8	1.0	10.3	2.8
15/21	1.625	.38	.38	2.50	...	1.7	6.25	4.50	4.0	1.0	.562	3.5	9.75	3.4	11.7	11.1	2.3	2.8	4.3	.7	1.5	12.0	2.8
32	1.875	.50	.50	3.00	...	1.7	7.25	5.50	4.6	1.1	.688	4.0	13.50	3.8	13.9	15.0	2.8	3.2	4.8	.8	1.8	14.5	5.0
43	2.125	.50	.50	3.25	...	1.7	9.25	7.00	5.7	1.3	.812	4.8	15.00	4.4	16.6	17.0	3.3	3.5	5.3	1.0	2.0	18.0	6.5
51/54	2.625	.62	.62	4.00	...	1.7	10.75	8.00	6.7	1.3	.938	6.0	17.25	5.3	20.0	19.3	4.0	4.5	6.5	1.0	2.4	20.8	7.0
64	3.125	.75	.75	5.00	12.3	1.7	10.75	8.00	6.7	1.3	.938	..	17.25	6.3	20.0	19.3	4.0	3.6	7.8	1.0	2.4	20.8	..
76	3.625	.88	.88	6.00	13.4	2.2	12.00	9.25	7.8	1.8	1.062	4.8	20.00	7.3	22.8	22.8	4.8	4.4	8.9	1.4	2.8	24.0	7.4

Double Reduction Units

Unit Size	L①	Key a	Key b	Key c	Y	Y_1	PB	P	Approx. Wt. Lbs.
5/10	.875	.19	.19	1.8	2.4	2.0	19.1	18.1	77
21	1.125	.25	.25	2.3	2.9	2.5	21.6	20.5	130
32	1.375	.31	.31	2.5	3.3	2.9	24.7	23.2	165
43	1.625	.38	.38	2.5	3.6	3.1	25.8	24.3	270
51/54	1.625	.38	.38	2.8	3.8	3.2	29.0	27.6	484
64	1.875③	.50③	.50③	1.8	2.5	2.5	30.4	29.4	550
76	2.125	.50	.50	3.3	4.6	3.9	35.9	34.2	767

Triple Reduction Units

Unit Size	Z①	Key a	Key b	Key c	B	B_1	MB	M	Approx. Wt. Lbs.
15/21	.875	.19	.19	1.8	2.4	2.0	23.8	22.8	140
32	.875	.19	.19	1.8	2.4	2.0	25.9	24.9	225
43	1.125	.25	.25	2.3	2.9	2.5	27.9	26.8	287
51/54	1.375	.31	.31	2.5	3.3	2.9	33.7	32.2	499
64	1.375	.31	.31	2.5	3.3	2.9	36.1	34.6	570
76	1.625	.38	.38	2.5	3.6	3.1	40.0	38.5	773

① Tolerance = +.000 to −.001.
② This dimension will never be exceeded. When exact dimension is required, shims up to .03 inch may be necessary.
③ 1.625 diameter, .375 sq. key with backstop.

Note: When Taconite oil seal is required, use dimension Y_1 and B_1 and add .50 inch to dimensions M, MB, P, PB and T (All units except size 64).

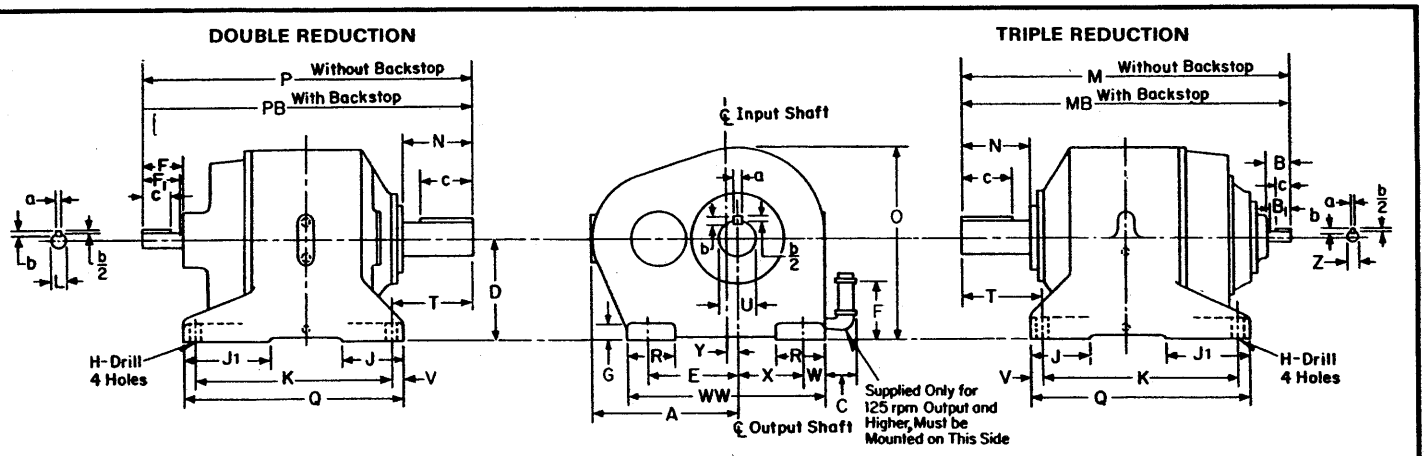
Reproduced from Drawing 823-D-019

PRELIMINARY ☐ **CERTIFIED** ☐ **PRINT FOR:**

Customer			Customer Order	
G.O.		Cat. No.	Item No.	
Motor Rpm	Output Rpm	Service Factor	Service Hp	Gear Ratio
Application		Signed		Date

In-Line Speed Reducers
Type R
Moduline®

DIMENSIONS
DOUBLE AND TRIPLE REDUCTIONS
85 THRU 98



Dimensions, Inches Not to be used for construction purposes unless dimensions are approved

Dimensions Common to Double and Triple Reduction Units

Unit Size	U①	Key a	Key b	Key c	A	C	D②	E	F max.	G	H	J	J1	K	N	O	Q	R	T	V	W	WW	X	Y
85/88	4.500	1.00	1.00	7.5	19.0	2.2	13.00	11.50	9.1	2.0	1.625	8.5	11.5	25.50	9.0	23.9	29.0	6.0	11.4	1.8	3.0	26.3	8.75	...
92	5.000	1.25	.88	7.5	20.6	2.2	14.50	12.62	10.2	2.3	1.875	9.0	12.5	28.00	9.0	27.5	31.5	7.0	11.4	1.8	3.0	28.0	9.38	1.62
98	5.500	1.25	.88	7.0	23.82	2.2	16.50	14.30	12.5	2.3	1.875	10.5	14.0	28.75	9.0	31.5	33.8	7.0	11.5	1.8	3.3	31.4	10.56	1.18

Double Reduction Units

Unit Size	L①	Key a	Key b	Key c	F	F_1	PB	P	Approx. Wt. Lbs.
85/88	2.125	.50	.50	3.3	4.6	3.6	③	40.1	1227
92	2.125	.50	.50	3.3	4.6	4.1	46.7	43.5	1300
98	3.000	.75	.75	3.7	5.8	4.4	49.7	46.6	2350

Triple Reduction Units

Unit Size	Z	Key a	Key b	Key c	B	B_1	MB	M	Approx. Wt. Lbs.
85/88	1.625	.38	.38	2.5	3.6	3.1	45.9	44.4	1236
92	1.625	.38	.38	2.5	3.8	3.2	47.6	46.2	1450
98	2.125	.50	.50	3.2	4.6	3.9	52.3	50.6	2400

① Tolerance = +.000 to −.001.
② This dimension will never be exceeded. When exact dimension is required, shims up to .03 inch may be necessary.
③ See outline drawing 4122-D-33

Note: When Taconite oil seal is required, use dimension F_1 and B_1, and add .50 inch to dimensions M, MB, P, PB and T.

Reproduced from Drawing 842-D-238.

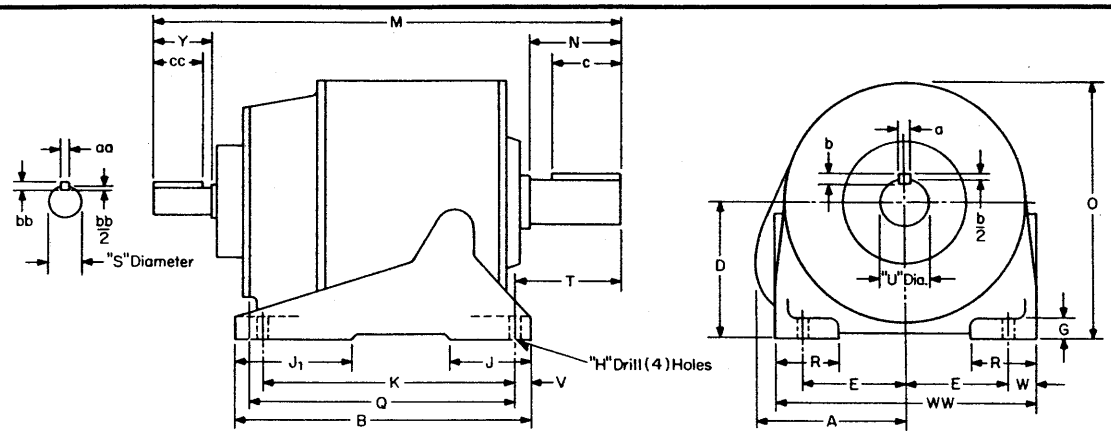
PRELIMINARY ☐ **CERTIFIED** ☐ **PRINT FOR:**

Customer			Customer Order	
G.O.		Cat. No.	Item No.	
Motor Rpm	Output Rpm	Service Factor	Service Hp	Gear Ratio
Application		Signed		Date

Your Total Drive Source

Moduline® In-Line Speed Reducers Type R

DIMENSIONS
QUADRUPLE REDUCTION
32Q THRU 76Q



Dimensions, Inches Not to be used for construction purposes unless dimensions are approved.

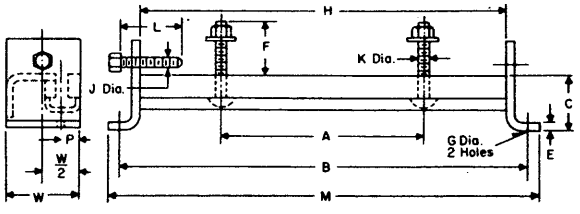
Unit Size	U①	Key (Low Speed) a	b	c	A	B	D②	E	G	H	J	J1	K	M	N
32	1.875	.50	.50	3.00	....	15.0	7.25	5.50	1.1	.69	4.0	5.0	13.50	23.75	3.81
43	2.125	.50	.50	3.25	....	17.0	9.25	7.00	1.2	.81	4.8	6.5	15.00	24.56	4.38
54	2.625	.62	.62	4.00	....	19.2	10.75	8.00	1.2	.94	6.0	7.0	17.25	28.19	5.20
64	3.125	.75	.75	5.00	12.3	19.2	10.75	8.00	1.2	.94	...	...	17.25	30.63	6.20
76	3.625	.88	.88	6.00	13.4	22.8	12.00	9.25	1.8	1.06	4.8	7.4	20.00	36.85	7.30

Unit Size	O	Q	R	S	Key (High Speed) aa	bb	cc	T	V	W	WW	Y	Approx. Wt. Lbs.
32	13.9	15.1	2.8	.875	.19	.19	1.5	4.75	.75	1.8	14.5	2.0	210
43	16.6	15.3	3.3	.875	.19	.19	1.5	5.31	1.0	2.0	18.0	2.0	280
54	20.0	17.8	4.0	.875	.19	.19	1.5	6.50	1.0	2.4	20.8	2.0	500
64	20.0	18.9	4.0	.875	.19	.19	1.5	7.75	1.0	2.4	20.8	2.0	570
76	22.8	21.5	4.8	1.125	.25	.25	2.0	8.94	1.4	2.8	24.0	2.5	775

① Tolerance = +.000 to −.001.
② This dimension will never be exceeded. When exact dimension is required, shims up to .03 inch may be necessary.

Reproduced from Drawing 1709-C-71

Moduline Slide Rails
Dimensions, Inches Not to be used for construction purposes unless dimensions are approved



④ Tolerance = +.000 to −.125.

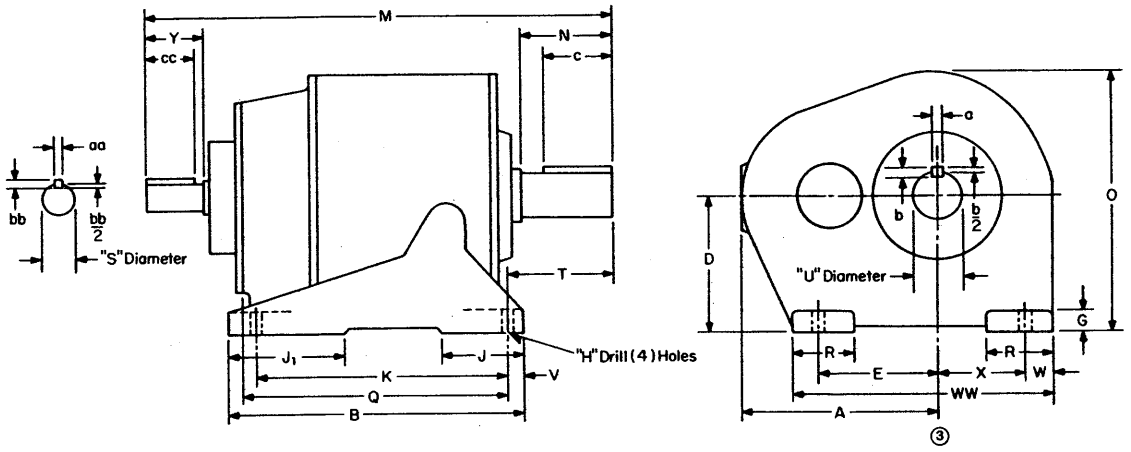
Unit Size	A	B	C④	E	F	G	H	J	K	L	M	P	W	Total Adj.
32	11.00	22.00	2.50	.50	2.00	.75	18.50	.50	.62	5.00	23.50	.69	3.00	4.0
43	14.00	26.75	3.00	.50	2.00	.88	23.00	.75	.75	6.00	28.50	.88	3.25	5.0
51/54	16.00	30.75	4.00	.50	1.75	1.00	26.75	.75	.88	7.00	32.75	.94	4.38	6.0
64	16.00	30.75	4.00	.50	1.75	1.00	26.75	.75	.88	7.00	32.75	.94	4.38	6.0
76	18.50	37.50	4.00	.75	2.75	1.25	32.00	.88	1.00	9.50	40.00	1.25	4.75	8.0
85/88	20.25	45.25	4.50	.75	3.75	1.62	39.00	.88	1.50	10.00	48.50	1.50	5.25	9.0
92	22.00	45.25	4.50	.75	3.75	1.62	39.00	.88	1.50	10.00	48.50	1.50	5.25	9.0
98	24.82	45.25	4.50	.75	3.75	1.62	39.00	.88	1.50	10.00	48.50	1.50	5.25	9.0

PRELIMINARY ☐ **CERTIFIED** ☐ **PRINT FOR:**

Customer			Customer Order	
G.O.		Cat. No.	Item No.	
Motor Rpm	Output Rpm	Service Factor	Service Hp	Gear Ratio
Application		Signed		Date

In-Line Speed Reducers
Type R
Moduline®

DIMENSIONS
QUADRUPLE REDUCTION
88Q THRU 98Q



Dimensions, Inches Not to be used for construction purposes unless dimensions are approved

Unit Size	U①	Key (Low Speed) a	b	c	A	B	D②	E	G	H	J	J1	K	M	N
88	4.500	1.00	1.00	7.5	19.0	29.0	13.00	11.50	2.0	1.63	8.5	11.5	25.50	42.15	9.0
92	5.000	1.25	.88	7.5	20.6	31.6	14.50	12.62	2.2	1.88	9.0	12.5	28.00	45.87	9.0
98	5.500	1.25	.88	7.0	23.5	32.4	16.50	14.30	2.3	1.88	10.5	14.0	28.75	48.13	9.3

Unit Size	O	Q	R	S	Key (High Speed) aa	bb	cc	T	V	W	WW	X	Y	Approx. Wt. Lbs.
88	23.9	25.0	6.0	1.125	.25	.25	2.0	11.4	1.8	3.0	26.3	8.75	2.5	1235
92	27.5	31.6	7.0	1.625	.375	.375	2.5	11.4	1.8	3.0	28.0	9.38	3.0	1470
98	31.5	32.25	7.0	1.625	.375	.375	2.5	11.5	1.8	3.3	31.4	10.56	3.0	2570

① Tolerance = +.000 to −.001.
② This dimension will never be exceeded. When exact dimension is required, shims up to .03 inch may be necessary.
③ Units 92Q and 98Q have input and output shaft offsets of 1.62 and 1.18 inches respectively.

Reproduced from Drawing 1709-C-71

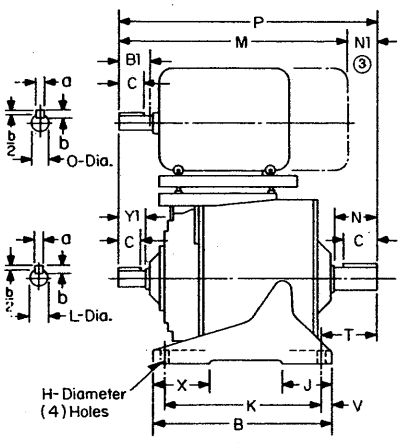
PRELIMINARY ☐ **CERTIFIED** ☐ **PRINT FOR:**

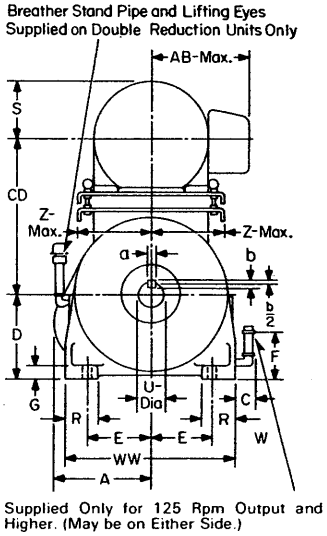
Customer			Customer Order	
G.O.		Cat. No.	Item No.	
Motor Rpm	Output Rpm	Service Factor	Service Hp	Gear Ratio
Application		Signed		Date

Your Total Drive Source

Moduline® In-Line Speed Reducers Type R

DIMENSIONS
PIGGY BACK MOTOR MOUNTING
SIZES 05 THRU 54





Supplied Only for 125 Rpm Output and Higher. (May be on Either Side.)

Dimensions, Inches Not to be used for construction purposes unless dimensions are approved

Dimensions Common to Double and Triple Reduction Units

Unit Size	U①	Key a	Key b	Key c	A	B	C	D②	E	F	G	H	J	K	N	R	T	V	W	WW	X	Z
5/10	1.375	.31	.31	2.00	5.2	10.5	1.7	5.69	4.12	3.4	.8	.44	2.8	9.00	2.6	1.6	3.4	.8	1.0	10.3	2.8	6.06
15/21	1.625	.38	.38	2.50	..	11.1	1.7	6.25	4.50	4.0	1.0	.56	3.5	9.75	3.4	2.3	4.3	.7	1.5	12.0	2.8	7.50
32	1.875	.50	.50	3.00	..	15.0	1.7	7.25	5.50	4.6	1.1	.69	4.0	13.50	3.8	2.8	4.8	.8	1.8	14.5	5.0	8.69
43	2.125	.50	.50	3.25	..	17.0	1.7	9.25	7.00	5.7	1.2	.81	4.8	15.00	4.4	3.3	5.3	1.0	2.0	18.0	6.5	8.69
51/54	2.625	.62	.62	4.00	..	19.3	1.7	10.75	8.00	6.7	1.2	.94	6.0	17.25	5.3	4.0	6.5	1.0	2.4	20.8	7.0	9.12

Double Reduction Units

Unit Size	L①	Key a	Key b	Key c	Yl	P	Approx. Wt. Lbs.
5/10	.875	.19	.19	1.75	2.44	18.06	80
21	1.125	.25	.25	2.25	2.94	20.50	140
32	1.375	.31	.31	2.50	3.31	23.19	202
43	1.625	.38	.38	2.50	3.56	24.25	278
51/54	1.625	.38	.38	2.75	3.81	27.62	490

Triple Reduction Units

Unit Size	L①	Key a	Key b	Key c	Yl	P	Approx. Wt. Lbs.
15/21	.875	.19	.19	1.75	2.44	22.75	135
32	.875	.19	.19	1.75	2.44	24.94	196
43	1.125	.25	.25	2.25	2.94	26.81	293
51/54	1.375	.31	.31	2.50	3.31	32.19	505

Motor Dimensions

Motor Frame	O①	Key a	Key b	Key c	Bl	Drip-proof AB	Drip-proof S	Drip-proof M	Drip-proof Wt.	TEFC, Expl. Proof AB	TEFC, Expl. Proof S	TEFC, Expl. Proof M	TEFC, Expl. Proof Wt.
143T	.875	.19	.19	1.38	2.12	5.7	3.3	12.7	40	8.2	3.3	13.0	55
145T	.875	.19	.19	1.38	2.12	5.7	3.3	12.7	45	8.2	3.3	13.0	60
182T	1.125	.25	.25	1.75	2.50	7.4	4.7	12.8	70	8.46	4.8	14.4	85
184T	1.125	.25	.25	1.75	2.50	7.4	4.7	13.8	88	8.46	4.8	15.4	100
213T	1.375	.31	.31	2.38	3.12	8.4	5.5	15.8	110	10.3	5.6	17.7	145
215T	1.375	.31	.31	2.38	3.12	8.4	5.5	17.3	130	10.3	5.6	19.2	175
254T	1.625	.38	.38	2.88	3.75	10.3	6.6	20.5	230	12.4	6.6	23.0	230
256T	1.625	.38	.38	2.88	3.75	10.3	6.6	22.3	265	12.4	6.6	24.8	270
284T	1.875	.50	.50	3.25	4.38	12.1	7.4	23.3	330	13.3	7.4	25.8	360
286T	1.875	.50	.50	3.25	4.38	12.1	7.4	24.8	370	13.3	7.4	27.3	390
324T	2.125	.50	.50	3.88	5.00	14.3	8.4	26.1	475	17.1	8.5	28.8	550
326T	1.875	.50	.50	2.00	3.50	14.3	8.4	26.1	525	17.1	8.5	28.8	610

CD Dimensions

Motor Frame	5/10 Max.	5/10 Min.	15/21 Max.	15/21 Min.	32 Max.	32 Min.	43 Max.	43 Min.	51/54 Max.	51/54 Min.
143T	12.5	10.0	14.4	11.4	15.4	12.1	....	....	....	....
145T	12.5	10.0	14.4	11.4	15.4	12.1	....	....	....	....
182T	13.5	11.0	15.4	12.4	16.4	13.1	17.6	14.4	19.4	15.9
184T	13.5	11.0	15.4	12.4	16.4	13.1	17.6	14.4	19.4	15.9
213T	....	....	16.1	13.1	17.1	13.9	18.4	15.1	20.1	16.6
215T	....	....	16.1	13.1	17.1	13.9	18.4	15.1	20.1	16.6
254T	....	....	....	....	18.6	15.4	19.4	16.1	21.6	18.1
256T	....	....	....	....	18.6	15.4	19.4	16.1	21.6	18.1
284T	....	....	....	....	19.4	16.1	20.1	16.9	22.4	18.9
286T	....	....	....	....	....	....	20.1	16.9	22.4	18.9
324T	....	....	....	....	....	....	....	....	23.4	19.9
326T	....	....	....	....	....	....	....	....	23.4	19.9

① Tolerance = +.000 to −.001.

② This dimension will never be exceeded. When exact dimension is required, shims up to .03 inch may be necessary.

③ NI or (P-M) dimension should be checked by customer to be sure that the motor length "M" does not interfere with driven equipment, belt, chain, etc. mounted on output shaft of gear unit.

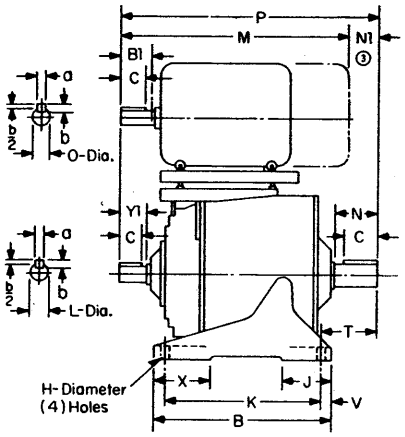
Reproduced from Drawing 5642-D-52

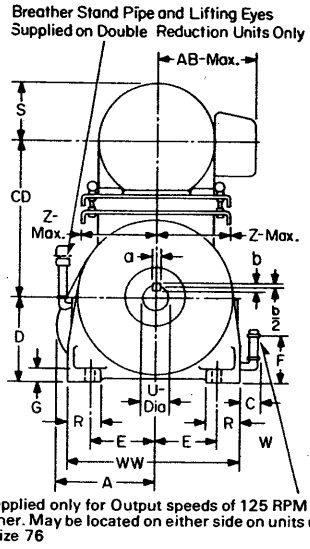
PRELIMINARY ☐ **CERTIFIED** ☐ **PRINT FOR:**

Customer			Customer Order	
G.O.		Cat. No.	Item No.	
Motor Rpm	Output Rpm	Service Factor	Service Hp	Gear Ratio
Application		Signed		Date

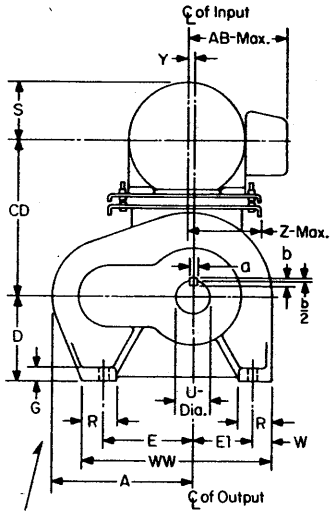
In-Line Speed Reducers
Type R
Moduline®

DIMENSIONS
PIGGYBACK MOTOR MOUNT
SIZES 64 THRU 98





Supplied only for Output speeds of 125 RPM or Higher. May be located on either side on units up to size 76



④ This End view for Units 85 to 98 only.

Dimensions, Inches Not to be used for construction purposes unless dimensions are approved

Dimensions Common to Double and Triple Reduction Units

Unit Size	U①	Key a	Key b	Key c	A	B	C	D②	E	E1	F	G	H	J	K	N	R	T	V	W	WW	X	Y	Z
64	3.125	.75	.75	5.0	12.3	19.3	2.2	10.75	8.00	....	6.7	1.2	.94	...	17.25	6.2	4.0	7.7	1.0	2.4	20.8	....	....	10.25
76	3.625	.88	.88	6.0	13.4	22.8	...	12.00	9.25	....	7.8	1.8	1.06	4.8	20.00	7.3	4.8	8.9	1.4	2.8	24.0	7.4	....	10.25
85/88	4.500	1.00	1.00	7.5	19.0	29.0	...	13.00	11.50	8.75	...	2.0	1.62	8.5	25.50	9.0	6.0	11.4	1.8	3.0	26.3	11.5	....	11.76
92	5.000	1.25	.88	7.5	20.6	31.5	...	14.50	12.63	9.38	...	2.3	1.88	9.0	28.00	9.0	7.0	11.4	1.8	3.0	28.0	12.5	1.63	12.88
98	5.500	1.25	.88	7.0	23.8	32.3		16.50	14.30	10.57		2.3	1.88	10.5	28.75	9.3	7.0	11.5	1.8	3.0	31.4	14.0	1.18	12.88

Double Reduction Units

Unit Size	L①	Key a	Key b	Key c	YI	P	Approx. Wt. Lbs.
64	1.875	.50	.50	1.75	2.50	29.40	560
76	2.125	.50	.50	3.25	4.56	34.19	770
85/88	2.125	.50	.50	3.25	4.56	40.12	1230
92	2.125	.50	.50	3.25	4.56	43.50	1310
98	3.000	.75	.75	3.7	5.8	50.6	2260

Triple Reduction Units

Unit Size	L①	Key a	Key b	Key c	YI	P	Approx. Wt. Lbs.
64	1.375	.31	.31	2.50	3.31	34.62	580
76	1.625	.38	.38	2.50	3.56	38.50	783
85/88	1.625	.38	.38	2.50	3.56	44.44	1246
92	1.625	.38	.38	2.50	3.81	46.19	1460
98	2.125	.58	.50	3.2	4.6	50.6	2410

Motor Dimensions														CD Dimensions									
Motor Frame	O①	Key a	Key b	Key c	BI	Drip-proof AB	Drip-proof S	Drip-proof M	Drip-proof Wt.	TEFC, Expl. Proof AB	TEFC, Expl. Proof S	TEFC, Expl. Proof M	TEFC, Expl. Proof Wt.	64 Max.	64 Min.	76 Max.	76 Min.	85/88 Max.	85/88 Min.	92 Max.	92 Min.	98 Max.	98 Min.
182T	1.125	.25	.25	1.75	2.50	7.4	4.7	12.8	70	8.4	4.8	14.4	85	19.4	15.9	....	....	....	....	....	....	....	....
184T	1.125	.25	.25	1.75	2.50	7.4	4.7	13.8	80	8.4	4.8	15.4	100	19.4	15.9	....	....	....	....	....	....	....	....
213T	1.375	.31	.31	2.38	3.12	8.4	5.5	15.8	115	10.3	5.6	17.7	145	20.1	16.6	....	....	....	....	....	....	....	....
215T	1.375	.31	.31	2.38	3.12	8.4	5.5	17.3	140	10.3	5.6	19.2	175	20.1	16.6	....	....	....	....	....	....	....	....
254T	1.625	.38	.38	2.88	3.75	10.3	6.6	20.5	200	12.4	6.6	23.0	230	21.6	18.1	24.9	20.9	25.4	19.2	....	....	....	....
256T	1.625	.38	.38	2.88	3.75	10.3	6.6	22.3	240	12.4	6.6	24.8	270	21.6	18.1	24.9	20.9	25.4	19.2	....	....	....	....
284T	1.875	.50	.50	3.25	4.38	12.1	7.4	23.3	330	13.3	7.4	25.8	360	22.4	18.9	25.6	21.6	26.1	21.9	27.9	23.4	29.9	25.4
286T	1.875	.50	.50	3.25	4.38	12.1	7.4	24.8	370	13.3	7.4	27.3	390	22.4	18.9	25.6	21.6	26.1	21.9	27.9	23.4	29.9	25.4
324T	2.125	.50	.50	3.88	5.00	14.3	8.4	26.1	475	17.1	8.5	28.8	550	23.4	19.9	26.6	22.6	27.1	22.9	28.9	24.4	30.9	26.4
326T	1.875	.50	.50	2.00	3.50	14.3	8.4	26.1	525	17.1	8.5	28.8	610	23.4	19.9	26.6	22.6	27.1	22.9	28.9	24.4	30.9	26.4
364T	1.875	.50	.50	2.00	3.50	17.9	9.3	26.6	672	18.8	9.6	30.5	835	24.4	20.9	27.6	23.6	28.1	23.9	29.9	25.4	31.9	27.4
365T	1.875	.50	.50	2.00	3.50	17.9	9.3	27.6	716	18.8	9.6	31.5	920	....	....	27.6	23.6	28.1	23.9	29.9	25.4	31.9	27.4
404T	2.125	.50	.50	2.75	4.00	18.9	10.6	29.6	960	20.5	10.8	33.6	1145	....	....	....	....	29.1	24.9	30.9	26.4	32.9	28.4
405T	2.125	.50	.50	2.75	4.00	18.9	10.6	31.1	1010	20.5	10.8	35.1	1260	....	....	....	....	29.1	24.9	30.9	26.4	32.9	28.4
444T	2.375	.62	.62	3.00	4.50	21.4	11.8	34.1	1388	26.3	12.1	38.4	1515	....	....	....	....	....	....	31.9	27.4	33.9	29.4

① Tolerance = +.000 to −.001.
② This dimension will never be exceeded. When exact dimension is required, shims up to .03 inch may be necessary.
③ NI or (P-M) dimension should be checked by customer to be sure that the motor length "M" does not interfere with driven equipment, belt, chain, etc. mounted on output shaft of gear unit.

Reproduced from Drawing 5642-D-52

④ Units 92Q and 98Q have input and output shaft offsets of 1.62 and 1.18 inches respectively.

PRELIMINARY ☐ **CERTIFIED** ☐ **PRINT FOR:**

Customer			Customer Order	
G.O.		Cat. No.	Item No.	
Motor Rpm	Output Rpm	Service Factor	Service Hp	Gear Ratio
Application		Signed		Date

Your Total Drive Source

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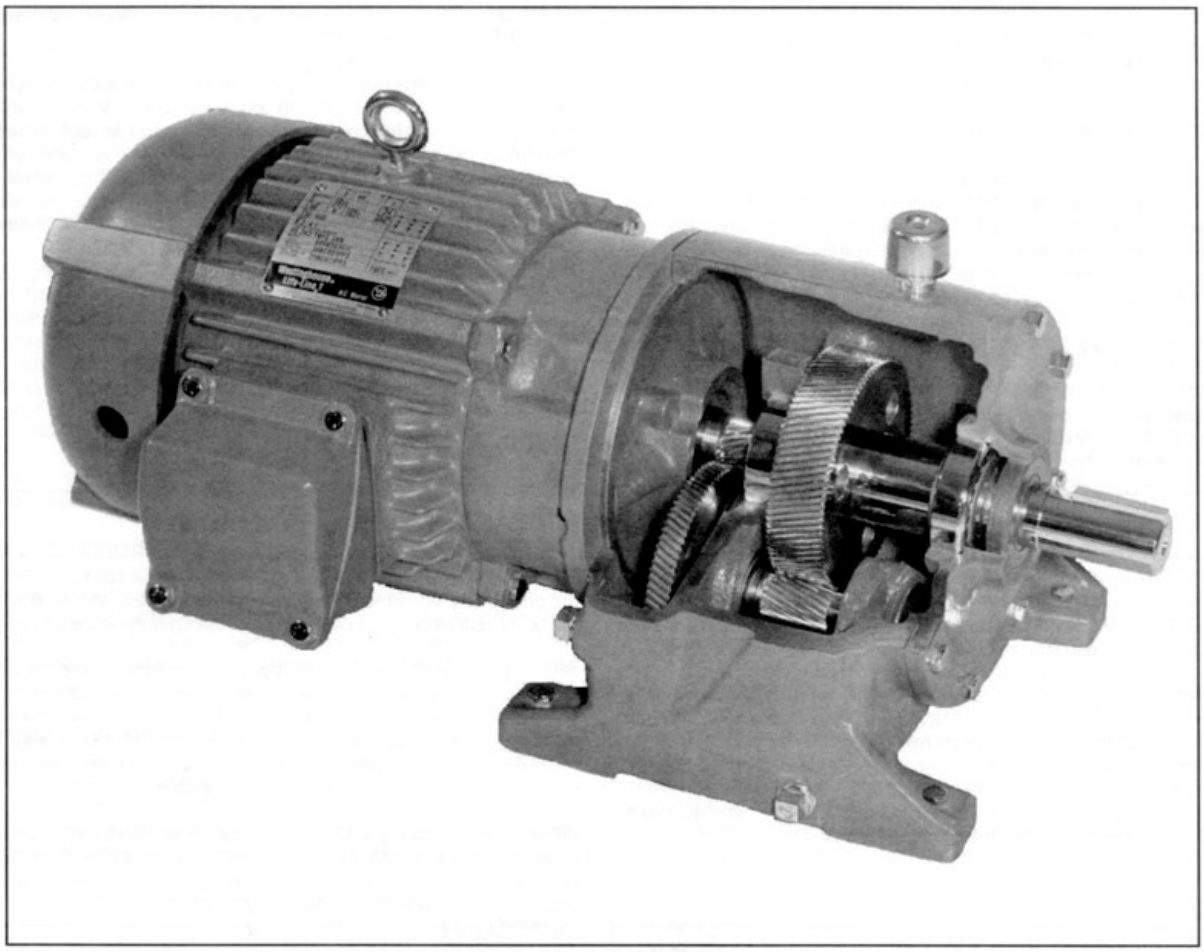
A REGAL REXNORD BRAND

Moduline Concentric Shaft Speed Reducers

- Installation
- Lubrication
- Maintenance
- Operation
- Replacement Parts



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WARRANTY

CAUTION: Service and repair under warranty must be performed only by a Nuttall authorized service shop, otherwise the warranty will become void.

Nuttall Gear warrants that the product furnished will be free of defects in material an workmanship for a period not to exceed one year from installation or eighteen months from shipment to the purchaser, whichever is soonest. Upon prompt notification and written substantiation that the equipment has been stored, installed, operated and maintained in accordance with Nuttall recommendations and standard industry practices, Nuttall will correct non-conformity by repair or replacement, at its option, F.O.B. factory.

The warranties set forth in this provision are exclusive and in lieu of all other warranties whether statutory, express or implied (including all warranties of merchantability and fitness for particular purpose and all warranties arising from course of dealing or usage of trade), except of title and against patent infringement. The remedies provided above shall constitute complete fulfillment of all the liabilities of Nuttall whether the claims of the purchaser are based in contract, in tort (including negligence), or otherwise with respect to, or arising out of, the product furnished hereunder.

The system of connected rotating parts—PRIME MOVER AND ACCESSORIES, GEAR UNIT, AND DRIVEN EQUIPMENT—must be compatible; free from critical speeds, torsional or other types of vibration, within the operating range, regardless of the source of such vibration, and/or it's inducement. Nuttall Gear Corporation's responsibility is limited to providing a gear unit within normal commercial levels of vibration generation. Nuttall Gear Corporation is not responsible for the unsatisfactory operation or failure of the drive system, resulting from the incompatibility of rotating components, nor the analysis required. The system responsibility remains with the purchaser, system builder or designer, unless Nuttall Gear Corporation has agreed to perform such analysis, and the nature of such vibrations is fully defined.

Those units supplied with motor/gear couplings mounted must be final aligned by the installer, Nuttall Gear verifies that the motor and gear can be aligned; however, Nuttall Gear does not do final alignment, because of changes that occur during shipment handling as well as foundation variances.

The user is responsible for furnishing and installing any guards or other safety equipment needed to protect operating personnel, even though such safety equipment may not have been furnished by the seller with the equipment purchased.

Nuttall, its contractors and suppliers of any tier, shall not be liable in contract, in tort (including negligence), or otherwise for damage or loss of other property or equipment, loss of profits or revenue, loss of use of equipment or power system, cost of capital, cost of purchased or replacement power or temporary equipment (including additional expenses incurred in using existing facilities), claims of customers of the purchaser, or for any special; indirect, incidental, or consequential damages whatsoever.

The remedies of the purchaser set forth herein are exclusive and the liability of Nuttall with respect to any contract, or anything done in connection therewith, such as the performance or breach thereof, or from the manufacture, sale, delivery, resale, or use of any equipment covered by or furnished under the contract, whether in contract, in tort (including negligence) or otherwise, shall not exceed the price of the equipment or part on which such liability is claimed.

In no event shall Nuttall be responsible for providing working access to the defect, including the removal, disassembly, replacement or reinstallation of any equipment, materials or structure to the extent necessary to permit Nuttall to perform its warranty obligations, or transportation costs to and from Nuttall factory or repair facility. The conditions of any tests shall be mutually agreed upon and Nuttall shall be notified of, and may be present at, all tests that may be made.

INTRODUCTION

The following instructions apply to all Nuttall Gear Moduline gearmotors, gear reducers and motor/reducer packages. If a unit is furnished with special features, refer to the supplemental instructions shipped with the unit or contact Nuttall Gear.

The gear drive is rated according to the latest standard of the American Gear Manufacturers Association, and was selected to suit the load conditions for the service ratings on the nameplate. Proper performance depends on adherence to these operational ratings. Operate this unit only at the ratings shown on the nameplate. Before changing any of these operational ratings, contact your Nuttall Gear representative for factory approval.

To protect warranty, installation and maintenance services must only be performed by trained personnel after reading the instructions. Particular attention must be paid to all nameplates and warning tags.

All warning labels and instructions for installing and operating electrical equipment must be carefully read and followed. All electrical connections must be installed only by qualified personnel in strict accordance with the national electric code and local requirements. Compliance with all codes, laws and safety ordinances is the sole responsibility of the user.

When communicating with your Nuttall Gear sales representative, make reference to the Nuttall nameplate shop order number, the type and rating of the gear drive, serial number, and any other information useful in identifying the gear drive.

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RECEIVING & HANDLING

Immediately upon receipt examine the unit for damage. Notify the carrier and your Nuttall Gear sales representative immediately if there is any evidence of shipping damage. Responsibility for reimbursement for losses or damage in shipment remain solely with the transportation company.

Operating instructions for accessories mounted on the gear unit assembly are normally attached to the unit. Save all hardware, accessories, wiring diagrams, and instruction information included with the unit.

CAUTION:

- Never use shaft extensions for pushing, pulling, or supporting the weight of the unit.
- Never drag the gear unit. Machined mounting surfaces will be marred and overstressing of the housing may occur.
- Never attempt to lift the entire unit by using the motor lifting lugs or eyebolt holes.
- When lifting, use slings to distribute the load evenly and to keep the unit from tilting. Spreader bars may be required to avoid stress on any piping and accessories mounted on the unit.
- Never use piping for lifting or climbing.
- If the unit is to be stored, refer to the storage instructions in this manual.

STORAGE

General

All internal and unpainted external surfaces of gear drives have been treated at the factory, prior to shipment, with a rust preventative. The protective life of this rust preventative will vary with temperature fluctuations, atmospheric moisture content, degree of exposure to the elements during storage, and degree of contact with other objects. Inspect all machined surfaces and spray or add rust inhibitor to exposed metal surfaces that may have had the protective coating removed in shipping and handling. To assure that the gear drive will operate satisfactorily at start-up, certain precautions must be taken by the customer upon receipt. The expected length of storage and the storage atmosphere dictated the maintenance schedule to be followed. Units must always be stored in their operating position and free of loads or weights on output and input shafts. These instructions apply to the reducer only. If a motor is included in our drive package, motor operating maintenance and storage instructions are included with drawing transmittals and are also attached to the unit. These instructions must be carefully read and followed.

Short Term Storage (Indoor)

If the gear drives are to be stored for a period of 30 days or less, the following should be observed: Store in a clean, dry location with factory packaging intact, and with as nearly a constant temperature as possible. Elevate a minimum of six inches above the floor level. Avoid areas that are subject to extremes in temperature, vibrations, and humidity.

Long Term Storage (Indoor)

If units are to be stored for a period longer than 30 days, the following should be observed:

1. Store in a clean dry location with the unit elevated a minimum of six inches above the floor level. Avoid areas that are subject to extremes in temperature, vibrations, and humidity.
2. Remove breather and replace with pipe plug.
3. Fill gear drive to the recommended oil level with Shell VSI grade 68 oil or equal, heated between 110-120°F. **Do Not Overfill**. Immediately close openings to maintain vapors in the housing.
4. Rotate the high speed shaft slowly by hand, a minimum of eighty revolutions, at least once every four weeks.
5. Inspect unit periodically and spray or add rust inhibitor suitable for anticipated storage conditions, as required.
6. Drain and replace with the recommended oil type prior to start-up.

Outdoor Storage

Note: OUTDOOR STORAGE IS NOT RECOMMENDED. When storage in a warehouse or enclosed building is not possible, however, the following should be observed:

1. Bring unit to an area in which the ambient temperature is greater than 50°F and allow to stand for a minimum of 24 hours.
2. Remove breather and replace with pipe plug. Seal the unit completely by sealing all air vents with pressure sensitive tape. Pack grease around the shafts near the contact seals and tape. Pack grease into the seal retainers and wrap tape against the seals.
3. Fill gear unit to half the recommended oil level with Shell VSI grade 68 oil or equal, heated between 110-120°F. Immediately close openings to maintain vapors in the housing.
4. Coat the entire exterior with a rust preventative.
5. Seal the unit in a moisture proof container with an adequate supply of desiccant inside to avoid moisture build-up. Unit must be elevated a minimum of six inches above the ground.
6. The high speed shaft should be rotated slowly by hand, eighty revolutions, at least once every four weeks.
7. Repeat operations 1,2,3, and 4 every six months. The Shell VSI Grade 68 Oil may be drained, reheated and reused.
8. Do not store the unit in direct sunlight.

INSTALLATION

The continuous efficient operation of a gear unit depends chiefly on four factors:

1. Proper type of foundation and correct mounting.
2. Correct alignment with the driven equipment.
3. Correct lubrication.
4. Full consideration of both preventative and operating maintenance.

CAUTION: Operate the gear unit only within the ratings shown on the nameplate. Review the application to confirm the unit will not be operated in conditions exceeding the nameplate rating. Selection and installation of guard, warning signs, or any provisions required to meet national and local safety codes are the responsibility of the user.

Environmental Considerations

Units should not be installed in locations of unusually high or low temperatures. Adequate air flow is required for proper heat dissipation from the unit. Ambient temperatures must not exceed 100°F, unless supplemental means of cooling are supplied. Environmental conditions, including exposure to direct sunlight, high humidity, dust or chemicals suspended in the air are worthy of special consideration. Gear drives exposed to these and other adverse conditions should be referred to Nuttall Gear for special evaluation and recommendation.

Foundation

A foundation or mounting, which provides rigidity and prevents weaving or flexing with resultant misalignment of the shafts, is essential to the successful operation of a gear unit. A concrete foundation should be used whenever possible and should be carefully prepared to conform with data regarding bolt spacing and physical measurements contained in the Dimension Leaflet supplied prior to delivery of the equipment. Grout steel mounting pads into the concrete base. Mount the unit on these steel pads. Do not gout the unit directly into the concrete base. Mount the unit on these steel pads. Do not grout the unit directly into the concrete foundation. When the units are installed on structural foundation pads a supporting base plate of steel should be provided to obtain proper rigidity. These plates or pads should be of a thickness equal to or greater than the diameter of the hold down bolts.

Foundation Bolt Torque Recommendations
Gear units must be securely bolted to their foundations with the specified bolt size. Bolts are to be SAE Grade 5 or equivalent fasteners. **Do not lubricate fasteners**. Tighten bolts per the torques listed below.

	Torque (Ft. Lbs.)			Torque (Ft. Lbs.)	
Bolt Size (UNC)	**Metal To Metal**	**Metal To Concrete**	**Bolt Size (UNC)**	**Metal To Metal**	**Metal To Concrete**
¼	8	6	1-1/4	1,050	834
5/16	16	12	1-3/8	1,375	1,084
3/8	28	22	1-1/2	1,842	1,458
½	69	54	1-3/4	1,975	1,558
5/8	137	108	2	3,083	2,147
¾	245	191	2-1/4	4,333	3,417
7/8	380	313	2-1/2	6,000	4,667
1	567	467	2-3/4	8,167	6,417
1-1/8	742	584	3	10,417	8,250

Bedplates
Bedplates are provided as common mounting surfaces which will support several components when mounted on a proper foundation. Bedplates are also designed to facilitate alignment of those components. Because of the disparity of component sizes, bedplates are not designed to be self-supporting structures under all conditions. They are not designed to provide a platform for lifting and transporting with all of the components mounted, unless the assemblies are properly supported and balanced with appropriate material handling fixtures. There will be occasions when it will be necessary to remove some components for transport, and subsequently, reassemble the drive train in its final location. Nuttall Gear supplies the components on the bedplate assemblies rough aligned to the coupling manufacturer's specifications. However, due to possible shifting in transit or handling and the possible variances in foundation surfaces, the final alignment is the responsibility of the installer. To align a bedplate supplied unit, the output shaft of the reducer should be aligned with the driven shaft by moving and shimming the bedplate assembly—not by moving the reducer on the bedplate. Insure that all bedplate mounting points are properly shimmed for proper support to provide a solid level surface. Failure to do so may create a twist in the bedplate and could make final alignment of the drive components difficult. After aligning the reducer output shaft and shimming between the bedplate and the foundation, the mounting bolts or lugs should be tightened and the bedplate firmly locked and grouted in place. Final alignment of the other bedplated components must now be completed.

Alignment
Gear units are designed with a tolerance of +0 and –1/16 in. between the shaft center and the base, therefore, shimming may be required. Flat shims of various thicknesses, slotted to slide around the foundation bolts, should be used. All feet must be solidly supported before the mounting bolts are tightened. After alignment has been secured through shimming, the equipment should be bolted down and alignment rechecked. Heat up couplings, sprockets or pinions and shrink them onto shaft extensions when required, avoiding contact with the shaft seal. Do not heat parts above manufacturers recommended limits, or 300°F, whichever is lower. **To avoid severe damage to bearing and gears the above must not be hammered on to shaft extensions**. When the prime-mover is connected to the gear unit or the gear unit is connected to the driven equipment by means of a coupling, correct alignment cannot be overemphasized. This becomes of greater importance as speeds are increased or the drive is subjected to variations in load conditions. Misalignment, either parallel or angular, is one of the most frequent causes of bearing or shaft failures, noisy operation, or excessive operating temperatures due to the extra load imposed. A straight edge laid across the coupling member at the machined diameter provided for alignment purposes shows correct parallel alignment when the straight edge rests on both coupling members for their full length. Check this at four positions-90 degrees apart. The use of feeler gauges between coupling member faces is a common method of checking for correct angular alignment. Check at four positions-90 degrees apart. A more accurate alignment check is obtained by the use of dial indicators. This is done by clamping the indicator on one coupling member with the indicator stem resting on the other coupling member, then rotating the member holding the clamped indicator. To minimize overhung loads, pulleys and sprockets should be mounted as close to the gear case as possible. Tighten hardware for pulleys and sprockets in accordance with the manufacturers recommendations. **Do not** over tighten belts or chains. Reducer bearing life may be significantly reduced if belts and chains are too tight. Install pulleys and sprockets on driver/driven equipment so that they run true. Guards should be mounted over couplings, pulleys, and sprockets after final alignment is completed.

LUBRICATION

Warning: Gear units are shipped from the factory without oil. Fill unit to the proper level before operating.
Lubrication oil for use with gear units must be high quality, straight mineral petroleum oils. They must be non-corrosive to gears or bearings, neutral in reaction, free from grit or abrasives, and have good defoaming and oxidation resisting properties. Refer to AGMA 9005 for more detailed information on lubricant property requirements. Performance and life of the gear unit are dependent upon the use of the proper lubricants maintaining the correct oil level, and regular oil changes, including draining the unit at regular intervals, and flushing it, before refilling. For applications where loads, speeds, or temperatures are abnormal, Nuttall should be contacted for specific recommendations.

Oil Sump Temperature
Gear drives operating in the ambient temperature range described in the table below generally produce oil sump temperatures of not more than 180°F. This sump temperature is considered maximum because lubricants begin to lose their lubrication properties as temperatures exceed 180°F. These lubrication recommendations exclude applications such as those gear drives installed in the food and drug industry where a possibility exists for incidental contact between the lubricant and the product being processed.

Lubricant Recommendations

Ambient Temperature Range*:			
-40°F to 0°F (-40°C to -20°C)	-20°F to +25°F (-30°C to -5°C)	15°F to 60°F (-10°C to +15°C)	50°F to 125°F (10°C to 50°C)
Contact factory	Use ISO VG 68 – 100 (AGMA 2 – 3)	Use ISO VG 100 – 150 (AGMA 3 – 4)	Use ISO VG 150 – 220 (AGMA 4 – 5)

*The ambient temperature range is defined as the air temperature in the immediate vicinity of the gear drive.

Lubricant Viscosity Ranges (for rust and oxidation inhibited gear oils)

ISO Viscosity Grade	AGMA Lubricant No.	CST Viscosity (mm^2/s) at 40°C	SSU Viscosity at 100°F
VG 68	2	61.2 to 74.8	284 to 347
VG 100	3	90 to 110	417 to 510
VG 150	4	135 to 165	626 to 765
VG 220	5	198 to242	918 to 1122

Lubricant Brand Name Cross Reference

ISO Grade	VG 68 (AGMA 2)	VG 100 (AGMA 3)	VG 150 (AGMA 4)	VG 220 (AGMA 5)
Texaco Regal	68	100	150	220
Exxon Teresstic	68	100	150	220
Keystone KLC	20	30	40	--
Nevastone	--	--	--	90
Shell Turbo Oil	68	100	150	220
Gulf Harmony Oil	68	100	150	220
Sun Oil Sunvis	931	951	975	999
Mobil DTE	Heavy Medium	Heavy	Extra Heavy	BB

Note: All oils listed are non-EP. EP gear lubricants in the corresponding viscosity grade may be used where the user believes he has continuous sustained heavy duty loading on his gear units. Consult a lube oil specialist. EP lubricants must not be used in backstops.

Oil Changes

Proper lubrication maintenance is vital to gear drive performance throughout its design life. After the first 500 hours or four weeks of operation, whichever occurs first, the gear drive should be thoroughly drained, flushed, and refilled with the proper lubricant. Under normal operating conditions, the lubricant should be changed every 2500 hours or six months, whichever occurs first. This change frequency can be extended if analysis of oil samples indicates very limited degradation or contamination.

Cleaning and Flushing

Ideally, the lubricant should be drained while the gear drive is at operating temperature. The gear drive should be cleaned with a flushing oil. Used lubricant and flushing oil should be completely removed for the system to avoid contaminating the new oil. The use of a solvent should be avoided unless the gear drive contains deposits of oxidized or contaminated lubricant which cannot be removed with a flushing oil. When persistent deposits necessitate the use of a solvent, a flushing oil should then be used to remove all traces of solvent for the system. The interior surfaces should be inspected where possible, and all traces of foreign material removed. The new charge of lubricant should be added and circulated to coat all internal parts.

Oil Filling Instructions

- Units with standpipes: Drain oil from unit. Remove breather. Remove pipe cap from stand pipe. Add oil through stand pipe until oil level is maintained at top edge of stand pipe. Replace breather and cap after filling.
- Units without stand pipes: Drain oil from unit. Remove breather. Remove pipe plug adjacent to oil level nameplate. Add oil through breather opening until oil starts to flow over edge of opening at oil level nameplate. Replace plug and breather.

CAUTION: Never attempt to add or replace oil while the unit is running. Do not fill beyond the indicated oil level. Excess lubrication increases the churning effect and may result in overheating and subsequent thinning of the oil and possible damage to the rotating components.

Cold Temperature Conditions

Lubrication, either by splash or pump, shall be given special attention if the gear drive is to be started or operated at temperatures below which the oil can be effectively splashed or pumped. Preheating the oil may be necessary under these low ambient temperature conditions. Nuttall should be informed when gear drives are to operate outside the individual temperature ranges listed below. Gear drives operating in cold areas must be provided with oil that circulates freely and does not cause high starting torques. An acceptable low temperature gear oil in addition to meeting AGMA specifications, must have a pour point at least 5°C (10°F) below the minimum expected ambient temperature and a viscosity which is low enough to allow the oil to flow freely at the start up temperature but high enough to carry the load at the operating temperature. When the lubricant selected does not provide proper lubrication for the expected ambient temperature range, the gear drive should be equipped with a sump heater to bring the oil up to a temperature at which it will circulate freely for starting. The heater watt-density should be selected to avoid excessive localized heating which could result in rapid degradation of the lubricant.

Abnormal Operating Conditions

A rise and fall in temperature may produce condensation. Dust, dirt, chemical particles, or chemical fumes may also react with the lubricant resulting in the formation of sludge. Sustained sump temperatures in excess of 180°F may result in accelerated degradation of the lubricant and excessive gear wear. When operating under these conditions the lubricant should be analyzed more frequently and changed when required.

Grease Lubrication of Seals and Bearings

On units supplied with special seals for hazardous dust conditions, fittings are provided for flushing away contaminated grease from seals. Grease should be applied at regular lubrication change periods or more frequently depending upon severity of dust. On some units, fittings are provided for grease lubrication of the input shaft outboard bearing. To lubricate, remove drain pipe plug on input bracket and add grease (with hand operated gun) to fitting on end cap until clean grease starts to flow from drain hole. Replace drain plug. A good grade of #2 bearing grease should be used for these applications and applied at regular lubrication change periods. On units supplied with internal backstops, fittings are provided for the input shaft outboard bearing and backstop. To lubricate, remove drain pipe plug on input bracket only and add grease (with hand operated gun) to fitting on end cap until clean grease starts to flow from drain hole on input bracket. Replace drain plug on input bracket. Remove drain pipe plug on end cap, and grease until grease starts to flow from drain hole on end cap. Replace drain plug. Socony Mobilux #2, Texaco Unitemp #2 or an equivalent

grease should be used for these applications and applied at regular lubrication change periods. **WARNING: Do not use lubricants of the EP type or those containing slippery additive such as Molybdenum disulphide and graphite, in a backstop.**

OIL CAPACITY

Approximate Oil Capacity in U.S. Gallons for Standard Floor Mounted Horizontal Units.

Unit Size	Single Reduction	Double Reduction	Triple Reduction	Quad Reduction
5 / 10	0.5	0.75	-	-
15 / 21	0.7	1.5	1.6	-
32	1.2	2.5	2.7	2.9
43	2.0	3.7	3.9	4.1
51 / 54	2.5	6.2	6.9	7.1
64	-	6.4	7.2	7.4
76	3.5	10.7	11.5	11.7
85 / 88	-	14.1	14.4	14.6
92	-	19.3	19.6	19.8
98	-	22.5	22.8	23.0

NOTE: All values are approximate. Always fill the unit to the level marked on the gear unit itself. Do not overfill.

START-UP

Pre-start For Units in Storage

1. Replace breather if removed during storage period.
2. Remove all tape applied in storage preparation.
3. Drain all oils applied during storage; Shell VSI Grade 68 is soluble in recommended lubricating oils. Unit does not require flushing.
4. Thoroughly inspect unit, sump, and all accessories for damage.
5. Follow additional start-up steps as outlined in this manual.

Start-up

Warning: Nuttall Gear units are shipped without oil. Prior to start-up, the unit must be filled with the proper amount of oil, selected in accordance with the operating conditions.

1. Add the correct amount of oil to the gear unit. Fill to the top of the stand pipe when unit is at a standstill. Operate unit until oil fills all lines. Stop the unit and recheck oil level and add oil as required.
2. Check that all electrical connections are made and in working order; and that all accessories are properly mounted.
3. Check all external mounting bolts, screws, etc. to make sure they have not loosened in transit or handling.
4. Check that all couplings, sprockets, pulleys, etc. are properly aligned, lubricated, mounted and keyed on shaft extensions.
5. Check that inspection plug is securely tightened and install guards for rotating equipment.
6. For units equipped with oil heaters in cold ambient temperature operation, turn the heater on and allow oil temperature to rise at least to 40°F before start-up.
7. Turn the shafts by hand to confirm there are no obstructions to rotation.
8. To avoid damage to the motor used with reducer having a built in backstop, break the high speed coupling connection, turn input shaft by hand to check proper rotation. Operate motor to check shaft rotation reversing leads if necessary to secure proper rotation. Reconnect coupling. Reducers will piggyback motors should be started very carefully with the output shaft coupling disconnected. If output shaft does not rotate, reverse motor direction and test. Reconnect the coupling.
9. Start unit under as light a load as possible. If rotation of the unit is limited to one direction only, a tag on the housing indicates direction of rotation. Make certain that direction of shaft rotation is as shown on tag.
10. The machinery should be checked frequently for unusual sounds, oil leaks, excessive vibration and excessive heat. If an operating problem develops, shut down immediately and correct the problem before restarting. The operating temperature of the unit housing should normally not exceed 180°F.

TROUBLE SHOOTING

Operating Temperature

These gear drives are designed for a 100°F rise in temperature over the ambient temperature, but not to exceed 180°F. If the unit is operated in the sun at ambient temperatures exceeding a "hot" running unit, takes periodic measurements over a twenty-four hour period.

Noisy Unit

By nature, all gear units produce some kind of noise in operation, either a low pitch rumble or a high whine from the high speed mesh. Learn to distinguish between normal gear noise and symptomatic noises that could mean lack of oil, bearing trouble, or misalignment. Remember that sound is often amplified by the type of mounting or can be induced y coupled apparatus. A new gear unit may be initially noisy and then quiet down after a reasonable period of service; normal were has taken place, and teeth have established a well defined run-in-pattern. Other subtle changes can take place resulting in smoother, quieter operation. Always record changes in noise patterns of levels, as well as temperature changes.

Problem	Potential Causes
Excessive operating temperature	1, 2, 3, 4, 5, 6, 7, 9, 12, 18, 21, 22, 23
Oil leakage	1, 2, 3, 4, 5, 7, 9, 12, 13, 18, 19, 20, 22, 23
Gear wear	1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 20, 22, 23
Bearing failure	1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20

Shaft failure	1, 6, 7, 8, 9, 10, 11, 12, 15, 16, 20, 21, 23
Excessive noise	1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 21, 22, 23

Potential Cause	Action
1. Unit overload	Reduce the loading.
2. Incorrect Oil Level	Verify that the oil level is correct. Too little or too much oil can cause high temperature.
3. Wrong Oil Grade	Use only the AGMA grade oil as specified for the unit size and ambient temperature.
4. Contaminated oil	If oil is oxidized, dirty, or has high sludge content, change the oil.
5. Clogged breather	Clean breather regularly.
6. Improper bearing Adjustment	Too few or too many shims cause incorrect bearing clearance. Contact the factory for correct end play, checking technique, and tolerance. Shafts should turn freely when disconnected from the load.
7. Improper coupling alignment	Disconnect couplings, check spacing between shafts, and check alignment. Realign as required.
8. Incorrect coupling	Rigid couplings can cause shaft failure. Replace with a coupling that provides flexibility and lateral play.
9. Excessive operating speed	Reduce the speed.
10. Torsional or lateral vibrations	Vibration can occur through a particular speed range known as the critical speed. Contact the factory for specific recommendations.
11. Extreme repetitive shocks	Apply couplings capable of absorbing shocks.
12. Improper lubrication of bearings	Verify that all bearings are receiving adequate amounts of lubricating oil, or grease.
13. Improper storage or prolonged shutdown	Destructive rusting of bearings and gears will be caused by storage or prolonged shutdown in moist ambient temperatures. If rust is found, unit must be disassembled, inspected and repaired.
14. Excessive backlash	Contact factory.
15. Misalignment of gears	Contact pattern to be a minimum of 75% of face.
16. Housing twisted or distorted	Verify proper shimming or stiffness of the foundation.
17. Gear tooth wear	Contact factory.
18. Open drains	Tighten drain plugs.
19. Worn oil seals	Check oil seals and replace if worn.
20. Loosely bolted covers	Check all bolted joints and tighten if necessary.
21. Motor related	Verify actual operating conditions are consistent with motor nameplate.
22. Excessive ambient temperature	Shield unit from direct sunlight, and maintain proper air flow around the gear unit.
23. Excessive overhung load	Move the pulley or sprocket closer to the housing. Check for excessive tension in belts or chains.

RENEWAL PARTS

This parts list provides information organized by unit. A cut-a-way view of the gear unit is shown with the parts individually identified by item number and description.

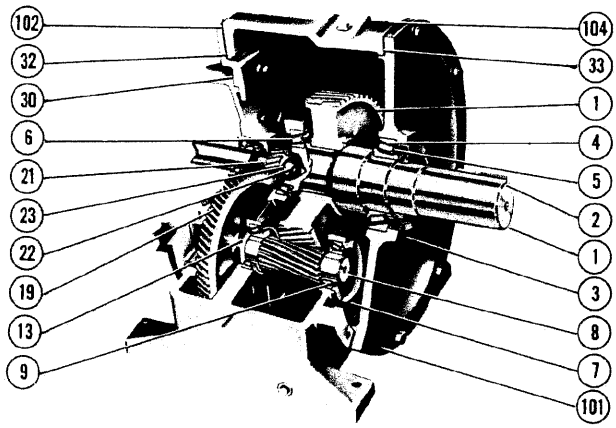
Instructions

In order to obtain renewal parts for your gear unit:

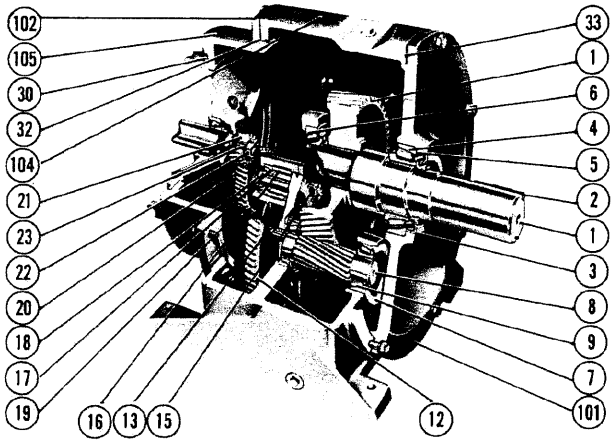
1. Record all of the information off of the gear unit nameplate (refer to the illustration at the right).
2. Refer to the correct illustrations and/or assembly drawing for the description of the required parts.
3. To order parts, contact your nearest Nuttall Gear Sales Office with the information you have assembled.

Integral Gearmotors (Type G)

Double Reduction
Sizes 05D thru 98D



Triple Reduction
Sizes 21T thru 98T



Part No.	Part Description
	A. LOW SPEED COMPONENTS - Consists of:
	Low Speed Gear Set - Includes: ① ② .....
1	L.S. Gear and Shaft Assembly
2	L.S. Shaft Key
8	L.S. Pinion Shaft
	Low Speed Bearing Set - Includes: ① ② ....
4	L.S. Shaft Outer Bearing
5	L.S. Shaft Bearing Shims
6	L.S. Shaft Inner Bearing
7	L.S. Pinion Shaft Bearing Retainer .....
9	L.S. Pinion Shaft Bearings ① ② .....
13	L.S. Pinion Shaft Locking Device.....
	C. HIGH SPEED COMPONENTS - Consists of:
	High Speed Gear Set - includes ① ② .....
19	H.S. Gear
21	H.S. Pinion
22	H.S. Pinion Shaft Nut.....
23	H.S. Pinion Shaft Spacer.....
	D. OIL SEALS and GASKETS - Includes ① ②
3	L.S. Shaft Oil Seal
30	Motor Flange Gasket
32	Adapter Gasket
33	L.S. Cover Gasket
	E. HOUSING PARTS
101	Low Speed Cover.....
102	Adapter (if required).....
104	Gear Housing.....

① Available only in sets.

② Order as Redi-Pak

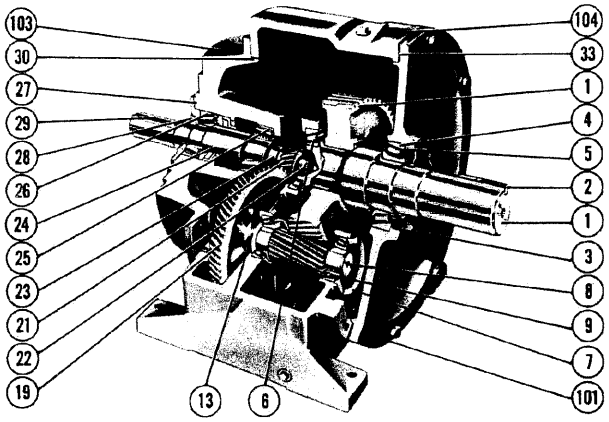
Order Information
When ordering renewal parts read the following from the nameplate:
1. Style Number
2. Motor Frame (if needed)
3. Gear Box Size and Reduction

Plus: Order by part number and description

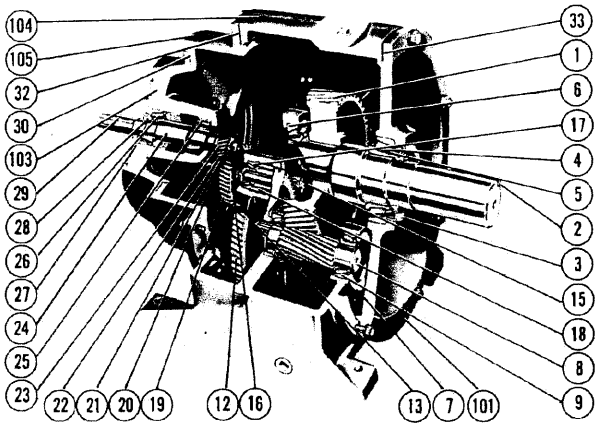
Part No.	Part Description
	A. LOW SPEED COMPONENTS - Consists of:
	Low Speed Gear Set - Includes: ① ② .....
1	L.S. Gear and Shaft Assembly
2	L.S. Shaft Key
8	L.S. Pinion Shaft
	Low Speed Bearing Set - Includes: ① ② .....
4	L.S. Shaft Outer Bearing
5	L.S. Shaft Bearing Shims
6	L.S. Shaft Inner Bearing
7	L.S. Pinion Shaft Bearing Retainer .....
9	L.S. Pinion Shaft Bearings ① ② .....
13	L.S. Pinion Shaft Locking Device.....
	B. INTERMEDIATE COMPONENTS - Consist of:
	Intermediate Gear Set - includes ① ② .....
12	Intermediate Gear
15	Intermediate Pinion Shaft
	Intermediate Bearing Set - Includes ① ② .....
17	Intermediate Bearings
18	Intermediate Shims
16	Intermediate Pinion Shaft Spacer.....
20	Intermediate Pinion Shaft Locking Device
	C. HIGH SPEED COMPONENTS - Consists of:
	High Speed Gear Set - Includes ① ② .....
19	H.S. Gear
21	H.S. Pinion
22	H.S. Pinion Shaft Nut.....
23	H.S. Pinion Shaft Spacer.....
	D. OIL SEALS and GASKETS - includes ① ② .....
3	L.S. Shaft Oil Seal
30	Motor Flange Gasket
32	Adapter Gasket
33	L.S. Cover Gasket
	E. HOUSING PARTS
101	Low Speed Cover.....
102	Adapter (if required).....
104	Gear Housing.....
105	Triple Reduction Housing.....

In-Line Speed Reducers (Type R) & All-Motor Gearmotors (Type U)

Double Reduction
Sizes 05D thru 98D



Triple Reduction
Sizes 15T thru 98T



Part No.	Part Description
	A. LOW SPEED COMPONENTS - Consists of:
	Low Speed Gear Set - Includes: (2) (3) .....
1	L.S. Gear and Shaft Assembly
2	L.S. Shaft Key
8	L.S. Pinion Shaft
	Low Speed Bearing Set - Includes: (2) (3) ....
4	L.S. Shaft Outer Bearing
5	L.S. Shaft Bearing Shims
6	L.S. Shaft Inner Bearing
7	L.S. Pinion Shaft Bearing Retainer .....
9	L.S. Pinion Shaft Bearings (2) (3) .....
13	L.S. Pinion Shaft Locking Device.....
	C. HIGH SPEED COMPONENTS - Consists of:
	High Speed Gear Set - includes (2) (3) .....
19	H.S. Gear
21	H.S. Pinion
22	H.S. Pinion Shaft Nut.....
23	H.S. Pinion Shaft Spacer.....
24	H.S. Shaft.....
29	H.S. Shaft Key.....
	High Speed Bearing Set - includes: (2) (3)
25	H.S. Shaft Inner Bearing
26	H.S. Shaft Outer Bearing
27	H.S. Shaft Shims
	D. OIL SEALS and GASKETS - Includes (2) (3) ..
3	L.S. Shaft Oil Seal
28	H.S. Shaft Oil Seal
30	H.S. Bracket Gasket
33	L.S. Cover Gasket
	E. HOUSING PARTS
101	Low Speed Cover.....
103	High Speed Bracket.....
104	Gear Housing.....

(2) Available only in sets.

(3) Order as Redi-Pak

Ordering Information
When ordering renewal parts read the following from the nameplate:
1. Style Number
2. Gear Box Size and Reduction

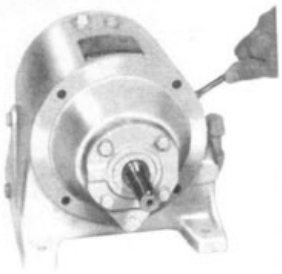
Plus: Order by part number and description

Part No.	Part Description
	A. LOW SPEED COMPONENTS - Consists of:
	Low Speed Gear Set - Includes: 2 3 .....
1	L.S. Gear and Shaft Assembly
2	L.S. Shaft Key
8	L.S. Pinion Shaft
	Low Speed Bearing Set - Includes: 2 3 .....
4	L.S. Shaft Outer Bearing
5	L.S. Shaft Bearing Shims
6	L.S. Shaft Inner Bearing
7	L.S. Pinion Shaft Bearing Retainer .....
9	L.S. Pinion Shaft Bearings 2 3 .....
13	L.S. Pinion Shaft Locking Device.....
	B. INTERMEDIATE COMPONENTS - Consists of:
	Intermediate Gear Set - includes 2 3 .....
12	Intermediate Gear
15	Intermediate Pinion Shaft
	Intermediate Bearing Set - Includes 2 3 .....
17	Intermediate Bearings
18	Intermediate Shims
16	Intermediate Pinion Shaft Spacer.....
20	Intermediate Pinion Shaft Locking Device
	C. HIGH SPEED COMPONENTS - Consists of:
	High Speed Gear Set - Includes 2 3 .....
19	H.S. Gear
21	H.S. Pinion
22	H.S. Pinion Shaft Nut.....
23	H.S. Pinion Spacer.....
24	H.S. Shaft.....
29	H.S. Shaft Key.....
	High Speed Bearing Set - includes: 2 3 .....
25	H.S. Shaft Inner Bearing
26	H.S. Shaft Outer Bearing
27	H.S. Shaft Shims
	D. OIL SEALS and GASKETS - includes 2 3 .....
3	L.S. Shaft Oil Seal
28	H.S. Shaft Oil Seal
30	H.S. Bracket Gasket
32	Triple Reduction Housing Gasket
33	L.S. Cover Gasket
	E. HOUSING PARTS
101	Low Speed Cover.....
103	High Speed Bracket.....
104	Gear Housing.....
105	Triple Reduction Housing.....

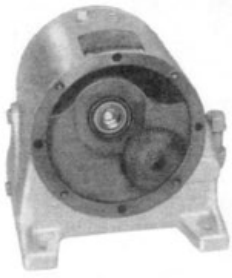
RATIO CHANGE

Ratio changes may be made without disconnecting the unit from the driven equipment. Increasing the Ratio in the change set raises the output torque and lowers the output RPM. Nuttall should be contacted to determine whether the unit has sufficient torque capacity at the new ratio. Decreasing the Ratio in the change set lowers the output torque and raises the output RPM. The prime mover and application should be checked since higher horsepower may require at the higher output RPM. Nuttall should be contacted if prime mover horsepower is to be increased. When ordering new gears for a ratio change, the complete nameplate data on the gear drive should be supplied for positive identification along with the desired ratio. In the majority of units a change in total ratio is accomplished by changing the ratio in only one set of gears. This set of "Change gears" has splined fits for ease of removal. The following procedure should be followed in changing ratios.

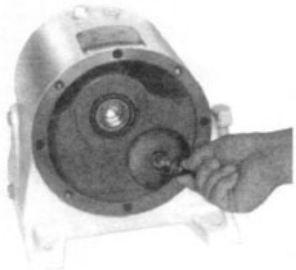
1. Begin disassembly at the input shaft end by removing the hex head bolts that secure the input bracket.



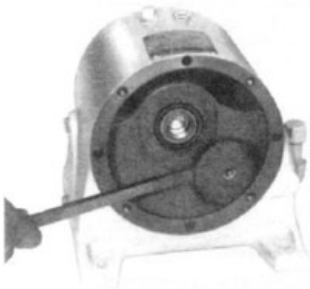
2. Pry the input bracket off using a screw driver at the inset between the bracket and housing.



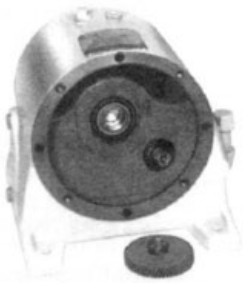
3. Remove the input bracket revealing the high speed gear. If gasket is damaged, remove and clean surfaces.



4. Lock the low speed shaft from rotating using a spanner wrench. Remove the hex bolt and washers that secure the high speed gear.

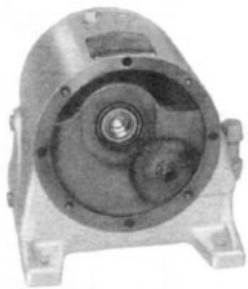


5. Pry the high speed gear off the splined shaft using a pry-bar.

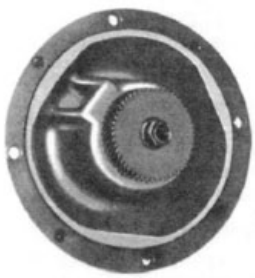


6. The new high speed gear and spacer are now ready to be placed on the splined shaft.

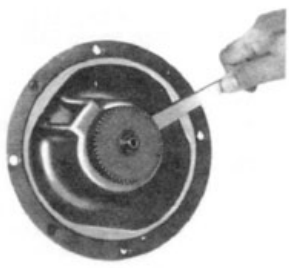
7. Place the original spacer and the new high speed gear on the splined shaft and secure with the hex bolt and its washers.



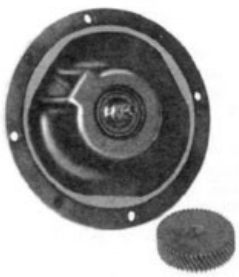
8. Shown here is the completed assembly with the new high speed gear.



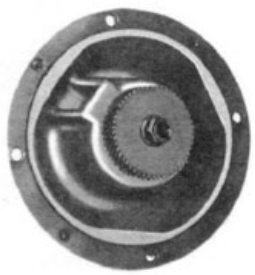
9. The next step is to change the high speed pinion. Lock the high speed shaft from rotating using a spanner wrench. Remove the hex head nut that secures the high speed pinion.



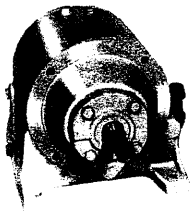
10. Pry the high speed pinion off the splined shaft using a pry-bar.



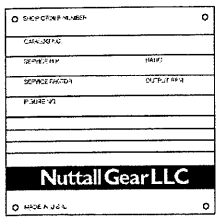
11. The new high speed pinion is now ready to be placed on the splined shaft.



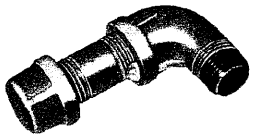
12. Place the new high speed pinion on the splined shaft and secure with the hex head nut. If the gasket was damaged, apply RTV to the clean surface in lieu of using a gasket.



13. Reassemble the input bracket to the housing and line up mounting holes. Be sure lube opening is in proper position (180° from application floor).



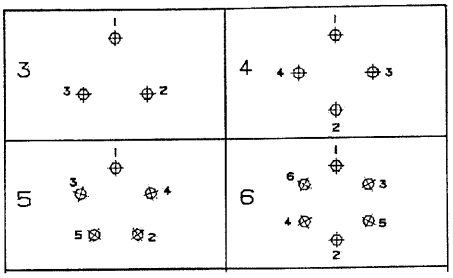
14. Change the nameplate to show the correct ratio, output RPM and reducer style number.

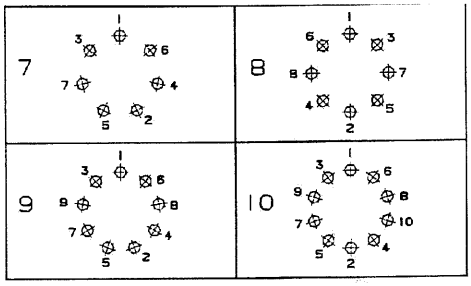


15. On Reducers 125 RPM out and faster, a standpipe must be installed to indicate the proper oil level. Remove the pipe plug at the base of the housing and install the standpipe.

FASTENERS

Fastener Tightening Sequence





Grade 5 Fastener Tightening Torques

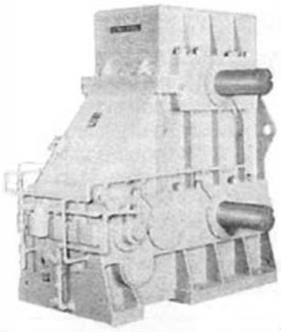
The following torque values are to be used for end covers, seal cages, shaft guards, inspection covers, and housing split line bolts, unless otherwise specified on the drawing or assembly instructions. Torque values for lubricated fasteners are to be used when fasteners are coated with thread locking compounds.

Diameter UNC	Dry Fastener (foot-lbs) Min.	Dry Fastener (foot-lbs) Max.	Lubricated Fastener (foot-lbs) Min.	Lubricated Fastener (foot-lbs) Max.
1/4	7	8	4	5
5/16	14	17	8	10
3/8	25	31	15	19
7/16	40	49	24	30
1/2	60	75	36	45
9/16	87	109	52	65
5/8	120	150	72	90
3/4	213	266	128	160
7/8	344	430	206	258
1	515	644	309	386
1-1/8	635	794	381	476
1-1/4	896	1,120	538	672
1-3/8	1,175	1,469	705	881
1-1/2	1,560	1,949	936	1,170
1-3/4	1,829	2,286	1,097	1,372
2	2,750	3,438	1,650	2,063
2-1/4	4,022	5,027	2,413	3,016
2-1/2	5,500	6,875	3,300	4,125
2-3/4	7,457	9,321	4,474	5,592

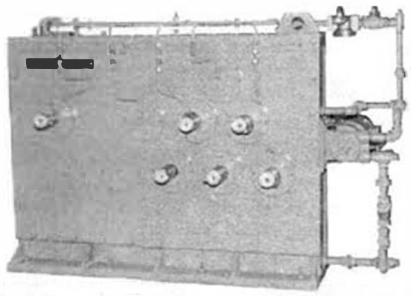
WEIGHT

Approximate Unit Weight in Pounds

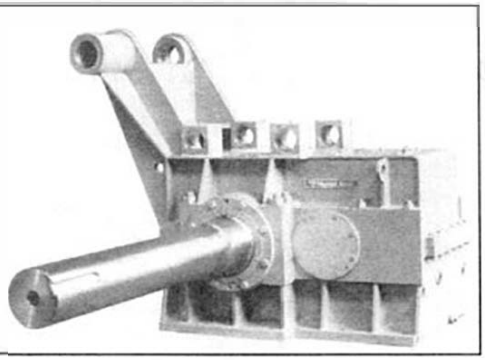
	(reducer only, no motor, motor support or accessories)			
Unit Size	Single	Double	Triple	Quad
5 / 10	70	77	--	--
15 / 21	110	130	140	--
32	180	165	190	210
43	200	270	290	300
51 / 54	350	490	500	570
64	--	550	620	700
76	350	770	800	825
85 / 88	--	1,237	1,340	1,435
92	--	1,300	1,450	1,570
98	--	2,350	2,400	2,570



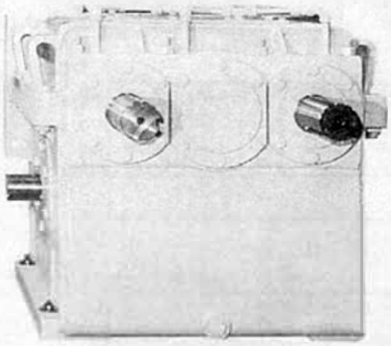
Combination Reducer/ Pinion Stands are available in ratings up to 14000 HP and output speeds down to 1.7 RPM and in ratios up to 357:1.

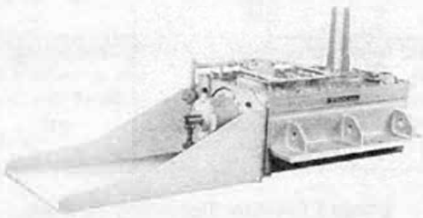


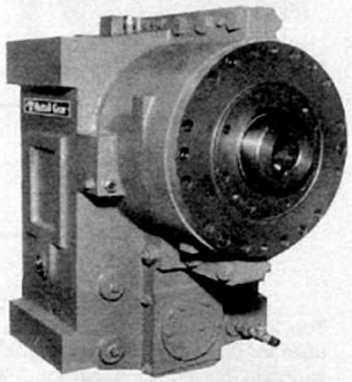
Combination Reducer Levelers & Flatteners are available in ratings up to 300 HP and output speeds down to 2.4 RPM and in ratios up to 357:1.



Reel Units are available in single and multiple speed designs, in ratings up to 14000 HP and output speeds down to 2.4 RPM and in ratios up to 357:1.



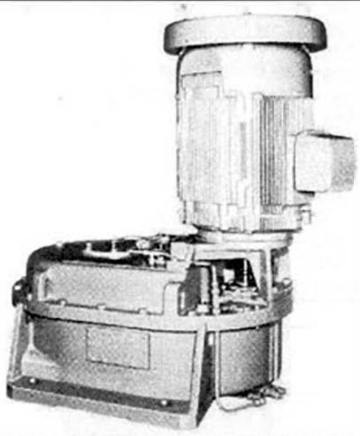


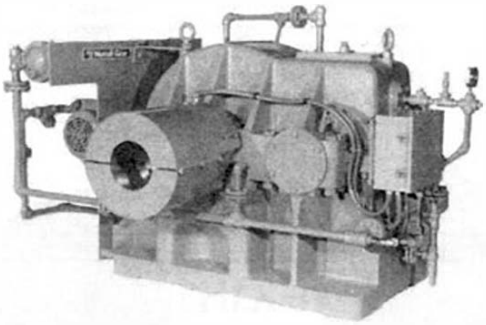


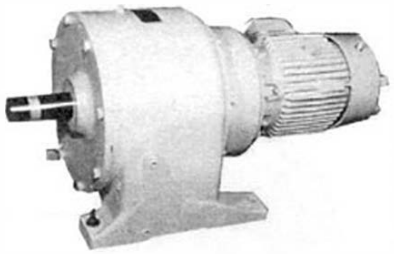
Custom Engineered Drives are available in ratings up to 6,000,000 inch pounds of torque, designed for specific customer and/or application requirements.

Type DRV, TRV, QRV Right Angle Vertical Reducers are available in ratings up to 9000 HP and output speeds down to 2.4 RPM and in ratios up to 238:1.

DHE, DVE Extruder Drives are available in horizontal and vertical mountings, in ratings up to 3000 HP and output speeds down to 55 RPM and in ratios up to 21:1.







Veri-Dri, Vertical Reducers are available in ratings up to 14000 HP and output speeds down to 1.7 RPM and in ratios up to 357:1.

Type SU Speed Increasers and SD Speed Reducers are available in ratings up to 15000 HP and output speeds up to 15000 RPM and in ratios up to 9:1.

Type R, G, & U Concentric Shaft Reducers and Integral and Scoop Mount Gearmotors are available in ratings up to 200 HP and output speeds down to 1.5 RPM and in ratios up to 985:1.

NUTTALL GEAR™

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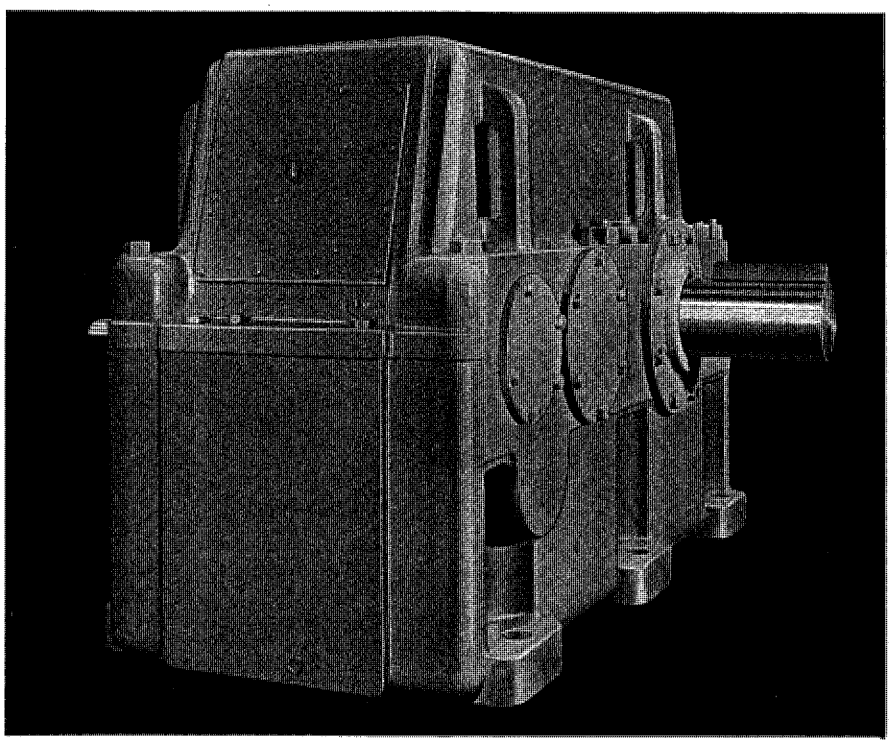
N70105; 5/06

Type TDS

Parallel Shaft Speed Reducers



Type **TDS** Parallel Shaft Speed Reducers are available with torque ratings up to 6,200,000 inch-pounds and standard gear ratios up to 357:1. **TDS** units incorporate precision helical gearing (in single, double, triple, and quadruple reductions) enclosed in heavy duty cast iron or steel fabricated housings. Standard features include tapered roller bearings, large inspection plates, a positive splash system for lubrication, extra wide bearing spans and center bearing supports; all to provide a rugged reliable unit with proven dependability in virtually every industrial application. **Nuttall Gear Corporation** can supply **TDS** units separately or in completely engineered packages including motor, reducer, and other accessories mounted on a bedplate.

For over 100 years **Nuttall Gear** has provided cost effective solutions to application problems in the broad spectrum of industrial machinery.

As a charter member of the American Gear Manufacturers Association (AGMA), **Nuttall Gear** has been at the forefront of gear design and manufacturing. To the basic standards established by AGMA, **Nuttall** research and field experience have added many advanced concepts to increase efficiency and operational reliability, and to simplify adaptation to the many special application requirements of specific industries.

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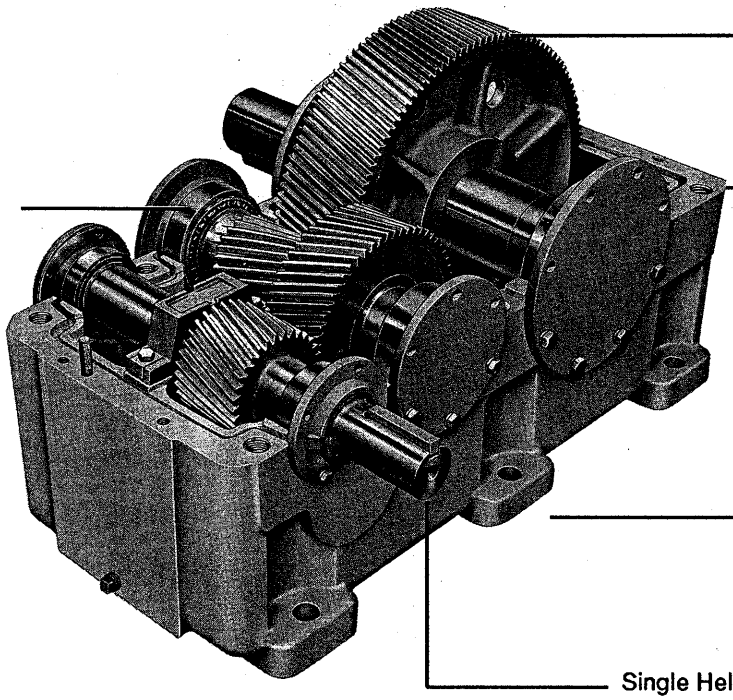
Effective: 15 SEPT 1993
Supersedes: 1 FEB 1991

Type TDS
Parallel Shaft Speed Reducers
Construction Features



Single Helical Gears hobbed and shaved to AGMA Quality 10 using through hardened high alloy steel for strength and shock resistance, to provide a long trouble free operating life.

Inspection Plate with attached breather permits easy inspection for preventative maintenance check-ups.

Oil Dip Stick provides a foolproof and time-saving method of accurately checking and maintaining the proper oil level.

Recessed Foot Pads reduce floor space requirements. Adequate clearance is provided in the housing recess for standard tools.

Splash Lubricated with oil troughs. Wipers and oil dams are also included when required.

Lifting Lugs can be used to lift the entire reducer safely and easily.

Cast-Iron Housing corrosion resistant, provides rigid alignment of internal components. The flat top allows for mounting of motors and auxiliary equipment. **TDS Reducers** are also available in fabricated steel housings in standard and special configurations.

Shafts are made of high alloy 4150 ANSI steel. Input and output shafts are fitted with **double lip seals** to keep oil in, and contaminants out.

Type TDS
Parallel Shaft Speed Reducers
Reducer Selection

REQUIRED APPLICATION DATA

A. Application Type
B. Hours of operation per day
C. Application Horsepower (or torque) required
D. Determine AGMA minimum application factor from tables on Section 310, pages 5 -7
E. Prime mover, type and speed
F. Gear ratio or desired output speed
G. Overhung load requirements, if any
H. Modifications or accessories
I. Mounting position

SELECTION PROCEDURE

Procedure:

A. Using the proper AGMA application factor, determine the minimum equivalent horsepower or torque capacity required. (Equivalent power = application power x application factor)

B. The rating tables are grouped by reduction, and sub-divided by input speeds of 1750, 1170, 870, 720, and 580 RPM. Locate the appropriate pages and find the desired gear ratio or output speed. Read across the page until you have found the horsepower or torque rating that equals or exceeds the equivalent power required. The column heading will indicate the selected unit. The column headings define the units selected. the first letter, **S, D, T, or Q** indicates the number of reductions, **S**ingle, **D**ouble, **T**riple or **Q**uadruple and the number is the approximate center distance of the low speed gears (A "W" Prefix indicates a steel housing).

C. Compare the thermal horsepower rating with the actual prime mover horsepower rating (not the equivalent horsepower rating - see Section 310, page 4 "Thermal Ratings"). If the rating equals or exceeds the prime mover rating then the selection is complete. If the prime mover rating is larger than the thermal capacity, consider the fan cooled unit, an oil-to-water, or oil-to-air heat exchanger, or, in some cases where auxiliary cooling cannot be used, select a larger unit that will meet the requirements.

Example:

A bucket elevator operates 24 hours per day. The prime mover is an electric motor, 75 hp, 1750 rpm. desired output speed is 100 rpm.

Solution:

1. Application factor is 1.5 (Section 310, page 5)
2. Equivalent horsepower is 112.5 (75 x 1.5)
3. Required ratio is 17.5. (17.09 nominal)
1750 rpm/100rpm = 17.5
4. Look in the double reduction section for an input speed of 1750 (Section 310, page 18).
5. Read across the **17.09/100 RPM** line until you reach the bold figure **144** which is greater than the equivalent HP.
6. By reading the top of the column the type designation **D9** is found. Reading down the column, we find the basic unit has a **thermal capacity of 68,** which is less than the 75 horsepower prime mover; however, by going to the **fan-cooled unit, we have a thermal capacity of 170,** which is more than adequate.
7. If auxiliary cooling is not acceptable, then moving to the next larger unit, **D11,** would provide the thermal capacity required.
8. If the exact output speed is critical, look at the table at the bottom of the page to determine the **exact gear ratio** for the unit selected. That ratio for D9 would be **17.893:1** and the D11 is **17.698:1,** both within 2% of the required 17.5:1 ratio. When required, **Nuttall Gear** can produce special gear ratios to meet your specifications.

MODIFICATION AND ACCESSORIES

Among the many options available are:

A. Complete packaged drive systems with motors, couplings, reducers and accessories mounted and "ready to run" without further assembly of components.
B. Motor mounting with bedplates, scoops, or piggy-back provisions.
C. Special enclosures, steel fabricated housings, sound dampening shrouds, protection from corrosive or abrasive ambient conditions as well as appropriate seals for applications requiring special attention, such as taconite or paper mill duty.
D. Backstops, brakes, clutches, and special couplings can all be supplied and mounted by Nuttall Gear.
E. Temperature detectors to monitor bearing and/or oil sump temperatures, as well as heaters to be used in low temperature locations.
F. Special exact gear ratios.
G. Special shafts.

Type TDS
Parallel Shaft Speed Reducers
Application

APPLICATION FACTORS

To provide long life and reliability for any given application, a suitable application factor must be applied to the load requirements.

The required equivalent horsepower or equivalent torque necessary to select a reducer from the rating tables is found my multiplying the load horsepower or torque by an application factor.

The gear drive selected will require a rating equal to, or in excess of, the equivalent horsepower or equivalent torque.

Pages 5 through 7, following, list the **minimum recommended** application factors for a broad spectrum of applications. These factors were developed by The American Gear Manufacturers Association, and were derived from data collected from countless installations over many years.

It is not possible to list all possible applications requiring gear drives, but a sufficient variety of types is covered to serve as a guide for other applications.

It should be noted that the values given in the tables are based on field experience of **average** operating conditions for each class of equipment and may not be correct in all cases, due to unique operating conditions or design of the driving or driven equipment.

Proper application factors can be determined if full operational conditions are known. It is necessary to have this data before a final gear drive selection is made. Any drive for use under abnormal conditions must be referred to Nuttall Gear.

The table also indicates the application factors for duration of service. If a single or multi-cylinder engine is used as the prime mover, the factors must be adjusted further. For a single cylinder engine, add .50 to the appropriate factor, if a multi-cylinder engine is used, then only a .25 addition is made.

THERMAL CAPACITY

The thermal horsepower rating represents the **actual** horsepower that a gear drive will transmit continually for more than three (3) hours without overheating. Maximum sump temperature is not to exceed 200°F.

It is not necessary to check thermal horsepower ratings when the continuous operating period is three (3) hours or less, and the shutdown time equals or exceeds the running time. If, however, the running time exceeds the shutdown time, selection must be made on the basis of an adequate thermal rating. It is important that the thermal horsepower be checked prior to application, for if the unit develops heat at a faster rate than can be dissipated, premature failure may occur. Note: **application factors do not apply to thermal ratings.** Only the **actual** transmitted horsepower is subject to thermal horsepower consideration.

In cases where transmitted horsepower exceeds the thermal rating horsepower, additional cooling by means of shaft mounted fans or an oil to water heat exchanger will be necessary at added cost. It should be noted that fan cooling may not be effective in high ambient conditions **or in high attitudes,** and all such applications must be referred to the factory.

The area in which the reducer is located should allow adequate air circulation. Also, the housing should be free from dust or other material which can become an insulator. Gear drives operating outdoors should be provided with a sun shield roof structure to eliminate the effects of solar heating. If these precautions are not taken, over-heating with premature failure may occur.

LOAD CONDITIONS

Basic conditions to be observed before applying application factors are as follows:

1. Excessive Overloads

The maximum momentary or starting load must not exceed 200 percent of rated load (100% overload). Rated load is defined as the unit rating with a service factor of 1.0. Driven equipment with high inertia loading may require higher application factors than indicated because of the high momentary torque required for breakaway. Expected breakaway and shock load torques must not exceed 200% of rated reducer torque.

2. Oversize Prime Mover

The practice of using oversize motors for motor standardization or starting conditions must be given attention due to the potential high starting torque available.

3. Braking Conditions

When the rating of a shaft mounted or motor mounted brake exceeds the motor rating, the rating of the brake must be used in selection of the reducer.

4. Drive-Train Vibrations

Gear reducers are sold with the understanding that the rotating parts are free from serious critical speeds or torsional vibrations. Calculation required to check the entire system is the responsibility of the systems builder. Details of reducer rotating parts for such calculations are available on request at time of order.

5. Pulsating Loads

The responsibility for satisfactory operation of reducers driving or driven by pulsating or reciprocating apparatus such as compressors, pumps, and internal combustion engines is assumed by Nuttall Gear provided that:

a. The gears are not operated with torque reversals at the gear mesh, except when starting and stopping.

b. When loaded, the torque variation at the gear mesh does not exceed ±25% of average transmitted torque.

c. When unloaded, the torque variation at the gear mesh does not exceed ±15% of rated torque with no negative torque.

AMBIENT CONDITIONS

Standard speed reducers are basically designed for horizontal floor mounted operation in a heated building where reasonably clean and dry conditions exist. For conditions other than this, special features may be required. Full data should be provided to insure proper selection.

Low Temperature Operation

Starting and operating gear drives at temperatures below 40°F could result in damage to the gears and bearings if the pour point of the lubricant is higher than the ambient temperature. This is of particular concern when controlled splash lubrication or circulation lube oil systems with pump and piping are employed. In such cases, it may be necessary to provide immersion heaters in the oil sump and provide a method of heating the external oil pump and piping at start-up.

High Temperature Operation

Operation at sustained ambient temperatures in excess of 100°F will greatly affect thermal modifications required to provide a reasonable operating temperature. High oil sump temperatures will drastically reduce the life of most lubricants and require frequent oil changes. Contact Nuttall Gear for lubrication recommendations if this condition is expected.

Type TDS
Parallel Shaft Speed Reducers
Application Factors

APPLICATION	LOAD DURATION HOURS PER DAY 0-3	3-10	10+
AGITATORS (Mixers)			
Pure Liquids	1.00	1.00	1.25
Liquids and Solids	1.00	1.25	1.50
Liquids - Variable Density	1.00	1.25	1.50
BLOWERS			
Centrifugal	1.00	1.00	1.25
Lobe	1.00	1.25	1.50
Vane	1.00	1.25	1.50
BREWING AND DISTILLING			
Bottling Machinery	1.00	1.00	1.25
Brew Kettles - Continuous Duty	1.25	1.25	1.25
Cookers - Continuous Duty	1.25	1.25	1.25
Mash Tubs - Continuous Duty	1.25	1.25	1.25
Scale Hopper - Frequent Starts	1.25	1.25	1.50
CAN FILLING MACHINES	1.00	1.00	1.25
CAR DUMPERS	1.50	1.75	2.00
CAR PULLERS	1.00	1.25	1.50
CLARIFIERS	1.00	1.00	1.25
CLASSIFIERS	1.00	1.25	1.50
CLAY WORKING MACHINERY			
Brick Press	1.50	1.75	2.00
Briquette Machine	1.50	1.75	2.00
Pug Mill	1.00	1.25	1.50
COMPACTORS	2.00	2.00	2.00
COMPRESSORS			
Centrifugal	1.00	1.00	1.25
Lobe	1.00	1.25	1.50
Reciprocating, Multi-Cylinder	1.50	1.50	1.75
Reciprocating, Single-Cylinder	1.75	1.75	2.00
CONVEYORS - GENERAL PURPOSE			
Uniformly loaded or fed	1.00	1.00	1.25
Heavy Duty, not uniformly fed	1.00	1.25	1.50
Reciprocating of Shaker	1.50	1.75	2.00
CRANES ①			
Dry Dock			
Main Hoist	2.50	2.50	2.50
Auxiliary Hoist	2.50	2.50	3.00
Boom Hoist	2.50	2.50	3.00
Slewing Drive	2.50	2.50	3.00
Traction Drive	3.00	3.00	3.00
Container			
Main Hoist	3.00	3.00	3.00
Boom Hoist	2.00	2.00	2.00
Trolly Drive			
Gantry Drive	3.00	3.00	3.00
Traction Drive	2.00	2.00	2.00
Mill Duty			
Main Hoist	3.50	3.50	3.50
Auxiliary	3.50	3.50	3.50
Bridge and	2.50	3.00	3.00

APPLICATION	LOAD DURATION HOURS PER DAY 0-3	3-10	10+
CRANES (cont.)			
Trolley Travel	2.50	3.00	3.00
Industrial Duty			
Main	2.50	2.50	3.00
Auxiliary	2.50	2.50	3.00
Bridge and	2.50	3.00	3.00
Trolley Travel	2.50	3.00	3.00
CRUSHER			
Stone or Ore	1.75	1.75	2.00
DREDGES			
Cable Reels	1.25	1.25	1.50
Conveyors	1.25	1.25	1.50
Cutter Head Drives	2.00	2.00	2.00
Pumps	2.00	2.00	2.00
Screen Drives	1.75	1.75	2.00
Stackers	1.25	1.25	1.50
Winches	1.25	1.25	1.50
ELEVATORS			
Bucket	1.00	1.25	1.50
Centrifugal Discharge	1.00	1.00	1.25
Escalators	1.00	1.00	1.25
Freight	1.00	1.25	1.50
Gravity Discharge	1.00	1.00	1.25
EXTRUDERS			
General	1.50	1.50	1.50
Plastics			
Variable Speed Drive	1.50	1.50	1.50
Fixed Speed Drive	1.75	1.75	1.75
Rubber			
Continuous Screw Operation	1.75	1.75	1.75
Intermittent Screw Operation	1.75	1.75	1.75
FANS			
Centrifugal	1.00	1.00	1.25
Cooling Towers	2.00	2.00	2.00
Forced Draft	1.25	1.25	1.25
Induced Draft	1.50	1.50	1.50
Industrial and Mine	1.50	1.50	1.50
FEEDERS			
Apron	1.00	1.25	1.50
Belt	1.00	1.15	1.50
Disc	1.00	1.00	1.25
Reciprocating	1.50	1.75	2.00
Screw	1.00	1.25	1.50
FOOD INDUSTRY			
Cereal Cooker	1.00	1.00	1.25
Dough Mixer	1.25	1.25	1.50
Meat Grinders	1.25	1.25	1.50
Slicers	1.25	1.25	1.50
GENERATORS AND EXCITERS	1.00	1.00	1.25
HAMMER MILLS	1.75	1.75	2.00
HOISTS			
Heavy Duty	1.75	1.75	2.00

Type TDS
Parallel Shaft Speed Reducers
Application Factors

APPLICATION	LOAD DURATION HOURS PER DAY 0-3	3-10	10+
HOISTS (cont.)			
Medium Duty	1.25	1.25	1.50
Skip Hoist	1.25	1.25	1.50
LAUNDRY			
Tumblers	1.25	1.25	1.50
Washers	1.50	1.50	2.00
LUMBER INDUSTRY			
Barkers - Spindle Feed	1.25	1.25	1.50
Main Drive	1.75	1.75	1.75
Conveyors - Burner	1.25	1.25	1.50
Main Drive or Heavy Duty	1.50	1.50	1.50
Main Log	1.75	1.75	2.00
Re-saw, Merry-Go-Round	1.25	1.25	1.50
Slab	1.75	1.75	2.00
Transfer	1.25	1.25	1.50
Chains			
Floor	1.50	1.50	1.50
Green	1.50	1.50	1.75
Cut-Off Saws			
Chain	1.50	1.50	1.75
Drag	1.50	1.50	1.75
Debarking Drums	1.75	1.75	2.00
Feeds			
Edger	1.25	1.25	1.50
Gang	1.75	1.75	1.75
Trimmer	1.25	1.25	1.50
Log Deck	1.75	1.75	1.75
Log Hauls - Incline - Well Type	1.75	1.75	1.75
Log Turning Devices	1.75	1.75	1.75
Planer Feed	1.25	1.25	1.50
Planer Tilting Hoists	1.50	1.50	1.50
Rolls - Live-of brg - Roll Cases	1.75	1.75	1.75
Sorting Table	1.25	1.25	1.50
Tipple Hoist	1.25	1.25	1.50
Transfers			
Chain	1.50	1.50	1.75
Craneway	1.50	1.50	1.75
Tray Drives	1.25	1.25	1.50
Veneer Lathe Drives	1.25	1.25	1.50
METAL MILLS			
Draw Bench Carriage and Main Drive	1.25	1.25	1.50
Runout Table			
Non-Reversing			
Group Drives	1.50	1.50	1.50
Individual Drives	2.00	2.00	2.00
Reversing	2.00	2.00	2.00
Slab Pushers	1.50	1.50	1.50
Shears	2.00	2.00	2.00
Wire Drawing	1.25	1.25	1.50
Wire Winding Machine	1.25	1.50	1.50
METAL STRIP PROCESSING MACHINERY			
Bridles	1.25	1.25	1.50
Coilers and Uncoilers	1.00	1.00	1.25
Edge Trimmers	1.00	1.25	1.50
Flatteners	1.25	1.25	1.50
Loopers (Accumulators)	1.00	1.00	1.25
Pinch Rolls	1.25	1.25	1.50
Scrap Choppers	1.25	1.25	1.50

APPLICATION	LOAD DURATION HOURS PER DAY 0-3	3-10	10+
METAL STRIP PROCESSING MACHINERY (cont.)			
Shears	2.00	2.00	2.00
Slitters	1.00	1.25	1.50
MILLS, ROTARY TYPE			
Ball and Rod			
Spur Ring Gear	2.00	2.00	2.00
Helical Ring Gear	1.50	1.50	1.50
Direct Connected	2.00	2.00	2.00
Cement Kilns	1.50	1.50	1.50
Dryers and Coolers	1.50	1.50	1.50
MIXERS			
Concrete	1.25	1.25	1.50
PAPER MILLS (2)			
Agitator (Mixer)	1.50	1.50	1.50
Agitator for Pure Liquors	1.25	1.25	1.25
Barking Drums	2.00	2.00	2.00
Barkers - Mechanical	2.00	2.00	2.00
Beater	1.50	1.50	1.50
Breaker Stack	1.25	1.25	1.25
Calender (3)	1.25	1.25	1.25
Chipper	2.00	2.00	2.00
Chip Feeder	1.50	1.50	1.50
Coating Rolls	1.25	1.25	1.25
Conveyors			
Chip, Bark, Chemical	1.25	1.25	1.25
Log (including Slab)	2.00	2.00	2.00
Couch Rolls	1.25	1.25	1.25
Cutter	2.00	2.00	2.00
Cylinder Molds	1.25	1.25	1.25
Dryers (3)			
Paper Machine	1.25	1.25	1.25
Conveyor Type	1.25	1.25	1.25
Embosser	1.25	1.25	1.25
Extruder	1.50	1.50	1.50
Fourdriner Rolls (Includes Lump breaker, dandy roll, wire turning, and return rolls)	1.25	1.25	1.25
Jordan	1.50	1.50	1.50
Kiln Drive	1.50	1.50	1.50
Mt. Hope Roll	1.25	1.25	1.25
Paper Rolls	1.25	1.25	1.25
Platter	1.50	1.50	1.50
Presses, Felt and Suction	1.25	1.25	1.25
Pulper	2.00	2.00	2.00
Pumps - Vacuum	1.50	1.50	1.50
Reel (Surface Type)	1.25	1.25	1.25
Screens			
Chip	1.50	1.50	1.50
Rotary	1.50	1.50	1.50
Vibrating	2.00	2.00	2.00
Size Press	1.25	1.25	1.25
Super Calender (4)	1.25	1.25	1.25
Thickener (AC Motor)	1.50	1.50	1.50
Thickener (DC Motor)	1.25	1.25	1.25
Washer (AC Motor)	1.50	1.50	1.50
Washer (DC Motor)	1.25	1.25	1.25
Wind and Unwind Stand	1.00	1.00	1.25
Winders (Surface Type)	1.25	1.25	1.25

Type TDS
Parallel Shaft Speed Reducers
Application Factors

APPLICATION	LOAD DURATION HOURS PER DAY 0-3	3-10	10+
PAPER MILLS (cont.)			
Yankee Dryers ③	1.25	1.25	1.25
PLASTICS INDUSTRY			
Primary Processing			
Intensive Internal Mixers			
Batch Mixers	1.75	1.75	1.75
Continuous Mixers	1.50	1.50	1.50
Batch Drop Mill - 2 smooth rolls	1.25	1.25	1.25
Continuous Feed, Holding & Blend Mill	1.25	1.25	1.25
Compounding Mill	1.25	1.25	1.25
Calenders	1.50	1.50	1.50
Secondary Processing			
Blow Molders	1.50	1.50	1.50
Coating	1.25	1.25	1.25
Film	1.25	1.25	1.25
Pipe	1.25	1.25	1.25
Pre-Plasticizers	1.50	1.50	1.50
Rods	1.25	1.25	1.25
Sheet	1.25	1.25	1.25
Tubing	1.25	1.25	1.50
PULLERS - BARGE HAUL	1.25	1.25	1.50
PUMPS			
Centrifugal	1.00	1.00	1.25
Proportioning	1.25	1.25	1.50
Reciprocating			
Single Acting, 3 or more cylinders	1.25	1.25	1.50
Double Acting, 2 or more cylinders	1.25	1.25	1.50
Rotary			
Gear Type	1.00	1.00	1.25
Lobe	1.00	1.00	1.25
Vane	1.00	1.00	1.25
RUBBER INDUSTRY			
Intensive Internal Mixers			
Batch Mixers	1.75	1.75	1.75
Continuous Mixers	1.50	1.50	1.50
Mixing Mill - 2 smooth rolls - (if corrugated rolls are used, then use the seme service factors that are used for a Cracker-Warmer)	1.50	1.50	1.50
Batch Drop Mill - 2 smooth rolls	1.50	1.50	1.50
Cracker-Warmer - 2 rolls; 1 corrugated roll	1.75	1.75	1.75
Cracker - 2 corrugated rolls	2.00	2.00	2.00

APPLICATION	LOAD DURATION HOURS PER DAY 0-3	3-10	10+
RUBBER INDUSTRY (cont.)			
Holding, Feed & blend Mill - 2 rolls	1.25	1.25	1.25
Refiner - 2 rolls	1.50	1.50	1.50
Calenders	1.50	1.50	1.50
SAND MULLER	1.25	1.25	1.50
SEWAGE DISPOSAL EQUIPMENT			
Bar Screens	1.25	1.25	1.25
Chemical Feeders	1.25	1.25	1.25
Dewatering Screens	1.50	1.50	1.50
Scum Breakers	1.50	1.50	1.50
Slow or Rapid Mixers	1.50	1.50	1.50
Sludge Collectors	1.25	1.25	1.25
Thickeners	1.50	1.50	1.50
Vacuum Filters	1.50	1.50	1.50
SCREENS			
Air Washing	1.00	1.00	1.25
Rotary - Stone or Gravel	1.25	1.25	1.50
Traveling Water Intake	1.00	1.00	1.25
SUGAR INDUSTRY			
Beet Slicer	2.00	2.00	2.00
Cane Knives	1.50	1.50	1.50
Crushers	1.50	1.50	1.50
Mills (low speed end)	1.75	1.75	1.75
TEXTILE INDUSTRY			
Batchers	1.25	1.25	1.50
Calenders	1.25	1.25	1.50
Cards	1.25	1.25	1.50
Dry Cans	1.25	1.25	1.50
Dryers	1.25	1.25	1.50
Dyeing Machinery	1.25	1.25	1.50
Looms	1.25	1.25	1.50
Mangles	1.25	1.25	1.50
Nappers	1.25	1.25	1.50
Pads	1.25	1.25	1.50
Slashers	1.25	1.25	1.50
Soapers	1.25	1.25	1.50
Spinners	1.25	1.25	1.50
Tenter Frames	1.25	1.25	1.50
Washers	1.25	1.25	1.50
Winders	1.25	1.25	1.50

NOTES:

① Crane drives are to be selected based on gear tooth bending strength. Contact **Nuttall Gear** for strength ratings. Application factor in durability should be a minimum of 1.0.
NOTE: Application factors shown for cranes are based on tooth bending strength and their use must be coordinated with **Nuttall Gear.** The values shown are consistent with those recommended by C.M.A.A. (Crane Manufacturers Association of America).

② Application factors for paper mill applications are applied to the nameplate rating of the electric drive motor at the motor rated based speed.

③ Anti-Friction Bearings only. Use 1.5 for sleeve bearings.

④ An application Factor of 1.00 may be applied at base speed of a super calender operating over a speed range of part constant horsepower, part constant torque where the constant horsepower speed range is greater than 1.5 to 1. An application factor of 1.25 is applicable to super calenders operating over the entire speed range at constant torque or where the constant horsepower speed range is less than 1.5 to 1.

Type TDS
Parallel Shaft Speed Reducers
Single Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	S7	S8	S9	S11	S12	S13	S15	S16	S18	S20
1.225	1420	MECH HP	810	1097	1745	2605	3745	4887	6045	7459	9092	
		TORQUE (X1000 IN. LBS.)	36	49	78	118	169	221	267	330	401	
1.500	1170	MECH HP	717	980	1544	2295	3338	4390	5361	6534	8095	10020
		TORQUE (X1000 IN. LBS.)	38	54	82	125	179	230	284	356	429	541
1.837	950	MECH HP	588	825	1290	1954	2780	3798	4408	5456	6667	8663
		TORQUE (X1000 IN. LBS.)	40	56	86	129	186	232	297	370	449	579
2.250	780	MECH HP	506	691	1068	1581	2193	3285	3606	4555	5463	7098
		TORQUE (X1000 IN. LBS.)	40	56	86	129	185	244	298	372	452	596
2.756	640	MECH HP	397	556	846	1242	1841	2536	3001	3649	4554	5673
		TORQUE (X1000 IN. LBS.)	39	55	84	126	181	236	293	364	444	581
3.375	520	MECH HP	301	426	645	1013	1387	1956	2289	2770	3482	4633
		TORQUE (X1000 IN. LBS.)	37	52	81	124	170	241	284	345	433	559
4.134	420	MECH HP	248	345	534	836	1112	1579	1892	2256	2890	3490
		TORQUE (X1000 IN. LBS.)	38	50	81	126	164	230	289	338	441	536
5.060	350	MECH HP	207	285	452	699	877	1182	1583	1850	2426	2848
		TORQUE (X1000 IN. LBS.)	37	51	79	123	160	223	281	341	431	538

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		S7	S8	S9	S11	S12	S13	S15	S16	S18	S20
1.225	1420	THERMAL HP	105	128	138	152	183	202	213	232	238	
		WITH FANS	263	320	345	380	458	505	533	580	595	
1.500	1170	THERMAL HP	107	131	140	155	187	207	218	238	244	247
		WITH FANS	268	328	350	388	468	518	545	595	610	618
1.837	950	THERMAL HP	110	135	145	161	194	214	226	246	253	257
		WITH FANS	275	338	363	403	485	535	565	615	633	643
2.250	780	THERMAL HP	112	137	147	164	197	219	231	255	260	265
		WITH FANS	280	343	368	410	493	548	578	638	650	663
2.756	640	THERMAL HP	113	139	150	167	202	225	238	262	270	277
		WITH FANS	283	348	375	418	505	563	595	655	675	693
3.375	520	THERMAL HP	117	144	156	174	211	235	250	276	287	296
		WITH FANS	293	360	390	435	528	588	625	690	718	740
4.134	420	THERMAL HP	127	157	171	192	234	262	281	312	326	339
		WITH FANS	318	393	428	480	585	655	703	780	815	848
5.060	350	THERMAL HP	135	168	182	205	249	280	300	334	349	365
		WITH FANS	338	420	455	513	623	700	750	835	873	913

EXACT GEAR RATIO

NOMINAL GEAR RATIO	S7	S8	S9	S11	S12	S13	S15	S16	S18	S20
1.225	1.225	1.244	1.238	1.256	1.256	1.255	1.225	1.227	1.225	
1.500	1.472	1.525	1.474	1.514	1.487	1.524	1.472	1.513	1.472	1.500
1.837	1.871	1.886	1.849	1.839	1.853	1.865	1.871	1.882	1.871	1.857
2.250	2.179	2.258	2.241	2.259	2.345	2.212	2.296	2.267	2.296	2.333
2.756	2.708	2.741	2.760	2.826	2.731	2.786	2.708	2.769	2.708	2.846
3.375	3.450	3.391	3.476	3.400	3.409	3.417	3.450	3.454	3.450	3.348
4.134	4.235	4.050	4.222	4.177	4.105	4.048	4.235	4.158	4.235	4.263
5.060	4.933	4.941	4.875	4.867	5.063	5.235	4.933	5.125	4.933	5.250

Type TDS
Parallel Shaft Speed Reducers
Single Reduction

MECHANICAL CAPACITY

S22	S25	WS28	WS30	WS32	WS34	WS36	WS38	WS40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
									MECH HP TORQUE(X1000 IN. LBS.)	1420	1.225
									MECH HP TORQUE(X1000 IN. LBS.)	1170	1.500
10017 683									MECH HP TORQUE(X1000 IN. LBS.)	950	1.837
8744 706				CONTACT NUTTALL GEAR FOR ADDITIONAL RATINGS					MECH HP TORQUE(X1000 IN. LBS.)	780	2.250
6795 690	**9787** 961	**13219** 1330	**17293** 1693						MECH HP TORQUE(X1000 IN. LBS.)	640	2.756
5281 658	**8041** 983	**10407** 1274	**13816** 1695						MECH HP TORQUE(X1000 IN. LBS.)	520	3.375
4307 635	**6199** 921	**7934** 1211	**10525** 1582						MECH HP TORQUE(X1000 IN. LBS.)	420	4.134
3581 638	**4667** 866	**6608** 1216	**8585** 1530						MECH HP TORQUE(X1000 IN. LBS.)	350	5.060

THERMAL CAPACITY

S22	S25	WS28	WS30	WS32	WS34	WS36	WS38	WS40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
									THERMAL HP WITH FANS	1420	1.225
									THERMAL HP WITH FANS	1170	1.500
272 680									THERMAL HP WITH FANS	950	1.837
281 703									THERMAL HP WITH FANS	780	2.250
297 743	**272** 680	**255** 638	**236** 590						THERMAL HP WITH FANS	640	2.756
320 800	**299** 748	**284** 710	**265** 663						THERMAL HP WITH FANS	520	3.375
369 923	**350** 875	**335** 838	**315** 788						THERMAL HP WITH FANS	420	4.134
398 995	**380** 950	**367** 918	**347** 868						THERMAL HP WITH FANS	350	5.060

EXACT GEAR RATIO

S22	S25	WS28	WS30	WS32	WS34	WS36	WS38	WS40	NOMINAL GEAR RATIO
									1.225
									1.500
1.892									1.837
2.242									2.250
2.821	2.727	2.793	2.719						2.756
3.458	3.393	3.400	3.407						3.375
4.095	4.125	4.238	4.174						4.134
4.944	5.150	5.111	4.950						5.060

Type TDS
Parallel Shaft Speed Reducers
Single Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	S7	S8	S9	S11	S12	S13	S15	S16	S18	S20
1.225	950	MECH HP	568	765	1225	1833	2627	3406	4256	5200	6414	
		TORQUE (X1000 IN. LBS.)	37	51	82	124	178	211	281	344	423	
1.500	780	MECH HP	504	679	1094	1620	2359	3050	3786	4623	5710	7006
		TORQUE (X1000 IN. LBS.)	40	56	87	132	189	222	300	377	453	566
1.837	640	MECH HP	412	577	906	1376	1961	2635	3106	3851	4725	6034
		TORQUE (X1000 IN. LBS.)	42	59	90	136	196	235	313	390	476	604
2.250	520	MECH HP	354	482	749	1110	1537	2299	2537	3208	3862	5027
		TORQUE (X1000 IN. LBS.)	42	59	90	135	194	241	314	392	478	632
2.756	420	MECH HP	278	388	594	873	1289	1782	2108	2569	3213	3984
		TORQUE (X1000 IN. LBS.)	41	57	88	133	190	241	308	383	469	611
3.375	350	MECH HP	209	298	451	708	968	1370	1601	1941	2444	3273
		TORQUE (X1000 IN. LBS.)	39	54	84	130	178	252	298	361	454	590
4.134	280	MECH HP	173	242	372	586	780	1103	1329	1585	2034	2458
		TORQUE (X1000 IN. LBS.)	39	53	85	132	172	241	303	355	464	564
5.060	230	MECH HP	144	199	316	488	612	825	1107	1299	1699	2001
		TORQUE (X1000 IN. LBS.)	38	53	83	128	167	233	294	359	451	566

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		S7	S8	S9	S11	S12	S13	S15	S16	S18	S20
1.225	950	THERMAL HP	174	214	232	263	322	363	392	440	466	
		WITH FANS	334	411	445	505	618	697	753	845	895	
1.500	780	THERMAL HP	175	217	235	267	327	369	398	447	473	502
		WITH FANS	336	417	451	513	628	708	764	858	908	964
1.837	640	THERMAL HP	177	219	238	269	330	372	402	452	479	510
		WITH FANS	340	420	457	516	634	714	772	868	920	979
2.250	520	THERMAL HP	179	221	240	272	333	376	406	456	484	515
		WITH FANS	344	424	461	522	639	722	780	876	929	989
2.756	420	THERMAL HP	181	224	244	276	338	382	412	463	489	520
		WITH FANS	348	430	468	530	649	733	791	889	939	998
3.375	350	THERMAL HP	186	230	249	282	345	389	420	471	499	529
		WITH FANS	357	442	478	541	662	747	806	904	958	1016
4.134	280	THERMAL HP	189	234	254	289	354	400	434	489	520	556
		WITH FANS	363	449	488	555	680	768	833	939	998	1068
5.060	230	THERMAL HP	192	238	259	295	363	410	446	504	537	576
		WITH FANS	369	457	497	566	697	787	856	968	1031	1106

EXACT GEAR RATIO

NOMINAL GEAR RATIO	S7	S8	S9	S11	S12	S13	S15	S16	S18	S20
1.225	1.225	1.244	1.238	1.256	1.256	1.255	1.225	1.227	1.225	
1.500	1.472	1.525	1.474	1.514	1.487	1.524	1.472	1.513	1.472	1.500
1.837	1.871	1.886	1.849	1.839	1.853	1.865	1.871	1.882	1.871	1.857
2.250	2.179	2.258	2.241	2.259	2.345	2.212	2.296	2.267	2.296	2.333
2.756	2.708	2.741	2.760	2.826	2.731	2.786	2.708	2.769	2.708	2.846
3.375	3.450	3.391	3.476	3.400	3.409	3.417	3.450	3.454	3.450	3.348
4.134	4.235	4.050	4.222	4.177	4.105	4.048	4.235	4.158	4.235	4.263
5.060	4.933	4.941	4.875	4.867	5.063	5.235	4.933	5.125	4.933	5.250

Type TDS
Parallel Shaft Speed Reducers
Single Reduction

MECHANICAL CAPACITY

S22	S25	WS28	WS30	WS32	WS34	WS36	WS38	WS40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
									MECH HP TORQUE (X1000 IN. LBS.)	950	1.225
8079 674	**10637** 865	**15453** 1249	**19170** 1527						MECH HP TORQUE (X1000 IN. LBS.)	780	1.500
6998 713	**9269** 929	**13547** 1329	**16543** 1633						MECH HP TORQUE (X1000 IN. LBS.)	640	1.837
6123 739	**8052** 970	**11584** 1395	**14325** 1710	CONTACT NUTTALL GEAR FOR ADDITIONAL RATINGS					MECH HP TORQUE (X1000 IN. LBS.)	520	2.250
4782 727	**6834** 1004	**9348** 1406	**12101** 1772						MECH HP TORQUE (X1000 IN. LBS.)	420	2.756
3717 692	**5616** 1026	**7348** 1346	**9762** 1792						MECH HP TORQUE (X1000 IN. LBS.)	350	3.375
3029 668	**4355** 968	**5650** 1290	**7425** 1669						MECH HP TORQUE (X1000 IN. LBS.)	280	4.134
2512 669	**3272** 908	**4651** 1280	**5992** 1598						MECH HP TORQUE (X1000 IN. LBS.)	230	5.060

THERMAL CAPACITY

S22	S25	WS28	WS30	WS32	WS34	WS36	WS38	WS40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
									THERMAL HP WITH FANS	950	1.225
557 1069	**563** 1081	**565** 1085	**560** 1075						THERMAL HP WITH FANS	780	1.500
568 1091	**578** 1110	**582** 1117	**580** 1114						THERMAL HP WITH FANS	640	1.837
573 1100	**584** 1121	**590** 1133	**590** 1133						THERMAL HP WITH FANS	520	2.250
578 1110	**590** 1133	**599** 1150	**604** 1160						THERMAL HP WITH FANS	420	2.756
589 1131	**602** 1156	**619** 1188	**628** 1206						THERMAL HP WITH FANS	350	3.375
625 1200	**648** 1244	**674** 1294	**695** 1334						THERMAL HP WITH FANS	280	4.134
649 1246	**680** 1306	**718** 1379	**740** 1421						THERMAL HP WITH FANS	230	5.060

EXACT GEAR RATIO

S22	S25	WS28	WS30	WS32	WS34	WS36	WS38	WS40	NOMINAL GEAR RATIO
									1.225
1.548	1.510	1.500	1.479						1.500
1.892	1.861	1.821	1.833						1.837
2.242	2.237	2.235	2.216						2.250
2.821	2.727	2.793	2.719						2.756
3.458	3.393	3.400	3.407						3.375
4.095	4.125	4.238	4.174						4.134
4.944	5.150	5.111	4.950						5.060

Type TDS
Parallel Shaft Speed Reducers
Single Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	S7	S8	S9	S11	S12	S13	S15	S16	S18	S20
1.225	710	MECH HP	435	583	943	1413	2009	2607	3288	3986	4962	
		TORQUE (X1000 IN. LBS.)	39	53	85	129	183	237	292	354	440	
1.500	580	MECH HP	387	518	842	1248	1818	2332	2923	3566	4413	5374
		TORQUE (X1000 IN. LBS.)	41	57	90	137	196	257	312	391	471	584
1.837	474	MECH HP	316	443	697	1058	1510	2013	2395	2971	3648	4624
		TORQUE (X1000 IN. LBS.)	43	61	93	141	203	272	325	405	494	622
2.250	387	MECH HP	271	370	575	854	1182	1755	1954	2473	2979	3880
		TORQUE (X1000 IN. LBS.)	43	61	93	140	201	281	325	406	495	656
2.756	316	MECH HP	213	297	455	670	991	1370	1622	1978	2476	3072
		TORQUE (X1000 IN. LBS.)	42	59	91	137	196	277	318	397	486	633
3.375	258	MECH HP	160	228	346	543	743	1053	1231	1493	1881	2522
		TORQUE (X1000 IN. LBS.)	40	56	87	134	183	261	308	374	470	612
4.134	210	MECH HP	132	185	285	449	598	846	1020	1218	1564	1891
		TORQUE (X1000 IN. LBS.)	40	54	87	136	178	248	313	367	480	584
5.060	172	MECH HP	110	152	242	373	469	633	849	997	1305	1538
		TORQUE (X1000 IN. LBS.)	39	54	85	132	172	240	303	370	466	585

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		S7	S8	S9	S11	S12	S13	S15	S16	S18	S20
1.225	710	THERMAL HP	233	288	312	355	437	496	539	610	651	
		WITH FANS	377	467	505	575	708	804	873	988	1055	
1.500	580	THERMAL HP	235	290	315	358	441	499	543	615	656	705
		WITH FANS	381	470	510	580	714	808	880	996	1063	1142
1.837	474	THERMAL HP	236	292	317	361	444	503	548	620	661	711
		WITH FANS	383	473	514	585	719	815	888	1004	1071	1152
2.250	387	THERMAL HP	238	294	319	363	447	507	552	625	667	717
		WITH FANS	386	476	517	588	724	821	894	1013	1081	1162
2.756	316	THERMAL HP	240	297	322	367	452	513	558	632	675	726
		WITH FANS	389	481	522	595	732	831	904	1024	1094	1176
3.375	258	THERMAL HP	244	302	328	374	460	522	569	644	688	741
		WITH FANS	395	489	531	606	745	846	922	1043	1115	1200
4.134	210	THERMAL HP	247	306	332	379	467	530	577	654	699	753
		WITH FANS	400	496	538	614	757	859	935	1059	1132	1220
5.060	172	THERMAL HP	249	309	336	383	472	535	584	662	707	762
		WITH FANS	403	501	544	620	765	867	946	1072	1145	1234

EXACT GEAR RATIO

NOMINAL GEAR RATIO	S7	S8	S9	S11	S12	S13	S15	S16	S18	S20
1.225	1.225	1.244	1.238	1.256	1.256	1.255	1.225	1.227	1.225	
1.500	1.472	1.525	1.474	1.514	1.487	1.524	1.472	1.513	1.472	1.500
1.837	1.871	1.886	1.849	1.839	1.853	1.865	1.871	1.882	1.871	1.857
2.250	2.179	2.258	2.241	2.259	2.345	2.212	2.296	2.267	2.296	2.333
2.756	2.708	2.741	2.760	2.826	2.731	2.786	2.708	2.769	2.708	2.846
3.375	3.450	3.391	3.476	3.400	3.409	3.417	3.450	3.454	3.450	3.348
4.134	4.235	4.050	4.222	4.177	4.105	4.048	4.235	4.158	4.235	4.263
5.060	4.933	4.941	4.875	4.867	5.063	5.235	4.933	5.125	4.933	5.250

Type TDS
Parallel Shaft Speed Reducers
Single Reduction

MECHANICAL CAPACITY

S22	S25	WS28	WS30	WS32	WS34	WS36	WS38	WS40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
									MECH HP TORQUE (X1000 IN. LBS.)	710	1.225
6199 695	8171 894	11919 1295	14747 1580						MECH HP TORQUE (X1000 IN. LBS.)	580	1.500
5365 735	7114 959	10406 1373	12714 1688						MECH HP TORQUE (X1000 IN. LBS.)	474	1.837
4690 762	6174 1001	8890 1439	10999 1766	CONTACT NUTTALL GEAR FOR ADDITIONAL RATINGS					MECH HP TORQUE (X1000 IN. LBS.)	387	2.250
3689 754	5235 1034	7225 1462	9282 1828						MECH HP TORQUE (X1000 IN. LBS.)	316	2.756
2865 718	4297 1056	5674 1398	7542 1732						MECH HP TORQUE (X1000 IN. LBS.)	258	3.375
2332 692	3356 1003	4357 1338	5729 1732						MECH HP TORQUE (X1000 IN. LBS.)	210	4.134
1932 692	2518 939	3583 1327	4619 1656						MECH HP TORQUE (X1000 IN. LBS.)	172	5.060

THERMAL CAPACITY

S22	S25	WS28	WS30	WS32	WS34	WS36	WS38	WS40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
									THERMAL HP WITH FANS	710	1.225
787 1275	809 1311	842 1364	857 1388						THERMAL HP WITH FANS	580	1.500
794 1286	817 1324	850 1377	869 1408						THERMAL HP WITH FANS	474	1.837
801 1298	825 1337	858 1390	877 1421						THERMAL HP WITH FANS	387	2.250
812 1315	837 1356	872 1413	887 1437						THERMAL HP WITH FANS	316	2.756
829 1343	857 1388	888 1439	904 1464						THERMAL HP WITH FANS	258	3.375
843 1366	873 1414	915 1482	945 1531						THERMAL HP WITH FANS	210	4.134
854 1383	885 1434	939 1521	977 1583						THERMAL HP WITH FANS	172	5.060

EXACT GEAR RATIO

S22	S25	WS28	WS30	WS32	WS34	WS36	WS38	WS40	NOMINAL GEAR RATIO
									1.225
1.548	1.510	1.500	1.479						1.500
1.892	1.861	1.821	1.833						1.837
2.242	2.237	2.235	2.216						2.250
2.821	2.727	2.793	2.719						2.756
3.458	3.393	3.400	3.407						3.375
4.095	4.125	4.238	4.174						4.134
4.944	5.150	5.111	4.950						5.060

Type TDS
Parallel Shaft Speed Reducers
Single Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	S7	S8	S9	S11	S12	S13	S15	S16	S18	S20
1.225	588	MECH HP	365	490	796	1195	1691	2195	2785	3360	4206	
		TORQUE (X1000 IN. LBS.)	39	53	86	131	186	241	299	361	451	
1.500	480	MECH HP	327	435	711	1055	1538	1963	2474	3004	3739	4531
		TORQUE (X1000 IN. LBS.)	42	58	92	140	200	262	319	398	482	595
1.837	392	MECH HP	267	372	588	894	1277	1693	2026	2515	3089	3897
		TORQUE (X1000 IN. LBS.)	44	61	95	144	207	276	332	414	506	633
2.250	320	MECH HP	229	312	486	721	999	1476	1652	2092	2521	3283
		TORQUE (X1000 IN. LBS.)	44	62	95	143	205	286	332	415	507	670
2.756	261	MECH HP	179	251	384	566	837	1157	1371	1672	2094	2599
		TORQUE (X1000 IN. LBS.)	42	60	93	140	200	282	325	405	496	647
3.375	213	MECH HP	135	192	291	458	627	888	1039	1261	1590	2132
		TORQUE (X1000 IN. LBS.)	41	57	89	136	187	266	314	381	480	625
4.134	174	MECH HP	111	156	240	379	504	714	861	1029	1321	1598
		TORQUE (X1000 IN. LBS.)	41	55	89	139	181	253	319	375	490	596
5.060	142	MECH HP	92	128	203	315	395	533	716	841	1102	1299
		TORQUE (X1000 IN. LBS.)	40	55	87	134	175	244	309	377	476	597

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		S7	S8	S9	S11	S12	S13	S15	S16	S18	S20
1.225	588	THERMAL HP	272	338	368	420	518	589	642	729	780	
		WITH FANS	400	497	541	617	761	866	944	1072	1147	
1.500	480	THERMAL HP	274	339	370	422	521	592	646	733	785	848
		WITH FANS	403	498	544	620	766	870	950	1078	1154	1247
1.837	392	THERMAL HP	275	341	371	424	524	595	650	737	790	853
		WITH FANS	404	501	545	623	770	875	956	1083	1161	1254
2.250	320	THERMAL HP	276	343	373	426	526	598	653	742	794	858
		WITH FANS	406	504	548	626	773	879	960	1091	1167	1261
2.756	261	THERMAL HP	278	345	376	430	530	603	658	748	801	866
		WITH FANS	409	507	553	632	779	886	967	1100	1177	1273
3.375	213	THERMAL HP	281	349	380	435	537	611	667	758	813	878
		WITH FANS	413	513	559	639	789	898	980	1114	1195	1291
4.134	174	THERMAL HP	283	352	384	439	543	617	674	767	822	890
		WITH FANS	416	517	564	645	798	907	991	1127	1208	1308
5.060	142	THERMAL HP	285	354	386	442	547	622	680	773	829	898
		WITH FANS	419	520	567	650	804	914	1000	1136	1219	1320

EXACT GEAR RATIO

NOMINAL GEAR RATIO	S7	S8	S9	S11	S12	S13	S15	S16	S18	S20
1.225	1.225	1.244	1.238	1.256	1.256	1.255	1.225	1.227	1.225	
1.500	1.472	1.525	1.474	1.514	1.487	1.524	1.472	1.513	1.472	1.500
1.837	1.871	1.886	1.849	1.839	1.853	1.865	1.871	1.882	1.871	1.857
2.250	2.179	2.258	2.241	2.259	2.345	2.212	2.296	2.267	2.296	2.333
2.756	2.708	2.741	2.760	2.826	2.731	2.786	2.708	2.769	2.708	2.846
3.375	3.450	3.391	3.476	3.400	3.409	3.417	3.450	3.454	3.450	3.348
4.134	4.235	4.050	4.222	4.177	4.105	4.048	4.235	4.158	4.235	4.263
5.060	4.933	4.941	4.875	4.867	5.063	5.235	4.933	5.125	4.933	5.250

Type TDS
Parallel Shaft Speed Reducers
Single Reduction

MECHANICAL CAPACITY

S22	S25	WS28	WS30	WS32	WS34	WS36	WS38	WS40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
									MECH HP TORQUE (X1000 IN. LBS.)	588	1.225
5228 708	6896 911	10066 1322	12458 1613						MECH HP TORQUE (X1000 IN. LBS.)	480	1.500
4522 749	6000 977	8783 1400	10734 1722						MECH HP TORQUE (X1000 IN. LBS.)	392	1.837
3951 775	5205 1019	7498 1467	9281 1800	CONTACT NUTTALL GEAR FOR ADDITIONAL RATINGS					MECH HP TORQUE (X1000 IN. LBS.)	320	2.250
3122 771	4410 1053	6122 1497	7827 1863						MECH HP TORQUE (X1000 IN. LBS.)	261	2.756
2423 733	3617 1074	4805 1430	6374 1901						MECH HP TORQUE (X1000 IN. LBS.)	213	3.375
1972 707	2838 1025	3687 1368	4862 1776						MECH HP TORQUE (X1000 IN. LBS.)	174	4.134
1632 706	2128 959	3030 1356	3907 1693						MECH HP TORQUE (X1000 IN. LBS.)	142	5.060

THERMAL CAPACITY

S22	S25	WS28	WS30	WS32	WS34	WS36	WS38	WS40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
									THERMAL HP WITH FANS	588	1.225
948 1394	978 1438	1025 1507	1055 1551						THERMAL HP WITH FANS	480	1.500
954 1402	986 1449	1034 1520	1065 1566						THERMAL HP WITH FANS	392	1.837
961 1413	994 1461	1043 1533	1075 1580						THERMAL HP WITH FANS	320	2.250
970 1426	1005 1477	1057 1554	1091 1604						THERMAL HP WITH FANS	261	2.756
986 1449	1024 1505	1080 1588	1116 1641						THERMAL HP WITH FANS	213	2.375
999 1469	1040 1529	1098 1614	1136 1670						THERMAL HP WITH FANS	174	4.134
1009 1483	1051 1545	1112 1635	1152 1693						THERMAL HP WITH FANS	142	5.060

EXACT GEAR RATIO

S22	S25	WS28	WS30	WS32	WS34	WS36	WS38	WS40	NOMINAL GEAR RATIO
									1.225
1.548	1.510	1.500	1.479						1.500
1.892	1.861	1.821	1.833						1.837
2.242	2.237	2.235	2.216						2.250
2.821	2.727	2.793	2.719						2.756
3.458	3.393	3.400	3.407						3.375
4.095	4.125	4.238	4.174						4.134
4.944	5.150	5.111	4.950						5.060

Type TDS
Parallel Shaft Speed Reducers
Single Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	S7	S8	S9	S11	S12	S13	S15	S16	S18	S20
1.225	473	MECH HP	299	401	652	986	1387	1802	2301	2761	3479	
		TORQUE (X1000 IN. LBS.)	40	54	88	135	189	213	306	368	463	
1.500	387	MECH HP	269	356	586	870	1264	1610	2044	2467	3091	3725
		TORQUE (X1000 IN. LBS.)	43	59	94	143	204	229	327	406	494	607
1.837	316	MECH HP	219	304	484	737	1053	1388	1673	2077	2552	3201
		TORQUE (X1000 IN. LBS.)	45	62	97	147	212	244	340	425	519	646
2.250	258	MECH HP	188	256	400	594	823	1209	1363	1726	2081	2695
		TORQUE (X1000 IN. LBS.)	45	63	97	146	210	240	340	425	519	683
2.756	210	MECH HP	147	206	316	466	689	953	1130	1379	1728	2145
		TORQUE (X1000 IN. LBS.)	43	61	95	143	204	232	333	415	508	663
3.375	172	MECH HP	111	158	239	377	516	731	856	1039	1311	1759
		TORQUE (X1000 IN. LBS.)	42	58	90	139	191	239	321	390	491	640
4.134	140	MECH HP	91	128	197	311	415	587	709	847	1088	1317
		TORQUE (X1000 IN. LBS.)	42	56	90	141	185	218	326	383	501	610
5.060	115	MECH HP	76	105	167	258	325	438	589	692	907	1069
		TORQUE (X1000 IN. LBS.)	41	56	88	136	179	218	316	385	486	610

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		S7	S8	S9	S11	S12	S13	S15	S16	S18	S20
1.225	473	THERMAL HP	314	391	427	489	605	689	755	859	923	
		WITH FANS	418	520	568	650	805	916	1004	1142	1228	
1.500	387	THERMAL HP	314	392	428	491	607	691	757	862	926	1005
		WITH FANS	418	521	569	653	807	919	1007	1146	1232	1337
1.837	316	THERMAL HP	315	393	429	492	609	693	759	865	929	1008
		WITH FANS	419	523	571	654	810	922	1009	1150	1236	1341
2.250	258	THERMAL HP	316	393	430	493	610	695	761	868	932	1012
		WITH FANS	420	523	572	656	811	924	1012	1154	1240	1346
2.756	210	THERMAL HP	317	395	431	495	613	698	765	872	937	1018
		WITH FANS	422	525	573	658	815	928	1017	1160	1246	1354
3.375	172	THERMAL HP	318	397	434	498	617	703	771	878	945	1027
		WITH FANS	423	528	577	662	821	935	1025	1168	1257	1366
4.134	140	THERMAL HP	319	398	436	501	620	707	775	884	951	1034
		WITH FANS	424	529	580	666	825	940	1031	1176	1265	1375
5.060	115	THERMAL HP	320	400	437	503	623	710	779	888	956	1039
		WITH FANS	426	532	581	669	829	944	1036	1181	1271	1382

EXACT GEAR RATIO

NOMINAL GEAR RATIO	S7	S8	S9	S11	S12	S13	S15	S16	S18	S20
1.225	1.225	1.244	1.238	1.256	1.256	1.255	1.225	1.227	1.225	
1.500	1.472	1.525	1.474	1.514	1.487	1.524	1.472	1.513	1.472	1.500
1.837	1.871	1.886	1.849	1.839	1.853	1.865	1.871	1.882	1.871	1.857
2.250	2.179	2.258	2.241	2.259	2.345	2.212	2.296	2.267	2.296	2.333
2.756	2.708	2.741	2.760	2.826	2.731	2.786	2.708	2.769	2.708	2.846
3.375	3.450	3.391	3.476	3.400	3.409	3.417	3.450	3.454	3.450	3.348
4.134	4.235	4.050	4.222	4.177	4.105	4.048	4.235	4.158	4.235	4.263
5.060	4.933	4.941	4.875	4.867	5.063	5.235	4.933	5.125	4.933	5.250

Your Total Drive Source

Type TDS
Parallel Shaft Speed Reducers
Single Reduction

MECHANICAL CAPACITY

S22	S25	WS28	WS30	WS32	WS34	WS36	WS38	WS40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
									MECH HP TORQUE (X1000 IN. LBS.)	473	1.225
4299 723	5675 931	8299 1353	10264 1650						MECH HP TORQUE (X1000 IN. LBS.)	387	1.500
3716 764	4935 998	7228 1430	8837 1760						MECH HP TORQUE (X1000 IN. LBS.)	316	1.837
3245 791	4278 1040	6167 1498	7635 1839	CONTACT NUTTALL GEAR FOR ADDITIONAL RATINGS					MECH HP TORQUE (X1000 IN. LBS.)	258	2.250
2578 790	3622 1073	5062 1536	6434 1901						MECH HP TORQUE (X1000 IN. LBS.)	210	2.756
1999 751	2969 1095	3969 1466	5235 1938						MECH HP TORQUE (X1000 IN. LBS.)	172	3.375
1626 724	2342 1050	3043 1401	4005 1817						MECH HP TORQUE (X1000 IN. LBS.)	140	4.134
1345 723	1754 982	2499 1388	3224 1734						MECH HP TORQUE (X1000 IN. LBS.)	115	5.060

THERMAL CAPACITY

S22	S25	WS28	WS30	WS32	WS34	WS36	WS38	WS40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
									THERMAL HP WITH FANS	473	1.225
1127 1499	1171 1557	1231 1637	1269 1688						THERMAL HP WITH FANS	387	1.500
1132 1506	1177 1565	1239 1648	1279 1701						THERMAL HP WITH FANS	316	1.837
1136 1511	1184 1575	1247 1659	1289 1714						THERMAL HP WITH FANS	258	2.250
1144 1522	1193 1587	1260 1676	1303 1733						THERMAL HP WITH FANS	210	2.756
1156 1537	1209 1608	1281 1704	1327 1765						THERMAL HP WITH FANS	172	3.375
1165 1549	1222 1625	1297 1725	1346 1790						THERMAL HP WITH FANS	140	4.134
1172 1559	1232 1639	1310 1742	1361 1810						THERMAL HP WITH FANS	115	5.060

EXACT GEAR RATIO

S22	S25	WS28	WS30	WS32	WS34	WS36	WS38	WS40	NOMINAL GEAR RATIO
									1.225
1.548	1.510	1.500	1.479						1.500
1.892	1.861	1.821	1.833						1.837
2.242	2.237	2.235	2.216						2.250
2.821	2.727	2.793	2.719						2.756
3.458	3.393	3.400	3.407						3.375
4.095	4.125	4.238	4.174						4.134
4.944	5.150	5.111	4.950						5.060

Type TDS
Parallel Shaft Speed Reducers
Double Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	D7	D8	D9	D11	D12	D13	D15	D16	D18	D20
6.200	280	MECH HP	169	238	368	593	764	1105	1327	1578	2005	2435
		TORQUE (X1000 IN. LBS.)	39	52	84	131	172	237	298	354	463	556
7.590	230	MECH HP	139	194	298	481	632	903	1084	1320	1694	2005
		TORQUE (X1000 IN. LBS.)	40	53	86	135	176	243	306	363	475	570
9.300	190	MECH HP	117	163	257	417	538	758	913	1088	1411	1626
		TORQUE (X1000 IN. LBS.)	40	54	87	137	180	248	312	372	486	585
11.39	155	MECH HP	98	135	210	342	451	628	757	920	1154	1420
		TORQUE (X1000 IN. LBS.)	41	55	89	139	183	253	319	379	497	595
13.95	125	MECH HP	80	116	175	275	372	509	614	766	978	1163
		TORQUE (X1000 IN. LBS.)	42	56	90	143	187	258	326	387	507	609
17.09	100	MECH HP	67	92	144	228	316	428	515	620	811	983
		TORQUE (X1000 IN. LBS.)	42	57	93	145	189	263	332	395	517	620
20.93	84	MECH HP	55	80	121	198	264	375	451	519	707	815
		TORQUE (X1000 IN. LBS.)	43	58	94	147	193	266	336	402	525	633

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		D7	D8	D9	D11	D12	D13	D15	D16	D18	D20
6.200	280	THERMAL HP	38	52	59	97	123	141	162	196	219	257
		WITH FANS	95	130	148	243	308	353	405	490	548	643
7.590	230	THERMAL HP	38	53	60	99	125	144	165	200	224	262
		WITH FANS	95	133	150	248	313	360	413	500	560	655
9.300	190	THERMAL HP	39	54	61	101	128	147	168	204	228	267
		WITH FANS	98	135	153	253	320	368	420	510	570	668
11.39	155	THERMAL HP	40	55	63	104	132	151	173	210	235	275
		WITH FANS	100	138	158	260	330	378	433	525	588	688
13.95	125	THERMAL HP	42	57	66	108	137	157	180	218	244	285
		WITH FANS	105	143	165	270	343	393	450	545	610	713
17.09	100	THERMAL HP	43	59	68	112	141	163	186	226	252	296
		WITH FANS	108	148	170	280	353	408	465	565	630	740
20.93	84	THERMAL HP	45	61	70	116	146	168	193	233	261	306
		WITH FANS	113	153	175	290	365	420	483	583	653	765

EXACT GEAR RATIO

NOMINAL GEAR RATIO	D7	D8	D9	D11	D12	D13	D15	D16	D18	D20
6.200	6.407	6.075	6.333	6.149	6.261	5.965	6.242	6.237	6.413	6.340
7.590	7.973	7.609	7.999	7.815	7.741	7.482	7.829	7.641	7.787	7.899
9.300	9.600	9.217	9.437	9.099	9.270	9.072	9.493	9.485	9.569	9.996
11.39	11.728	11.340	11.793	11.311	11.251	11.171	11.689	11.434	11.969	11.642
13.95	14.631	13.439	14.355	14.409	13.922	14.070	14.723	14.033	14.400	14.534
17.09	17.610	17.325	17.893	17.698	16.627	17.090	17.882	17.671	17.689	17.502
20.93	21.706	19.997	21.579	20.604	20.285	19.732	20.647	21.523	20.612	21.583

Type TDS
Parallel Shaft Speed Reducers
Double Reduction

MECHANICAL CAPACITY

D22	D25	D28	D30	WD32	WD34	WD36	WD38	WD40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
3041	**4424**	**5595**	**7422**	**7836**	**9878**	**11128**	**12262**	**13776**	**MECH HP**	280	6.200
667	968	1257	1643	1710	2219	2479	2728	3095	TORQUE (X1000 IN. LBS.)		
2506	**3576**	**4542**	**6020**	**6541**	**8303**	**9344**	**10300**	**11575**	**MECH HP**	230	7.590
685	994	1297	1693	1767	2291	2564	2823	3204	TORQUE (X1000 IN. LBS.)		
2034	**2985**	**3793**	**5029**	**5392**	**7191**	**8000**	**8821**	**9916**	**MECH HP**	190	9.300
703	1018	1329	1736	1830	2352	2639	2907	3299	TORQUE (X1000 IN. LBS.)		
1776	**2578**	**3277**	**4346**	**4544**	**5913**	**6756**	**7452**	**8379**	**MECH HP**	155	11.39
715	1037	1355	1769	1881	2433	2718	2994	3399	TORQUE (X1000 IN. LBS.)		
1456	**2077**	**2641**	**3505**	**3952**	**4965**	**5602**	**6180**	**6951**	**MECH HP**	125	13.95
732	1065	1391	1818	1925	2504	2803	3089	3508	TORQUE (X1000 IN. LBS.)		
1232	**1728**	**2198**	**2918**	**3206**	**4290**	**4737**	**5228**	**5881**	**MECH HP**	100	17.09
746	1087	1421	1858	1989	2563	2882	3177	3609	TORQUE (X1000 IN. LBS.)		
1020	**1508**	**1919**	**2548**	**2674**	**3642**	**3900**	**4306**	**4845**	**MECH HP**	84	20.93
761	1105	1445	1890	2043	2627	2962	3267	3712	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

D22	D25	D28	D30	WD32	WD34	WD36	WD38	WD40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
291	**329**	**379**	**398**	**416**	**426**	**430**	**427**	**407**	**THERMAL HP**	280	6.200
728	823	948	995	1040	1065	1075	1068	1018	WITH FANS		
297	**336**	**388**	**406**	**425**	**436**	**439**	**436**	**416**	**THERMAL HP**	230	7.590
743	840	970	1015	1063	1090	1098	1090	1040	WITH FANS		
303	**343**	**395**	**414**	**433**	**444**	**448**	**445**	**424**	**THERMAL HP**	190	9.300
758	858	988	1035	1083	1110	1120	1113	1060	WITH FANS		
312	**353**	**406**	**426**	**446**	**457**	**461**	**458**	**436**	**THERMAL HP**	155	11.39
780	883	1015	1065	1115	1143	1153	1145	1090	WITH FANS		
324	**366**	**422**	**442**	**463**	**474**	**478**	**475**	**453**	**THERMAL HP**	125	13.95
810	915	1055	1105	1158	1185	1195	1188	1133	WITH FANS		
335	**380**	**437**	**458**	**480**	**491**	**496**	**492**	**469**	**THERMAL HP**	100	17.09
838	950	1093	1145	1200	1228	1240	1230	1173	WITH FANS		
347	**392**	**452**	**474**	**496**	**508**	**512**	**509**	**485**	**THERMAL HP**	84	20.93
868	980	1130	1185	1240	1270	1280	1273	1213	WITH FANS		

EXACT GEAR RATIO

D22	D25	D28	D30	WD32	WD34	WD36	WD38	WD40	NOMINAL GEAR RATIO
6.090	6.073	6.239	6.145	6.060	6.268	6.185	6.178	6.238	6.200
7.588	7.718	7.930	7.809	7.503	7.662	7.619	7.611	7.685	7.590
9.603	9.472	9.732	9.584	9.426	9.082	9.160	9.150	9.239	9.300
11.183	11.172	11.479	11.304	11.497	11.427	11.169	11.157	11.265	11.39
13.961	14.231	14.621	14.400	13.525	14.006	13.895	13.880	14.014	13.95
16.812	17.471	17.950	17.678	17.223	16.586	16.893	16.875	17.038	17.09
20.732	20.350	20.908	20.591	21.210	20.025	21.090	21.068	21.272	20.93

Type TDS
Parallel Shaft Speed Reducers
Double Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	D7	D8	D9	D11	D12	D13	D15	D16	D18	D20
6.200	190	MECH HP	117	165	256	413	533	771	927	1103	1406	1704
		TORQUE (X1000 IN. LBS.)	40	54	87	137	180	248	312	371	486	582
7.590	155	MECH HP	96	135	207	332	440	629	755	919	1182	1401
		TORQUE (X1000 IN. LBS.)	41	55	89	140	183	254	318	378	496	596
9.300	125	MECH HP	81	113	178	289	374	528	635	757	983	1135
		TORQUE (X1000 IN. LBS.)	42	56	90	142	187	258	325	387	507	611
11.39	100	MECH HP	67	93	145	237	313	438	526	639	803	988
		TORQUE (X1000 IN. LBS.)	42	57	92	144	190	264	331	394	518	620
13.95	84	MECH HP	55	80	121	190	258	354	426	530	678	809
		TORQUE (X1000 IN. LBS.)	43	58	94	147	193	268	338	401	526	633
17.09	68	MECH HP	46	63	99	157	219	296	357	430	562	683
		TORQUE (X1000 IN. LBS.)	44	59	95	150	196	272	344	409	536	644
20.93	56	MECH HP	38	55	83	137	182	260	312	359	489	564
		TORQUE (X1000 IN. LBS.)	44	59	96	152	199	276	347	416	543	656

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		D7	D8	D9	D11	D12	D13	D15	D16	D18	D20
6.200	190	THERMAL HP	73	99	114	187	237	272	311	377	422	494
		WITH FANS	140	190	219	359	455	522	597	724	810	948
7.590	155	THERMAL HP	74	101	115	190	240	276	316	383	428	501
		WITH FANS	142	194	221	365	461	530	607	735	822	962
9.300	125	THERMAL HP	75	103	117	194	244	281	322	390	436	511
		WITH FANS	144	198	225	372	468	540	618	749	837	981
11.39	100	THERMAL HP	76	105	119	197	249	286	327	396	443	519
		WITH FANS	146	202	228	378	478	549	628	760	851	996
13.95	84	THERMAL HP	78	106	122	200	253	291	333	404	451	529
		WITH FANS	150	204	234	384	486	559	639	776	866	1016
17.09	68	THERMAL HP	79	109	124	205	259	298	340	413	461	540
		WITH FANS	152	209	238	394	497	572	653	793	885	1037
20.93	56	THERMAL HP	81	111	127	210	265	305	348	422	472	553
		WITH FANS	156	213	244	403	509	586	668	810	906	1062

EXACT GEAR RATIO

NOMINAL GEAR RATIO	D7	D8	D9	D11	D12	D13	D15	D16	D18	D20
6.200	6.407	6.075	6.333	6.149	6.261	5.965	6.242	6.237	6.413	6.340
7.590	7.973	7.609	7.999	7.815	7.741	7.482	7.829	7.641	7.787	7.899
9.300	9.600	9.217	9.437	9.099	9.270	9.072	9.493	9.485	9.569	9.996
11.39	11.728	11.340	11.793	11.311	11.251	11.171	11.689	11.434	11.969	11.642
13.95	14.631	13.439	14.355	14.409	13.922	14.070	14.723	14.033	14.400	14.534
17.09	17.610	17.325	17.893	17.698	16.627	17.090	17.882	17.671	17.689	17.502
20.93	21.706	19.997	21.579	20.604	20.285	19.732	20.647	21.523	20.612	21.583

Type TDS
Parallel Shaft Speed Reducers
Double Reduction

MECHANICAL CAPACITY

D22	D25	D28	D30	WD32	WD34	WD36	WD38	WD40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
2131	3103	3928	5220	5575	7000	7937	8745	9830	MECH HP	190	6.200
699	1015	1320	1728	1820	2363	2644	2910	3303	TORQUE (X1000 IN. LBS.)		
1752	2509	3178	4221	4639	5898	6639	7323	8234	MECH HP	155	7.590
716	1043	1358	1776	1875	2434	2725	3002	3409	TORQUE (X1000 IN. LBS.)		
1419	2089	2647	3517	3814	5098	5676	6263	7044	MECH HP	125	9.300
734	1066	1388	1816	1937	2494	2801	3087	3506	TORQUE (X1000 IN. LBS.)		
1238	1804	2286	3038	3213	4180	4775	5281	5929	MECH HP	100	11.39
746	1086	1413	1850	1990	2573	2873	3174	3598	TORQUE (X1000 IN. LBS.)		
1013	1450	1838	2445	2786	3501	3950	4361	4907	MECH HP	84	13.95
762	1112	1448	1897	2030	2642	2957	3261	3704	TORQUE (X1000 IN. LBS.)		
856	1204	1527	2031	2253	3020	3331	3678	4140	MECH HP	68	17.09
775	1133	1476	1934	2090	2698	3031	3343	3800	TORQUE (X1000 IN. LBS.)		
707	1048	1330	1770	1871	2558	2743	3030	3411	MECH HP	56	20.93
790	1149	1498	1963	2138	2759	3116	3439	3909	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

D22	D25	D28	D30	WD32	WD34	WD36	WD38	WD40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
561	634	731	766	802	821	828	823	783	THERMAL HP	190	6.200
1077	1217	1404	1471	1540	1576	1590	1580	1503	WITH FANS		
569	644	742	777	814	833	841	835	795	THERMAL HP	155	7.590
1092	1236	1425	1492	1563	1599	1614	1603	1526	WITH FANS		
579	655	755	791	828	848	856	850	809	THERMAL HP	125	9.300
1112	1258	1450	1519	1590	1628	1643	1632	1553	WITH FANS		
589	667	768	805	843	863	871	865	823	THERMAL HP	100	11.39
1131	1281	1475	1546	1619	1657	1672	1660	1580	WITH FANS		
600	679	782	819	857	879	886	880	838	THERMAL HP	84	13.95
1152	1304	1501	1572	1645	1688	1701	1690	1609	WITH FANS		
613	694	799	838	877	898	906	900	857	THERMAL HP	68	17.09
1177	1332	1534	1609	1684	1724	1740	1728	1645	WITH FANS		
627	710	818	857	897	919	927	921	877	THERMAL HP	56	20.93
1204	1363	1571	1645	1722	1764	1780	1768	1684	WITH FANS		

EXACT GEAR RATIO

D22	D25	D28	D30	WD32	WD34	WD36	WD38	WD40	NOMINAL GEAR RATIO
6.090	6.073	6.239	6.145	6.060	6.268	6.185	6.178	6.238	6.200
7.588	7.718	7.930	7.809	7.503	7.662	7.619	7.611	7.685	7.590
9.603	9.472	9.732	9.584	9.426	9.082	9.160	9.150	9.239	9.300
11.183	11.172	11.479	11.304	11.497	11.427	11.169	11.157	11.265	11.39
13.961	14.231	14.621	14.400	13.525	14.006	13.895	13.880	14.014	13.95
16.812	17.471	17.950	17.678	17.223	16.586	16.893	16.875	17.038	17.09
20.732	20.350	20.908	20.591	21.210	20.025	21.090	21.068	21.272	20.93

Type TDS
Parallel Shaft Speed Reducers
Double Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	D7	D8	D9	D11	D12	D13	D15	D16	D18	D20
6.200	140	MECH HP	90	126	196	316	408	588	710	847	1080	1308
		TORQUE (X1000 IN. LBS.)	42	55	90	141	185	254	321	383	502	601
7.590	115	MECH HP	73	103	158	255	337	479	578	705	905	1073
		TORQUE (X1000 IN. LBS.)	42	57	92	144	189	260	328	390	511	614
9.300	94	MECH HP	62	86	136	222	286	402	485	579	752	868
		TORQUE (X1000 IN. LBS.)	43	57	93	146	192	264	334	398	521	629
11.39	76	MECH HP	51	71	111	181	239	332	402	489	612	757
		TORQUE (X1000 IN. LBS.)	43	58	95	148	195	269	340	405	531	638
13.95	62	MECH HP	42	61	92	145	196	269	325	406	518	617
		TORQUE (X1000 IN. LBS.)	45	59	96	151	198	274	347	413	540	650
17.09	51	MECH HP	35	48	75	120	167	225	272	329	428	521
		TORQUE (X1000 IN. LBS.)	45	60	97	154	201	279	352	421	548	661
20.93	42	MECH HP	29	42	63	104	139	197	238	274	373	428
		TORQUE (X1000 IN. LBS.)	46	61	98	155	204	282	356	427	557	669

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		D7	D8	D9	D11	D12	D13	D15	D16	D18	D20
6.200	140	THERMAL HP	113	155	178	293	370	425	486	589	659	772
		WITH FANS	183	251	288	475	599	689	787	954	1068	1251
7.590	115	THERMAL HP	116	158	181	298	377	433	496	601	672	787
		WITH FANS	188	256	293	483	611	701	804	974	1089	1275
9.300	94	THERMAL HP	118	162	185	305	385	443	507	614	687	805
		WITH FANS	191	262	300	494	624	718	821	995	1113	1304
11.39	76	THERMAL HP	121	166	189	312	394	453	518	628	702	823
		WITH FANS	196	269	306	505	638	734	839	1017	1137	1333
13.95	62	THERMAL HP	124	169	193	319	402	463	530	642	718	841
		WITH FANS	201	274	313	517	651	750	859	1040	1163	1362
17.09	51	THERMAL HP	127	173	198	327	412	474	543	657	735	861
		WITH FANS	206	280	321	530	667	768	880	1064	1191	1395
20.93	42	THERMAL HP	129	177	203	334	422	485	555	673	752	881
		WITH FANS	209	287	329	541	684	786	899	1090	1218	1427

EXACT GEAR RATIO

NOMINAL GEAR RATIO	D7	D8	D9	D11	D12	D13	D15	D16	D18	D20
6.200	6.407	6.075	6.333	6.149	6.261	5.965	6.242	6.237	6.413	6.340
7.590	7.973	7.609	7.999	7.815	7.741	7.482	7.829	7.641	7.787	7.899
9.300	9.600	9.217	9.437	9.099	9.270	9.072	9.493	9.485	9.569	9.996
11.39	11.728	11.340	11.793	11.311	11.251	11.171	11.689	11.434	11.969	11.642
13.95	14.631	13.439	14.355	14.409	13.922	14.070	14.723	14.033	14.400	14.534
17.09	17.610	17.325	17.893	17.698	16.627	17.090	17.882	17.671	17.689	17.502
20.93	21.706	19.997	21.579	20.604	20.285	19.732	20.647	21.523	20.612	21.583

Type TDS
Parallel Shaft Speed Reducers
Double Reduction

MECHANICAL CAPACITY

D22	D25	D28	D30	WD32	WD34	WD36	WD38	WD40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
1637	2382	3028	4029	4327	5435	6166	6802	7650	MECH HP	140	6.200
722	1048	1369	1794	1900	2468	2763	3044	3457	TORQUE (X1000 IN. LBS.)		
1344	1922	2445	3254	3596	4572	5149	5682	6391	MECH HP	115	7.590
739	1075	1405	1841	1955	2538	2842	3133	3558	TORQUE (X1000 IN. LBS.)		
1087	1600	2035	2710	2946	3945	4386	4841	5447	MECH HP	94	9.300
756	1098	1435	1882	2012	2596	2910	3209	3646	TORQUE (X1000 IN. LBS.)		
947	1377	1753	2335	2476	3229	3688	4083	4583	MECH HP	76	11.39
767	1114	1458	1912	2062	2673	2984	3300	3740	TORQUE (X1000 IN. LBS.)		
774	1106	1408	1877	2144	2700	3050	3368	3792	MECH HP	62	13.95
783	1140	1491	1958	2101	2740	3070	3387	3850	TORQUE (X1000 IN. LBS.)		
654	917	1167	1556	1732	2326	2561	2829	3185	MECH HP	51	17.09
796	1161	1518	1993	2161	2794	3134	3458	3931	TORQUE (X1000 IN. LBS.)		
540	797	1016	1355	1425	1967	2101	2321	2614	MECH HP	42	20.93
810	1175	1539	2021	2190	2854	3210	3542	4028	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

D22	D25	D28	D30	WD32	WD34	WD36	WD38	WD40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
876	991	1142	1197	1252	1283	1294	1286	1224	THERMAL HP	140	6.200
1419	1605	1850	1939	2028	2078	2096	2083	1983	WITH FANS		
892	1010	1163	1220	1276	1308	1319	1307	1247	THERMAL HP	115	7.590
1445	1636	1884	1976	2067	2119	2137	2117	2020	WITH FANS		
913	1033	1190	1248	1306	1338	1349	1340	1276	THERMAL HP	94	9.300
1479	1673	1928	2022	2116	2168	2185	2171	2067	WITH FANS		
933	1056	1216	1275	1334	1367	1379	1370	1304	THERMAL HP	76	11.39
1511	1711	1970	2066	2161	2215	2234	2219	2112	WITH FANS		
954	1080	1244	1304	1364	1398	1410	1401	1333	THERMAL HP	62	13.95
1545	1750	2015	2112	2210	2265	2284	2270	2159	WITH FANS		
977	1106	1274	1335	1397	1431	1444	1434	1366	THERMAL HP	51	17.09
1583	1792	2064	2163	2263	2318	2339	2323	2213	WITH FANS		
1000	1132	1303	1366	1430	1465	1478	1468	1398	THERMAL HP	42	20.93
1620	1834	2111	2213	2317	2373	2394	2378	2265	WITH FANS		

EXACT GEAR RATIO

D22	D25	D28	D30	WD32	WD34	WD36	WD38	WD40	NOMINAL GEAR RATIO
6.090	6.073	6.239	6.145	6.060	6.268	6.185	6.178	6.238	6.200
7.588	7.718	7.930	7.809	7.503	7.662	7.619	7.611	7.685	7.590
9.603	9.472	9.732	9.584	9.426	9.082	9.160	9.150	9.239	9.300
11.183	11.172	11.479	11.304	11.497	11.427	11.169	11.157	11.265	11.39
13.961	14.231	14.621	14.400	13.525	14.006	13.895	13.880	14.014	13.95
16.812	17.471	17.950	17.678	17.223	16.586	16.893	16.875	17.038	17.09
20.732	20.350	20.908	20.591	21.210	20.025	21.090	21.068	21.272	20.93

Type TDS
Parallel Shaft Speed Reducers
Double Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	D7	D8	D9	D11	D12	D13	D15	D16	D18	D20
6.200	116	MECH HP	75	106	164	266	343	497	598	713	909	1104
		TORQUE (X1000 IN. LBS.)	42	56	91	143	188	260	327	389	510	613
7.590	95	MECH HP	61	86	133	213	283	404	487	593	764	906
		TORQUE (X1000 IN. LBS.)	43	57	93	146	192	265	334	397	521	626
9.300	77	MECH HP	52	72	114	185	239	339	408	488	633	731
		TORQUE (X1000 IN. LBS.)	44	58	94	147	194	269	339	405	530	640
11.39	63	MECH HP	43	60	92	152	201	281	338	411	516	635
		TORQUE (X1000 IN. LBS.)	44	60	95	150	198	275	346	411	541	647
13.95	52	MECH HP	35	51	77	122	165	227	273	340	436	519
		TORQUE (X1000 IN. LBS.)	45	60	97	154	201	280	352	418	550	660
17.09	42	MECH HP	29	40	63	100	140	190	229	275	360	437
		TORQUE (X1000 IN. LBS.)	45	61	99	155	204	284	358	425	557	669
20.93	34	MECH HP	24	35	53	87	116	166	199	229	313	361
		TORQUE (X1000 IN. LBS.)	46	61	100	157	206	287	360	431	565	682

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		D7	D8	D9	D11	D12	D13	D15	D16	D18	D20
6.200	116	THERMAL HP	159	218	249	411	519	597	683	827	925	1084
		WITH FANS	234	320	366	604	763	878	1004	1216	1360	1593
7.590	95	THERMAL HP	162	222	254	418	527	607	694	841	941	1102
		WITH FANS	238	326	373	614	775	892	1020	1236	1383	1620
9.300	77	THERMAL HP	165	226	258	426	537	618	707	857	959	1123
		WITH FANS	243	332	379	626	789	908	1039	1260	1410	1651
11.39	63	THERMAL HP	168	230	263	434	547	630	720	873	976	1143
		WITH FANS	247	338	387	638	804	926	1058	1283	1435	1680
13.95	52	THERMAL HP	171	234	268	442	557	641	733	889	994	1164
		WITH FANS	251	344	394	650	819	942	1078	1307	1461	1711
17.09	42	THERMAL HP	174	239	273	451	568	654	748	907	1014	1188
		WITH FANS	256	351	401	663	835	961	1100	1333	1491	1746
20.93	34	THERMAL HP	178	244	279	460	580	667	763	925	1034	1212
		WITH FANS	262	359	410	676	853	980	1122	1360	1520	1782

EXACT GEAR RATIO

NOMINAL GEAR RATIO	D7	D8	D9	D11	D12	D13	D15	D16	D18	D20
6.200	6.407	6.075	6.333	6.149	6.261	5.965	6.242	6.237	6.413	6.340
7.590	7.973	7.609	7.999	7.815	7.741	7.482	7.829	7.641	7.787	7.899
9.300	9.600	9.217	9.437	9.099	9.270	9.072	9.493	9.485	9.569	9.996
11.39	11.728	11.340	11.793	11.311	11.251	11.171	11.689	11.434	11.969	11.642
13.95	14.631	13.439	14.355	14.409	13.922	14.070	14.723	14.033	14.400	14.534
17.09	17.610	17.325	17.893	17.698	16.627	17.090	17.882	17.671	17.689	17.502
20.93	21.706	19.997	21.579	20.604	20.285	19.732	20.647	21.523	20.612	21.583

Type TDS
Parallel Shaft Speed Reducers
Double Reduction

MECHANICAL CAPACITY

D22	D25	D28	D30	WD32	WD34	WD36	WD38	WD40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
1381	2016	2554	3394	3676	4618	5235	5776	6497	MECH HP	116	6.200
736	1072	1395	1826	1950	2534	2834	3124	3548	TORQUE (X1000 IN. LBS.)		
1133	1622	2061	2740	3049	3880	4367	4820	5423	MECH HP	95	7.590
753	1096	1431	1873	2003	2602	2912	3211	3648	TORQUE (X1000 IN. LBS.)		
916	1349	1716	2282	2497	3345	3719	4106	4621	MECH HP	77	9.300
770	1118	1462	1914	2060	2659	2982	3289	3737	TORQUE (X1000 IN. LBS.)		
798	1160	1477	1964	2100	2734	3123	3460	3882	MECH HP	63	11.39
781	1134	1484	1943	2113	2735	3053	3379	3828	TORQUE (X1000 IN. LBS.)		
652	935	1186	1579	1817	2284	2582	2853	3212	MECH HP	52	13.95
796	1165	1518	1990	2151	2801	3140	3466	3940	TORQUE (X1000 IN. LBS.)		
550	774	983	1308	1449	1966	2167	2395	2697	MECH HP	42	17.09
809	1184	1545	2024	2185	2854	3204	3538	4022	TORQUE (X1000 IN. LBS.)		
454	671	855	1138	1200	1662	1774	1960	2208	MECH HP	34	20.93
823	1195	1565	2051	2228	2912	3275	3615	4111	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

D22	D25	D28	D30	WD32	WD34	WD36	WD38	WD40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
1229	1392	1603	1680	1758	1801	1817	1805	1718	THERMAL HP	116	6.200
1807	2046	2356	2470	2584	2647	2671	2653	2525	WITH FANS		
1250	1415	1630	1708	1788	1832	1848	1835	1747	THERMAL HP	95	7.590
1838	2080	2396	2511	2628	2693	2717	2697	2568	WITH FANS		
1274	1442	1660	1741	1822	1866	1883	1870	1780	THERMAL HP	77	9.300
1873	2120	2440	2559	2678	2743	2768	2749	2617	WITH FANS		
1297	1468	1690	1772	1854	1900	1916	1904	1812	THERMAL HP	63	11.39
1907	2158	2484	2605	2725	2793	2817	2799	2664	WITH FANS		
1320	1495	1721	1805	1888	1935	1952	1939	1846	THERMAL HP	52	13.95
1940	2198	2530	2653	2775	2844	2869	2850	2713	WITH FANS		
1347	1525	1756	1841	1927	1974	1991	1978	1883	THERMAL HP	42	17.09
1980	2242	2581	2706	2833	2902	2927	2908	2768	WITH FANS		
1374	1556	1791	1878	1965	2014	2031	2018	1921	THERMAL HP	34	20.93
2020	2287	2633	2761	2889	2961	2986	2966	2824	WITH FANS		

EXACT GEAR RATIO

D22	D25	D28	D30	WD32	WD34	WD36	WD38	WD40	NOMINAL GEAR RATIO
6.090	6.073	6.239	6.145	6.060	6.268	6.185	6.178	6.238	6.200
7.588	7.718	7.930	7.809	7.503	7.662	7.619	7.611	7.685	7.590
9.603	9.472	9.732	9.584	9.426	9.082	9.160	9.150	9.239	9.300
11.183	11.172	11.479	11.304	11.497	11.427	11.169	11.157	11.265	11.39
13.961	14.231	14.621	14.400	13.525	14.006	13.895	13.880	14.014	13.95
16.812	17.471	17.950	17.678	17.223	16.586	16.893	16.875	17.038	17.09
20.732	20.350	20.908	20.591	21.210	20.025	21.090	21.068	21.272	20.93

Type TDS
Parallel Shaft Speed Reducers
Double Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	D7	D8	D9	D11	D12	D13	D15	D16	D18	D20
6.200	94	MECH HP	61	87	135	219	282	407	491	587	748	906
		TORQUE (X1000 IN. LBS.)	42	57	93	146	192	264	333	398	521	624
7.590	76	MECH HP	50	70	109	176	233	331	399	487	626	744
		TORQUE (X1000 IN. LBS.)	43	58	95	149	196	269	339	404	530	639
9.300	62	MECH HP	42	59	93	153	197	278	335	400	520	600
		TORQUE (X1000 IN. LBS.)	44	59	95	151	198	274	346	412	541	652
11.39	51	MECH HP	35	49	76	125	164	229	277	338	423	521
		TORQUE (X1000 IN. LBS.)	45	60	97	154	201	278	352	420	550	659
13.95	42	MECH HP	29	42	63	100	135	185	224	279	358	426
		TORQUE (X1000 IN. LBS.)	46	61	98	157	204	283	358	425	560	673
17.09	34	MECH HP	24	33	51	83	115	154	187	226	294	359
		TORQUE (X1000 IN. LBS.)	46	62	99	160	208	286	363	434	565	683
20.93	28	MECH HP	20	29	44	72	96	136	166	191	259	299
		TORQUE (X1000 IN. LBS.)	47	63	103	161	212	292	372	447	580	701

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		D7	D8	D9	D11	D12	D13	D15	D16	D18	D20
6.200	94	THERMAL HP	240	329	376	620	782	900	1029	1247	1395	1634
		WITH FANS	319	438	500	825	1040	1197	1369	1659	1855	2173
7.590	76	THERMAL HP	247	338	387	638	805	926	1059	1284	1435	1682
		WITH FANS	329	450	515	849	1071	1232	1408	1708	1909	2237
9.300	62	THERMAL HP	253	347	397	654	825	950	1086	1317	1472	1725
		WITH FANS	336	462	528	870	1097	1264	1444	1752	1958	2294
11.39	51	THERMAL HP	258	353	404	666	841	967	1107	1341	1499	1757
		WITH FANS	343	469	537	886	1119	1286	1472	1784	1994	2337
13.95	42	THERMAL HP	262	359	411	677	855	983	1125	1363	1524	1786
		WITH FANS	348	477	547	900	1137	1307	1496	1813	2027	2375
17.09	34	THERMAL HP	266	364	417	687	867	997	1141	1382	1545	1811
		WITH FANS	354	484	555	914	1153	1326	1518	1838	2055	2409
20.93	28	THERMAL HP	269	368	421	694	876	1008	1153	1397	1562	1830
		WITH FANS	358	489	560	923	1165	1341	1533	1858	2077	2434

EXACT GEAR RATIO

NOMINAL GEAR RATIO	D7	D8	D9	D11	D12	D13	D15	D16	D18	D20
6.200	6.407	6.075	6.333	6.149	6.261	5.965	6.242	6.237	6.413	6.340
7.590	7.973	7.609	7.999	7.815	7.741	7.482	7.829	7.641	7.787	7.899
9.300	9.600	9.217	9.437	9.099	9.270	9.072	9.493	9.485	9.569	9.996
11.39	11.728	11.340	11.793	11.311	11.251	11.171	11.689	11.434	11.969	11.642
13.95	14.631	13.439	14.355	14.409	13.922	14.070	14.723	14.033	14.400	14.534
17.09	17.610	17.325	17.893	17.698	16.627	17.090	17.882	17.671	17.689	17.502
20.93	21.706	19.997	21.579	20.604	20.285	19.732	20.647	21.523	20.612	21.583

Type TDS
Parallel Shaft Speed Reducers
Double Reduction

MECHANICAL CAPACITY

D22	D25	D28	D30	WD32	WD34	WD36	WD38	WD40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
1137	**1656**	**2107**	**2806**	**3042**	**3828**	**4347**	**4798**	**5398**	**MECH HP**	94	6.200
753	1093	1428	1874	2003	2607	2922	3221	3659	TORQUE (X1000 IN. LBS.)		
932	**1334**	**1698**	**2262**	**2526**	**3212**	**3617**	**3994**	**4495**	**MECH HP**	76	7.590
769	1119	1463	1919	2059	2675	2995	3303	3754	TORQUE (X1000 IN. LBS.)		
752	**1106**	**1408**	**1877**	**2063**	**2767**	**3087**	**3403**	**3830**	**MECH HP**	62	9.300
785	1138	1489	1955	2113	2731	3073	3384	3845	TORQUE (X1000 IN. LBS.)		
655	**953**	**1214**	**1618**	**1724**	**2259**	**2582**	**2853**	**3212**	**MECH HP**	51	11.39
796	1157	1514	1987	2154	2805	3134	3459	3932	TORQUE (X1000 IN. LBS.)		
535	**764**	**974**	**1298**	**1488**	**1885**	**2123**	**2346**	**2642**	**MECH HP**	42	13.95
811	1181	1547	2031	2187	2869	3205	3538	4023	TORQUE (X1000 IN. LBS.)		
451	**631**	**799**	**1065**	**1192**	**1621**	**1785**	**1973**	**2223**	**MECH HP**	34	17.09
824	1198	1558	2046	2231	2921	3277	3618	4116	TORQUE (X1000 IN. LBS.)		
376	**543**	**708**	**988**	**979**	**1381**	**1480**	**1636**	**1845**	**MECH HP**	28	20.93
847	1201	1609	2211	2256	3006	3392	3745	4265	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

D22	D25	D28	D30	WD32	WD34	WD36	WD38	WD40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
1853	**2098**	**2416**	**2533**	**2650**	**2715**	**2739**	**2721**	**2590**	**THERMAL HP**	94	6.200
2464	2790	3213	3369	3525	3611	3643	3619	3445	WITH FANS		
1907	**2159**	**2486**	**2607**	**2728**	**2795**	**2819**	**2800**	**2666**	**THERMAL HP**	76	7.590
2536	2871	3306	3467	3628	3717	3749	3724	3546	WITH FANS		
1956	**2214**	**2550**	**2673**	**2798**	**2866**	**2891**	**2872**	**2735**	**THERMAL HP**	62	9.300
2601	2945	3392	3555	3721	3812	3845	3820	3638	WITH FANS		
1993	**2255**	**2597**	**2723**	**2850**	**2920**	**2945**	**2925**	**2785**	**THERMAL HP**	51	11.39
2651	2999	3454	3622	3791	3884	3917	3890	3704	WITH FANS		
2025	**2293**	**2640**	**2768**	**2897**	**2968**	**2993**	**2974**	**2831**	**THERMAL HP**	42	13.95
2693	3050	3511	3681	3853	3947	3981	3955	3765	WITH FANS		
2054	**2325**	**2677**	**2807**	**2937**	**3009**	**3035**	**3015**	**2871**	**THERMAL HP**	34	17.09
2732	3092	3560	3733	3906	4002	4037	4010	3818	WITH FANS		
2076	**2350**	**2706**	**2837**	**2969**	**3042**	**3068**	**3048**	**2902**	**THERMAL HP**	28	20.93
2761	3126	3599	3773	3949	4046	4080	4054	3860	WITH FANS		

EXACT GEAR RATIO

D22	D25	D28	D30	WD32	WD34	WD36	WD38	WD40	NOMINAL GEAR RATIO
6.090	6.073	6.239	6.145	6.060	6.268	6.185	6.178	6.238	6.200
7.588	7.718	7.930	7.809	7.503	7.662	7.619	7.611	7.685	7.590
9.603	9.472	9.732	9.584	9.426	9.082	9.160	9.150	9.239	9.300
11.183	11.172	11.479	11.304	11.497	11.427	11.169	11.157	11.265	11.39
13.961	14.231	14.621	14.400	13.525	14.006	13.895	13.880	14.014	13.95
16.812	17.471	17.950	17.678	17.223	16.586	16.893	16.875	17.038	17.09
20.732	20.350	20.908	20.591	21.210	20.025	21.090	21.068	21.272	20.93

Type TDS
Parallel Shaft Speed Reducers
Triple Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	T7	T8	T9	T11	T12	T13	T15	T16	T18	T20
25.63	68	MECH HP	46	62	98	156	218	294	355	437	572	672
		TORQUE (X1000 IN. LBS.)	44	59	96	150	196	271	343	409	536	646
31.39	56	MECH HP	38	52	80	127	177	240	290	351	459	553
		TORQUE (X1000 IN. LBS.)	45	60	97	152	199	278	351	418	547	657
38.44	45	MECH HP	32	44	67	107	149	201	242	305	398	469
		TORQUE (X1000 IN. LBS.)	46	61	98	155	203	282	355	423	552	668
47.08	37	MECH HP	26	36	56	89	122	166	200	249	327	393
		TORQUE (X1000 IN. LBS.)	46	62	100	157	205	286	361	429	564	679
57.66	30	MECH HP	22	30	46	73	105	142	173	201	263	326
		TORQUE (X1000 IN. LBS.)	47	63	102	161	209	290	370	441	578	697
70.62	25	MECH HP	19	26	39	62	84	114	139	168	221	278
		TORQUE (X1000 IN. LBS.)	48	65	104	164	215	300	383	453	596	710
86.50	20	MECH HP	15	21	32	52	75	101	122	147	194	234
		TORQUE (X1000 IN. LBS.)	50	67	106	170	222	307	388	462	610	729

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		T7	T8	T9	T11	T12	T13	T15	T16	T18	T20
25.63	68	THERMAL HP	47	64	73	120	152	175	200	242	271	317
		WITH FANS	118	160	183	300	380	438	500	605	678	793
31.39	56	THERMAL HP	48	65	75	123	155	178	204	247	276	324
		WITH FANS	120	163	188	308	388	445	510	618	690	810
38.44	45	THERMAL HP	49	67	77	127	160	185	211	256	286	335
		WITH FANS	123	168	193	318	400	463	528	640	715	838
47.08	37	THERMAL HP	50	68	78	129	163	187	214	260	291	340
		WITH FANS	125	170	195	323	408	468	535	650	728	850
57.66	30	THERMAL HP	51	69	79	131	165	190	217	263	294	344
		WITH FANS	128	173	198	328	413	475	543	658	735	860
70.62	25	THERMAL HP	51	70	80	131	166	191	218	264	295	346
		WITH FANS	128	175	200	328	415	478	545	660	738	865
86.50	20	THERMAL HP	51	70	80	132	166	191	219	265	296	347
		WITH FANS	128	175	200	330	415	478	548	663	740	868

EXACT GEAR RATIO

NOMINAL GEAR RATIO	T7	T8	T9	T11	T12	T13	T15	T16	T18	T20
25.63	26.905	26.469	27.069	26.760	24.941	25.635	26.823	26.015	26.042	26.691
31.39	32.469	31.944	33.682	33.298	31.239	32.109	33.597	33.062	33.096	33.004
38.44	39.623	38.981	40.558	40.096	37.841	38.895	40.698	38.498	38.537	39.521
47.08	49.162	48.366	49.549	48.984	46.555	47.852	50.070	47.858	47.907	47.968
57.66	58.699	57.749	61.811	61.107	55.172	56.708	59.336	60.965	61.027	59.355
70.62	71.419	70.263	74.397	73.549	71.127	73.108	76.496	74.842	74.918	70.883
86.50	89.225	87.780	91.702	90.656	82.096	84.382	88.292	87.176	87.265	86.481

Type TDS
Parallel Shaft Speed Reducers
Triple Reduction

MECHANICAL CAPACITY

T22	T25	T28	T30	WT32	WT34	WT36	WT38	WT40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
841	**1217**	**1514**	**2011**	**2268**	**2971**	**3382**	**3735**	**4203**	**MECH HP**	68	25.63
777	1128	1482	1939	2092	2704	3029	3342	3797	TORQUE (X1000 IN. LBS.)		
667	**993**	**1270**	**1688**	**1863**	**2487**	**2733**	**3018**	**3398**	**MECH HP**	56	31.39
792	1155	1510	1976	2141	2770	3111	3432	3901	TORQUE (X1000 IN. LBS.)		
588	**830**	**1053**	**1399**	**1504**	**2138**	**2278**	**2516**	**2834**	**MECH HP**	45	38.44
804	1171	1538	2012	2187	2824	3182	3511	3993	TORQUE (X1000 IN. LBS.)		
492	**683**	**856**	**1140**	**1305**	**1741**	**1966**	**2173**	**2448**	**MECH HP**	37	47.08
817	1186	1564	2052	2210	2896	3239	3577	4068	TORQUE (X1000 IN. LBS.)		
407	**552**	**733**	**976**	**1061**	**1457**	**1590**	**1757**	**1981**	**MECH HP**	30	57.66
836	1207	1611	2113	2244	2974	3337	3684	4194	TORQUE (X1000 IN. LBS.)		
350	**459**	**613**	**807**	**887**	**1265**	**1347**	**1489**	**1679**	**MECH HP**	25	70.62
857	1219	1655	2146	2259	3058	3471	3833	4363	TORQUE (X1000 IN. LBS.)		
295	**401**	**538**	**699**	**735**	**1020**	**1175**	**1300**	**1466**	**MECH HP**	20	86.50
882	1230	1693	2166	2308	3188	3529	3898	4438	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

T22	T25	T28	T30	WT32	WT34	WT36	WT38	WT40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
360	**407**	**469**	**491**	**514**	**527**	**532**	**528**	**503**	**THERMAL HP**	68	25.63
900	1018	1173	1228	1285	1318	1330	1320	1258	WITH FANS		
367	**416**	**479**	**502**	**525**	**538**	**543**	**539**	**514**	**THERMAL HP**	56	31.39
918	1040	1198	1255	1313	1345	1358	1348	1285	WITH FANS		
380	**430**	**495**	**519**	**543**	**557**	**562**	**558**	**531**	**THERMAL HP**	45	38.44
950	1075	1238	1298	1358	1393	1405	1395	1328	WITH FANS		
386	**437**	**503**	**528**	**552**	**566**	**571**	**567**	**540**	**THERMAL HP**	37	47.08
965	1093	1258	1320	1380	1415	1428	1418	1350	WITH FANS		
391	**442**	**509**	**534**	**559**	**573**	**578**	**574**	**546**	**THERMAL HP**	30	57.66
978	1105	1273	1335	1398	1433	1445	1435	1365	WITH FANS		
393	**444**	**512**	**537**	**561**	**575**	**580**	**576**	**549**	**THERMAL HP**	25	70.62
983	1110	1280	1343	1403	1438	1450	1440	1373	WITH FANS		
394	**446**	**513**	**538**	**563**	**577**	**582**	**578**	**550**	**THERMAL HP**	20	86.50
985	1115	1283	1345	1408	1443	1455	1445	1375	WITH FANS		

EXACT GEAR RATIO

T22	T25	T28	T30	WT32	WT34	WT36	WT38	WT40	NOMINAL GEAR RATIO
25.638	25.747	27.181	26.769	25.614	25.273	24.870	24.843	25.083	25.63
31.703	32.295	33.004	32.504	31.913	30.930	31.606	31.573	31.878	31.39
37.963	39.160	40.553	39.939	40.385	36.690	38.791	38.750	39.124	38.44
46.077	48.220	50.727	49.959	47.032	46.203	45.751	45.702	46.144	47.08
57.015	60.733	61.029	60.104	58.715	56.668	58.280	58.219	58.781	57.66
68.089	73.763	74.966	73.831	70.705	67.133	71.546	71.471	72.161	70.62
83.071	85.171	87.355	86.032	87.192	86.831	83.338	83.249	84.053	86.50

Type TDS
Parallel Shaft Speed Reducers
Triple Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	T7	T8	T9	T11	T12	T13	T15	T16	T18	T20
25.63	45	MECH HP	31	43	67	107	150	204	245	301	394	465
		TORQUE (X1000 IN. LBS.)	45	61	98	154	202	282	354	422	553	669
31.39	37	MECH HP	26	36	55	88	122	165	199	242	317	382
		TORQUE (X1000 IN. LBS.)	45	62	100	158	205	285	360	431	565	679
38.44	30	MECH HP	22	30	47	75	103	140	169	211	278	326
		TORQUE (X1000 IN. LBS.)	47	63	103	162	210	293	370	438	577	694
47.08	25	MECH HP	18	25	39	62	86	117	141	174	229	276
		TORQUE (X1000 IN. LBS.)	48	65	104	164	216	302	380	449	591	713
57.66	20	MECH HP	15	21	32	52	74	100	121	143	186	230
		TORQUE (X1000 IN. LBS.)	50	67	107	171	220	305	387	470	611	735
70.62	16.5	MECH HP	13	18	27	44	59	81	97	119	156	197
		TORQUE (X1000 IN. LBS.)	50	68	111	174	226	319	400	480	630	752
86.50	13.5	MECH HP	11	15	23	37	52	71	86	105	137	165
		TORQUE (X1000 IN. LBS.)	52	71	114	181	230	323	409	493	644	769

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		T7	T8	T9	T11	T12	T13	T15	T16	T18	T20
25.63	45	THERMAL HP	83	113	130	214	270	310	355	430	481	563
		WITH FANS	159	217	250	411	518	595	682	826	924	1081
31.39	37	THERMAL HP	85	116	133	219	276	318	364	441	493	577
		WITH FANS	163	223	255	420	530	611	699	847	947	1108
38.44	30	THERMAL HP	86	118	135	223	281	324	370	449	502	588
		WITH FANS	165	227	259	428	540	622	710	862	964	1129
47.08	25	THERMAL HP	88	120	137	227	286	329	376	456	510	597
		WITH FANS	169	230	263	436	549	632	722	876	979	1146
57.66	20	THERMAL HP	89	122	140	230	290	334	382	463	518	607
		WITH FANS	171	234	269	442	557	641	733	889	995	1165
70.62	16.5	THERMAL HP	90	123	140	232	292	336	385	466	521	611
		WITH FANS	173	236	269	445	561	645	739	895	1000	1173
86.50	13.5	THERMAL HP	90	123	141	232	293	337	386	468	523	613
		WITH FANS	173	236	271	445	563	647	741	899	1004	1177

EXACT GEAR RATIO

NOMINAL GEAR RATIO	T7	T8	T9	T11	T12	T13	T15	T16	T18	T20
25.63	26.905	26.469	27.069	26.760	24.941	25.635	26.823	26.015	26.042	26.691
31.39	32.469	31.944	33.682	33.298	31.239	32.109	33.597	33.062	33.096	33.004
38.44	39.623	38.981	40.558	40.096	37.841	38.895	40.698	38.498	38.537	39.521
47.08	49.162	48.366	49.549	48.984	46.555	47.852	50.070	47.858	47.907	47.968
57.66	58.699	57.749	61.811	61.107	55.172	56.708	59.336	60.965	61.027	59.355
70.62	71.419	70.263	74.397	73.549	71.127	73.108	76.496	74.842	74.918	70.883
86.50	89.225	87.780	91.702	90.656	82.096	84.382	88.292	87.176	87.265	86.481

Type TDS
Parallel Shaft Speed Reducers
Triple Reduction

MECHANICAL CAPACITY

T22	T25	T28	T30	WT32	WT34	WT36	WT38	WT40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
583	**845**	**1046**	**1392**	**1575**	**2082**	**2365**	**2613**	**2943**	**MECH HP**	45	25.63
805	1172	1532	2007	2173	2834	3168	3497	3976	TORQUE (X1000 IN. LBS.)		
480	**685**	**877**	**1167**	**1289**	**1739**	**1910**	**2111**	**2378**	**MECH HP**	37	31.39
819	1192	1559	2043	2216	2897	3252	3590	4083	TORQUE (X1000 IN. LBS.)		
408	**571**	**732**	**974**	**1037**	**1496**	**1601**	**1769**	**1994**	**MECH HP**	30	38.44
835	1204	1599	2095	2256	2957	3345	3693	4202	TORQUE (X1000 IN. LBS.)		
346	**469**	**602**	**799**	**896**	**1235**	**1392**	**1538**	**1735**	**MECH HP**	25	47.08
859	1218	1645	2150	2270	3073	3431	3786	4313	TORQUE (X1000 IN. LBS.)		
288	**375**	**516**	**667**	**727**	**1040**	**1140**	**1261**	**1422**	**MECH HP**	20	57.66
885	1227	1696	2160	2299	3176	3579	3955	4503	TORQUE (X1000 IN. LBS.)		
247	**311**	**432**	**549**	**607**	**902**	**950**	**1051**	**1162**	**MECH HP**	16.5	70.62
907	1236	1745	2183	2312	3262	3661	4046	4517	TORQUE (X1000 IN. LBS.)		
208	**269**	**381**	**477**	**502**	**726**	**839**	**928**	**1013**	**MECH HP**	13.5	86.50
932	1234	1793	2211	2358	3394	3769	4162	4587	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

T22	T25	T28	T30	WT32	WT34	WT36	WT38	WT40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
639	**723**	**833**	**873**	**914**	**936**	**944**	**938**	**893**	**THERMAL HP**	45	25.63
1227	1388	1599	1676	1755	1797	1812	1801	1715	WITH FANS		
655	**741**	**853**	**895**	**936**	**959**	**967**	**961**	**915**	**THERMAL HP**	37	31.39
1258	1423	1638	1718	1797	1841	1857	1845	1757	WITH FANS		
667	**755**	**870**	**912**	**954**	**977**	**986**	**979**	**933**	**THERMAL HP**	30	38.44
1281	1450	1670	1751	1832	1876	1893	1880	1791	WITH FANS		
677	**767**	**883**	**926**	**969**	**993**	**1001**	**995**	**947**	**THERMAL HP**	25	47.08
1300	1473	1695	1778	1860	1907	1922	1910	1818	WITH FANS		
688	**779**	**897**	**941**	**985**	**1009**	**1017**	**1011**	**962**	**THERMAL HP**	20	57.66
1321	1496	1722	1807	1891	1937	1953	1941	1847	WITH FANS		
693	**784**	**903**	**946**	**990**	**1015**	**1023**	**1017**	**968**	**THERMAL HP**	16.5	70.62
1331	1505	1734	1816	1901	1949	1964	1953	1859	WITH FANS		
695	**787**	**906**	**950**	**994**	**1018**	**1027**	**1020**	**971**	**THERMAL HP**	13.5	86.50
1334	1511	1740	1824	1908	1955	1972	1958	1864	WITH FANS		

EXACT GEAR RATIO

T22	T25	T28	T30	WT32	WT34	WT36	WT38	WT40	NOMINAL GEAR RATIO
25.638	25.747	27.181	26.769	25.614	25.273	24.870	24.843	25.083	25.63
31.703	32.295	33.004	32.504	31.913	30.930	31.606	31.573	31.878	31.39
37.963	39.160	40.553	39.939	40.385	36.690	38.791	38.750	39.124	38.44
46.077	48.220	50.727	49.959	47.032	46.203	45.751	45.702	46.144	47.08
57.015	60.733	61.029	60.104	58.715	56.668	58.280	58.219	58.781	57.66
68.089	73.763	74.966	73.831	70.705	67.133	71.546	71.471	72.161	70.62
83.071	85.171	87.355	86.032	87.192	86.831	83.338	83.249	84.053	86.50

Type TDS
Parallel Shaft Speed Reducers
Triple Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	T7	T8	T9	T11	T12	T13	T15	T16	T18	T20
25.63	34	MECH HP	24	33	51	82	115	154	187	230	300	354
		TORQUE (X1000 IN. LBS.)	47	63	100	159	208	286	363	433	566	684
31.39	28	MECH HP	20	28	42	68	94	126	154	186	244	294
		TORQUE (X1000 IN. LBS.)	48	64	102	164	213	293	375	445	585	703
38.44	22	MECH HP	17	23	36	57	79	108	130	164	215	253
		TORQUE (X1000 IN. LBS.)	49	66	106	166	217	304	383	457	600	724
47.08	18.5	MECH HP	14	19	30	48	67	90	108	135	178	213
		TORQUE (X1000 IN. LBS.)	50	68	109	170	226	312	392	468	618	740
57.66	15.0	MECH HP	12	16	25	40	58	77	95	110	143	177
		TORQUE (X1000 IN. LBS.)	52	69	113	177	232	316	406	486	632	761
70.62	12.5	MECH HP	10	14	21	34	46	62	75	91	120	152
		TORQUE (X1000 IN. LBS.)	53	71	115	181	237	328	416	493	651	781
86.50	10.0	MECH HP	8.3	11	17	28	40	54	66	79	104	127
		TORQUE (X1000 IN. LBS.)	54	72	117	184	238	330	422	499	657	796

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		T7	T8	T9	T11	T12	T13	T15	T16	T18	T20
25.63	34	THERMAL HP	132	181	207	341	430	494	566	685	766	898
		WITH FANS	214	293	335	552	697	800	917	1110	1241	1455
31.39	28	THERMAL HP	134	183	209	345	435	501	573	694	776	909
		WITH FANS	217	296	339	559	705	812	928	1124	1257	1473
38.44	22	THERMAL HP	135	185	211	348	439	506	578	701	784	918
		WITH FANS	219	300	342	564	711	820	936	1136	1270	1487
47.08	18.5	THERMAL HP	136	186	212	350	442	508	581	705	788	923
		WITH FANS	220	301	343	567	716	823	941	1142	1277	1495
57.66	15.0	THERMAL HP	136	187	213	352	444	511	584	708	791	927
		WITH FANS	220	303	345	570	719	828	946	1147	1281	1502
70.62	12.5	THERMAL HP	137	187	214	353	445	512	586	710	794	930
		WITH FANS	222	303	347	572	721	829	949	1150	1286	1507
86.50	10.0	THERMAL HP	137	188	215	354	447	514	588	713	797	933
		WITH FANS	222	305	348	573	724	833	953	1155	1291	1511

EXACT GEAR RATIO

NOMINAL GEAR RATIO	T7	T8	T9	T11	T12	T13	T15	T16	T18	T20
25.63	26.905	26.469	27.069	26.760	24.941	25.635	26.823	26.015	26.042	26.691
31.39	32.469	31.944	33.682	33.298	31.239	32.109	33.597	33.062	33.096	33.004
38.44	39.623	38.981	40.558	40.096	37.841	38.895	40.698	38.498	38.537	39.521
47.08	49.162	48.366	49.549	48.984	46.555	47.852	50.070	47.858	47.907	47.968
57.66	58.699	57.749	61.811	61.107	55.172	56.708	59.336	60.965	61.027	59.355
70.62	71.419	70.263	74.397	73.549	71.127	73.108	76.496	74.842	74.918	70.883
86.50	89.225	87.780	91.702	90.656	82.096	84.382	88.292	87.176	87.265	86.481

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Type TDS
Parallel Shaft Speed Reducers
Triple Reduction

MECHANICAL CAPACITY

T22	T25	T28	T30	WT32	WT34	WT36	WT38	WT40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
444	640	799	1065	1200	1598	1819	2011	2265	MECH HP	34	25.63
825	1194	1573	2065	2227	2926	3277	3619	4116	TORQUE (X1000 IN. LBS.)		
370	517	682	902	979	1348	1480	1636	1845	MECH HP	28	31.39
849	1210	1631	2124	2263	3020	3389	3742	4261	TORQUE (X1000 IN. LBS.)		
317	428	571	748	786	1169	1245	1376	1552	MECH HP	22	38.44
871	1214	1677	2164	2300	3106	3499	3863	4399	TORQUE (X1000 IN. LBS.)		
268	351	473	598	676	963	1082	1196	1342	MECH HP	18.5	47.08
895	1226	1738	2164	2303	3223	3586	3960	4486	TORQUE (X1000 IN. LBS.)		
223	283	399	503	546	810	889	983	1079	MECH HP	15.0	57.66
922	1245	1764	2190	2322	3327	3753	4146	4595	TORQUE (X1000 IN. LBS.)		
191	232	334	414	458	702	738	826	896	MECH HP	12.5	70.62
945	1240	1814	2214	2346	3414	3825	4275	4683	TORQUE (X1000 IN. LBS.)		
160	204	290	357	378	558	642	715	774	MECH HP	10.0	86.50
963	1259	1835	2225	2388	3513	3878	4312	4724	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

T22	T25	T28	T30	WT32	WT34	WT36	WT38	WT40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
1018	1153	1328	1392	1456	1492	1506	1495	1424	THERMAL HP	34	25.63
1649	1868	2151	2255	2359	2417	2438	2422	2307	WITH FANS		
1031	1167	1344	1409	1474	1511	1524	1514	1441	THERMAL HP	28	31.39
1670	1891	2177	2283	2388	2448	2469	2453	2334	WITH FANS		
1041	1179	1358	1423	1489	1526	1539	1529	1456	THERMAL HP	22	38.44
1686	1910	2200	2305	2412	2472	2493	2477	2359	WITH FANS		
1047	1185	1365	1431	1497	1534	1547	1537	1464	THERMAL HP	18.5	47.08
1696	1920	2211	2318	2425	2485	2506	2490	2372	WITH FANS		
1052	1191	1371	1437	1504	1541	1554	1544	1470	THERMAL HP	15.0	57.66
1704	1929	2221	2328	2436	2496	2517	2501	2381	WITH FANS		
1055	1194	1376	1442	1509	1546	1560	1549	1475	THERMAL HP	12.5	70.62
1709	1934	2229	2336	2445	2505	2527	2509	2390	WITH FANS		
1059	1198	1380	1447	1514	1551	1565	1555	1480	THERMAL HP	10.0	86.50
1716	1941	2236	2344	2453	2513	2535	2519	2398	WITH FANS		

EXACT GEAR RATIO

T22	T25	T28	T30	WT32	WT34	WT36	WT38	WT40	NOMINAL GEAR RATIO
25.638	25.747	27.181	26.769	25.614	25.273	24.870	24.843	25.083	25.63
31.703	32.295	33.004	32.504	31.913	30.930	31.606	31.573	31.878	31.39
37.963	39.160	40.553	39.939	40.385	36.690	38.791	38.750	39.124	38.44
46.077	48.220	50.727	49.959	47.032	46.203	45.751	45.702	46.144	47.08
57.015	60.733	61.029	60.104	58.715	56.668	58.280	58.219	58.781	57.66
68.089	73.763	74.966	73.831	70.705	67.133	71.546	71.471	72.161	70.62
83.071	85.171	87.355	86.032	87.192	86.831	83.338	83.249	84.053	86.50

Type TDS
Parallel Shaft Speed Reducers
Triple Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	T7	T8	T9	T11	T12	T13	T15	T16	T18	T20
25.63	28	MECH HP	20	28	44	70	97	132	159	195	255	301
		TORQUE (X1000 IN. LBS.)	48	64	104	163	212	296	373	444	581	703
31.39	23	MECH HP	17	24	36	58	80	108	131	159	207	251
		TORQUE (X1000 IN. LBS.)	49	66	107	168	219	304	385	460	600	725
38.44	19	MECH HP	14	20	31	49	68	92	111	139	182	216
		TORQUE (X1000 IN. LBS.)	50	67	109	172	225	313	396	468	614	747
47.08	15	MECH HP	12	16	26	41	57	77	93	116	152	182
		TORQUE (X1000 IN. LBS.)	52	69	112	177	231	323	408	486	637	764
57.66	12.5	MECH HP	10	14	21	34	49	65	79	93	122	152
		TORQUE (X1000 IN. LBS.)	53	71	115	182	236	323	417	496	652	790
70.62	10.2	MECH HP	8.6	11	18	29	39	53	63	77	101	127
		TORQUE (X1000 IN. LBS.)	54	72	116	184	242	337	422	504	662	788
86.50	8.3	MECH HP	7.0	9.5	14	23	34	46	55	66	87	105
		TORQUE (X1000 IN. LBS.)	54	73	118	186	244	340	425	504	665	795

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		T7	T8	T9	T11	T12	T13	T15	T16	T18	T20
25.63	28	THERMAL HP	181	248	283	467	589	678	775	939	1050	1230
		WITH FANS	266	365	416	686	866	997	1139	1380	1544	1808
31.39	23	THERMAL HP	183	250	286	472	595	685	784	950	1062	1244
		WITH FANS	269	368	420	694	875	1007	1152	1397	1561	1829
38.44	19	THERMAL HP	184	253	289	476	601	691	791	958	1072	1255
		WITH FANS	270	372	425	700	883	1016	1163	1408	1576	1845
47.08	15	THERMAL HP	185	254	290	478	604	695	795	963	1077	1262
		WITH FANS	272	373	426	703	888	1022	1169	1416	1583	1855
57.66	12.5	THERMAL HP	186	255	291	481	606	698	798	967	1082	1267
		WITH FANS	273	375	428	707	891	1026	1173	1421	1591	1862
70.62	10.2	THERMAL HP	186	255	292	481	607	699	799	969	1083	1269
		WITH FANS	273	375	429	707	892	1028	1175	1424	1592	1865
86.50	8.3	THERMAL HP	187	256	292	482	608	700	800	970	1084	1270
		WITH FANS	275	376	429	709	894	1029	1176	1426	1593	1867

EXACT GEAR RATIO

NOMINAL GEAR RATIO	T7	T8	T9	T11	T12	T13	T15	T16	T18	T20
25.63	26.905	26.469	27.069	26.760	24.941	25.635	26.823	26.015	26.042	26.691
31.39	32.469	31.944	33.682	33.298	31.239	32.109	33.597	33.062	33.096	33.004
38.44	39.623	38.981	40.558	40.096	37.841	38.895	40.698	38.498	38.537	39.521
47.08	49.162	48.366	49.549	48.984	46.555	47.852	50.070	47.858	47.907	47.968
57.66	58.699	57.749	61.811	61.107	55.172	56.708	59.336	60.965	61.027	59.355
70.62	71.419	70.263	74.397	73.549	71.127	73.108	76.496	74.842	74.918	70.883
86.50	89.225	87.780	91.702	90.656	82.096	84.382	88.292	87.176	87.265	86.481

Type TDS
Parallel Shaft Speed Reducers
Triple Reduction

MECHANICAL CAPACITY

T22	T25	T28	T30	WT32	WT34	WT36	WT38	WT40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
377	**536**	**681**	**906**	**1004**	**1362**	**1546**	**1709**	**1927**	**MECH HP**	28	25.63
847	1208	1620	2123	2251	3014	3366	3716	4231	TORQUE (X1000 IN. LBS.)		
314	**433**	**575**	**753**	**820**	**1151**	**1267**	**1401**	**1580**	**MECH HP**	23	31.39
873	1224	1661	2142	2291	3115	3505	3872	4409	TORQUE (X1000 IN. LBS.)		
269	**361**	**483**	**620**	**659**	**997**	**1070**	**1183**	**1326**	**MECH HP**	19	38.44
895	1237	1715	2168	2330	3202	3633	4013	4541	TORQUE (X1000 IN. LBS.)		
228	**297**	**398**	**501**	**563**	**821**	**926**	**1024**	**1129**	**MECH HP**	15	47.08
919	1254	1767	2191	2319	3319	3708	4097	4560	TORQUE (X1000 IN. LBS.)		
190	**237**	**340**	**421**	**458**	**690**	**751**	**825**	**895**	**MECH HP**	12.5	57.66
946	1260	1816	2215	2354	3424	3831	4204	4605	TORQUE (X1000 IN. LBS.)		
161	**195**	**282**	**348**	**387**	**594**	**628**	**684**	**742**	**MECH HP**	10.2	70.62
962	1259	1851	2249	2395	3493	3933	4279	4687	TORQUE (X1000 IN. LBS.)		
134	**171**	**243**	**299**	**315**	**469**	**543**	**588**	**639**	**MECH HP**	8.3	86.50
975	1275	1858	2252	2404	3566	3964	4285	4701	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

T22	T25	T28	T30	WT32	WT34	WT36	WT38	WT40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
1396	**1580**	**1819**	**1907**	**1996**	**2045**	**2063**	**2049**	**1951**	**THERMAL HP**	28	25.63
2052	2323	2674	2803	2934	3006	3033	3012	2868	WITH FANS		
1411	**1598**	**1840**	**1929**	**2018**	**2068**	**2086**	**2072**	**1973**	**THERMAL HP**	23	31.39
2074	2349	2705	2836	2966	3040	3066	3046	2900	WITH FANS		
1424	**1612**	**1856**	**1946**	**2036**	**2086**	**2104**	**2091**	**1990**	**THERMAL HP**	19	38.44
2093	2370	2728	2861	2993	3066	3093	3074	2925	WITH FANS		
1431	**1620**	**1865**	**1956**	**2046**	**2097**	**2115**	**2101**	**2000**	**THERMAL HP**	15	47.08
2104	2381	2742	2875	3008	3083	3109	3088	2940	WITH FANS		
1437	**1627**	**1874**	**1964**	**2055**	**2106**	**2124**	**2110**	**2009**	**THERMAL HP**	12.5	57.66
2112	2392	2755	2887	3021	3096	3122	3102	2953	WITH FANS		
1439	**1629**	**1877**	**1967**	**2059**	**2109**	**2127**	**2113**	**2012**	**THERMAL HP**	10.2	70.62
2115	2395	2759	2891	3027	3100	3127	3106	2958	WITH FANS		
1441	**1631**	**1878**	**1969**	**2060**	**2111**	**2129**	**2115**	**2014**	**THERMAL HP**	8.3	86.50
2118	2398	2761	2894	3028	3103	3130	3109	2961	WITH FANS		

EXACT GEAR RATIO

T22	T25	T28	T30	WT32	WT34	WT36	WT38	WT40	NOMINAL GEAR RATIO
25.638	25.747	27.181	26.769	25.614	25.273	24.870	24.843	25.083	25.63
31.703	32.295	33.004	32.504	31.913	30.930	31.606	31.573	31.878	31.39
37.963	39.160	40.553	39.939	40.385	36.690	38.791	38.750	39.124	38.44
46.077	48.220	50.727	49.959	47.032	46.203	45.751	45.702	46.144	47.08
57.015	60.733	61.029	60.104	58.715	56.668	58.280	58.219	58.781	57.66
68.089	73.763	74.966	73.831	70.705	67.133	71.546	71.471	72.161	70.62
83.071	85.171	87.355	86.032	87.192	86.831	83.338	83.249	84.053	86.50

Type TDS
Parallel Shaft Speed Reducers
Triple Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	T7	T8	T9	T11	T12	T13	T15	T16	T18	T20
25.63	22.6	MECH HP	17	23	36	58	81	109	131	161	211	251
		TORQUE (X1000 IN. LBS.)	49	66	107	168	219	304	382	455	597	728
31.39	18.5	MECH HP	14	19	30	48	66	89	109	132	172	208
		TORQUE (X1000 IN. LBS.)	50	68	110	173	224	311	398	474	619	746
38.44	15.1	MECH HP	12	16	26	41	56	75	92	114	152	179
		TORQUE (X1000 IN. LBS.)	52	69	112	177	230	317	407	477	637	769
47.08	12.3	MECH HP	9.9	13	21	34	47	63	76	95	125	152
		TORQUE (X1000 IN. LBS.)	53	71	115	182	238	328	414	494	651	792
57.66	10.1	MECH HP	8.4	11	17	28	40	55	66	75	99	124
		TORQUE (X1000 IN. LBS.)	54	72	117	184	240	336	423	497	657	800
70.62	8.2	MECH HP	7.0	9.6	14	23	32	43	52	63	83	105
		TORQUE (X1000 IN. LBS.)	54	73	118	186	245	342	431	512	676	809
86.50	6.7	MECH HP	5.7	7.9	12	19	28	37	46	55	72	87
		TORQUE (X1000 IN. LBS.))	56	75	121	191	250	344	438	524	683	818

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		T7	T8	T9	T11	T12	T13	T15	T16	T18	T20
25.63	22.6	THERMAL HP	271	371	424	699	882	1015	1161	1407	1574	1844
		WITH FANS	360	493	564	930	1173	1350	1544	1871	2093	2453
31.39	18.5	THERMAL HP	271	371	425	700	883	1017	1163	1409	1576	1846
		WITH FANS	360	493	565	931	1174	1353	1547	1874	2096	2455
38.44	15.1	THERMAL HP	271	371	425	700	883	1017	1163	1409	1576	1846
		WITH FANS	360	493	565	931	1174	1353	1547	1874	2096	2455
47.08	12.3	THERMAL HP	271	371	425	700	883	1017	1163	1409	1576	1846
		WITH FANS	360	493	565	931	1174	1353	1547	1874	2096	2455
57.66	10.1	THERMAL HP	271	371	425	700	883	1017	1163	1409	1576	1846
		WITH FANS.	360	493	565	931	1174	1353	1547	1874	2096	2455
70.62	8.2	THERMAL HP	271	371	425	700	883	1017	1163	1409	1576	1846
		WITH FANS	360	493	565	931	1174	1353	1547	1874	2096	2455
86.50	6.7	THERMAL HP	271	371	425	700	883	1017	1163	1409	1576	1846
		WITH FANS	360	493	565	931	1174	1353	1547	1874	2096	2455

EXACT GEAR RATIO

NOMINAL GEAR RATIO	T7	T8	T9	T11	T12	T13	T15	T16	T18	T20
25.63	26.905	26.469	27.069	26.760	24.941	25.635	26.823	26.015	26.042	26.691
31.39	32.469	31.944	33.682	33.298	31.239	32.109	33.597	33.062	33.096	33.004
38.44	39.623	38.981	40.558	40.096	37.841	38.895	40.698	38.498	38.537	39.521
47.08	49.162	48.366	49.549	48.984	46.555	47.852	50.070	47.858	47.907	47.968
57.66	58.699	57.749	61.811	61.107	55.172	56.708	59.336	60.965	61.027	59.355
70.62	71.419	70.263	74.397	73.549	71.127	73.108	76.496	74.842	74.918	70.883
86.50	89.225	87.780	91.702	90.656	82.096	84.382	88.292	87.176	87.265	86.481

Type TDS
Parallel Shaft Speed Reducers
Triple Reduction

MECHANICAL CAPACITY

T22	T25	T28	T30	WT32	WT34	WT36	WT38	WT40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
313	**437**	**571**	**748**	**820**	**1137**	**1290**	**1426**	**1608**	**MECH HP**	22.6	25.63
873	1223	1687	2176	2282	3123	3486	3850	4383	TORQUE (X1000 IN. LBS.)		
261	**351**	**484**	**614**	**667**	**960**	**1058**	**1170**	**1309**	**MECH HP**	18.5	31.39
899	1232	1736	2169	2313	3725	3634	4014	4534	TORQUE (X1000 IN. LBS.)		
228	**292**	**399**	**503**	**537**	**831**	**889**	**983**	**1079**	**MECH HP**	15.1	38.44
920	1243	1758	2183	2357	3312	3747	4139	4587	TORQUE (X1000 IN. LBS.)		
190	**237**	**328**	**405**	**458**	**683**	**764**	**840**	**932**	**MECH HP**	12.3	47.08
945	1242	1808	2199	2341	3431	3798	4172	4671	TORQUE (X1000 IN. LBS.)		
153	**190**	**277**	**341**	**369**	**569**	**613**	**683**	**742**	**MECH HP**	10.1	57.66
958	1254	1837	2227	2354	3507	3882	4323	4737	TORQUE (X1000 IN. LBS.)		
128	**157**	**230**	**283**	**315**	**487**	**514**	**556**	**604**	**MECH HP**	8.2	70.62
973	1258	1874	2270	2420	3555	3996	4318	4736	TORQUE (X1000 IN. LBS.)		
111	**138**	**197**	**242**	**260**	**390**	**444**	**487**	**528**	**MECH HP**	6.7	86.50
975	1277	1870	2262	2460	3676	4023	4404	4826	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

T22	T25	T28	T30	WT32	WT34	WT36	WT38	WT40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
2091	**2367**	**2726**	**2858**	**2991**	**3064**	**3091**	**3070**	**2923**	**THERMAL HP**	22.6	25.63
2781	3148	3626	3801	3978	4075	4111	4083	3888	WITH FANS		
2094	**2370**	**2729**	**2861**	**2994**	**3068**	**3094**	**3074**	**2927**	**THERMAL HP**	18.5	31.39
2785	3152	3630	3805	3982	4080	4115	4088	3893	WITH FANS		
2094	**2370**	**2729**	**2861**	**2994**	**3068**	**3094**	**3074**	**2927**	**THERMAL HP**	15.1	38.44
2785	3152	3630	3805	3982	4080	4115	4088	3893	WITH FANS		
2094	**2370**	**2729**	**2861**	**2994**	**3068**	**3094**	**3074**	**2927**	**THERMAL HP**	12.3	47.08
2785	3152	3630	3805	3982	4080	4115	4088	3893	WITH FANS		
2094	**2370**	**2729**	**2861**	**2994**	**3068**	**3094**	**3074**	**2927**	**THERMAL HP**	10.1	57.66
2785	3152	3630	3805	3982	4080	4115	4088	3893	WITH FANS		
2094	**2370**	**2729**	**2861**	**2994**	**3068**	**3094**	**3074**	**2927**	**THERMAL HP**	8.2	70.62
2785	3152	3630	3805	3982	4080	4115	4088	3893	WITH FANS		
2094	**2370**	**2729**	**2861**	**2994**	**3068**	**3094**	**3074**	**2927**	**THERMAL HP**	6.7	86.50
2785	3152	3630	3805	3982	4080	4115	4088	3893	WITH FANS		

EXACT GEAR RATIO

T22	T25	T28	T30	WT32	WT34	WT36	WT38	WT40	NOMINAL GEAR RATIO
25.638	25.747	27.181	26.769	25.614	25.273	24.870	24.843	25.083	25.63
31.703	32.295	33.004	32.504	31.913	30.930	31.606	31.573	31.878	31.39
37.963	39.160	40.553	39.939	40.385	36.690	38.791	38.750	39.124	38.44
46.077	48.220	50.727	49.959	47.032	46.203	45.751	45.702	46.144	47.08
57.015	60.733	61.029	60.104	58.715	56.668	58.280	58.219	58.781	57.66
68.089	73.763	74.966	73.831	70.705	67.133	71.546	71.471	72.161	70.62
83.071	85.171	87.355	86.032	87.192	86.831	83.338	83.249	84.053	86.50

Type TDS
Parallel Shaft Speed Reducers
Quadruple Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	Q7	Q8	Q9	Q11	Q12	Q13	Q15	Q16	Q18	Q20
105.9	16.5	MECH HP	13	17	27	43	59	80	96	118	154	196
		TORQUE (X1000 IN. LBS.)	51	69	112	174	230	320	404	481	629	750
129.7	13.5	MECH HP	11	15	23	37	50	68	82	97	129	162
		TORQUE (X1000 IN. LBS.)	52	70	114	181	235	328	416	492	655	776
158.9	11.0	MECH HP	9.1	12	19	31	42	57	68	82	108	135
		TORQUE (X1000 IN. LBS.)	53	72	116	183	240	334	422	501	661	784
194.6	9.0	MECH HP	7.7	10	16	25	34	46	56	68	90	110
		TORQUE (X1000 IN. LBS.)	54	72	117	185	244	338	427	508	672	786
238.4	7.5	MECH HP	6.4	8.8	13	21	29	39	47	56	73	94
		TORQUE (X1000 IN. LBS.)	55	74	119	189	248	343	436	521	686	796
291.9	6.0	MECH HP	5.4	7.4	11	18	24	32	40	48	62	77
		TORQUE (X1000 IN. LBS.)	56	76	122	193	254	345	447	535	696	840
357.5	5.0	MECH HP	4.4	6.0	9.3	15	20	26	33	40	52	68
		TORQUE (X1000 IN. LBS.)	57	77	125	199	261	348	460	549	719	858

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		Q7	Q8	Q9	Q11	Q12	Q13	Q15	Q16	Q18	Q20
105.9	16.5	THERMAL HP	51	70	80	132	167	192	220	266	297	348
		WITH FANS	128	175	200	330	418	480	550	665	743	870
129.7	13.5	THERMAL HP	51	70	81	133	168	193	221	267	299	350
		WITH FANS	128	175	203	333	420	483	553	668	748	875
158.9	11.0	THERMAL HP	52	71	81	133	168	194	222	269	300	352
		WITH FANS	130	178	203	333	420	485	555	673	750	880
194.6	9.0	THERMAL HP	52	71	82	134	170	195	223	270	302	354
		WITH FANS	130	178	205	335	425	488	558	675	755	885
238.4	7.5	THERMAL HP	52	72	82	135	171	197	225	273	305	357
		WITH FANS	130	180	205	338	428	493	563	683	763	893
291.9	6.0	THERMAL HP	53	73	83	137	173	199	227	275	308	361
		WITH FANS	133	183	208	343	433	498	568	688	770	903
357.5	5.0	THERMAL HP	53	73	83	138	175	201	229	277	310	365
		WITH FANS	133	183	208	345	438	503	573	693	775	913

EXACT GEAR RATIO

NOMINAL GEAR RATIO	Q7	Q8	Q9	Q11	Q12	Q13	Q15	Q16	Q18	Q20
105.9	111.592	109.746	116.246	112.368	108.668	111.694	116.871	113.221	113.336	106.321
129.7	130.526	128.413	135.968	135.610	131.144	134.797	141.043	140.883	141.026	133.170
158.9	162.835	160.200	169.626	165.486	160.036	164.493	172.116	169.644	169.817	161.314
194.6	194.781	191.628	202.904	205.327	198.565	204.096	213.554	207.252	207.463	198.466
238.4	236.811	232.978	246.687	245.161	237.088	243.691	254.984	258.542	258.804	235.195
291.9	289.433	284.748	301.502	298.286	288.463	296.497	310.237	311.185	311.502	303.211
357.5	361.066	355.222	376.123	372.651	360.379	370.416	387.582	383.565	383.955	349.973

Type TDS
Parallel Shaft Speed Reducers
Quadruple Reduction

MECHANICAL CAPACITY

Q22	Q25	Q28	Q30	WQ32	WQ34	WQ36	WQ38	WQ40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
247	**310**	**439**	**557**	**598**	**887**	**938**	**1064**	**1178**	**MECH HP**	16.5	105.9
908	1235	1745	2180	2322	3272	3686	4036	4512	TORQUE (X1000 IN. LBS.)		
203	**250**	**358**	**445**	**493**	**742**	**789**	**887**	**962**	**MECH HP**	13.5	129.7
936	1248	1808	2214	2368	3381	3834	4220	4621	TORQUE (X1000 IN. LBS.)		
172	**209**	**309**	**381**	**414**	**636**	**670**	**731**	**793**	**MECH HP**	11.0	158.9
958	1264	1818	2207	2380	3472	3989	1217	4619	TORQUE (X1000 IN. LBS.)		
141	**171**	**253**	**307**	**342**	**532**	**557**	**604**	**656**	**MECH HP**	9.0	194.6
971	1272	1850	2211	2387	3527	3934	4291	4705	TORQUE (X1000 IN. LBS.)		
121	**145**	**200**	**241**	**278**	**439**	**460**	**492**	**517**	**MECH HP**	7.5	238.4
982	1278	1863	2211	2400	3603	4019	4402	4671	TORQUE (X1000 IN. LBS.)		
94	**113**	**164**	**199**	**232**	**377**	**384**	**409**	**429**	**MECH HP**	6.0	291.9
991	1284	1875	2241	2393	3695	4007	4443	4707	TORQUE (X1000 IN. LBS.)		
82	**99**	**142**	**174**	**195**	**318**	**322**	**356**	**387**	**MECH HP**	5.0	357.5
996	1299	1891	2283	2453	3799	4100	4472	4902	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

Q22	Q25	Q28	Q30	WQ32	WQ34	WQ36	WQ38	WQ40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
395	**447**	**515**	**540**	**565**	**579**	**584**	**580**	**553**	**THERMAL HP**	16.5	105.9
988	1118	1288	1350	1413	1448	1460	1450	1383	WITH FANS		
397	**449**	**518**	**543**	**568**	**582**	**587**	**583**	**555**	**THERMAL HP**	13.5	129.7
993	1123	1295	1358	1420	1455	1468	1458	1388	WITH FANS		
399	**452**	**520**	**546**	**571**	**585**	**590**	**586**	**558**	**THERMAL HP**	11.0	158.9
998	1130	1300	1365	1428	1463	1475	1465	1395	WITH FANS		
402	**455**	**524**	**549**	**575**	**589**	**594**	**590**	**562**	**THERMAL HP**	9.0	194.6
1005	1138	1310	1373	1438	1473	1485	1475	1405	WITH FANS		
405	**459**	**528**	**554**	**579**	**594**	**599**	**595**	**566**	**THERMAL HP**	7.5	238.4
1013	1148	1320	1385	1448	1485	1498	1488	1415	WITH FANS		
409	**463**	**533**	**599**	**585**	**600**	**605**	**601**	**572**	**THERMAL HP**	6.0	291.9
1023	1158	1333	1398	1463	1500	1513	1503	1430	WITH FANS		
413	**467**	**538**	**564**	**591**	**606**	**611**	**607**	**579**	**THERMAL HP**	5.0	357.5
1033	1168	1345	1410	1478	1515	1528	1518	1448	WITH FANS		

EXACT GEAR RATIO

Q22	Q25	Q28	Q30	WQ32	WQ34	WQ36	WQ38	WQ40	NOMINAL GEAR RATIO
102.133	110.644	110.365	108.694	107.825	102.377	109.108	105.323	106.344	105.9
127.924	138.586	140.261	138.138	133.350	126.593	134.936	132.114	133.390	129.7
154.961	167.877	163.321	160.848	159.652	151.590	161.551	160.195	161.742	158.9
190.648	206.536	203.030	199.956	193.802	183.993	196.108	197.260	199.164	194.6
225.931	244.760	258.633	254.717	239.761	227.667	242.612	248.447	250.846	238.4
291.268	315.543	317.503	312.696	286.355	271.887	289.761	301.751	304.678	291.9
336.188	364.205	369.830	364.231	349.353	331.714	353.509	348.421	351.785	357.5

Type TDS
Parallel Shaft Speed Reducers
Quadruple Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	Q7	Q8	Q9	Q11	Q12	Q13	Q15	Q16	Q18	Q20
105.9	11	MECH HP	8.9	12	18	30	41	56	67	83	108	138
		TORQUE (X1000 IN. LBS.)	53	72	116	182	240	335	422	503	659	790
129.7	9	MECH HP	7.7	10	16	25	34	47	56	67	88	111
		TORQUE (X1000 IN. LBS.)	54	73	117	183	240	339	425	510	669	796
158.9	7.5	MECH HP	6.3	8.6	13	21	29	39	47	57	74	94
		TORQUE (X1000 IN. LBS.)	55	74	120	187	250	346	436	521	677	816
194.6	6.0	MECH HP	5.4	7.3	11	17	24	31	38	48	63	78
		TORQUE (X1000 IN. LBS.)	56	76	123	194	252	341	437	535	699	833
238.4	5.0	MECH HP	4.5	6.1	9.4	15	20	26	33	39	52	68
		TORQUE (X1000 IN. LBS.)	58	77	125	198	255	341	453	550	719	858
291.9	4.0	MECH HP	3.8	5.0	7.9	12	17	22	28	33	44	54
		TORQUE (X1000 IN. LBS.)	59	77	129	203	267	351	468	561	735	886
357.5	3.2	MECH HP	3.1	4.0	6.5	10	14	17	23	27	36	47
		TORQUE (X1000 IN. LBS.)	60	78	132	209	271	352	480	564	754	890

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		Q7	Q8	Q9	Q11	Q12	Q13	Q15	Q16	Q18	Q20
105.9	11	THERMAL HP	90	124	142	233	294	339	388	470	525	615
		WITH FANS	173	238	273	447	564	651	745	902	1008	1181
129.7	9	THERMAL HP	91	124	142	235	296	341	390	472	528	618
		WITH FANS	175	238	273	451	568	655	749	906	1014	1187
158.9	7.5	THERMAL HP	91	125	143	236	298	343	392	475	531	622
		WITH FANS	175	240	275	453	572	659	753	912	1020	1194
194.6	6.0	THERMAL HP	92	126	144	238	300	345	395	479	535	627
		WITH FANS	177	242	276	457	576	662	758	920	1027	1204
238.4	5.0	THERMAL HP	93	127	146	240	303	348	398	483	540	633
		WITH FANS	179	244	280	461	582	668	764	927	1037	1215
291.9	4.0	THERMAL HP	94	129	147	243	306	352	403	488	546	640
		WITH FANS	180	248	282	467	588	676	774	937	1048	1229
357.5	3.2	THERMAL HP	95	131	149	246	309	356	407	493	552	647
		WITH FANS	182	252	286	472	593	684	781	947	1060	1242

EXACT GEAR RATIO

NOMINAL GEAR RATIO	Q7	Q8	Q9	Q11	Q12	Q13	Q15	Q16	Q18	Q20
105.9	111.592	109.746	116.246	112.368	108.668	111.694	116.871	113.221	113.336	106.321
129.7	130.526	128.413	135.968	135.610	131.144	134.797	141.043	140.883	141.026	133.170
158.9	162.835	160.200	169.626	165.486	160.036	164.493	172.116	169.644	169.817	161.314
194.6	194.781	191.628	202.904	205.327	198.565	204.096	213.554	207.252	207.463	198.466
238.4	236.811	232.978	246.687	245.161	237.088	243.691	254.984	258.542	258.804	235.195
291.9	289.433	284.748	301.502	298.286	288.463	296.497	310.237	311.185	311.502	303.211
357.5	361.066	355.222	376.123	372.651	360.379	370.416	387.582	383.565	383.955	349.973

Type TDS
Parallel Shaft Speed Reducers
Quadruple Reduction

MECHANICAL CAPACITY

Q22	Q25	Q28	Q30	WQ32	WQ34	WQ36	WQ38	WQ40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
174	**209**	**308**	**381**	**413**	**630**	**656**	**746**	**822**	**MECH HP**	11	105.9
957	1246	1831	2231	2401	3475	3856	4232	4708	TORQUE (X1000 IN. LBS.)		
141	**172**	**243**	**299**	**333**	**518**	**543**	**604**	**663**	**MECH HP**	9	129.7
971	1284	1836	2225	2392	3536	3947	4298	4767	TORQUE (X1000 IN. LBS.)		
118	**143**	**210**	**258**	**285**	**441**	**460**	**492**	**553**	**MECH HP**	7.5	158.9
983	1293	1848	2235	2448	3601	4003	4246	4815	TORQUE (X1000 IN. LBS.)		
96	**115**	**169**	**208**	**237**	**373**	**390**	**411**	**453**	**MECH HP**	6.0	194.6
990	1279	1848	2240	2470	3701	4122	4367	4864	TORQUE (X1000 IN. LBS.)		
82	**100**	**135**	**166**	**193**	**311**	**319**	**329**	**364**	**MECH HP**	5.0	238.4
996	1318	1881	2278	2494	3813	4163	4403	4916	TORQUE (X1000 IN. LBS.)		
64	**76**	**112**	**137**	**162**	**263**	**269**	**278**	**302**	**MECH HP**	4.0	291.9
1004	1292	1912	2316	2512	3855	4194	4523	4958	TORQUE (X1000 IN. LBS.)		
56	**66**	**96**	**119**	**135**	**218**	**222**	**242**	**263**	**MECH HP**	3.2	357.5
1009	1295	1921	2327	2532	3887	4229	4550	4988	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

Q22	Q25	Q28	Q30	WQ32	WQ34	WQ36	WQ38	WQ40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
698	**790**	**910**	**953**	**998**	**1022**	**1031**	**1025**	**975**	**THERMAL HP**	11	105.9
1340	1517	1747	1830	1916	1962	1980	1968	1872	WITH FANS		
701	**794**	**914**	**959**	**1003**	**1028**	**1037**	**1030**	**986**	**THERMAL HP**	9	129.7
1346	1524	1755	1841	1926	1974	1991	1978	1882	WITH FANS		
706	**799**	**920**	**964**	**1009**	**1034**	**1043**	**1036**	**986**	**THERMAL HP**	7.5	158.9
1356	1534	1766	1851	1937	1985	2003	1989	1893	WITH FANS		
711	**805**	**927**	**972**	**1017**	**1042**	**1051**	**1044**	**994**	**THERMAL HP**	6.0	194.6
1365	1546	1780	1866	1953	2001	2018	2004	1908	WITH FANS		
718	**812**	**935**	**981**	**1026**	**1051**	**1061**	**1054**	**1003**	**THERMAL HP**	5.0	238.4
1379	1559	1795	1884	1970	2018	2037	2024	1926	WITH FANS		
726	**821**	**946**	**992**	**1038**	**1063**	**1072**	**1065**	**1014**	**THERMAL HP**	4.0	291.9
1394	1576	1816	1905	1993	2041	2058	2045	1947	WITH FANS		
734	**830**	**957**	**1003**	**1049**	**1068**	**1083**	**1076**	**1028**	**THERMAL HP**	3.2	357.5
1409	1594	1837	1926	2014	2051	2079	2066	1974	WITH FANS		

EXACT GEAR RATIO

Q22	Q25	Q28	Q30	WQ32	WQ34	WQ36	WQ38	WQ40	NOMINAL GEAR RATIO
102.133	110.644	110.365	108.694	107.825	102.377	109.108	105.323	106.344	105.9
127.924	138.586	140.261	138.138	133.350	126.593	134.936	132.114	133.390	129.7
154.961	167.877	163.321	160.848	159.652	151.590	161.551	160.195	161.742	158.9
190.648	206.536	203.030	199.956	193.802	183.993	196.108	197.260	199.164	194.6
225.931	244.760	258.633	254.717	239.761	227.667	242.612	248.447	250.846	238.4
291.268	315.543	317.503	312.696	286.355	271.887	289.761	301.751	304.678	291.9
336.188	364.205	369.830	364.231	349.353	331.714	353.509	348.421	351.785	357.5

Type TDS
Parallel Shaft Speed Reducers
Quadruple Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	Q7	Q8	Q9	Q11	Q12	Q13	Q15	Q16	Q18	Q20
105.9	8.2	MECH HP	6.7	9.2	14	23	31	42	51	63	82	105
		TORQUE (X1000 IN. LBS.)	54	73	118	187	245	342	432	517	672	808
129.7	6.7	MECH HP	5.8	8.1	12	19	26	35	43	52	68	86
		TORQUE (X1000 IN. LBS.)	55	75	121	191	251	344	447	529	691	829
158.9	5.5	MECH HP	4.8	6.6	10	16	22	29	36	44	58	73
		TORQUE (X1000 IN. LBS.)	57	77	124	196	255	347	453	541	707	849
194.6	4.5	MECH HP	4.1	5.6	8.6	13	18	24	30	37	48	61
		TORQUE (X1000 IN. LBS.)	58	77	126	201	264	349	465	555	725	872
238.4	3.6	MECH HP	3.5	4.6	7.3	11	15	20	26	30	40	52
		TORQUE (X1000 IN. LBS.)	60	78	130	206	270	350	480	562	746	887
291.9	3.0	MECH HP	2.9	3.8	6.1	9.7	13	16	22	25	34	41
		TORQUE (X1000 IN. LBS.)	61	78	133	210	271	352	487	566	763	894
357.5	2.5	MECH HP	2.4	3.0	5.0	8.0	10	13	18	21	28	35
		TORQUE (X1000 IN. LBS.)	63	78	136	216	273	357	500	573	782	897

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		Q7	Q8	Q9	Q11	Q12	Q13	Q15	Q16	Q18	Q20
105.9	8.2	THERMAL HP	138	189	216	355	449	516	590	716	800	937
		WITH FANS	224	306	350	575	727	836	956	1160	1296	1518
129.7	6.7	THERMAL HP	138	190	217	357	451	519	593	719	804	942
		WITH FANS	224	308	352	578	731	841	961	1165	1302	1526
158.9	5.5	THERMAL HP	139	191	218	359	454	522	597	724	809	948
		WITH FANS	225	309	353	582	735	846	967	1173	1311	1536
194.6	4.5	THERMAL HP	140	192	220	362	457	526	602	729	815	955
		WITH FANS	227	311	356	586	740	852	975	1181	1320	1547
238.4	3.6	THERMAL HP	142	194	222	365	461	531	607	735	822	963
		WITH FANS	230	314	360	591	747	860	983	1191	1332	1560
291.9	3.0	THERMAL HP	143	196	224	369	466	536	614	744	831	974
		WITH FANS	232	318	363	598	755	868	995	1205	1346	1578
357.5	2.5	THERMAL HP	143	196	226	373	471	541	621	753	840	985
		WITH FANS	232	318	366	604	763	876	1006	1220	1361	1596

EXACT GEAR RATIO

NOMINAL GEAR RATIO	Q7	Q8	Q9	Q11	Q12	Q13	Q15	Q16	Q18	Q20
105.9	111.592	109.746	116.246	112.368	108.668	111.694	116.871	113.221	113.336	106.321
129.7	130.526	128.413	135.968	135.610	131.144	134.797	141.043	140.883	141.026	133.170
158.9	162.835	160.200	169.626	165.486	160.036	164.493	172.116	169.644	169.817	161.314
194.6	194.781	191.628	202.904	205.327	198.565	204.096	213.554	207.252	207.463	198.466
238.4	236.811	232.978	246.687	245.161	237.088	243.691	254.984	258.542	258.804	235.195
291.9	289.433	284.748	301.502	298.286	288.463	296.497	310.237	311.185	311.502	303.211
357.5	361.066	355.222	376.123	372.651	360.379	370.416	387.582	383.565	383.955	349.973

Type TDS
Parallel Shaft Speed Reducers
Quadruple Reduction

MECHANICAL CAPACITY

Q22	Q25	Q28	Q30	WQ32	WQ34	WQ36	WQ38	WQ40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
132	**160**	**230**	**283**	**306**	**480**	**501**	**572**	**621**	**MECH HP**	8.2	105.9
976	1281	1839	2228	2390	3559	3960	4367	4784	TORQUE (X1000 IN. LBS.)		
106	**129**	**183**	**225**	**251**	**399**	**414**	**461**	**501**	**MECH HP**	6.7	129.7
987	1291	1859	2252	2425	3661	4047	4416	4840	TORQUE (X1000 IN. LBS.)		
88	**107**	**156**	**196**	**214**	**342**	**353**	**384**	**417**	**MECH HP**	5.5	158.9
993	1300	1846	2287	2475	3755	4131	4457	4884	TORQUE (X1000 IN. LBS.)		
72	**87**	**128**	**158**	**176**	**288**	**291**	**315**	**342**	**MECH HP**	4.5	194.6
1000	1309	1883	2289	2471	3840	4134	4498	4930	TORQUE (X1000 IN. LBS.)		
61	**74**	**101**	**124**	**145**	**235**	**240**	**252**	**274**	**MECH HP**	3.6	238.4
1005	1316	1892	2288	2524	3874	4215	4542	4979	TORQUE (X1000 IN. LBS.)		
48	**58**	**84**	**103**	**123**	**198**	**202**	**209**	**227**	**MECH HP**	3.0	291.9
1013	1326	1930	2338	2541	3901	4245	4578	5018	TORQUE (X1000 IN. LBS.)		
42	**51**	**72**	**89**	**100**	**164**	**167**	**182**	**198**	**MECH HP**	2.5	357.5
1017	1334	1939	2350	2531	3931	4277	4603	5046	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

Q22	Q25	Q28	Q30	WQ32	WQ34	WQ36	WQ38	WQ40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
1063	**1203**	**1386**	**1453**	**1520**	**1558**	**1571**	**1561**	**1486**	**THERMAL HP**	8.2	105.9
1722	1949	2245	2354	2462	2524	2545	2529	2407	WITH FANS		
1069	**1210**	**1393**	**1460**	**1528**	**1566**	**1579**	**1569**	**1494**	**THERMAL HP**	6.7	129.7
1732	1960	2257	2365	2475	2537	2558	2542	2420	WITH FANS		
1075	**1217**	**1401**	**1469**	**1523**	**1575**	**1589**	**1578**	**1503**	**THERMAL HP**	5.5	158.9
1742	1972	2270	2380	2467	2552	2574	2556	2435	WITH FANS		
1083	**1226**	**1412**	**1480**	**1549**	**1587**	**1601**	**1590**	**1514**	**THERMAL HP**	4.5	194.6
1754	1986	2287	2398	2509	2571	2594	2576	2453	WITH FANS		
1093	**1237**	**1425**	**1493**	**1563**	**1601**	**1615**	**1604**	**1527**	**THERMAL HP**	3.6	238.4
1771	2004	2309	2419	2532	2594	2616	2598	2474	WITH FANS		
1105	**1251**	**1440**	**1510**	**1580**	**1619**	**1633**	**1622**	**1544**	**THERMAL HP**	3.0	291.9
1790	2027	2333	2446	2560	2623	2645	2628	2501	WITH FANS		
1117	**1265**	**1455**	**1527**	**1597**	**1638**	**1651**	**1640**	**1565**	**THERMAL HP**	2.5	357.5
1810	2049	2357	2474	2587	2654	2675	2657	2535	WITH FANS		

EXACT GEAR RATIO

Q22	Q25	Q28	Q30	WQ32	WQ34	WQ36	WQ38	WQ40	NOMINAL GEAR RATIO
102.133	110.644	110.365	108.694	107.825	102.377	109.108	105.323	106.344	105.9
127.924	138.586	140.261	138.138	133.350	126.593	134.936	132.114	133.390	129.7
154.961	167.877	163.321	160.848	159.652	151.590	161.551	160.195	161.742	158.9
190.648	206.536	203.030	199.956	193.802	183.993	196.108	197.260	199.164	194.6
225.931	244.760	258.633	254.717	239.761	227.667	242.612	248.447	250.846	238.4
291.268	315.543	317.503	312.696	286.355	271.887	289.761	301.751	304.678	291.9
336.188	364.205	369.830	364.231	349.353	331.714	353.509	348.421	351.785	357.5

Type TDS
Parallel Shaft Speed Reducers
Quadruple Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	Q7	Q8	Q9	Q11	Q12	Q13	Q15	Q16	Q18	Q20
105.9	6.8	MECH HP	5.7	7.8	12	19	26	35	43	53	69	88
		TORQUE (X1000 IN. LBS.)	56	75	121	191	251	344	440	525	685	818
129.7	5.6	MECH HP	5.0	6.8	10	16	22	29	37	44	57	73
		TORQUE (X1000 IN. LBS.)	57	77	124	196	257	346	453	541	704	849
158.9	4.5	MECH HP	4.0	5.5	8.6	14	19	24	31	37	49	62
		TORQUE (X1000 IN. LBS.)	58	77	127	201	263	348	464	554	724	870
194.6	3.7	MECH HP	3.5	4.6	7.3	11	15	19	25	31	41	51
		TORQUE (X1000 IN. LBS.)	60	77	130	206	270	351	476	562	743	887
238.4	3.0	MECH HP	2.9	3.8	6.2	9.8	13	16	22	25	34	43
		TORQUE (X1000 IN. LBS.)	61	78	133	210	271	352	487	566	763	885
291.9	2.5	MECH HP	2.5	3.1	5.1	8.3	11	13	18	21	29	34
		TORQUE (X1000 IN. LBS.)	62	78	135	215	272	355	498	571	780	898
357.5	2.0	MECH HP	2.0	2.6	4.3	6.8	8.9	11	15	17	24	30
		TORQUE (X1000 IN. LBS.)	64	81	140	221	281	367	512	590	801	917

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		Q7	Q8	Q9	Q11	Q12	Q13	Q15	Q16	Q18	Q20
105.9	6.8	THERMAL HP	187	256	292	482	608	700	801	971	1085	1271
		WITH FANS	275	376	429	709	894	1029	1177	1427	1595	1868
129.7	5.6	THERMAL HP	187	256	293	483	609	701	802	972	1087	1273
		WITH FANS	275	376	431	710	895	1030	1179	1429	1598	1871
158.9	4.5	THERMAL HP	187	257	293	484	610	702	803	973	1088	1275
		WITH FANS	275	378	431	711	897	1032	1180	1430	1599	1874
194.6	3.7	THERMAL HP	188	257	294	484	611	703	805	975	1090	1277
		WITH FANS	276	378	432	711	898	1033	1183	1433	1602	1877
238.4	3.0	THERMAL HP	188	258	294	486	613	705	806	977	1093	1280
		WITH FANS	276	379	432	714	901	1036	1185	1436	1607	1882
291.9	2.5	THERMAL HP	189	258	295	487	614	707	809	980	1096	1284
		WITH FANS	278	379	434	716	903	1039	1189	1441	1611	1887
357.5	2.0	THERMAL HP	189	259	295	487	615	709	811	983	1099	1287
		WITH FANS	278	381	434	716	904	1042	1192	1445	1616	1892

EXACT GEAR RATIO

NOMINAL GEAR RATIO	Q7	Q8	Q9	Q11	Q12	Q13	Q15	Q16	Q18	Q20
105.9	111.592	109.746	116.246	112.368	108.668	111.694	116.871	113.221	113.336	106.321
129.7	130.526	128.413	135.968	135.610	131.144	134.797	141.043	140.883	141.026	133.170
158.9	162.835	160.200	169.626	165.486	160.036	164.493	172.116	169.644	169.817	161.314
194.6	194.781	191.628	202.904	205.327	198.565	204.096	213.554	207.252	207.463	198.466
238.4	236.811	232.978	246.687	245.161	237.088	243.691	254.984	258.542	258.804	235.195
291.9	289.433	284.748	301.502	298.286	288.463	296.497	310.237	311.185	311.502	303.211
357.5	361.066	355.222	376.123	372.651	360.379	370.416	387.582	383.565	383.955	349.973

Type TDS
Parallel Shaft Speed Reducers
Quadruple Reduction

MECHANICAL CAPACITY

Q22	Q25	Q28	Q30	WQ32	WQ34	WQ36	WQ38	WQ40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
110	**132**	**193**	**238**	**261**	**407**	**429**	**478**	**519**	**MECH HP**	6.8	105.9
986	1278	1865	2264	2459	3649	4097	4408	4831	TORQUE (X1000 IN. LBS.)		
89	**106**	**153**	**188**	**213**	**339**	**338**	**385**	**418**	**MECH HP**	5.6	129.7
993	1286	1878	2273	2482	3760	3992	4456	4883	TORQUE (X1000 IN. LBS.)		
74	**88**	**132**	**162**	**179**	**289**	**291**	**321**	**348**	**MECH HP**	4.5	158.9
999	1293	1887	2281	2502	3859	4115	4494	4926	TORQUE (X1000 IN. LBS.)		
60	**73**	**107**	**132**	**149**	**240**	**245**	**263**	**285**	**MECH HP**	3.7	194.6
1006	1317	1902	2310	2522	3870	4206	4534	4971	TORQUE (X1000 IN. LBS.)		
51	**62**	**84**	**105**	**121**	**196**	**200**	**210**	**229**	**MECH HP**	3.0	238.4
1011	1323	1902	2337	2543	3903	4247	4577	5017	TORQUE (X1000 IN. LBS.)		
40	**49**	**70**	**86**	**102**	**165**	**169**	**175**	**190**	**MECH HP**	2.5	291.9
1019	1344	1945	2345	2559	3930	4275	4625	5071	TORQUE (X1000 IN. LBS.)		
35	**43**	**62**	**76**	**86**	**139**	**142**	**155**	**169**	**MECH HP**	2.0	357.5
1040	1374	1998	2421	2639	4024	4408	4736	5193	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

Q22	Q25	Q28	Q30	WQ32	WQ34	WQ36	WQ38	WQ40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
1442	**1632**	**1880**	**1971**	**2062**	**2113**	**2131**	**2117**	**2016**	**THERMAL HP**	6.8	105.9
2119	2399	2764	2897	3031	3106	3133	3112	2964	WITH FANS		
1444	**1634**	**1883**	**1973**	**2065**	**2116**	**2134**	**2120**	**2018**	**THERMAL HP**	5.6	129.7
2123	2402	2767	2900	3036	3111	3137	3116	2966	WITH FANS		
1446	**1637**	**1885**	**1976**	**2068**	**2119**	**2137**	**2123**	**2021**	**THERMAL HP**	4.5	158.9
2126	2406	2771	2905	3040	3115	3141	3121	2971	WITH FANS		
1449	**1640**	**1889**	**1980**	**2072**	**2123**	**2141**	**2127**	**2025**	**THERMAL HP**	3.7	194.6
2130	2411	2777	2911	3046	3121	3147	3127	2977	WITH FANS		
1452	**1644**	**1893**	**1984**	**2077**	**2128**	**2146**	**2132**	**2030**	**THERMAL HP**	3.0	238.4
2134	2417	2783	2916	3053	3128	3155	3134	2984	WITH FANS		
1456	**1648**	**1898**	**1990**	**2082**	**2133**	**2152**	**2138**	**2035**	**THERMAL HP**	2.5	291.9
2140	2423	2790	2925	3061	3136	3163	3143	2991	WITH FANS		
1461	**1652**	**1903**	**1996**	**2087**	**2138**	**2158**	**2144**	**2042**	**THERMAL HP**	2.0	357.5
2147	2428	2797	2934	3068	3143	3172	3152	3002	WITH FANS		

EXACT GEAR RATIO

Q22	Q25	Q28	Q30	WQ32	WQ34	WQ36	WQ38	WQ40	NOMINAL GEAR RATIO
102.133	110.644	110.365	108.694	107.825	102.377	109.108	105.323	106.344	105.9
127.924	138.586	140.261	138.138	133.350	126.593	134.936	132.114	133.390	129.7
154.961	167.877	163.321	160.848	159.652	151.590	161.551	160.195	161.742	158.9
190.648	206.536	203.030	199.956	193.802	183.993	196.108	197.260	199.164	194.6
225.931	244.760	258.633	254.717	239.761	227.667	242.612	248.447	250.846	238.4
291.268	315.543	317.503	312.696	286.355	271.887	289.761	301.751	304.678	291.9
336.188	364.205	369.830	364.231	349.353	331.714	353.509	348.421	351.785	357.5

Type TDS
Parallel Shaft Speed Reducers
Quadruple Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	Q7	Q8	Q9	Q11	Q12	Q13	Q15	Q16	Q18	Q20
105.9	5.5	MECH HP	4.7	6.4	9.9	16	22	29	36	44	57	73
		TORQUE (X1000 IN. LBS.)	57	77	125	196	258	347	457	541	702	843
129.7	4.5	MECH HP	4.1	5.5	8.6	13	18	24	30	36	47	60
		TORQUE (X1000 IN. LBS.)	58	77	127	201	264	349	465	551	720	868
158.9	3.7	MECH HP	3.4	4.4	7.1	11	15	19	25	31	40	51
		TORQUE (X1000 IN. LBS.)	60	78	131	206	270	351	476	563	738	888
194.6	3.0	MECH HP	2.9	3.8	6.1	9.5	12	16	21	25	34	41
		TORQUE (X1000 IN. LBS.)	61	78	133	211	271	353	489	566	763	893
238.4	2.4	MECH HP	2.4	3.1	5.1	8.1	10	13	18	20	28	35
		TORQUE (X1000 IN. LBS.)	63	78	135	216	273	356	499	574	783	894
291.9	2.0	MECH HP	2.0	2.6	4.3	6.8	9.0	11	15	17	24	28
		TORQUE (X1000 IN. LBS.)	63	81	140	221	281	367	511	591	801	928
357.5	1.7	MECH HP	1.7	2.2	3.5	5.6	7.4	9.4	12	14	19	25
		TORQUE (X1000 IN. LBS.)	66	83	143	227	290	380	525	610	821	949

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		Q7	Q8	Q9	Q11	Q12	Q13	Q15	Q16	Q18	Q20
105.9	5.5	THERMAL HP	271	371	425	700	883	1017	1163	1409	1576	1846
		WITH FANS	360	493	565	931	1174	1353	1547	1874	2096	2455
129.7	4.5	THERMAL HP	271	371	425	700	883	1017	1163	1409	1576	1846
		WITH FANS	360	493	565	931	1174	1353	1547	1874	2096	2455
158.9	3.7	THERMAL HP	271	371	425	700	883	1017	1163	1409	1576	1846
		WITH FANS	360	493	565	931	1174	1353	1547	1874	2096	2455
194.6	3.0	THERMAL HP	271	371	425	700	883	1017	1163	1409	1576	1846
		WITH FANS	360	493	565	931	1174	1353	1547	1874	2096	2455
238.4	2.4	THERMAL HP	271	371	425	700	883	1017	1163	1409	1576	1846
		WITH FANS	360	493	565	931	1174	1353	1547	1874	2096	2455
291.9	2.0	THERMAL HP	271	371	425	700	883	1017	1163	1409	1576	1846
		WITH FANS	360	493	565	931	1174	1353	1547	1874	2096	2455
357.5	1.7	THERMAL HP	271	371	425	700	883	1017	1163	1409	1576	1846
		WITH FANS	360	493	565	931	1174	1353	1547	1874	2096	2455

EXACT GEAR RATIO

NOMINAL GEAR RATIO	Q7	Q8	Q9	Q11	Q12	Q13	Q15	Q16	Q18	Q20
105.9	111.592	109.746	116.246	112.368	108.668	111.694	116.871	113.221	113.336	106.321
129.7	130.526	128.413	135.968	135.610	131.144	134.797	141.043	140.883	141.026	133.170
158.9	162.835	160.200	169.626	165.486	160.036	164.493	172.116	169.644	169.817	161.314
194.6	194.781	191.628	202.904	205.327	198.565	204.096	213.554	207.252	207.463	198.466
238.4	236.811	232.978	246.687	245.161	237.088	243.691	254.984	258.542	258.804	235.195
291.9	289.433	284.748	301.502	298.286	288.463	296.497	310.237	311.185	311.502	303.211
357.5	361.066	355.222	376.123	372.651	360.379	370.416	387.582	383.565	383.955	349.973

Type TDS
Parallel Shaft Speed Reducers
Quadruple Reduction

MECHANICAL CAPACITY

Q22	Q25	Q28	Q30	WQ32	WQ34	WQ36	WQ38	WQ40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
89	**108**	**156**	**192**	**212**	**338**	**350**	**389**	**422**	**MECH HP**	5.5	105.9
993	1299	1871	2268	2483	3762	4144	4454	4881	TORQUE (X1000 IN. LBS.)		
72	**87**	**125**	**154**	**173**	**280**	**285**	**313**	**340**	**MECH HP**	4.5	129.7
1000	1309	1905	2307	2505	3845	4183	4499	4931	TORQUE (X1000 IN. LBS.)		
60	**72**	**107**	**132**	**145**	**235**	**240**	**261**	**283**	**MECH HP**	3.7	158.9
1006	1317	1899	2307	2524	3814	4215	4536	4972	TORQUE (X1000 IN. LBS.)		
49	**59**	**87**	**106**	**121**	**195**	**199**	**213**	**232**	**MECH HP**	3.0	194.6
1013	1326	1919	2303	2543	3904	4247	4574	5014	TORQUE (X1000 IN. LBS.)		
41	**50**	**70**	**86**	**99**	**159**	**163**	**172**	**187**	**MECH HP**	2.4	238.4
1018	1330	1954	2368	2571	3935	4293	4642	5089	TORQUE (X1000 IN. LBS.)		
33	**41**	**58**	**72**	**85**	**137**	**140**	**146**	**159**	**MECH HP**	2.0	291.9
1052	1390	2001	2445	2646	4036	4420	4793	5255	TORQUE (X1000 IN. LBS.)		
29	**36**	**51**	**63**	**72**	**116**	**119**	**130**	**141**	**MECH HP**	1.7	357.5
1076	1425	2050	2505	2733	4169	4566	4906	5380	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

Q22	Q25	Q28	Q30	WQ32	WQ34	WQ36	WQ38	WQ40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
2094	**2370**	**2729**	**2861**	**2994**	**3068**	**3094**	**3074**	**2927**	**THERMAL HP**	5.5	105.9
2785	3152	3630	3805	3982	4080	4115	4088	3893	WITH FANS		
2094	**2370**	**2729**	**2861**	**2994**	**3068**	**3094**	**3074**	**2927**	**THERMAL HP**	4.5	129.7
2785	3152	3630	3805	3982	4080	4115	4088	3893	WITH FANS		
2094	**2370**	**2729**	**2861**	**2994**	**3068**	**3094**	**3074**	**2927**	**THERMAL HP**	3.7	158.9
2785	3152	3630	3805	3982	4080	4115	4088	3893	WITH FANS		
2094	**2370**	**2729**	**2861**	**2994**	**3068**	**3094**	**3074**	**2927**	**THERMAL HP**	3.0	194.6
2785	3152	3630	3805	3982	4080	4115	4088	3893	WITH FANS		
2094	**2370**	**2729**	**2861**	**2994**	**3068**	**3094**	**3074**	**2927**	**THERMAL HP**	2.4	238.4
2785	3152	3630	3805	3982	4080	4115	4088	3893	WITH FANS		
2094	**2370**	**2729**	**2861**	**2994**	**3068**	**3094**	**3074**	**2927**	**THERMAL HP**	2.0	291.9
2785	3152	3630	3805	3982	4080	4115	4088	3893	WITH FANS		
2094	**2370**	**2729**	**2861**	**2994**	**3068**	**3094**	**3074**	**2927**	**THERMAL HP**	1.7	357.5
2785	3152	3630	3805	3982	4080	4115	4088	3893	WITH FANS		

EXACT GEAR RATIO

Q22	Q25	Q28	Q30	WQ32	WQ34	WQ36	WQ38	WQ40	NOMINAL GEAR RATIO
102.133	110.644	110.365	108.694	107.825	102.377	109.108	105.323	106.344	105.9
127.924	138.586	140.261	138.138	133.350	126.593	134.936	132.114	133.390	129.7
154.961	167.877	163.321	160.848	159.652	151.590	161.551	160.195	161.742	158.9
190.648	206.536	203.030	199.956	193.802	183.993	196.108	197.260	199.164	194.6
225.931	244.760	258.633	254.717	239.761	227.667	242.612	248.447	250.846	238.4
291.268	315.543	317.503	312.696	286.355	271.887	289.761	301.751	304.678	291.9
336.188	364.205	369.830	364.231	349.353	331.714	353.509	348.421	351.785	357.5

Type TDS
Parallel Shaft Speed Reducers

NOTES

Type TDS
Parallel Shaft Speed Reducers
Additional Thermal Capacity

A. Increased Thermal Rating Capacity by fan Cooling

Cooling fans mounted externally on the extensions of a double extended high speed shaft provide a method of increasing the heat dissipation of the gear housing thereby permitting increased thermal ratings.

Thermal Ratings with Fans are shown in the Selection Tables (Section 310).

B. Increased Thermal Rating Capacity by Water Cooling

If the required thermal rating is beyond the range of cooling fans, a circulating lube oil system will be required. This method requires the user to supply cooling water for removal of excess heat.

The circulating lube oil system includes — shaft driven lube oil pump, oil to water heat exchanger (for 85°F max. water temp. fouling factor .001) cleanable oil strainer, flow switch, necessary pipe and pipe fittings to provide a complete assembly.

For thermal increase greater than shown, refer to Nuttall Gear. If cooling water is not available, oil-to-air heat exchangers can be furnished. Refer to Nuttall Gear.

ADDITIONAL THERMAL HORSEPOWER CAPACITY

INPUT SPEED	REDUC.	COOLING UNIT SIZES 1	2	3	4	5	6
1750	Single	979		2080		4282	
	Double	469		1040		2141	
	Triple	326		693		1427	
	Quadruple	245		520		1071	
1170	Single		734		1346	2814	
	Double		367		673	1407	
	Triple		245		449	938	
870	Single		489		979		2202
	Double		245		489		1101
	Triple		163		326		734
720	Single		489		734		1713
	Double		245		367		856
580	Single		367		612		1468
	Double		184		306		734

WATER FLOW REQUIRED ①

1750	All Reductions	8	17	35
1170		6	11	23
870		4	8	18
720		4	6	14
580		3	5	12

① In GPM with a maximum temperature of 85°F.

SELECTION OF PUMP AND COOLER UNITS

1. Determine the thermal horsepower capacity that is required. This is usually the horsepower rating of the prime mover.
2. Use the rating tables (Section 310) to determine the thermal capacity of the selected unit (the rating without fans).
3. Subtracting the unit's thermal rating from the thermal requirement results in the additional cooling that is needed.
4. In the Cooling Capacity Table, locate the input speed in the far left column, and within that speed group, select the number of reductions — single, double, triple, or quadruple. Reading to the right on the appropriate line, select the first size that **exceeds** the additional cooling needed.
5. Determine the water flow required for the unit selected, using the adjacent table, and insure that there is an adequate supply available. Please refer to Nuttall Gear for application assistance.

Type TDS
Parallel Shaft Speed Reducers
Backstop Ratings

Backstops are required for applications in which rotation in one direction must be prevented — for example, on conveyor drives.

The instant the shaft attempts to change direction, the backstop sprags grip, thereby preventing reverse rotation. This action is fully automatic.

A backstop is generally located on the end of the reducer high speed shaft opposite the motor. If space limitations prevent normal mounting, the backstop can be mounted on an intermediate shaft extension.

BACKSTOP SELECTION TABLE		
MODEL No.	MAX. RPM	TORQUE RATING
B20	2900	3,600
B50	2650	12,000
B80	2300	26,400
B110	2000	48,000
B120	1800	81,600
B130	1400	138,000
B150	1300	216,000

SELECTION

1. Calculate the required torque. Use the formula:

$$T = \frac{63{,}000 \times \text{Motor HP}}{\text{Input Speed}}$$

   Formula must be modified if the backstop is mounted on a shaft other than the input shaft.

2. Refer to the backstop selection table and read down the column until the listed torque rating is equal to or greater than the required torque calculated in step 1. Read to the left to determine the model number of the required backstop.

3. The maximum allowable backstop speed must be equal to or greater than the speed of the shaft upon which the backstop is mounted. If this is not the case, refer to Nuttall Gear.

4. Specify the direction of rotation of the reducer output shaft when ordering a backstop (clockwise or counter-clockwise when facing the end of the low speed shaft).

Type TDS
Parallel Shaft Speed Reducers
WK²

NOM. GEAR RATIO	UNIT SIZE 7	8	9	11	12	13	15	16	18	20	22	25	28	30
SINGLE REDUCTION														
1.225	3.38	7.83	13.4	26.5	50.5	71.9	117.2	192	275					
1.500	3.16	6.15	10.99	21.6	42.1	58.4	96.4	154	227	362	499	967	1408	2067
1.837	2.41	4.79	8.51	17.5	33.2	47.0	74.6	122	176	289	404	590	1087	1592
2.250	2.03	3.97	6.82	13.9	25.6	38.9	59.6	99.8	141	226	336	473	823	1218
2.756	1.57	3.07	5.3	10.7	21.4	29.9	49.4	79.5	117	180	191	362	609	930
3.375	1.17	2.35	4.0	8.6	16.4	23.4	36.9	55.3	87.7	112	146	215	450	555
4.134	.90	1.88	3.1	6.6	13.0	18.9	28.5	48.4	67.9	78.5	117	171	277	398
5.060	.74	1.44	2.6	5.4	9.8	13.4	23.3	36.9	55.7	59.6	86.3	161	255	347
DOUBLE REDUCTION														
6.20	.74	1.76	3.0	6.0	11.2	19.4	24.2	38.7	51.0	77.5	113	171	354	408
7.59	.53	1.26	2.1	4.2	8.2	14.1	17.2	29.7	37.8	56.9	84.3	121	256	290
9.30	.40	.96	1.7	3.3	6.4	10.8	13.0	20.7	27.7	41.4	66.5	90.2	195	218
11.39	.31	.72	1.2	2.5	4.8	8.1	9.7	15.9	19.9	33.8	48.7	71.4	157	174
13.95	.22	.56	.93	1.8	3.6	6.0	7.1	11.9	15.3	25.3	37.1	50.5	114	125
17.09	.17	.40	.68	1.3	2.8	4.6	5.5	8.7	11.4	19.9	29.7	37.5	86.1	93.8
20.93	.13	.33	.53	1.1	2.1	3.8	4.5	6.7	9.2	15.3	21.4	29.9	70.0	76.0
TRIPLE REDUCTION														
25.63	.22	.31	.66	.94	2.2	3.0	3.3	5.8	6.4	13.2	23.5	28.5	58.6	79.3
31.39	.17	.24	.49	.67	1.5	2.1	2.3	4.2	4.5	9.5	16.6	20.0	43.2	57.7
38.44	.13	.18	.38	.51	1.2	1.6	1.8	3.4	3.6	7.4	12.5	14.9	31.6	41.7
47.08	.10	.14	.29	.38	.88	1.2	1.3	2.5	2.7	5.5	9.3	10.9	22.8	29.7
57.66	.08	.11	.22	.28	.69	.92	1.1	1.9	2.0	4.0	6.7	7.9	17.5	22.7
70.62	.07	.09	.17	.22	.50	.67	.78	1.4	1.5	3.1	5.1	6.0	13.2	17.1
86.50	.06	.07	.13	.17	.42	.56	.67	1.2	1.3	2.4	4.2	4.9	10.8	14.0
QUADRUPLE REDUCTION														
105.9	.07	.09	.19	.26	.36	.41	.45	.99	1.0	2.5	3.3	3.6	8.5	9.6
129.7	.06	.09	.17	.21	.28	.31	.33	.70	.74	1.8	2.3	2.5	5.8	6.5
158.9	.06	.08	.15	.16	.21	.23	.25	.53	.55	1.4	1.7	1.8	4.6	5.1
194.6	.05	.07	.12	.13	.16	.17	.18	.40	.41	1.1	1.3	1.4	3.3	3.7
238.4	.05	.07	.09	.10	.13	.13	.15	.29	.30	.85	1.0	1.1	2.4	2.6
291.9	.05	.06	.07	.08	.10	.10	.11	.22	.23	.65	.74	.78	1.8	1.9
357.5	.05	.05	.06	.07	.08	.08	.08	.17	.18	.56	.63	.65	1.5	1.6

NOM. GEAR RATIO	UNIT SIZE 32	34	36	38	40
DOUBLE REDUCTION					
6.20	698	922	1471	1601	1652
7.59	512	692	931	1017	1050
9.30	371	545	718	777	800
11.39	281	328	513	553	569
13.95	187	242	352	378	388
17.09	129	190	263	281	288
20.93	96.3	141	230	241	245
TRIPLE REDUCTION					
25.63	102	142	213	221	224
31.39	73.7	105	149	154	156
38.44	52.6	81.7	111	114	116
47.08	42.5	59.1	88.3	90.6	91.6
57.66	31.6	44.8	63.4	64.9	65.4
70.62	24.9	35.9	48.2	49.2	49.6
86.50	19.2	26.0	39.6	40.3	40.6
QUADRUPLE REDUCTION					
105.9	16.2	20.7	24.4	31.3	31.5
129.7	11.7	14.6	17.0	21.9	22.1
158.9	9.0	11.1	12.7	16.4	16.5
194.6	6.8	8.2	9.3	12.4	12.4
238.4	5.1	5.6	6.7	8.8	8.9
291.9	4.0	4.7	5.2	6.8	6.8
357.5	3.2	3.6	3.9	5.7	5.7

The WK² values listed are in pound-feet² at the high speed shaft. These values include rotating parts of the standard reducer but do not include values for couplings, clutches, fans, brake wheels or other external devices. Special ratios, extended shafts and shaft driven pumps will also affect actual values, and can be calculated at time of order engineering, if required.

Type TDS
Parallel Shaft Speed Reducers
Overhung Load Ratings

Overhung Load Capacities
When a pulley, sprocket or pinion is to be mounted on the input or output shaft of a reducer, the overhung load capacity of the reducer must be checked. The magnitude of the overhung load varies with the type of connection and its location from the shaft bearing. Use the following overhung load formula after selecting appropriate Lc and Lf factors from the tables.

Overhung Load Formula

$$\text{OHL (lbs)} = \frac{\text{Motor Hp} \times 126{,}000 \times \text{Lc}}{\text{Shaft RPM} \times \text{Pitch Diameter (Inches)} \times \text{Lf}}$$

Compare the calculated overhung load with the overhung load table applicable to the reducer type, size and shaft. If the calculated overhung load is greater than that listed, contact Nuttall Gear.

Load Connection Factor • Lc

Type of Load Connection	Factor, Lc
Sprocket	1.00
Pinion	1.25
V-Belt	1.50
Flat Belt	2.50

Load Location Factor • Lf
See table below for low speed shafts. For high speed shaft, use Lf of 1.00 unless load location is outboard of shaft midpoint, then contact Nuttall Gear.

EXAMPLE

A belt conveyor is to be driven by a T11 reducer at 68 RPM, and requires 100 Hp. A sprocket with a 12 inch pitch diameter is mounted 4 inches from the end cap.

Calculate the overhung load.

Lc = 1.00 from table
Lf = .99 from table

$$\frac{100 \times 126{,}000 \times 1.00}{68 \times 12 \times .99} = 15{,}597 \text{ lbs.}$$

Refer to the **"Low Speed Shaft Overhung Rating"** table. The T11 reducer at 68 RPM has a rating of 22,500 pounds and is suitable for the application.

Lf - LOAD LOCATION FACTORS - LOW SPEED SHAFT

① IN.	UNIT SIZE 7	8	9	11	12	13	15	16	18	20	22	25	28	30	32	34	36	38	40
1	1.13	1.13	1.18	1.16	1.16	1.22	1.17	1.16	1.18	1.17	1.17	1.19	1.20	1.20	1.21	1.19	1.20	1.19	1.18
2	1.04	1.06	1.10	1.10	1.11	1.16	1.12	1.11	1.13	1.13	1.13	1.15	1.16	1.17	1.17	1.17	1.17	1.16	1.15
3	0.96	0.99	1.03	1.05	1.06	1.11	1.07	1.07	1.09	1.09	1.10	1.12	1.13	1.13	1.15	1.14	1.14	1.13	1.13
4	0.89	0.93	0.96	0.99	1.01	1.06	1.02	1.02	1.05	1.06	1.06	1.08	1.10	1.10	1.12	1.12	1.11	1.11	1.10
5	0.84	0.88	0.91	0.95	0.97	1.02	0.99	0.99	1.01	1.02	1.03	1.05	1.07	1.07	1.09	1.09	1.09	1.09	1.08
6			0.86	0.91	0.93	0.99	0.95	0.95	0.98	0.99	1.00	1.02	1.04	1.05	1.06	1.06	1.07	1.07	1.06
7				0.87	0.89	0.94	0.92	0.92	0.95	0.96	0.97	0.99	1.01	1.02	1.03	1.04	1.04	1.04	1.04
8					0.86	0.91	0.88	0.90	0.92	0.93	0.94	0.97	0.99	1.00	1.01	1.01	1.02	1.02	1.02
9						0.88	0.86	0.87	0.89	0.91	0.92	0.94	0.96	0.97	0.99	1.00	1.00	1.00	1.00
10									0.86	0.88	0.90	0.92	0.94	0.95	0.97	0.97	0.98	0.98	0.98
11										0.85	0.87	0.89	0.92	0.93	0.95	0.95	0.96	0.96	0.96
12											0.85	0.87	0.90	0.91	0.93	0.94	0.94	0.95	0.95
13												0.85	0.88	0.89	0.91	0.92	0.92	0.93	0.93
14													0.86	0.87	0.90	0.90	0.90	0.91	0.91
15													0.84	0.85	0.87	0.88	0.89	0.90	0.90
16														0.83	0.86	0.87	0.87	0.88	0.88

① Center of applied load in inches from the end cap.

LOW SPEED SHAFT OVERHUNG LOAD RATINGS ②

OUTPUT SPEED	UNIT SIZE 7	8	9	11	12	13	15	16	18	20	22	25	28	30	32	34	36	38	40
1420	1.8	4.1	2.5	5.1	4.8	1.2	3.0	4.6											
1170	2.1	4.6	2.9	5.8	5.4	4.7	3.7	5.0											
950	2.6	5.2	3.7	6.6	6.5	5.7	5.2	6.9	6.2	8.6	6.2								
750	3.0	5.8	4.4	7.6	8.0	6.4	6.5	8.6	7.9	12.7	8.6								
640	3.6	6.7	5.3	8.8	9.0	8.6	7.7	10.9	9.3	15.0	13.9	16.8	28.1	26.2					
520	4.3	7.4	6.3	9.8	10.7	10.5	9.6	13.7	11.8	17.0	16.8	19.5	32.5	31.1					
420	4.8	8.3	7.0	10.8	11.9	12.0	11.0	15.6	13.6	20.1	19.0	22.6	37.8	36.0					
350	5.1	9.1	7.6	11.7	13.4	14.2	11.9	18.1	14.6	22.6	21.5	26.6	42.1	40.4					
280	4.8	8.3	6.9	12.6	13.6	10.5	6.3	10.8	14.3	13.4	21.2	16.7	34.2	30.6	43.3	67.5	57.0	63.0	81.0
230	5.2	9.1	7.7	13.9	13.6	11.8	7.5	12.0	15.7	15.2	23.0	19.7	38.4	35.1	47.6	72.8	63.0	70.0	89.0
190	5.6	9.8	8.0	14.9	16.0	14.1	8.4	12.9	17.1	17.2	25.1	21.7	41.9	38.4	52.8	72.5	69.0	76.0	96.0
155	6.1	10.6	8.9	16.2	17.3	15.0	9.4	14.5	19.1	18.1	27.5	23.1	44.5	40.8	57.3	79.6	75.0	83.0	104.0
125	6.7	11.5	9.6	17.8	18.8	16.8	10.8	15.5	20.6	20.2	29.8	26.1	49.4	47.2	60.6	86.1	84.0	92.0	115.0
100	7.2	12.6	10.5	19.3	20.0	18.3	11.7	17.3	22.5	21.7	31.1	28.7	53.6	52.5	67.2	91.6	91.0	100.0	124.0
84	8.0	13.3	11.4	20.4	21.7	19.4	12.8	19.0	24.7	24.2	36.3	30.7	56.9	55.9	73.5	95.0	103.0	113.0	139.0
68	8.6	14.5	12.4	22.5	23.5	21.6	14.1	20.6	27.1	26.4	38.2	35.2	93.5	60.7	75.0	95.0	109.0	119.0	147.0
56	9.3	15.5	13.6	24.3	25.6	23.5	15.8	23.2	30.0	29.1	41.4	38.0	68.6	65.6	75.0	95.0	120.0	135.0	160.0
③ 45	10.1	16.7	14.6	26.1	27.6	25.4	17.4	24.6	31.8	31.4	45.0	41.2	74.4	71.0	75.0	95.0	120.0	140.0	160.0
③ 37	10.8	18.0	15.8	28.0	29.8	27.4	19.1	27.1	34.9	33.8	48.8	45.1	81.3	77.8	75.0	89.5	120.0	140.0	160.0

② X 1000 Pounds
③ And all lower speeds

Type TDS
Parallel Shaft Speed Reducers
Overhung Load Ratings ①

SINGLE REDUCTION

	1170 INPUT							870 INPUT						
	NOMINAL RATIOS							NOMINAL RATIOS						
UNIT	1.500	1.837	2.250	2.756	3.375	4.134	5.060	1.500	1.837	2.250	2.756	3.375	4.134	5.060
S7	1.1	1.2	1.4	1.6	1.9	1.9	2.1	1.3	1.5	1.7	1.9	2.2	2.3	2.4
S8	3.0	3.0	3.3	3.5	3.8	4.0	4.0	3.6	3.6	3.9	4.0	4.0	4.0	4.0
S9	1.1	1.5	1.9	2.2	2.7	2.8	3.0	1.8	2.1	2.4	2.6	3.2	3.4	3.5
S11	2.2	2.6	3.0	3.1	3.4	3.5	3.7	2.6	3.1	3.4	3.6	3.9	4.0	4.3
S12	3.2	3.6	3.8	4.2	4.3	4.5	4.7	4.2	4.5	4.6	5.1	5.2	5.3	5.4
S13	0.2	0.3	0.4	0.6	3.3	3.9	4.1	0.2	0.3	0.4	0.7	3.0	3.5	4.5
S15	1.3	2.3	3.3	4.1	4.3	4.7	5.2	0.9	1.2	1.7	4.7	4.8	5.6	6.1
S16	1.1	1.6	2.4	5.5	6.1	6.8	7.3	0.7	1.2	5.9	6.8	7.5	8.2	8.6
S18	0.5	2.7	3.0	4.0	4.6	5.1	5.6	0.7	3.2	3.7	4.9	5.2	5.5	6.5
S20	5.0	4.4	7.0	8.0	9.6	9.6	10.2	7.1	6.8	8.4	9.5	10.8	11.1	11.7
S22	2.3	3.0	3.5	4.4	6.4	8.2	8.8	3.5	5.1	6.9	8.1	8.9	9.6	10.0
S25	1.0	7.3	7.6	8.0	8.2	9.4	10.9	7.9	8.4	8.7	9.2	9.9	11.0	12.6
S28	3.4	4.1	6.1	6.8	8.9	11.0	12.7	6.5	6.9	7.6	8.4	10.7	13.0	15.4
S30	2.0	2.9	6.4	7.7	8.6	11.0	12.4	7.7	8.0	8.5	10.4	11.8	12.8	14.4

DOUBLE REDUCTION

	1170 INPUT							870 INPUT						
	NOMINAL RATIOS							NOMINAL RATIOS						
UNIT	6.200	7.590	9.300	11.39	13.95	17.09	20.93	6.200	7.590	9.300	11.39	13.95	17.09	20.93
D7	0.5	0.6	0.7	0.8	0.8	0.9	0.9	0.6	0.7	0.9	1.0	1.0	1.1	1.1
D8	0.2	0.4	0.5	0.5	0.6	0.7	0.7	0.4	0.5	0.7	0.7	0.8	0.9	0.9
D9	0.2	0.2	0.3	0.5	0.6	0.6	0.8	0.5	0.5	0.5	0.8	1.0	1.0	1.2
D11	0.1	0.2	0.5	0.6	0.9	0.9	0.9	0.2	0.4	0.8	1.0	1.0	1.2	1.3
D12	0.9	1.2	1.4	1.6	1.7	1.8	1.9	1.5	1.5	2.1	2.3	2.5	2.7	2.7
D13	0.1	0.2	0.5	0.7	0.9	1.1	1.2	0.3	0.6	1.0	1.2	1.3	1.4	1.7
D15	0.1	0.2	0.2	0.3	0.4	0.5	0.7	0.1	0.3	0.3	0.5	0.7	0.9	1.1
D16	0.7	1.2	1.4	1.9	2.0	2.0	2.2	1.3	1.9	2.2	2.6	2.8	2.8	2.9
D18	0.1	0.2	0.3	0.3	0.7	1.1	1.3	0.2	0.3	0.7	1.0	1.3	1.5	1.8
D20	0.3	0.4	0.6	0.8	1.2	1.5	1.9	0.5	0.7	0.7	1.8	2.1	2.6	2.7
D22	0.1	0.2	0.3	0.3	0.4	0.9	1.7	0.1	0.1	0.2	1.1	1.2	1.8	2.0
D25	0.1	0.2	0.2	1.0	1.2	1.6	1.9	0.4	0.5	1.1	2.0	2.3	2.4	2.8
D28	0.1	0.2	0.7	1.5	1.9	2.0	2.5	0.3	1.0	1.8	2.8	2.8	3.1	4.0
D30	2.4	5.3	8.7	9.6	9.9	10.2	11.0	6.8	9.5	10.2	11.0	11.6	12.0	13.0
D32	2.1	3.1	4.1	5.2	7.1	6.7	7.3	3.7	4.2	5.3	6.3	7.7	8.0	8.5
D34	4.6	8.7	9.9	10.5	10.9	11.8	12.2	9.3	10.5	11.7	12.0	12.6	13.3	13.7
D36	1.0	7.3	7.6	8.0	8.2	9.4	10.9	7.9	8.4	8.7	9.2	9.9	11.0	12.6
D38	3.2	7.5	7.8	8.2	8.4	9.6	11.1	8.1	8.6	9.0	9.4	10.1	11.2	12.9
D40	12.1	13.6	14.0	14.3	14.6	15.7	17.3	14.8	15.3	15.7	16.2	16.8	17.9	19.6

① In pounds X 1000.

Type TDS
Parallel Shaft Speed Reducers
Overhung Load Ratings①

TRIPLE REDUCTION

	1170 INPUT							870 INPUT						
	NOMINAL RATIOS							NOMINAL RATIOS						
UNIT	25.63	31.39	38.44	47.08	57.66	70.62	86.50	25.63	31.39	38.44	47.08	57.66	70.62	86.50
T7	1.7	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.1
T8	1.5	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.8	1.9	1.9	1.9	1.9	2.0
T9	2.2	2.3	2.3	2.3	2.3	2.4	2.4	2.5	2.6	2.6	2.6	2.6	2.7	2.7
T11	2.4	2.4	2.5	2.5	2.5	2.6	2.6	2.6	2.7	2.8	2.8	2.8	2.9	2.9
T12	4.0	4.0	4.1	4.1	4.2	4.2	4.2	4.5	4.5	4.6	4.6	4.6	4.6	4.7
T13	3.5	3.6	3.6	3.7	3.8	3.8	3.8	4.0	4.0	4.1	4.2	4.2	4.3	4.3
T15	3.1	3.2	3.3	3.3	3.4	3.4	3.5	3.6	3.7	3.8	3.8	3.8	3.8	3.9
T16	5.8	6.0	6.1	6.1	6.2	6.2	6.2	6.5	6.6	6.7	6.7	6.7	6.8	6.9
T18	5.3	5.4	5.5	5.6	5.6	5.7	5.7	6.0	6.0	6.1	6.2	6.3	6.3	6.4
T20	5.8	6.0	6.2	6.3	6.4	6.5	6.6	6.5	6.7	6.9	7.0	7.1	7.2	7.2
T22	7.4	7.6	7.8	7.9	7.9	8.0	8.0	8.3	8.5	8.6	8.9	9.0	9.0	9.0
T25	7.5	8.5	9.2	9.5	9.6	9.7	9.9	9.6	10.3	10.5	10.7	10.8	10.9	11.0
T28	10.9	11.2	11.4	11.5	11.6	11.8	12.0	12.1	12.3	12.6	12.8	13.0	13.1	13.3
T30	10.1	10.3	10.5	10.6	10.9	10.9	11.2	11.1	11.5	11.7	11.9	12.0	12.2	12.4
T32	4.5	5.1	5.6	6.2	6.5	6.8	7.2	5.7	6.5	6.5	7.7	8.0	8.4	8.5
T34	5.9	6.1	6.5	7.1	8.2	9.0	9.3	6.6	6.8	7.1	7.5	8.9	9.6	10.2
T36	8.2	8.8	9.5	10.3	10.5	10.9	11.2	10.1	10.6	11.3	12.3	12.4	12.5	13.0
T38	8.2	8.8	9.5	10.3	10.5	10.9	11.2	10.1	10.6	11.3	12.3	12.4	12.5	13.0
T40	12.2	12.8	13.5	14.3	14.5	14.8	15.2	14.4	14.9	15.6	16.7	16.7	16.9	17.3

QUADRUPLE REDUCTION

	1170 INPUT							870 INPUT						
	NOMINAL RATIOS							NOMINAL RATIOS						
UNIT	105.9	129.7	158.9	194.6	238.4	291.9	357.5	105.9	129.7	158.9	194.6	238.4	291.9	357.5
Q7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Q8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.1
Q9	1.7	1.7	1.7	1.7	1.7	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Q11	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.4	1.4	1.4
Q12	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.2	2.2
Q13	1.7	1.8	1.8	1.8	1.9	1.9	2.0	1.9	2.0	2.0	2.1	2.1	2.1	2.1
Q15	1.2	1.3	1.3	1.4	1.4	1.4	1.4	1.5	1.5	1.5	1.6	1.6	1.6	1.6
Q16	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.2	2.3	2.3	2.3	2.4	2.4	2.4
Q18	1.7	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.2	2.2
Q20	1.3	1.4	1.4	1.5	1.5	1.6	1.6	1.5	1.6	1.6	1.7	1.7	1.8	1.8
Q22	3.6	3.6	3.7	3.8	3.8	3.8	3.9	4.0	4.1	4.1	4.2	4.2	4.3	4.3
Q25	2.0	2.1	2.2	2.3	2.3	2.5	2.5	2.3	2.4	2.6	2.7	2.8	2.8	2.8
Q28	4.3	4.5	4.6	4.8	4.8	5.0	4.1	5.0	5.1	5.3	5.4	5.5	5.6	4.6
Q30	4.1	4.4	4.5	4.7	4.8	4.9	3.8	4.8	5.0	5.2	5.3	5.4	5.6	4.4
Q32	4.1	4.3	4.4	4.5	4.6	4.6	4.7	4.7	4.8	4.9	5.0	5.2	5.2	5.2
Q34	3.8	4.0	4.1	4.3	4.4	4.4	4.5	4.4	4.6	4.7	4.8	4.9	5.1	5.1
Q36	2.8	3.0	3.2	3.3	3.5	3.6	3.7	3.3	3.5	3.7	3.8	3.5	4.1	4.2
Q38	4.9	5.1	5.4	5.5	5.6	5.8	5.9	5.7	6.0	6.1	6.2	6.4	6.6	6.6
Q40	4.6	4.9	5.2	5.3	5.5	5.7	5.8	5.4	5.8	5.9	6.0	6.3	6.4	6.4

① In pounds X 1000.

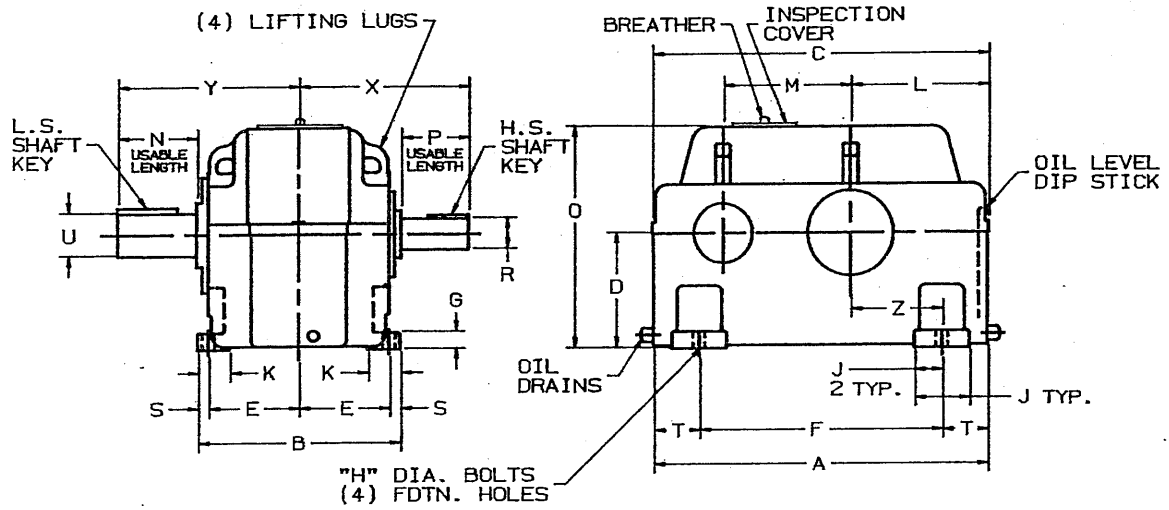
Type TDS
Parallel Shaft Speed Reducers
Dimensions

CAST IRON HOUSINGS			FABRICATED STEEL HOUSINGS	
UNIT	**PAGE**		**UNIT**	**PAGE**
S7 - S9	1	**SINGLE REDUCTION**	WS7 - WS9	12
S11 - S25	2		WS11 - WS25	13
			WS28 - WS30	14
D7 - D9	3	**DOUBLE REDUCTION**	WD7 - WD9	15
D11 - D25	4		WD11 - WD25	16
D28 - D30	5		WD28 - WD40	17
T7 - T9	6	**TRIPLE REDUCTION**	WT7 - WT9	18
T11 - T25	7		WT11 - WT25	19
T28 - T30	8		WT28 - WT40	20
Q7 - Q9	9	**QUADRUPLE REDUCTION**	WQ7 - WQ9	21
Q11 - Q25	10		WQ11 - WQ25	22
Q28 - Q30	11		WQ28 - WQ40	23

ACCESSORIES AND AUXILIARY EQUIPMENT

	PAGE
AUXILIARY COOLING	
FAN	25
PUMP AND COOLER	26
BACKSTOPS	27, 28
BEDPLATES	31 - 39
HOLLOW SHAFTS	29
SHAFT COVERS	30

Type TDS
Parallel Shaft Speed Reducers
Single Reduction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

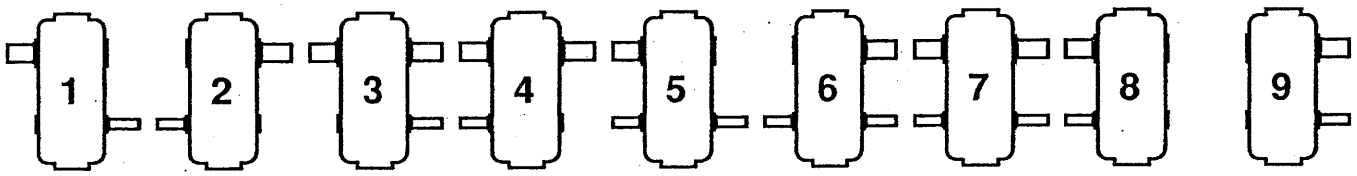
UNIT SIZE	A	B	C	D ②	E	F	G	H	J	K	L	M	O	S	T	Z	APPROX WT. LBS.
S7	26.0	12.8	26.3	8.25	5.50	20.00	1.1	.75	3.5	2.4	9.1	7.500	15.8	.9	3.0	6.00	500
S8	33.0	15.0	33.3	10.25	6.50	25.50	1.5	1.00	4.0	2.8	11.1	8.548	20.0	1.0	3.8	7.25	750
S9	33.0	15.0	33.3	10.25	6.50	25.50	1.5	1.00	4.0	2.8	11.1	9.500	20.0	1.0	3.8	7.25	850

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT R①	KEY	P	X
S7	2.875	.750 x .750 x 4.0	5.0	11.3	1.875	.500 x .500 x 3.0	4.0	10.3
S8	3.375	.875 x .875 x 4.5	6.0	13.6	2.125	.500 x .500 x 3.5	4.3	11.5
S9	3.875	1.000 x 1.000 x 5.3	6.6	14.3	2.375	.625 x .625 x 3.8	4.8	12.0

①**TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

②**THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

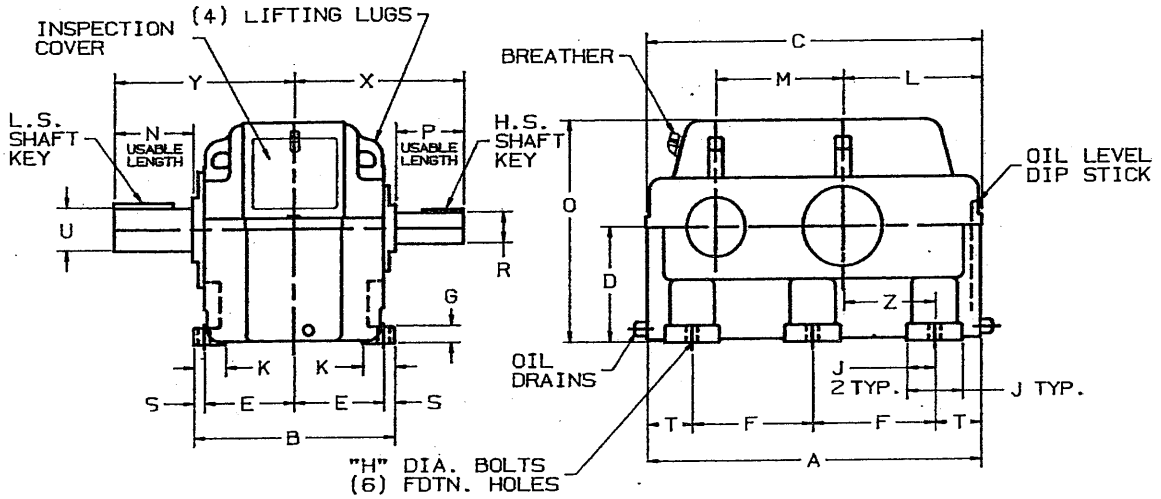
STANDARD ASSEMBLY POSITIONS



Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

Type TDS
Parallel Shaft Speed Reducers
Single Reduction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

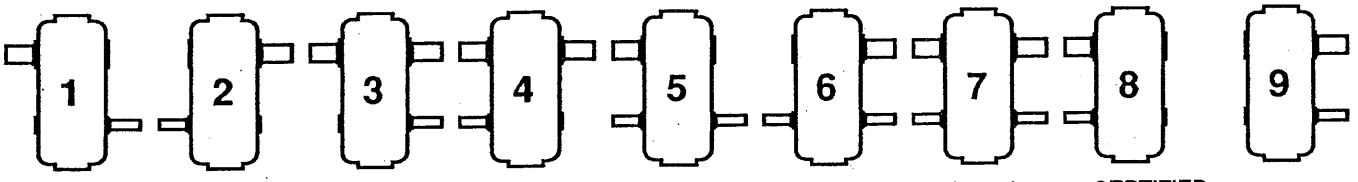
UNIT SIZE	A	B	C	D②	E	F	G	H	J	K	L	M	O	S	T	Z	APPROX WT. LBS.
S11	33.5	16.0	33.8	11.50	7.00	12.25	1.8	1.00	5.0	3.3	14.1	11.138	23.0	1.0	4.5	9.50	1,400
S12	36.0	19.0	36.3	12.50	8.25	13.25	2.0	1.25	5.5	3.8	15.1	12.318	25.0	1.3	4.8	10.25	1,900
S13	47.3	23.8	47.6	13.50	10.63	18.25	2.0	1.25	6.5	3.8	16.2	13.469	27.0	1.3	5.4	10.70	2,750
S15	42.5	21.0	42.8	15.00	9.00	15.75	2.3	1.50	6.0	4.3	17.6	15.024	30.0	1.5	5.5	12.00	2,750
S16	55.5	28.5	55.8	16.50	12.50	21.88	2.5	1.50	7.5	5.0	19.6	16.578	33.0	1.8	5.9	13.62	4,850
S18	49.5	23.0	49.8	18.00	9.75	19.00	2.8	1.75	6.5	4.8	20.1	18.132	36.0	1.8	5.8	14.25	4,650
S20	54.0	24.0	54.3	20.00	10.25	21.00	3.0	1.75	7.0	5.3	22.1	20.205	40.0	1.8	6.0	16.00	4,900
S22	59.0	26.0	59.5	22.00	11.25	22.50	3.3	2.00	7.5	5.3	24.3	21.759	44.0	1.8	7.0	17.00	5,500
S25	67.5	27.5	68.0	25.00	11.75	26.25	3.5	2.25	8.0	6.0	27.8	24.867	50.0	2.0	7.5	20.00	5,950

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT R①	KEY	P	X
S11	4.500	1.000 x 1.000 x 6.0	7.8	16.5	2.875	.750 x .750 x 4.0	5.5	14.3
S12	4.750	1.250 x 1.250 x 6.8	8.5	18.4	3.375	.875 x .875 x 5.0	6.5	16.3
S13	5.000	1.250 x 1.250 x 7.0	9.1	21.3	3.625	.875 x .875 x 5.3	6.6	18.8
S15	5.250	1.250 x 1.250 x 7.8	9.5	20.1	3.875	1.000 x 1.000 x 5.8	7.3	17.8
S16	5.500	1.250 x 1.250 x 8.3	9.8	23.5	4.250	1.000 x 1.000 x 5.8	7.4	21.1
S18	6.000	1.500 x 1.500 x 8.8	10.5	22.3	4.500	1.000 x 1.000 x 6.0	8.0	19.3
S20	6.500	1.500 x 1.500 x 9.3	11.3	23.5	4.750	1.250 x 1.250 x 6.8	8.5	20.3
S22	7.000	1.750 x 1.750 x 9.8	12.0	25.3	5.000	1.250 x 1.250 x 7.5	9.0	21.8
S25	8.000	2.000 x 2.000 x 10.8	13.5	27.3	5.750	1.500 x 1.500 x 8.0	10.0	23.8

①**TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

②**THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

STANDARD ASSEMBLY POSITIONS

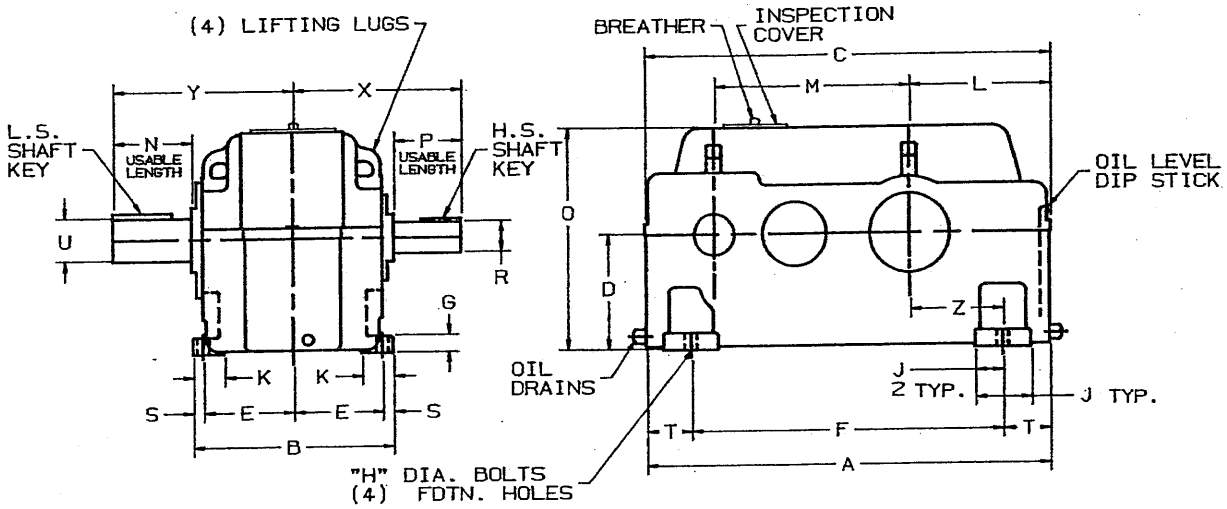


Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ☐ CERTIFIED ☐	BY:		DATE:	

Your Total Drive Source

Type TDS
Parallel Shaft Speed Reducers
Double Reduction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

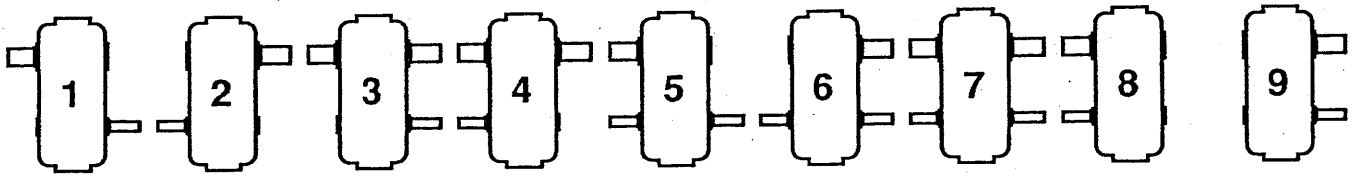
UNIT SIZE	A	B	C	D②	E	F	G	H	J	K	L	M	O	S	T	Z	APPROX WT. LBS.
D7	26.0	12.8	26.3	8.25	5.50	20.00	1.1	0.75	3.5	2.4	9.1	12.500	15.8	0.9	3.0	6.00	550
D8	33.0	15.0	33.3	10.25	6.50	25.50	1.5	1.00	4.0	2.8	11.1	14.548	20.0	1.0	3.8	7.25	900
D9	33.0	15.0	33.3	10.25	6.50	25.50	1.5	1.00	4.0	2.8	11.1	16.500	20.0	1.0	3.8	7.25	1,000

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT R①	KEY	P	X
D7	2.875	.750 x .750 x 4.0	5.0	11.3	1.375	.312 x .312 x 2.5	3.5	9.5
D8	3.375	.875 x .875 x 4.5	6.0	13.6	1.500	.375 x .375 x 2.5	3.7	10.7
D9	3.875	1.000 x 1.000 x 5.3	6.6	14.3	1.875	.500 x .500 x 3.0	4.0	11.0

①**TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

②**THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

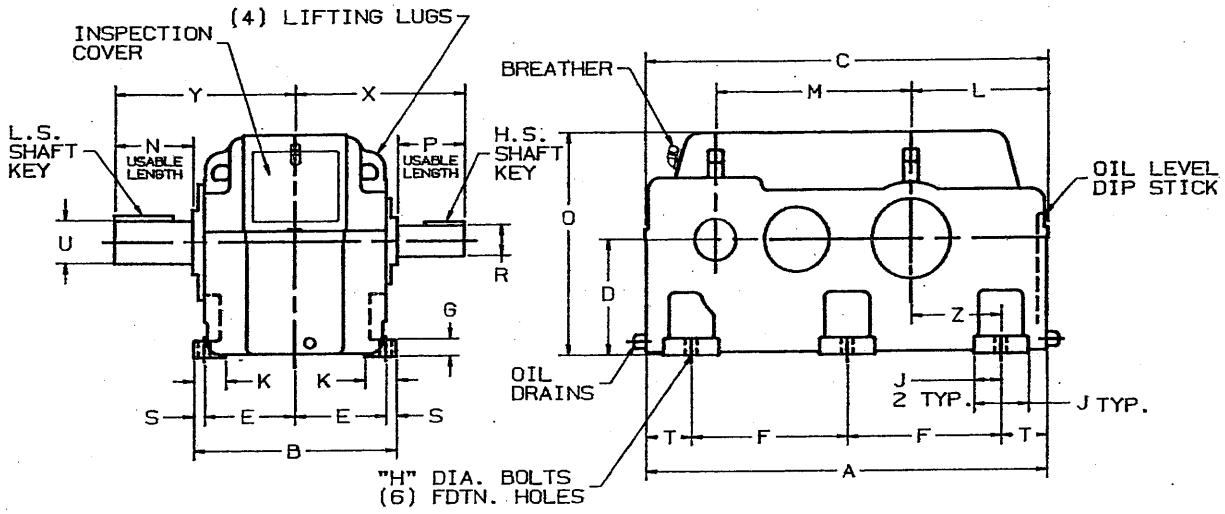
STANDARD ASSEMBLY POSITIONS



Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ☐ CERTIFIED ☐	BY:		DATE:	

Type TDS
Parallel Shaft Speed Reducers
Double Reduction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

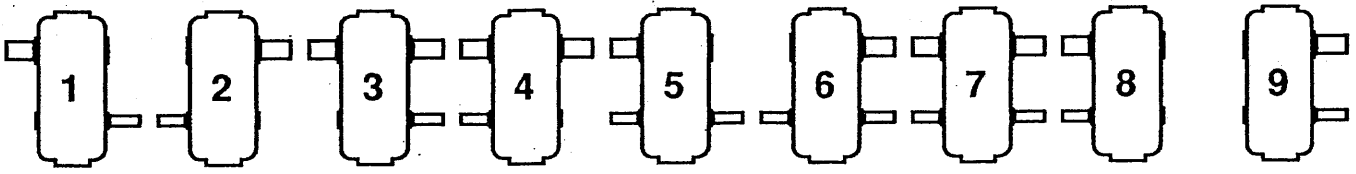
UNIT SIZE	A	B	C	D②	E	F	G	H	J	K	L	M	O	S	T	Z	APPROX WT. LBS.
D11	39.5	21.0	39.8	11.50	9.25	14.75	1.8	1.00	5.8	3.8	14.0	18.638	23.0	1.3	5.0	8.88	1,750
D12	43.0	23.0	43.3	12.50	10.25	16.25	2.0	1.25	6.5	3.8	15.3	20.866	25.0	1.3	5.3	9.88	2,450
D13	47.3	23.8	47.6	13.50	10.63	18.25	2.0	1.25	6.5	3.8	16.2	22.969	27.0	1.3	5.4	10.70	2,900
D15	49.5	25.0	49.8	15.00	11.00	19.25	2.3	1.50	7.3	4.3	17.4	24.524	30.0	1.5	5.5	11.75	3,400
D16	55.5	28.5	55.8	16.50	12.50	21.88	2.5	1.50	7.5	5.0	19.6	27.198	33.0	1.8	5.9	13.62	4,850
D18	58.8	29.0	59.0	18.00	12.75	23.00	2.8	1.75	8.5	5.0	20.8	29.270	35.5	1.8	6.4	14.25	5,650
D20	65.3	31.0	65.5	20.00	13.75	25.50	3.0	1.75	9.3	5.8	23.1	32.523	39.5	1.8	7.1	15.88	5,900
D22	68.3	33.0	68.5	22.00	14.50	26.50	3.3	2.00	9.8	6.3	24.6	34.077	43.5	2.0	7.6	16.88	7,000
D25	77.5	35.0	77.8	25.00	15.25	30.50	3.5	2.25	10.5	7.0	27.1	39.891	49.5	2.3	8.3	18.75	8,450

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT R①	KEY	P	X
D11	4.500	1.000 x 1.000 x 6.0	7.8	18.5	2.125	.500 x .500 x 3.5	4.5	15.0
D12	4.750	1.250 x 1.250 x 6.8	8.5	20.3	2.625	.625 x .625 x 4.0	5.3	16.8
D13	5.000	1.250 x 1.250 x 7.0	9.1	21.3	2.875	.750 x .750 x 4.3	5.6	17.5
D15	5.250	1.250 x 1.250 x 7.8	9.5	22.0	3.125	.750 x .750 x 4.8	6.0	18.3
D16	5.500	1.250 x 1.250 x 8.3	9.5	23.5	3.375	.875 x .875 x 4.8	6.0	19.8
D18	6.000	1.500 x 1.500 x 8.8	10.5	25.0	3.375	.875 x .875 x 5.0	6.5	20.5
D20	6.500	1.500 x 1.500 x 9.3	11.3	26.5	3.375	.875 x .875 x 5.0	6.5	21.5
D22	7.000	1.750 x 1.750 x 9.8	12.0	28.8	3.625	.875 x .875 x 5.0	7.0	23.3
D25	8.000	2.000 x 2.000 x 10.8	13.5	30.8	3.875	1.000 x1.000 x 5.8	7.3	24.0

①**TOLERANCE** = ±.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

②**THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

STANDARD ASSEMBLY POSITIONS

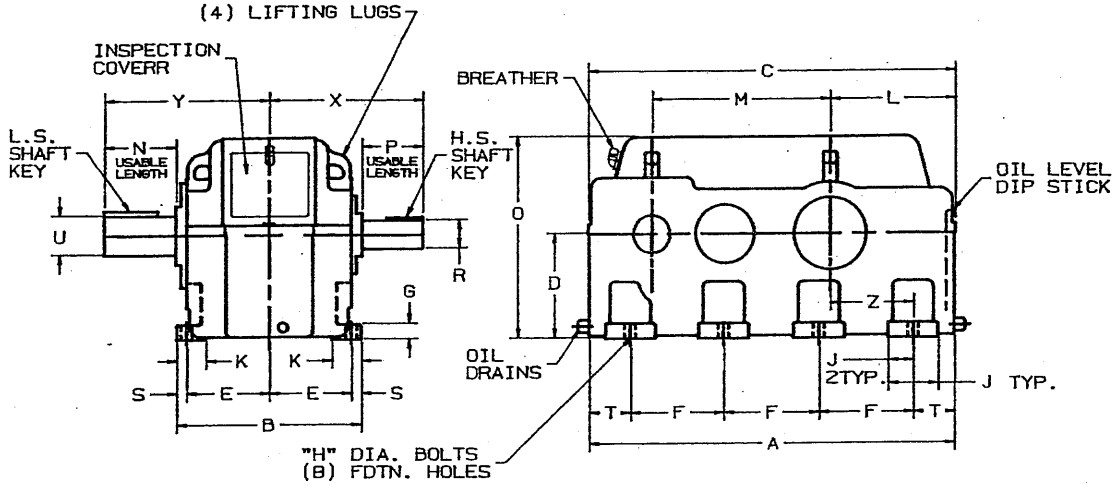


Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

Your Total Drive Source

Type TDS
Parallel Shaft Speed Reducers
Double Reduction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

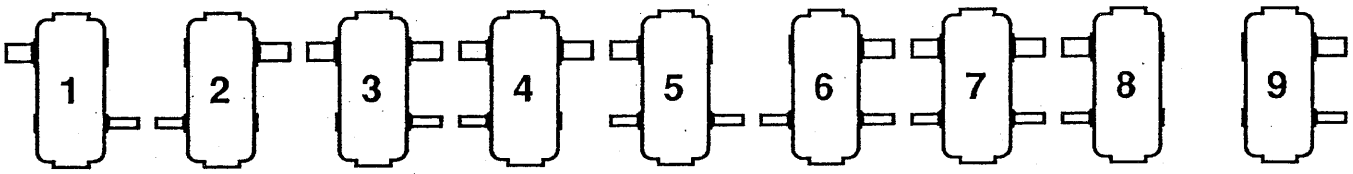
UNIT SIZE	A	B	C	D ②	E	F	G	H	J	K	L	M	O	S	T	Z	APPROX WT. LBS.
D28	88.0	40.5	88.3	28.00	17.75	23.50	3.5	2.25	11.5	7.5	30.6	46.108	55.5	2.5	8.8	21.75	9,900
D30	93.0	42.8	93.3	30.00	18.62	24.50	3.6	2.50	12.0	8.1	32.9	48.180	59.0	2.8	9.8	23.00	12,800

UNIT SIZE	LOW SPEED SHAFT U ①	KEY	N	Y	HIGH SPEED SHAFT R ①	KEY	P	X
D28	9.000	2.500 x 2.500 x12.3	15.0	34.3	4.500	1.000 x 1.000 x 6.0	8.0	26.5
D30	9.500	2.500 x 2.500 x12.5	15.8	35.5	5.000	1.250 x 1.250 x 7.0	9.0	28.3

①**TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

②**THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

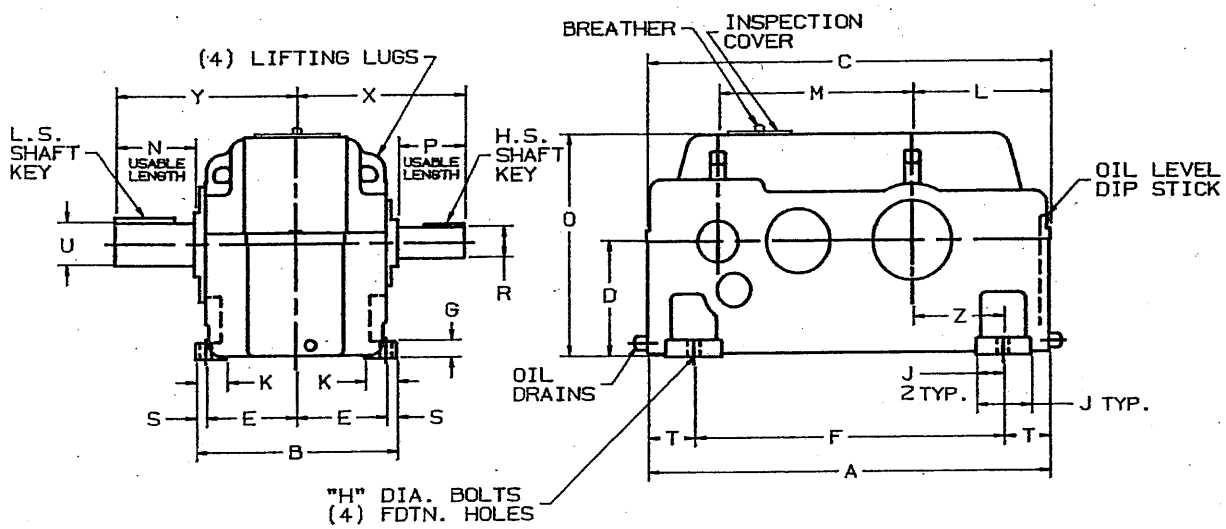
STANDARD ASSEMBLY POSITIONS



Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ☐ CERTIFIED ☐	BY:		DATE:	

Type TDS
Parallel Shaft Speed Reducers
Triple Reduction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

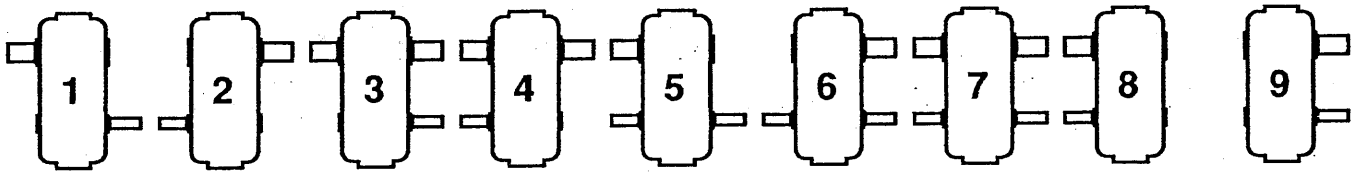
UNIT SIZE	A	B	C	D②	E	F	G	H	J	K	L	M	O	S	T	Z	APPROX WT. LBS.
T7	26.0	12.8	26.3	8.25	5.50	20.00	1.1	0.75	3.5	2.4	9.1	12.500	15.8	0.9	3.0	6.00	600
T8	33.0	15.0	33.3	10.25	6.50	25.50	1.5	1.00	4.0	2.8	11.1	14.548	20.0	1.0	3.8	7.25	950
T9	33.0	15.0	33.3	10.25	6.50	25.50	1.5	1.00	4.0	2.8	11.1	16.500	20.0	1.0	3.8	7.25	1,100

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT R①	KEY	P	X
T7	2.875	.750 x .750 x 4.0	5.0	11.3	1.125	.250 x .250 x 2.5	3.3	9.3
T8	3.375	.875 x .875 x 4.5	6.0	13.6	1.125	.250 x .250 x 2.5	3.3	10.3
T9	3.875	1.000 x 1.000 x 5.3	6.6	14.3	1.375	.312 x .312 x 2.5	3.5	10.5

①**TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

②**THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

STANDARD ASSEMBLY POSITIONS

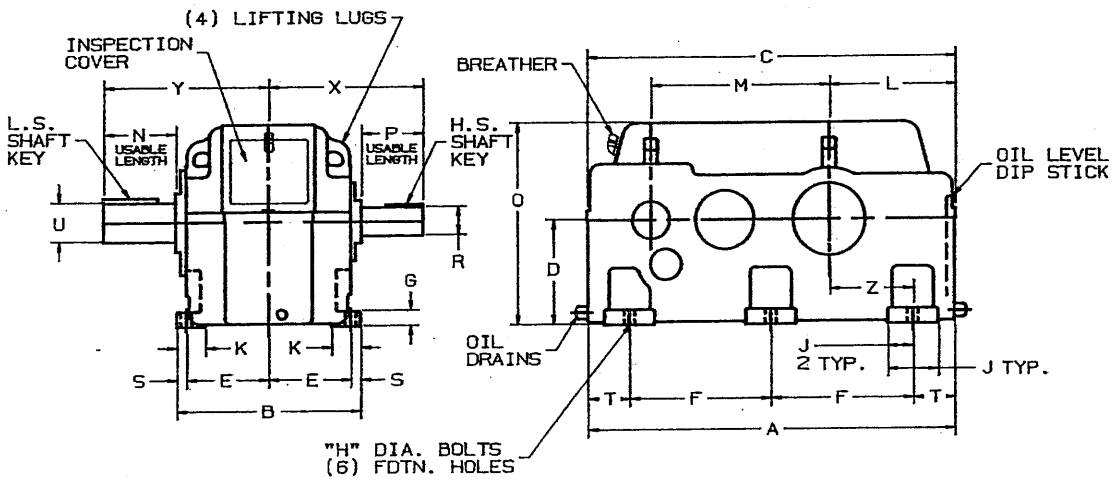


Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ☐ CERTIFIED ☐	BY:		DATE:	

Your Total Drive Source

Type TDS
Parallel Shaft Speed Reducers
Triple Reduction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

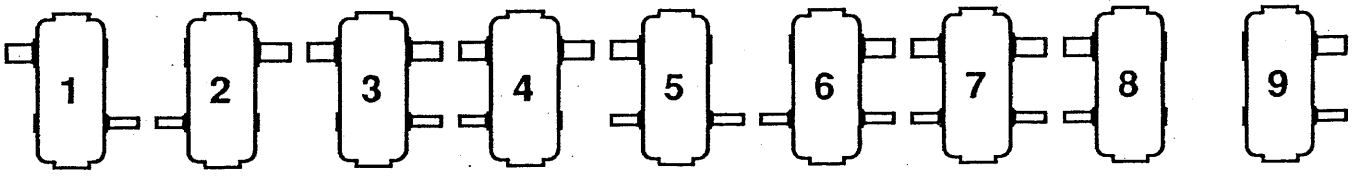
UNIT SIZE	A	B	C	D ②	E	F	G	H	J	K	L	M	O	S	T	Z	APPROX WT. LBS.
T11	39.5	21.0	39.8	11.50	9.25	14.75	1.8	1.00	5.8	3.8	14.0	18.638	23.0	1.3	5.0	8.88	1,850
T12	43.0	23.0	43.3	12.50	10.25	16.25	2.0	1.25	6.5	3.8	15.3	20.866	25.0	1.3	5.3	9.88	2,550
T13	47.3	23.8	47.6	13.50	10.63	18.25	2.0	1.25	6.5	3.8	16.2	22.969	27.0	1.3	5.4	10.70	3,050
T15	49.5	25.0	49.8	15.00	11.00	19.25	2.3	1.50	7.3	4.3	17.4	24.524	30.0	1.5	5.5	11.75	3,550
T16	55.5	28.5	55.8	16.50	12.50	21.88	2.5	1.50	7.5	5.0	19.6	27.198	33.0	1.8	5.9	13.62	5,000
T18	58.8	29.0	59.0	18.00	12.75	23.00	2.8	1.75	8.5	5.0	20.8	29.270	35.5	1.8	6.4	14.25	5,850
T20	65.3	31.0	65.5	20.00	13.75	25.50	3.0	1.75	9.3	5.8	23.1	32.523	39.5	1.8	7.1	15.88	6,100
T22	68.3	33.0	68.5	22.00	14.50	26.50	3.3	2.00	9.8	6.3	24.6	34.077	43.5	2.0	7.6	16.88	7,250
T25	77.5	35.0	77.8	25.00	15.25	30.50	3.5	2.25	10.5	7.0	27.1	39.891	49.5	2.3	8.3	18.75	8,750

UNIT SIZE	LOW SPEED SHAFT U ①	KEY	N	Y	HIGH SPEED SHAFT R ①	KEY	P	X
T11	4.500	1.000 x 1.000 x 6.0	7.8	18.5	1.375	.312 x .312 x 2.5	3.5	14.0
T12	4.750	1.250 x 1.250 x 6.8	8.5	20.3	1.625	.375 x .375 x 2.8	3.8	15.3
T13	5.000	1.250 x 1.250 x 7.0	9.1	21.3	1.625	.375 x .375 x 2.8	4.0	16.0
T15	5.250	1.250 x 1.250 x 7.8	9.5	22.0	1.875	.500 x .500 x 3.0	4.0	16.3
T16	5.500	1.250 x 1.250 x 8.3	9.5	23.5	2.125	.500 x .500 x 3.0	4.0	17.8
T18	6.000	1.500 x 1.500 x 8.8	10.5	25.0	2.125	.500 x .500 x 3.5	4.5	18.5
T20	6.500	1.500 x 1.500 x 9.3	11.3	26.5	2.375	.625 x .625 x 3.8	4.8	19.8
T22	7.000	1.750 x 1.750 x 9.8	12.0	28.8	2.625	.625 x .625 x 4.0	5.3	21.5
T25	8.000	2.000 x 2.000 x 10.8	13.5	30.8	2.875	.750 x .750 x 4.0	5.5	22.3

① **TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

② **THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

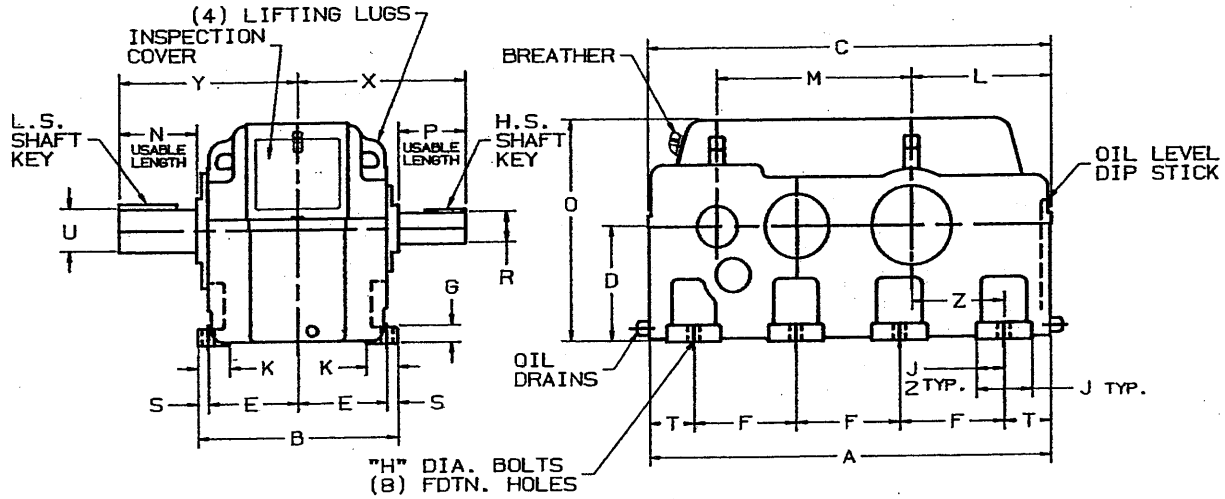
STANDARD ASSEMBLY POSITIONS



Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ☐ CERTIFIED ☐	BY:		DATE:	

Type TDS
Parallel Shaft Speed Reducers
Triple Reduction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

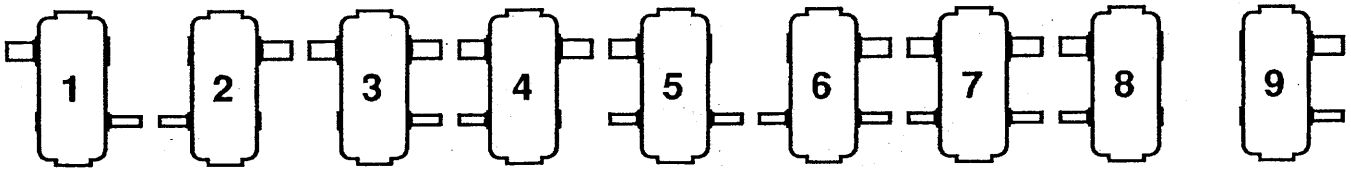
UNIT SIZE	A	B	C	D ②	E	F	G	H	J	K	L	M	O	S	T	Z	APPROX WT. LBS.
T28	88.0	40.5	88.3	28.00	17.75	23.50	3.5	2.25	11.5	7.5	30.6	46.108	55.5	2.5	8.8	21.75	10,250
T30	93.0	42.8	93.3	30.00	18.62	24.50	3.6	2.50	12.0	8.1	32.9	48.180	59.0	2.8	9.8	23.00	13,150

UNIT SIZE	LOW SPEED SHAFT U ①	KEY	N	Y	HIGH SPEED SHAFT R ①	KEY	P	X
T28	9.000	2.500 x 2.500 x 12.3	15.0	34.3	3.375	.875 x .875 x 4.5	6.5	25.0
T30	9.500	2.500 x 2.500 x 12.5	15.8	35.5	3.625	.875 x .875 x 5.0	7.0	26.3

① **TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

② **THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

STANDARD ASSEMBLY POSITIONS

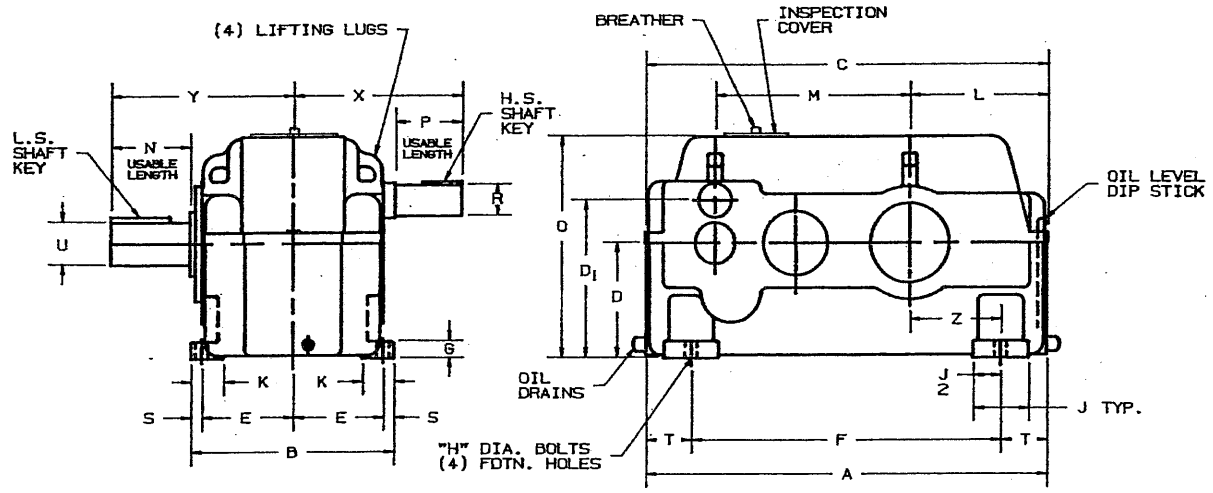


Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ☐ CERTIFIED ☐	BY:		DATE:	

Your Total Drive Source

Type TDS
Parallel Shaft Speed Reducers
Quadruple Reduction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

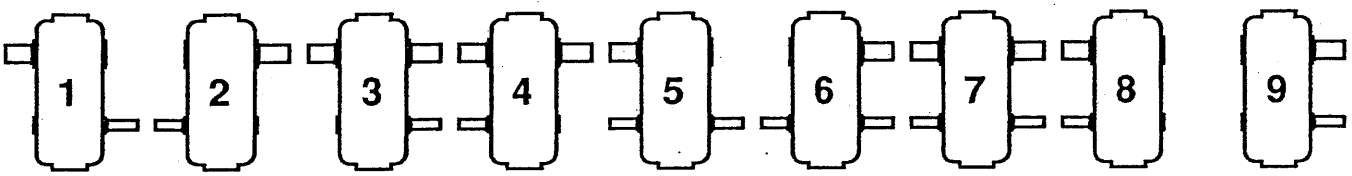
UNIT SIZE	A	B	C	D ②	D1	E	F	G	H	J	K	L	M	O	S	T	Z	APPROX WT. LBS.
Q7	26.0	12.8	26.3	8.25	11.75	5.50	20.00	1.1	0.75	3.5	2.4	9.1	12.500	15.8	0.9	3.0	6.00	650
Q8	33.0	15.0	33.3	10.25	13.75	6.50	25.50	1.5	1.00	4.0	2.8	11.1	14.548	20.0	1.0	3.8	7.25	1,000
Q9	33.0	15.0	33.3	10.25	13.75	6.50	25.50	1.5	1.00	4.0	2.8	11.1	16.500	20.0	1.0	3.8	7.25	1,200

UNIT SIZE	LOW SPEED SHAFT U ①	KEY	N	Y	HIGH SPEED SHAFT R ①	KEY	P	X
Q7	2.875	.750 x .750 x 4.0	5.0	11.3	1.125	.250 x .250 x 2.5	3.3	9.3
Q8	3.375	.875 x .875 x 4.5	6.0	13.6	1.125	.250 x .250 x 2.5	3.3	10.3
Q9	3.875	1.000 x 1.000 x 5.3	6.6	14.3	1.375	.312 x .312 x 2.5	3.5	10.5

① **TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

② **THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

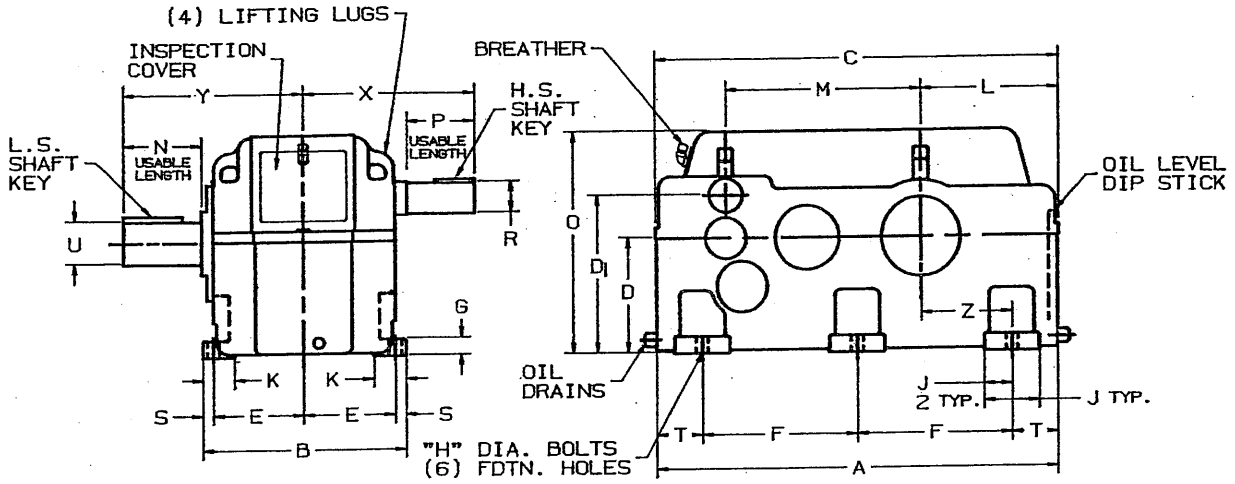
STANDARD ASSEMBLY POSITIONS



Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ☐ CERTIFIED ☐	BY:		DATE:	

Type TDS
Parallel Shaft Speed Reducers
Quadruple Reduction



DIMENSIONS - INCHES

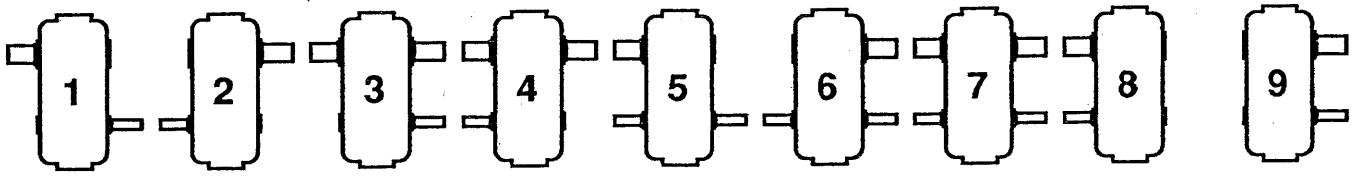
UNIT SIZE	A	B	C	D②	D1	E	F	G	H	J	K	L	M	O	S	T	Z	APPROX WT. LBS.
Q11	39.5	21.0	39.8	11.50	15.50	9.25	14.75	1.8	1.00	5.8	3.8	14.0	18.638	23.0	1.3	5.0	8.88	1,950
Q12	43.0	23.0	43.3	12.50	16.50	10.25	16.25	2.0	1.25	6.5	3.8	15.3	20.866	25.0	1.3	5.3	9.88	2,650
Q13	47.3	23.8	47.6	13.50	17.50	10.63	18.25	2.0	1.25	6.5	3.8	16.2	22.969	27.0	1.3	5.4	10.70	3,200
Q15	49.5	25.0	49.8	15.00	19.00	11.00	19.25	2.3	1.50	7.3	4.3	17.4	24.524	30.0	1.5	5.5	11.75	3,700
Q16	55.5	28.5	55.8	16.50	21.50	12.50	21.88	2.5	1.50	7.5	5.0	19.6	27.198	33.0	1.8	5.9	13.62	5,150
Q18	58.8	29.0	59.0	18.00	23.00	12.75	23.00	2.8	1.75	8.5	5.0	20.8	29.270	35.5	1.8	6.4	14.25	6,050
Q20	65.3	31.0	65.5	20.00	26.00	13.75	25.50	3.0	1.75	9.3	5.8	23.1	32.523	39.5	1.8	7.1	15.88	6,300
Q22	68.3	33.0	68.5	22.00	28.00	14.50	26.50	3.3	2.00	9.8	6.3	24.6	34.077	43.5	2.0	7.6	16.88	7,500
Q25	77.5	35.0	77.8	25.00	31.00	15.25	30.50	3.5	2.25	10.5	7.0	27.1	39.891	49.5	2.3	8.3	18.75	9,050

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT R①	KEY	P	X
Q11	4.500	1.000 x 1.000 x 6.0	7.8	18.5	1.375	.312 x .312 x 2.5	3.5	14.0
Q12	4.750	1.250 x 1.250 x 6.8	8.5	20.3	1.625	.375 x .375 x 2.8	3.8	15.3
Q13	5.000	1.250 x 1.250 x 7.0	9.1	21.3	1.625	.375 x .375 x 2.8	4.0	16.0
Q15	5.250	1.250 x 1.250 x 7.8	9.5	22.0	1.875	.500 x .500 x 3.0	4.0	16.3
Q16	5.500	1.250 x 1.250 x 8.3	9.5	23.5	2.125	.500 x .500 x 3.0	4.0	17.8
Q18	6.000	1.500 x 1.500 x 8.8	10.5	25.0	2.125	.500 x .500 x 3.5	4.5	18.5
Q20	6.500	1.500 x 1.500 x 9.3	11.3	26.5	2.375	.625 x .625 x 3.8	4.8	19.8
Q22	7.000	1.750 x 1.750 x 9.8	12.0	28.8	2.625	.625 x .625 x 4.0	5.3	21.5
Q25	8.000	2.000 x 2.000 x 10.8	13.5	30.8	2.875	.750 x .750 x 4.0	5.5	22.3

①**TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

②**THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

STANDARD ASSEMBLY POSITIONS

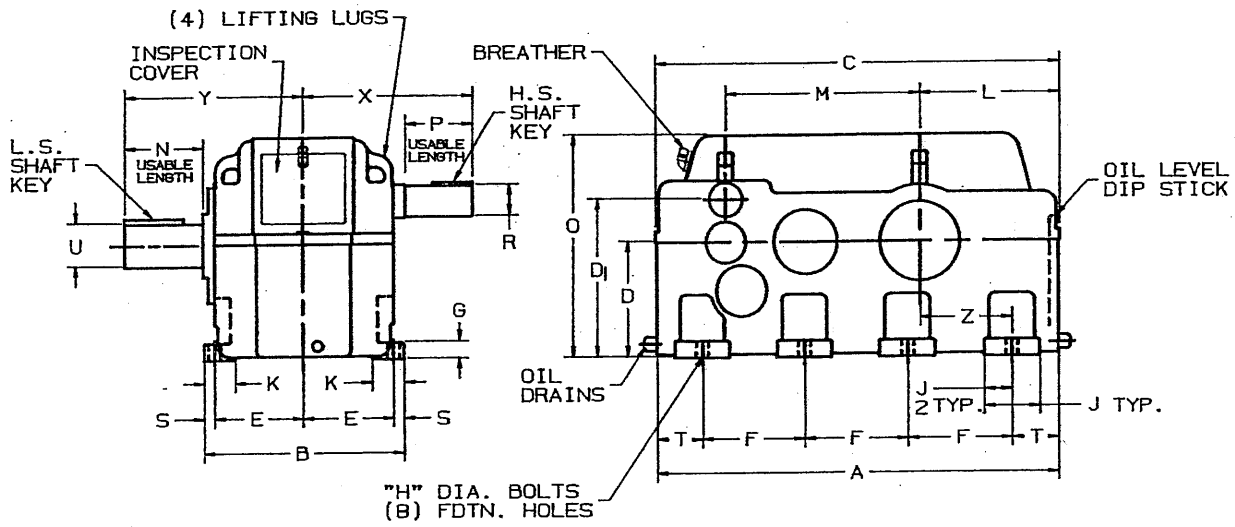


Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑	CERTIFIED ❑	BY:	DATE:	

Your Total Drive Source

Type TDS
Parallel Shaft Speed Reducers
Quadruple Reduction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

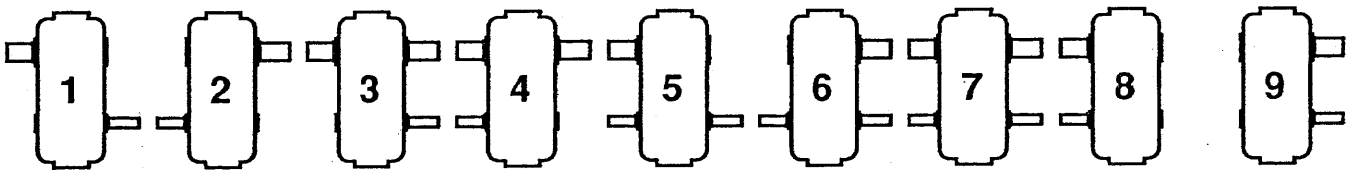
UNIT SIZE	A	B	C	D②	D1	E	F	G	H	J	K	L	M	O	S	T	Z	APPROX WT. LBS.
Q28	88.0	40.5	88.3	28.00	35.50	17.75	23.50	3.5	2.25	11.5	7.5	30.6	46.108	55.5	2.5	8.8	21.75	10,600
Q30	93.0	42.8	93.3	30.00	37.50	18.62	24.50	3.6	2.50	12.0	8.1	32.9	48.180	59.0	2.8	9.8	23.00	13,500

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT R①	KEY	P	X
Q28	9.000	2.500 x 2.500 x 12.3	15.0	34.3	3.375	.875 x .875 x 4.5	6.5	25.0
Q30	9.500	2.500 x 2.500 x 12.5	15.8	35.5	3.625	.875 x .875 x 5.0	7.0	26.3

①**TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

②**THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

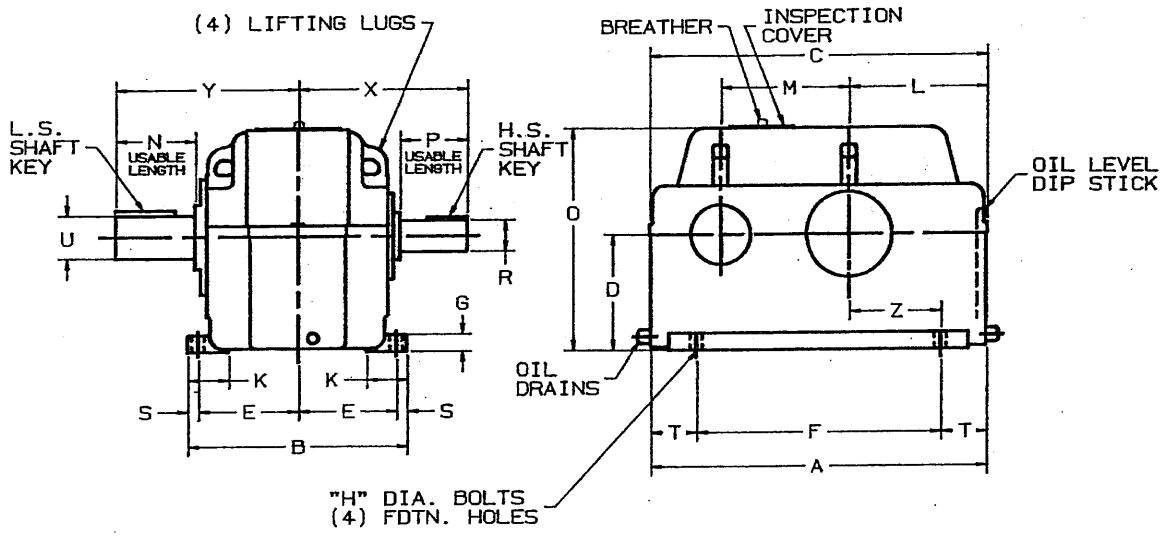
STANDARD ASSEMBLY POSITIONS



Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ☐ CERTIFIED ☐	BY:		DATE:	

Type TDS
Parallel Shaft Speed Reducers
Single Reduction-Steel Construction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

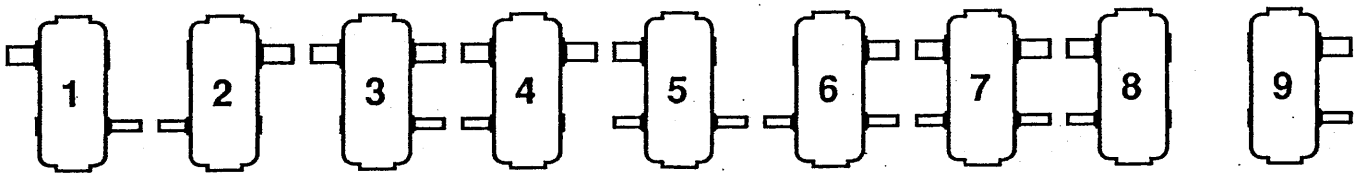
UNIT SIZE	A	B	C	D②	E	F	G	H	K	L	M	O	S	T	Z	APPROX WT. LBS.
WS7	26.0	15.3	26.3	8.25	6.75	20.00	1.1	.75	3.7	9.1	7.500	15.8	.9	3.0	6.00	700
WS8	33.0	18.0	33.3	10.25	8.00	25.50	1.5	1.00	4.3	11.1	8.548	20.0	1.0	3.8	7.25	950
WS9	33.0	18.0	33.3	10.25	8.00	25.50	1.5	1.00	4.3	11.1	9.500	20.0	1.0	3.8	7.25	1,050

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT R①	KEY	P	X
WS7	2.875	.750 x .750 x 4.0	5.0	11.3	1.875	.500 x .500 x 3.0	4.0	10.3
WS8	3.375	.875 x .875 x 4.5	6.0	13.6	2.125	.500 x .500 x 3.5	4.3	11.5
WS9	3.875	1.000 x 1.000 x 5.3	6.6	14.3	2.375	.625 x .625 x 3.8	4.8	12.0

①**TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

②**THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

STANDARD ASSEMBLY POSITIONS

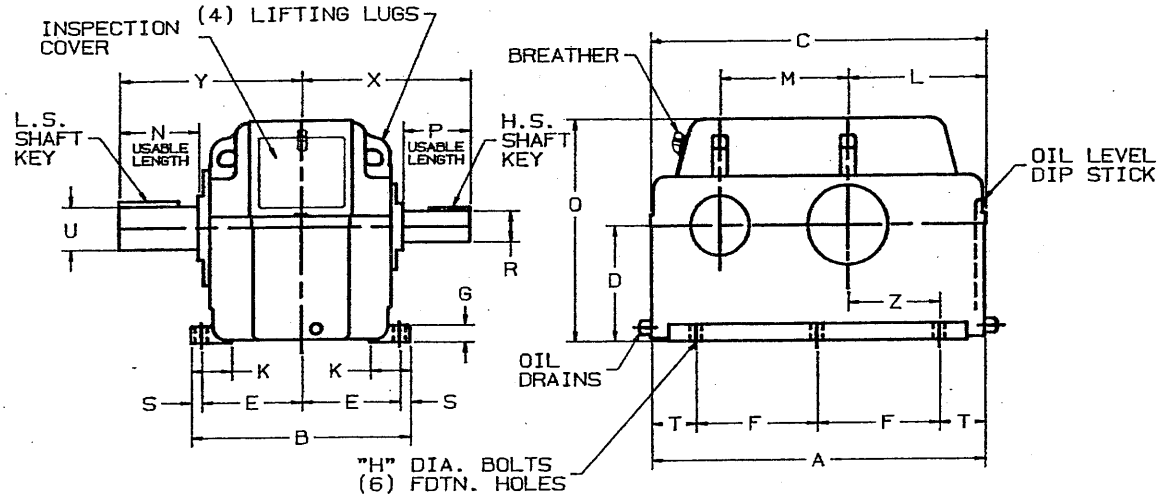


Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ☐ CERTIFIED ☐	BY:		DATE:	

Your Total Drive Source

Type TDS
Parallel Shaft Speed Reducers
Single Reduction-Steel Construction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

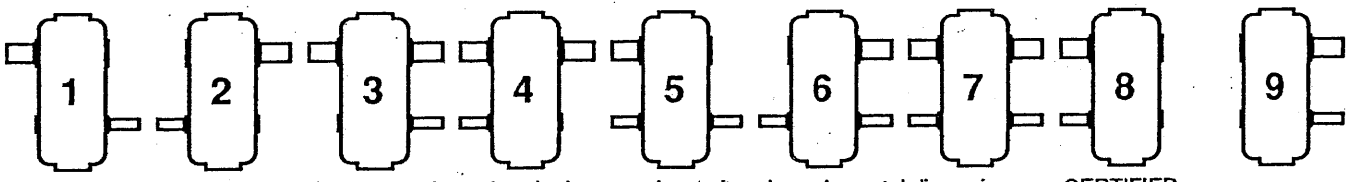
UNIT SIZE	A	B	C	D②	E	F	G	H	K	L	M	O	S	T	Z	APPROX WT. LBS.
WS11	33.5	19.5	33.8	11.50	8.75	12.25	1.8	1.00	5.0	14.1	11.138	23.0	1.0	4.5	9.50	1,650
WS12	36.0	23.0	36.3	12.50	10.25	13.25	2.0	1.25	5.8	15.1	12.318	25.0	1.3	4.8	10.25	2,150
WS13	47.3	28.0	47.6	13.50	12.75	18.25	2.0	1.25	5.9	16.2	13.469	27.0	1.3	5.4	10.70	3,050
WS15	42.5	25.5	42.8	15.00	11.25	15.75	2.3	1.50	6.5	17.6	15.024	30.0	1.5	5.5	12.00	3,150
WS16	55.5	33.0	55.8	16.50	14.75	21.88	2.5	1.50	7.3	19.6	16.578	33.0	1.8	5.9	13.62	5,450
WS18	49.5	23.0	49.8	18.00	9.75	19.00	2.8	1.75	4.8	20.1	18.132	36.0	1.8	5.8	14.25	5,350
WS20	54.0	24.0	54.3	20.00	10.25	21.00	3.0	1.75	5.3	22.1	20.205	40.0	1.8	6.0	16.00	5,700
WS22	59.0	26.0	59.5	22.00	11.25	22.50	3.3	2.00	5.3	24.3	21.759	44.0	1.8	7.0	17.00	6,400
WS25	67.5	27.5	68.0	25.00	11.75	26.25	3.5	2.25	6.0	27.8	24.867	50.0	2.0	7.5	20.00	6,950

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT R①	KEY	P	X
WS11	4.500	1.000 x 1.000 x 6.0	7.8	16.5	2.875	.750 x .750 x 4.0	5.5	14.3
WS12	4.750	1.250 x 1.250 x 6.8	8.5	18.4	3.375	.875 x .875 x 5.0	6.5	16.3
WS13	5.000	1.250 x 1.250 x 7.0	9.1	21.3	3.625	.875 x .875 x 5.3	6.6	18.8
WS15	5.250	1.250 x 1.250 x 7.8	9.5	20.1	3.875	1.000 x 1.000 x 5.8	7.3	17.8
WS16	5.500	1.250 x 1.250 x 8.3	9.5	23.5	4.250	1.000 x 1.000 x 5.8	7.4	21.1
WS18	6.000	1.500 x 1.500 x 8.8	10.5	22.3	4.500	1.000 x 1.000 x 6.0	8.0	19.3
WS20	6.500	1.500 x 1.500 x 9.3	11.3	23.5	4.750	1.250 x 1.250 x 6.8	8.5	20.3
WS22	7.000	1.750 x 1.750 x 9.8	12.0	25.3	5.000	1.250 x 1.250 x 7.5	9.0	21.8
WS25	8.000	2.000 x 2.000 x10.8	13.5	27.3	5.750	1.500 x 1.500 x 8.0	10.0	23.8

①**TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

②**THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

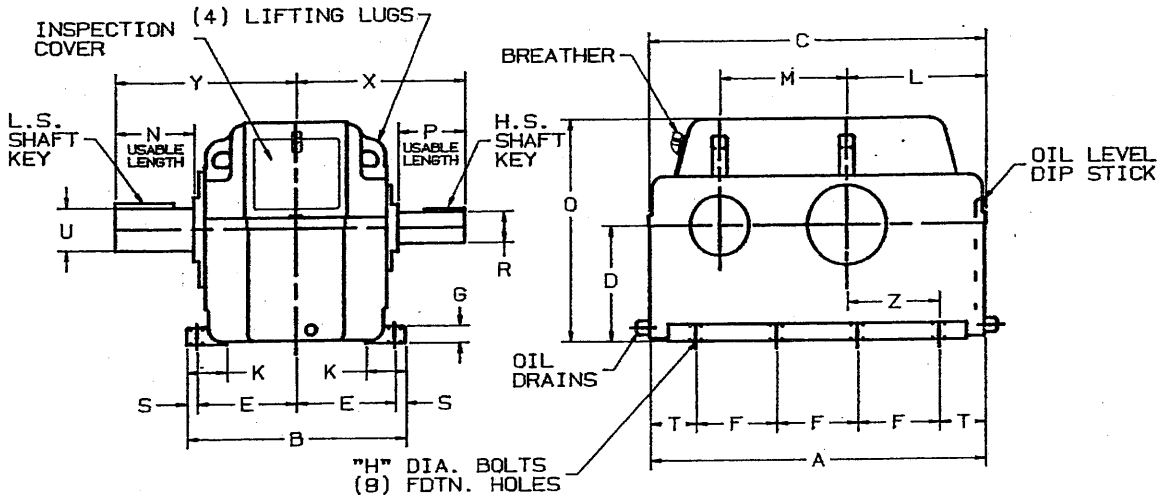
STANDARD ASSEMBLY POSITIONS



Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ☐ CERTIFIED ☐	BY:		DATE:	

Type TDS
Parallel Shaft Speed Reducers
Single Reduction-Steel Construction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

UNIT SIZE	A	B	C	D②	E	F	G	H	K	L	M	O	S	T	Z	APPROX WT. LBS.
WS28	76.5	31.0	77.0	28.00	13.00	20.00	3.5	2.25	7.5	31.0	27.976	55.5	2.5	8.3	22.50	9,450
WS30	81.5	33.5	82.0	30.00	14.00	21.00	3.6	2.50	8.1	33.0	30.048	59.0	2.8	9.3	23.50	11,300

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT R①	KEY	P	X
WS28	9.000	2.500 x 2.500 x 12.3	15.0	30.0	6.500	1.500 x 1.500 x 9.3	11.0	26.0
WS30	9.500	2.500 x 2.500 x 12.5	15.8	31.8	7.000	1.750 x 1.750 x 10.0	12.0	28.0

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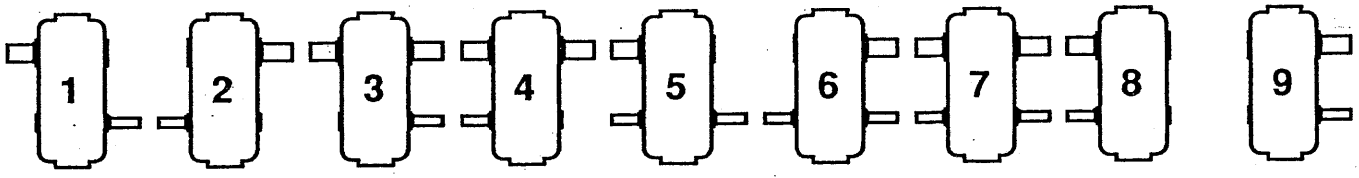
②**THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

STANDARD ASSEMBLY POSITIONS

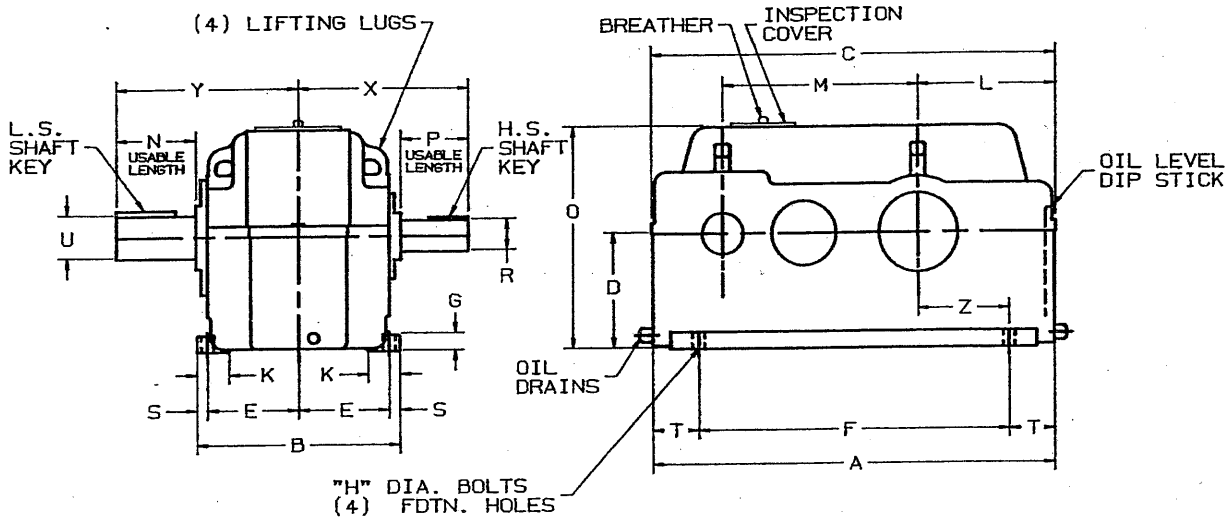


Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ☐ CERTIFIED ☐	BY:		DATE:	

Your Total Drive Source

Type TDS
Parallel Shaft Speed Reducers
Double Reduction-Steel Construction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

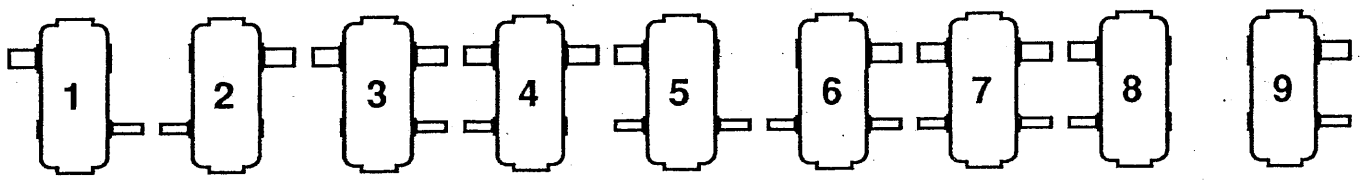
UNIT SIZE	A	B	C	D ②	E	F	G	H	K	L	M	O	S	T	Z	APPROX WT. LBS.
WD7	26.0	15.3	26.3	8.25	6.75	20.00	1.1	0.75	3.7	9.1	12.500	15.8	0.9	3.0	6.00	750
WD8	33.0	18.0	33.3	10.25	8.00	25.50	1.5	1.00	4.3	11.1	14.548	20.0	1.0	3.8	7.25	1,100
WD9	33.0	18.0	33.3	10.25	8.00	25.50	1.5	1.00	4.3	11.1	16.500	20.0	1.0	3.8	7.25	1,200

UNIT SIZE	LOW SPEED SHAFT U ①	KEY	N	Y	HIGH SPEED SHAFT R ①	KEY	P	X
WD7	2.875	.750 x .750 x 4.0	5.0	11.3	1.375	.312 x .312 x 2.5	3.5	9.5
WD8	3.375	.875 x .875 x 4.5	6.0	13.6	1.500	.375 x .375 x 2.5	3.7	10.7
WD9	3.875	1.000 x 1.000 x 5.3	6.6	14.3	1.875	.500 x .500 x 3.0	4.0	11.0

① **TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

② **THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

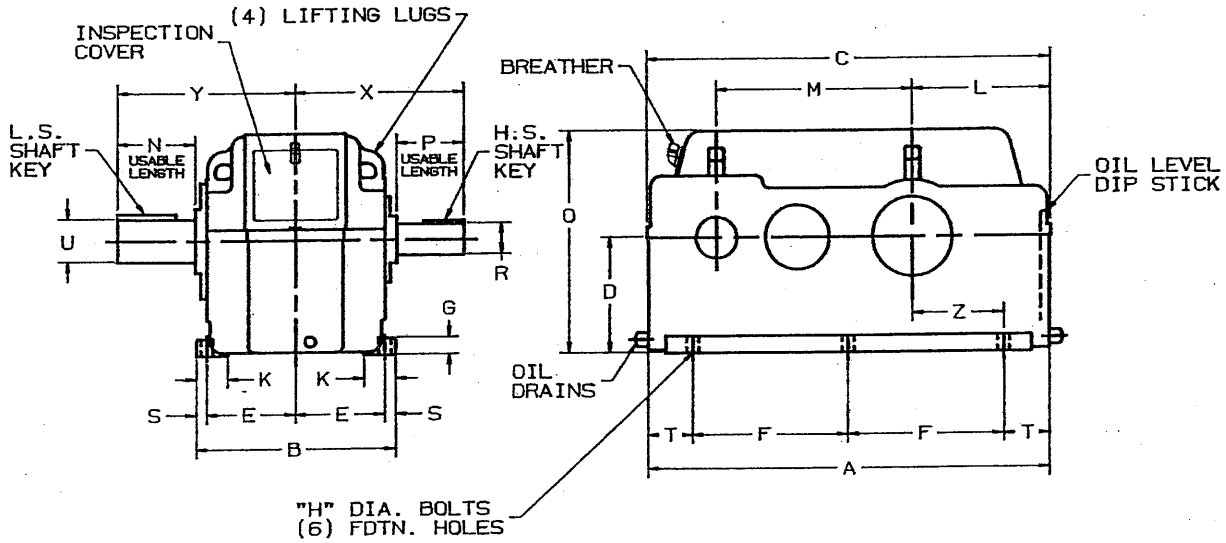
STANDARD ASSEMBLY POSITIONS



Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ☐ CERTIFIED ☐	BY:		DATE:	

Type TDS
Parallel Shaft Speed Reducers
Double Reduction-Steel Construction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

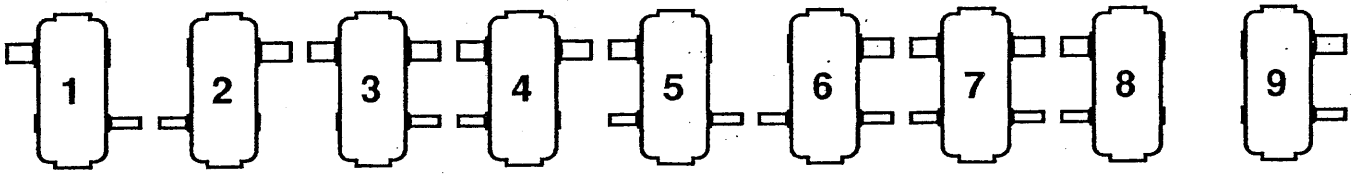
UNIT SIZE	A	B	C	D ②	E	F	G	H	K	L	M	O	S	T	Z	APPROX WT. LBS.
WD11	39.5	25.0	39.8	11.50	11.25	14.75	1.8	1.00	5.8	14.0	18.638	23.0	1.3	5.0	8.88	2,100
WD12	43.0	27.0	43.3	12.50	12.25	16.25	2.0	1.25	5.8	15.3	20.866	25.0	1.3	5.3	9.88	2,950
WD13	47.3	28.0	47.6	13.50	12.75	18.25	2.0	1.25	5.9	16.2	22.969	27.0	1.3	5.4	10.70	3,400
WD15	49.5	29.5	49.8	15.00	13.25	19.25	2.3	1.50	6.5	17.4	24.524	30.0	1.5	5.5	11.75	4,000
WD16	55.5	33.0	55.8	16.50	14.75	21.88	2.5	1.50	7.3	19.6	27.198	33.0	1.8	5.9	13.62	5,650
WD18	58.8	29.0	59.0	18.00	12.75	23.00	2.8	1.75	5.0	20.8	29.270	35.5	1.8	6.4	14.25	6,650
WD20	65.3	31.0	65.5	20.00	13.75	25.50	3.0	1.75	5.8	23.1	32.523	39.5	1.8	7.1	15.88	7,100
WD22	68.3	33.0	68.5	22.00	14.50	26.50	3.3	2.00	6.3	24.6	34.077	43.5	2.0	7.6	16.88	8,500
WD25	77.5	35.0	77.8	25.00	15.25	30.50	3.5	2.25	7.0	27.1	39.891	49.5	2.3	8.3	18.75	10,150

UNIT SIZE	LOW SPEED SHAFT U ①	KEY	N	Y	HIGH SPEED SHAFT R ①	KEY	P	X
WD11	4.500	1.000 x 1.000 x 6.0	7.8	18.5	2.125	.500 x .500 x 3.5	4.5	15.0
WD12	4.750	1.250 x 1.250 x 6.8	8.5	20.3	2.625	.625 x .625 x 4.0	5.3	16.8
WD13	5.000	1.250 x 1.250 x 7.0	9.1	21.3	2.875	.750 x .750 x 4.3	5.6	17.5
WD15	5.250	1.250 x 1.250 x 7.8	9.5	22.0	3.125	.750 x .750 x 4.8	6.0	18.3
WD16	5.500	1.250 x 1.250 x 8.3	9.5	23.5	3.375	.875 x .875 x 4.8	6.0	19.8
WD18	6.000	1.500 x 1.500 x 8.8	10.5	25.0	3.375	.875 x .875 x 5.0	6.5	20.5
WD20	6.500	1.500 x 1.500 x 9.3	11.3	26.5	3.375	.875 x .875 x 5.0	6.5	21.5
WD22	7.000	1.750 x 1.750 x 9.8	12.0	28.8	3.625	.875 x .875 x 5.0	7.0	23.3
WD25	8.000	2.000 x 2.000 x 10.8	13.5	30.8	3.875	1.000 x 1.000 x 5.8	7.3	24.0

① **TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

② **THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

STANDARD ASSEMBLY POSITIONS

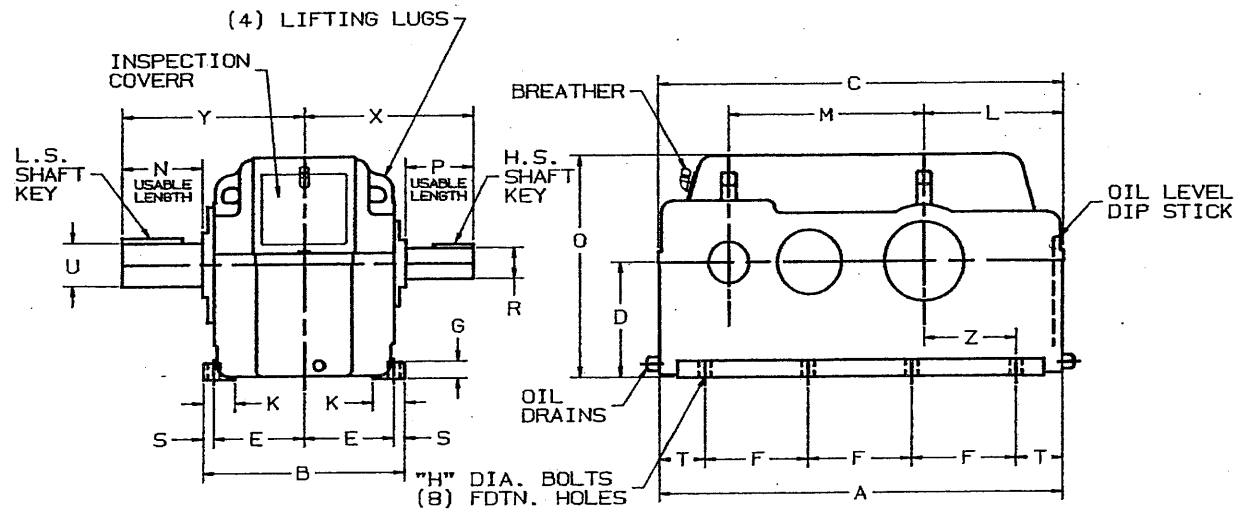


Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ☐ CERTIFIED ☐	BY:		DATE:	

Your Total Drive Source

Type TDS
Parallel Shaft Speed Reducers
Double Reduction-Steel Construction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

UNIT SIZE	A	B	C	D②	E	F	G	H	K	L	M	O	S	T	Z	APPROX WT. LBS.
WD28	88.0	40.5	88.3	28.00	17.75	23.50	3.5	2.25	7.5	30.6	46.108	55.5	2.5	8.8	21.75	11,800
WD30	93.0	42.8	93.3	30.00	18.62	24.50	3.6	2.50	8.1	32.9	48.180	59.0	2.8	9.8	23.00	14,800
WD32	100.6	45.0	101.1	32.00	19.75	25.75	3.1	2.50	8.3	34.3	52.325	63.0	2.8	11.7	22.25	18,400
WD34	105.5	47.5	106.0	34.00	20.75	27.00	3.1	2.75	9.0	36.0	55.951	67.0	3.0	12.3	23.50	21,650
WD36	114.0	49.0	114.5	36.00	21.50	29.50	3.1	2.75	9.0	37.5	61.132	71.0	3.0	12.8	24.50	25,600
WD38	117.0	51.0	117.5	38.00	22.25	30.50	3.1	3.00	9.8	39.0	62.867	75.0	3.3	12.8	26.00	30,000
WD40	121.5	53.0	122.0	40.00	23.25	32.00	3.1	3.00	9.8	40.8	64.867	79.0	3.3	12.8	27.75	35,600

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT R①	KEY	P	X
WD28	9.000	2.500 x 2.500 x 12.3	15.0	34.3	4.500	1.000 x 1.000 x 6.0	8.0	26.5
WD30	9.500	2.500 x 2.500 x 12.5	15.8	35.5	5.000	1.250 x 1.250 x 7.0	9.0	28.3
WD32	10.500	2.500 x 2.500 x 13.5	17.0	38.3	5.000	1.250 x 1.250 x 7.0	9.0	29.5
WD34	11.500	3.000 x 3.000 x 14.3	18.0	40.3	5.250	1.250 x 1.250 x 8.0	10.0	31.5
WD36	12.500	3.000 x 3.000 x 15.0	19.0	43.0	5.500	1.500 x 1.500 x 8.0	10.0	32.5
WD38	13.250	3.500 x 3.500 x 16.0	20.0	45.0	5.750	1.500 x 1.500 x 8.0	10.0	33.5
WD40	14.000	3.500 x 3.500 x 17.0	21.0	47.0	5.750	1.500 x 1.500 x 8.0	10.0	34.5

①**TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

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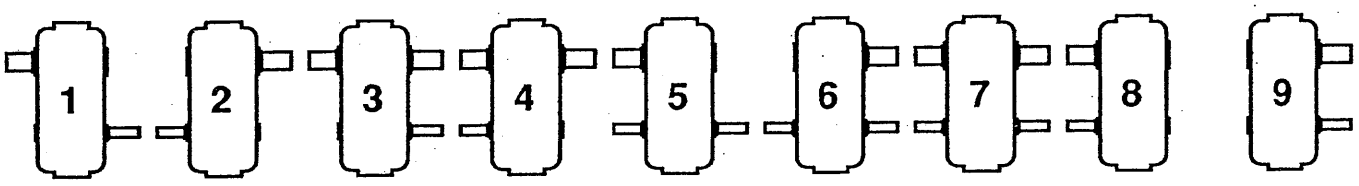
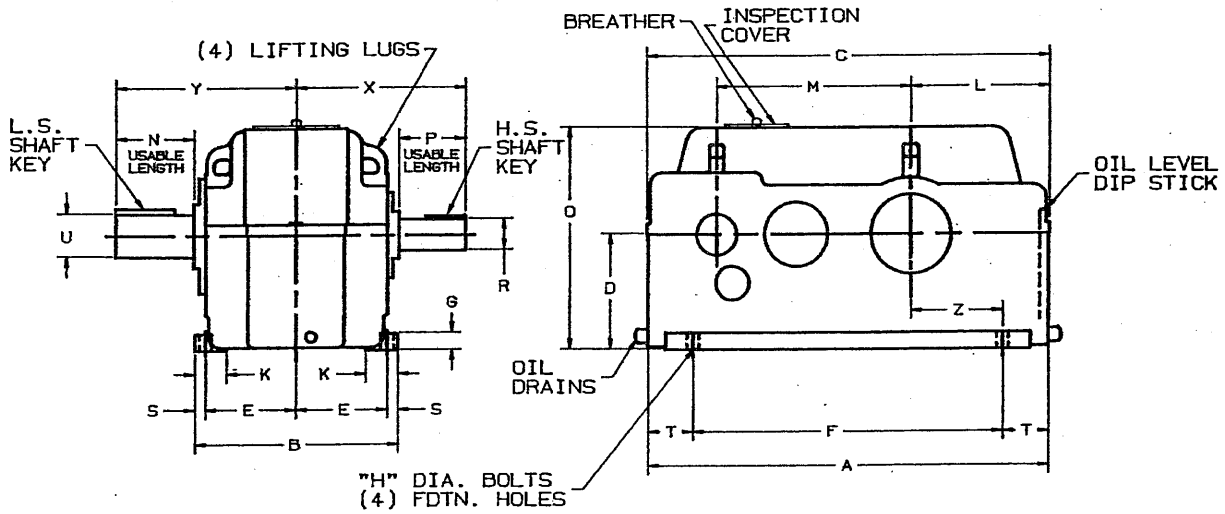
STANDARD ASSEMBLY POSITIONS



Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ☐ CERTIFIED ☐	BY:		DATE:	

Type TDS
Parallel Shaft Speed Reducers
Triple Reduction-Steel Construction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

UNIT SIZE	A	B	C	D ②	E	F	G	H	K	L	M	O	S	T	Z	APPROX WT. LBS.
WT7	26.0	15.3	26.3	8.25	6.75	20.00	1.1	0.75	3.7	9.1	12.500	15.8	0.9	3.0	6.00	800
WT8	33.0	18.0	33.3	10.25	8.00	25.50	1.5	1.00	4.3	11.1	14.548	20.0	1.0	3.8	7.25	1,150
WT9	33.0	18.0	33.3	10.25	8.00	25.50	1.5	1.00	4.3	11.1	16.500	20.0	1.0	3.8	7.25	1,300

UNIT SIZE	LOW SPEED SHAFT U ①	KEY	N	Y	HIGH SPEED SHAFT R ①	KEY	P	X
WT7	2.875	.750 x .750 x 4.0	5.0	11.3	1.125	.250 x .250 x 2.5	3.3	9.3
WT8	3.375	.875 x .875 x 4.5	6.0	13.6	1.125	.250 x .250 x 2.5	3.3	10.3
WT9	3.875	1.000 x 1.000 x 5.3	6.6	14.3	1.375	.312 x .312 x 2.5	3.5	10.5

① TOLERANCE = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

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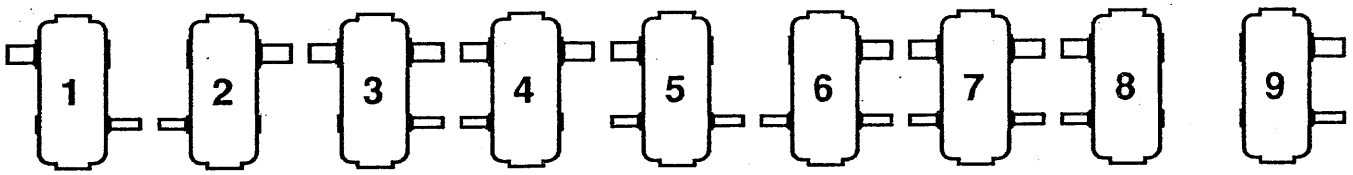
STANDARD ASSEMBLY POSITIONS

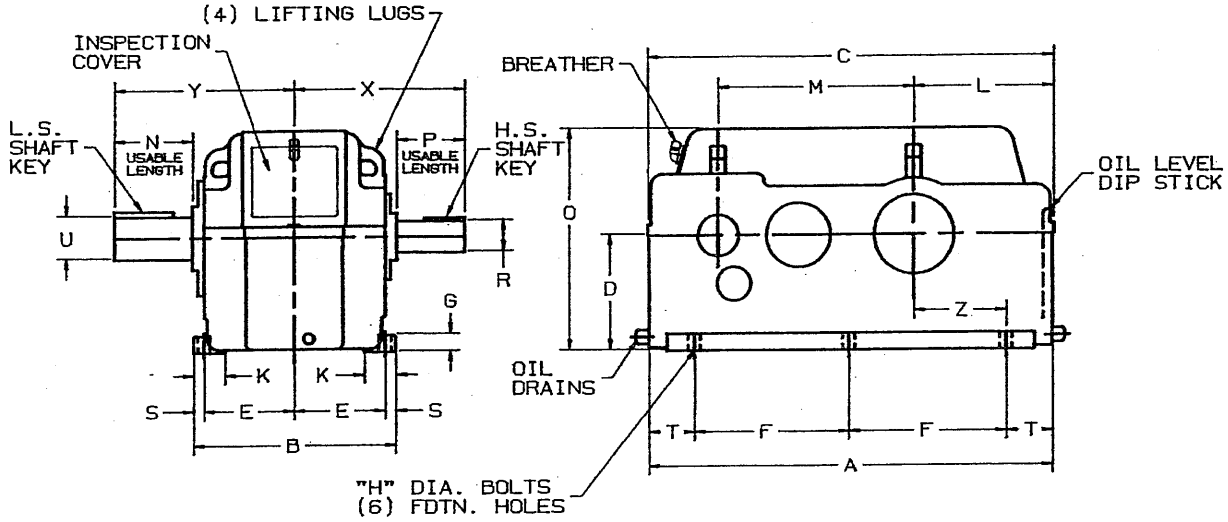


Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ☐ CERTIFIED ☐	BY:		DATE:	

Your Total Drive Source

Type TDS
Parallel Shaft Speed Reducers
Triple Reduction-Steel Construction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

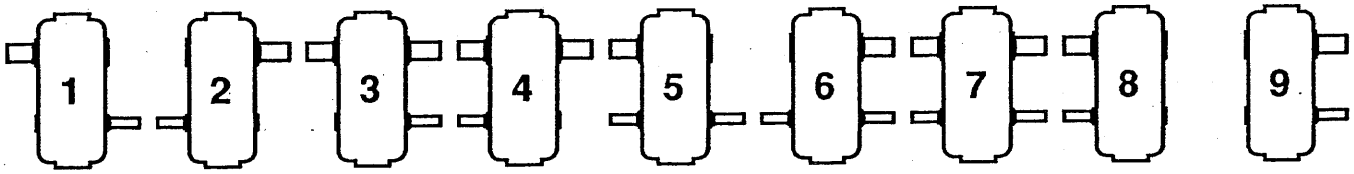
UNIT SIZE	A	B	C	D②	E	F	G	H	K	L	M	O	S	T	Z	APPROX WT. LBS.
WT11	39.5	25.0	39.8	11.50	11.25	14.75	1.8	1.00	5.8	14.0	18.638	23.0	1.3	5.0	8.88	2,200
WT12	43.0	27.0	43.3	12.50	12.25	16.25	2.0	1.25	5.8	15.3	20.866	25.0	1.3	5.3	9.88	3,050
WT13	47.3	28.0	47.6	13.50	12.75	18.25	2.0	1.25	5.9	16.2	22.969	27.0	1.3	5.4	10.70	3,550
WT15	49.5	29.5	49.8	15.00	13.25	19.25	2.3	1.50	6.5	17.4	24.524	30.0	1.5	5.5	11.75	4,150
WT16	55.5	33.0	55.8	16.50	14.75	21.88	2.5	1.50	7.3	19.6	27.198	33.0	1.8	5.9	13.62	5,700
WT18	58.8	29.0	59.0	18.00	12.75	23.00	2.8	1.75	5.0	20.8	29.270	35.5	1.8	6.4	14.25	6,850
WT20	65.3	31.0	65.5	20.00	13.75	25.50	3.0	1.75	5.8	23.1	32.523	39.5	1.8	7.1	15.88	7,300
WT22	68.3	33.0	68.5	22.00	14.50	26.50	3.3	2.00	6.3	24.6	34.077	43.5	2.0	7.6	16.88	8,750
WT25	77.5	35.0	77.8	25.00	15.25	30.50	3.5	2.25	7.0	27.1	39.891	49.5	2.3	8.3	18.75	10,450

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT R①	KEY	P	X
WT11	4.500	1.000 x 1.000 x 6.0	7.8	18.5	1.375	.312 x .312 x 2.5	3.5	14.0
WT12	4.750	1.250 x 1.250 x 6.8	8.5	20.3	1.625	.375 x .375 x 2.8	3.8	15.3
WT13	5.000	1.250 x 1.250 x 7.0	9.1	21.3	1.625	.375 x .375 x 2.8	4.0	16.0
WT15	5.250	1.250 x 1.250 x 7.8	9.5	22.0	1.875	.500 x .500 x 3.0	4.0	16.3
WT16	5.500	1.250 x 1.250 x 8.3	9.5	23.5	2.125	.500 x .500 x 3.0	4.0	17.8
WT18	6.000	1.500 x 1.500 x 8.8	10.5	25.0	2.125	.500 x .500 x 3.5	4.5	18.5
WT20	6.500	1.500 x 1.500 x 9.3	11.3	26.5	2.375	.625 x .625 x 3.8	4.8	19.8
WT22	7.000	1.750 x 1.750 x 9.8	12.0	28.8	2.625	.625 x .625 x 4.0	5.3	21.5
WT25	8.000	2.000 x 2.000 x10.8	13.5	30.8	2.875	.750 x .750 x 4.0	5.5	22.3

①**TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

②**THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

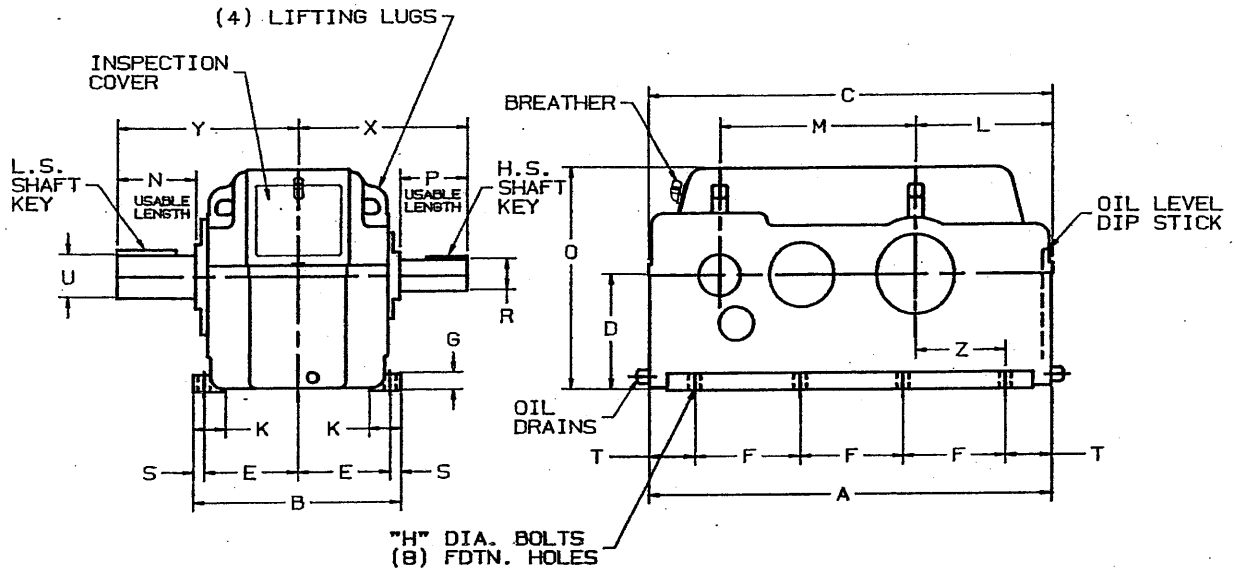
STANDARD ASSEMBLY POSITIONS



Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ☐ CERTIFIED ☐	BY:		DATE:	

Type TDS
Parallel Shaft Speed Reducers
Triple Reduction-Steel Construction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

UNIT SIZE	A	B	C	D ②	E	F	G	H	K	L	M	O	S	T	Z	APPROX WT. LBS.
WT28	88.0	40.5	88.3	28.00	17.75	23.50	3.5	2.25	7.5	30.6	46.108	55.5	2.5	8.8	21.75	12,150
WT30	93.0	42.8	93.3	30.00	18.62	24.50	3.6	2.50	8.1	32.9	48.180	59.0	2.8	9.8	23.00	15,150
WT32	100.6	45.0	101.1	32.00	19.75	25.75	3.1	2.50	8.3	34.3	52.325	63.0	2.8	11.7	22.25	18,800
WT34	105.5	47.5	106.0	34.00	20.75	27.00	3.1	2.75	9.0	36.0	55.951	67.0	3.0	12.3	23.50	22,050
WT36	114.0	49.0	114.5	36.00	21.50	29.50	3.1	2.75	9.0	37.5	61.132	71.0	3.0	12.8	24.50	26,050
WT38	117.0	51.0	117.5	38.00	22.25	30.50	3.1	3.00	9.8	39.0	62.867	75.0	3.3	12.8	26.00	30,450
WT40	121.5	53.0	122.0	40.00	23.25	32.00	3.1	3.00	9.8	40.8	64.867	79.0	3.3	12.8	27.75	36,100

UNIT SIZE	LOW SPEED SHAFT U ①	KEY	N	Y	HIGH SPEED SHAFT R ①	KEY	P	X
WT28	9.000	2.500 x 2.500 x 12.3	15.0	34.3	3.375	.875 x .875 x 4.5	6.5	25.0
WT30	9.500	2.500 x 2.500 x 12.5	15.8	35.5	3.625	.875 x .875 x 5.0	7.0	26.3
WT32	10.500	2.500 x 2.500 x 13.5	17.0	38.3	3.625	.875 x .875 x 5.0	7.0	27.5
WT34	11.500	3.000 x 3.000 x 14.3	18.0	40.3	3.625	.875 x .875 x 5.0	7.0	28.5
WT36	12.500	3.000 x 3.000 x 15.0	19.0	43.0	3.875	1.000 x 1.000 x 5.5	8.0	30.5
WT38	13.250	3.500 x 3.500 x 16.0	20.0	45.0	3.875	1.000 x 1.000 x 5.5	8.0	31.5
WT40	14.000	3.500 x 3.500 x 17.0	21.0	47.0	3.875	1.000 x 1.000 x 5.5	8.0	33.0

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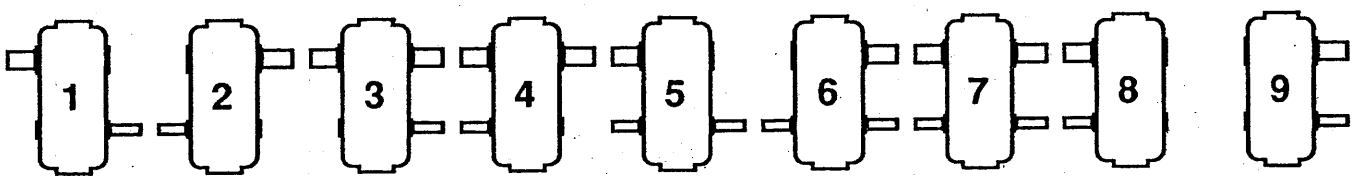
STANDARD ASSEMBLY POSITIONS

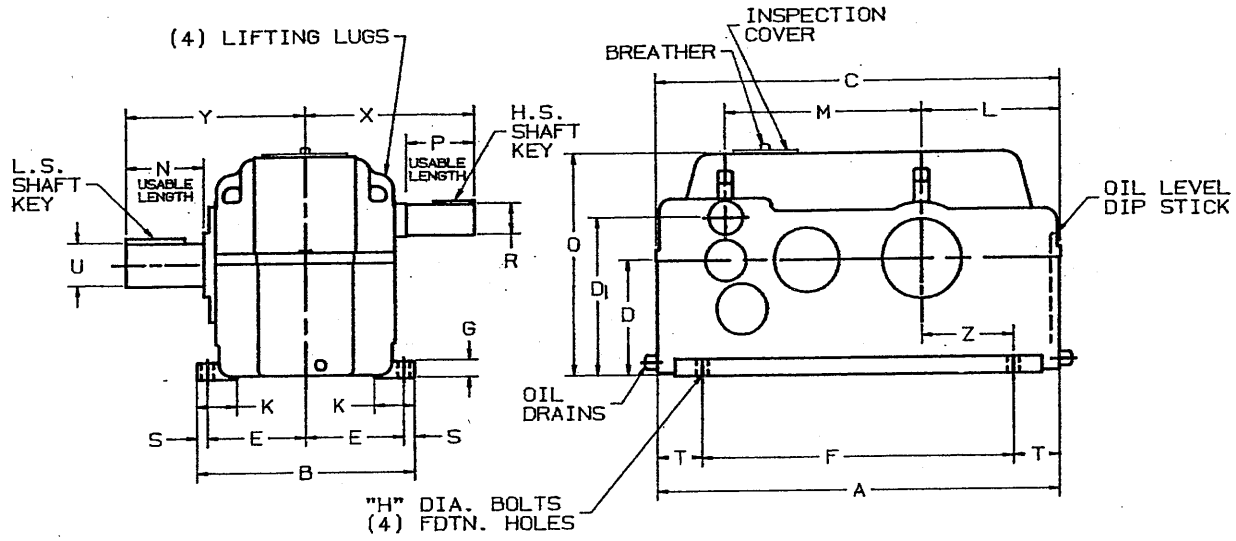


Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ☐ CERTIFIED ☐	BY:		DATE:	

Your Total Drive Source

Type TDS
Parallel Shaft Speed Reducers
Quadruple Reduction-Steel Construction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

UNIT SIZE	A	B	C	D ②	D1	E	F	G	H	K	L	M	O	S	T	Z	APPROX WT. LBS.
WQ7	26.0	15.3	26.3	8.25	11.75	6.75	20.00	1.1	0.75	3.7	9.1	12.500	15.8	0.9	3.0	6.00	850
WQ8	33.0	18.0	33.3	10.25	13.75	8.00	25.50	1.5	1.00	4.3	11.1	14.548	20.0	1.0	3.8	7.25	1,200
WQ9	33.0	18.0	33.3	10.25	13.75	8.00	25.50	1.5	1.00	4.3	11.1	16.500	20.0	1.0	3.8	7.25	1,400

UNIT SIZE	LOW SPEED SHAFT U ①	KEY	N	Y	HIGH SPEED SHAFT R ①	KEY	P	X
WQ7	2.875	.750 x .750 x 4.0	5.0	11.3	1.125	.250 x .250 x 2.5	3.3	9.3
WQ8	3.375	.875 x .875 x 4.5	6.0	13.6	1.125	.250 x .250 x 2.5	3.3	10.3
WQ9	3.875	1.000 x 1.000 x 5.3	6.6	14.3	1.375	.312 x .312 x 2.5	3.5	10.5

① TOLERANCE = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

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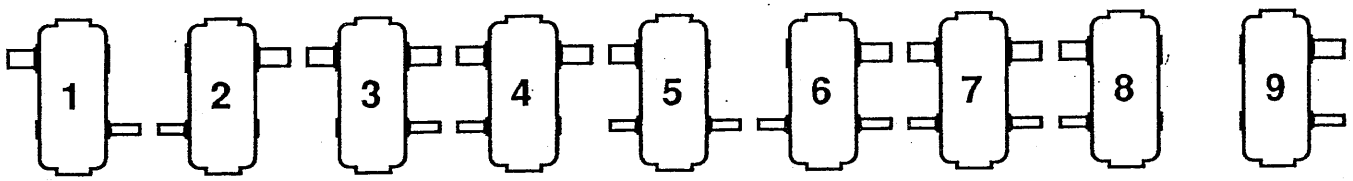
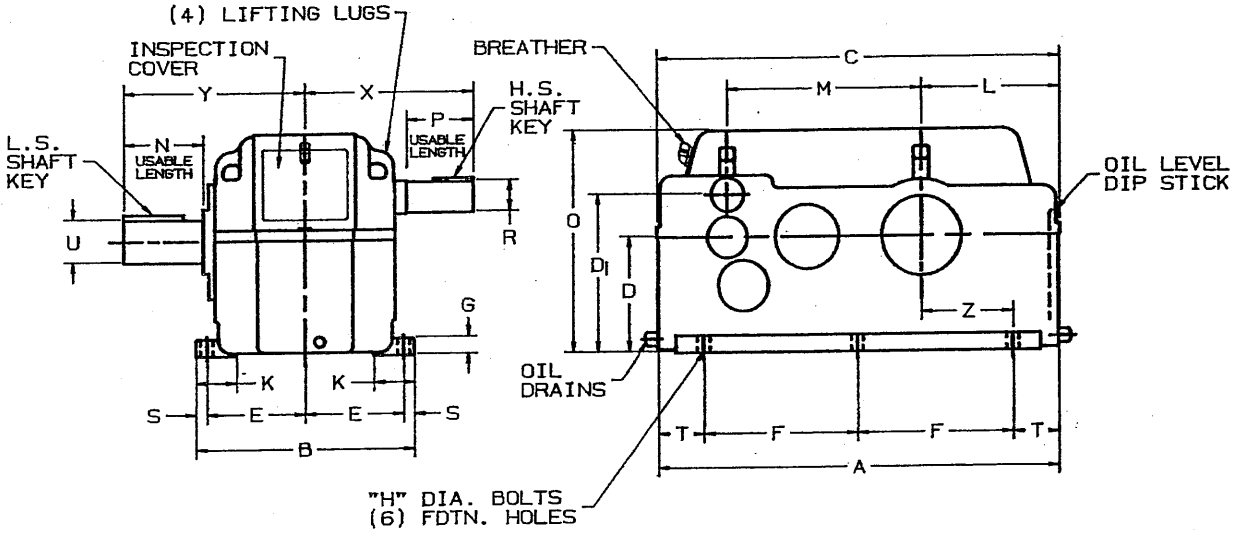
STANDARD ASSEMBLY POSITIONS



Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ☐ CERTIFIED ☐	BY:		DATE:	

Type TDS
Parallel Shaft Speed Reducers
WQ11 to WQ25 Quadruple Reduction-Steel Construction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

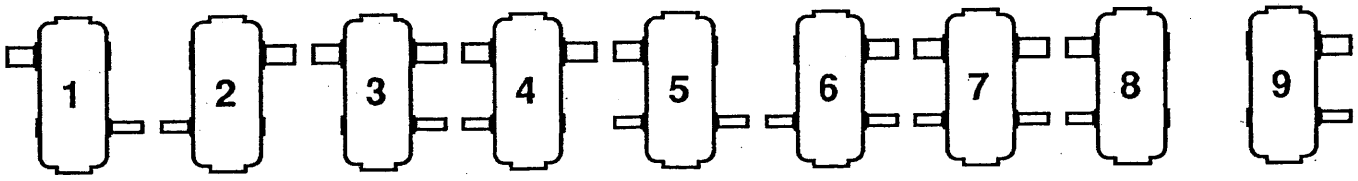
UNIT SIZE	A	B	C	D ②	D1	E	F	G	H	K	L	M	O	S	T	Z	APPROX WT. LBS.
WQ11	39.5	25.0	39.8	11.50	15.50	11.25	14.75	1.8	1.00	5.8	14.0	18.638	23.0	1.3	5.0	8.88	2,300
WQ12	43.0	27.0	43.3	12.50	16.50	12.25	16.25	2.0	1.25	5.8	15.3	20.866	25.0	1.3	5.3	9.88	3,150
WQ13	47.3	28.0	47.6	13.50	17.50	12.75	18.25	2.0	1.25	5.9	16.2	22.969	27.0	1.3	5.4	10.70	3,700
WQ15	49.5	29.5	49.8	15.00	19.00	13.25	19.25	2.3	1.50	6.5	17.4	24.524	30.0	1.5	5.5	11.75	4,300
WQ16	55.5	33.0	55.8	16.50	21.50	14.75	21.88	2.5	1.50	7.3	19.6	27.198	33.0	1.8	5.9	13.62	5,850
WQ18	58.8	29.0	59.0	18.00	23.00	12.75	23.00	2.8	1.75	5.0	20.8	29.270	35.5	1.8	6.4	14.25	7,050
WQ20	65.3	31.0	65.5	20.00	26.00	13.75	25.50	3.0	1.75	5.8	23.1	32.523	39.5	1.8	7.1	15.88	7,500
WQ22	68.3	33.0	68.5	22.00	28.00	14.50	26.50	3.3	2.00	6.3	24.6	34.077	43.5	2.0	7.6	16.88	9,000
WQ25	77.5	35.0	77.8	25.00	31.00	15.25	30.50	3.5	2.25	7.0	27.1	39.891	49.5	2.3	8.3	18.75	10,750

UNIT SIZE	LOW SPEED SHAFT U ①	KEY	N	Y	HIGH SPEED SHAFT R ①	KEY	P	X
WQ11	4.500	1.000 x 1.000 x 6.0	7.8	18.5	1.375	.312 x .312 x 2.5	3.5	14.0
WQ12	4.750	1.250 x 1.250 x 6.8	8.5	20.3	1.625	.375 x .375 x 2.8	3.8	15.3
WQ13	5.000	1.250 x 1.250 x 7.0	9.1	21.3	1.625	.375 x .375 x 2.8	4.0	16.0
WQ15	5.250	1.250 x 1.250 x 7.8	9.5	22.0	1.875	.500 x .500 x 3.0	4.0	16.3
WQ16	5.500	1.250 x 1.250 x 8.3	9.5	23.5	2.125	.500 x .500 x 3.0	4.0	17.8
WQ18	6.000	1.500 x 1.500 x 8.8	10.5	25.0	2.125	.500 x .500 x 3.5	4.5	18.5
WQ20	6.500	1.500 x 1.500 x 9.3	11.3	26.5	2.375	.625 x .625 x 3.8	4.8	19.8
WQ22	7.000	1.750 x 1.750 x 9.8	12.0	28.8	2.625	.625 x .625 x 4.0	5.3	21.5
WQ25	8.000	2.000 x 2.000 x10.8	13.5	30.8	2.875	.750 x .750 x 4.0	5.5	22.3

① TOLERANCE = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

② THIS DIMENSION will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

STANDARD ASSEMBLY POSITIONS

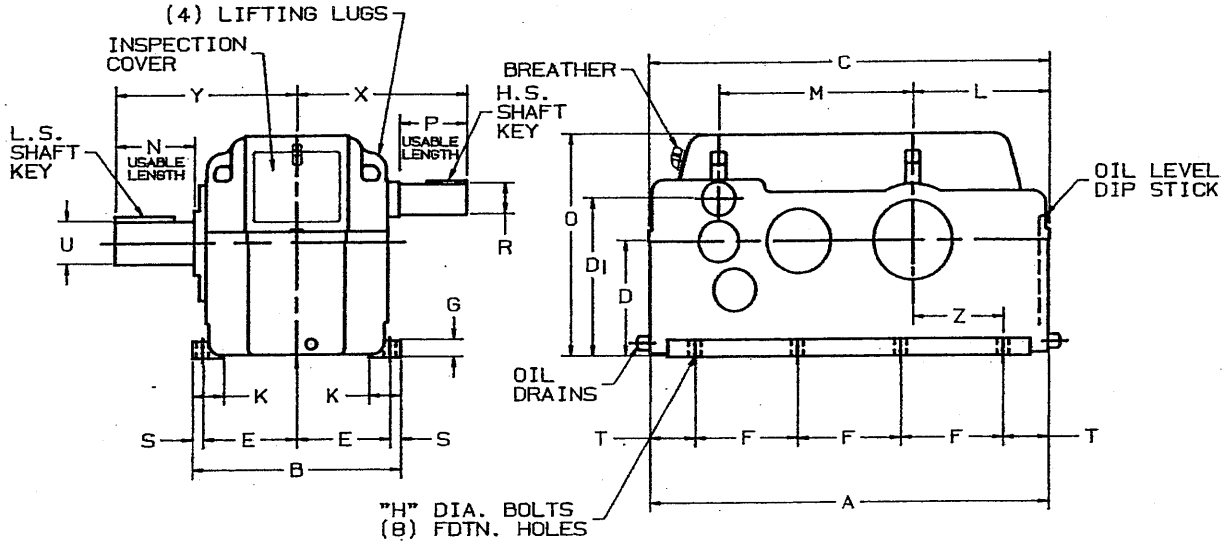


Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ☐ CERTIFIED ☐	BY:		DATE:	

Your Total Drive Source

Type TDS
Parallel Shaft Speed Reducers
Quadruple Reduction-Steel Construction WQ28 to WQ40



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

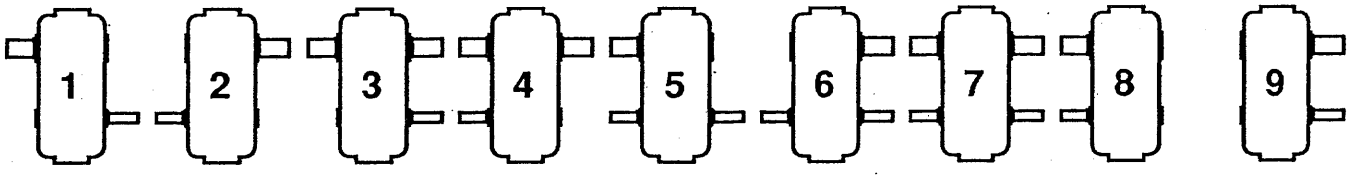
UNIT SIZE	A	B	C	D②	D1	E	F	G	H	K	L	M	O	S	T	Z	APPROX WT. LBS.
WQ28	88.0	40.5	88.3	28.00	35.50	17.75	23.50	3.5	2.25	7.5	30.6	46.108	55.5	2.5	8.8	21.75	12,500
WQ30	93.0	42.8	93.3	30.00	37.50	18.62	24.50	3.6	2.50	8.1	32.9	48.180	59.0	2.8	9.8	23.00	15,500
WQ32	100.6	45.0	101.1	32.00	40.50	19.75	25.75	3.1	2.50	8.3	34.3	52.325	63.0	2.8	11.7	22.25	19,200
WQ34	105.5	47.5	106.0	34.00	42.50	20.75	27.00	3.1	2.75	9.0	36.0	55.951	67.0	3.0	12.3	23.50	22,450
WQ36	114.0	49.0	114.5	36.00	44.50	21.50	29.50	3.1	2.75	9.0	37.5	61.132	71.0	3.0	12.8	24.50	26,500
WQ38	117.0	51.0	117.5	38.00	47.50	22.25	30.50	3.1	3.00	9.8	39.0	62.867	75.0	3.3	12.8	26.00	30,900
WQ40	121.5	53.0	122.0	40.00	49.50	23.25	32.00	3.1	3.00	9.8	40.8	64.867	79.0	3.3	12.8	27.75	36,600

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT R①	KEY	P	X
WQ28	9.000	2.500 x 2.500 x 12.3	15.0	34.3	3.375	.875 x .875 x 4.5	6.5	25.0
WQ30	9.500	2.500 x 2.500 x 12.5	15.8	35.5	3.625	.875 x .875 x 5.0	7.0	26.3
WQ32	10.500	2.500 x 2.500 x 13.5	17.0	38.3	3.625	.875 x .875 x 5.0	7.0	27.5
WQ34	11.500	3.000 x 3.000 x 14.3	18.0	40.3	3.625	.875 x .875 x 5.0	7.0	28.5
WQ36	12.500	3.000 x 3.000 x 15.0	19.0	43.0	3.875	1.000 x 1.000 x 5.5	8.0	30.5
WQ38	13.250	3.500 x 3.500 x 16.0	20.0	45.0	3.875	1.000 x 1.000 x 5.5	8.0	31.5
WQ40	14.000	3.500 x 3.500 x 17.0	21.0	47.0	3.875	1.000 x 1.000 x 5.5	8.0	33.0

① TOLERANCE = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

② THIS DIMENSION will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

STANDARD ASSEMBLY POSITIONS



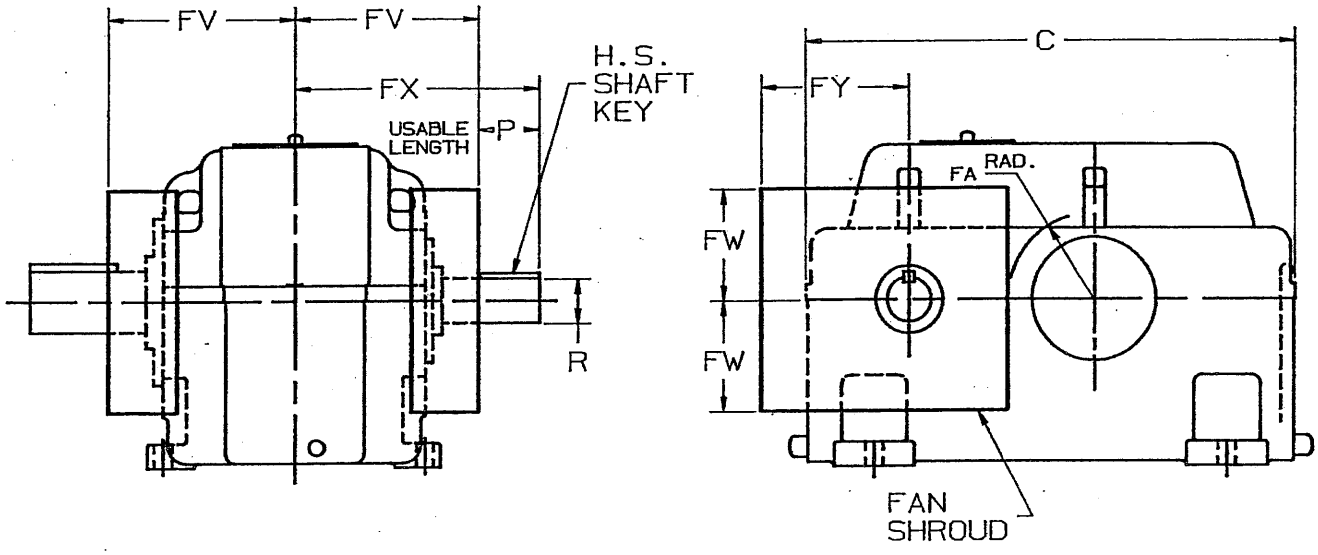
Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

Type TDS
Parallel Shaft Speed Reducers

NOTES

Type TDS
Parallel Shaft Speed Reducers
Fan Cooled



① H.S. SHAFT length is longer than standard on fan cooled unit to accomodate the fan and maintain usable shaft length

SINGLE REDUCTION

UNIT SIZE	C	FA	FV	FW	FY	P	FX ①
7	27.7	3.0	8.3	4.3	11.1	4.0	12.3
8	34.8	3.0	9.5	5.0	15.1	4.3	13.8
9	34.8	4.3	9.5	5.0	14.1	4.8	14.3
11	35.3	3.9	11.5	8.0	10.0	5.5	17.0
12	37.7	5.1	12.5	8.0	10.3	6.5	19.0
13	49.1	5.2	15.5	8.0	19.4	6.6	21.7
15	44.2	5.5	14.0	9.5	11.6	7.3	21.3
16	57.3	6.2	17.5	9.5	21.1	7.4	25.2
18	51.2	8.6	15.3	9.5	13.0	8.0	23.3
20	55.7	10.7	15.8	9.5	13.4	8.5	24.3
22	61.0	11.3	16.9	11.0	14.9	9.0	26.0
25	69.5	12.9	17.9	12.0	16.8	10.0	18.0
28	78.5	13.9	19.1	12.0	19.5	11.0	30.1
30	83.5	14.9	20.4	12.0	20.5	12.0	32.5

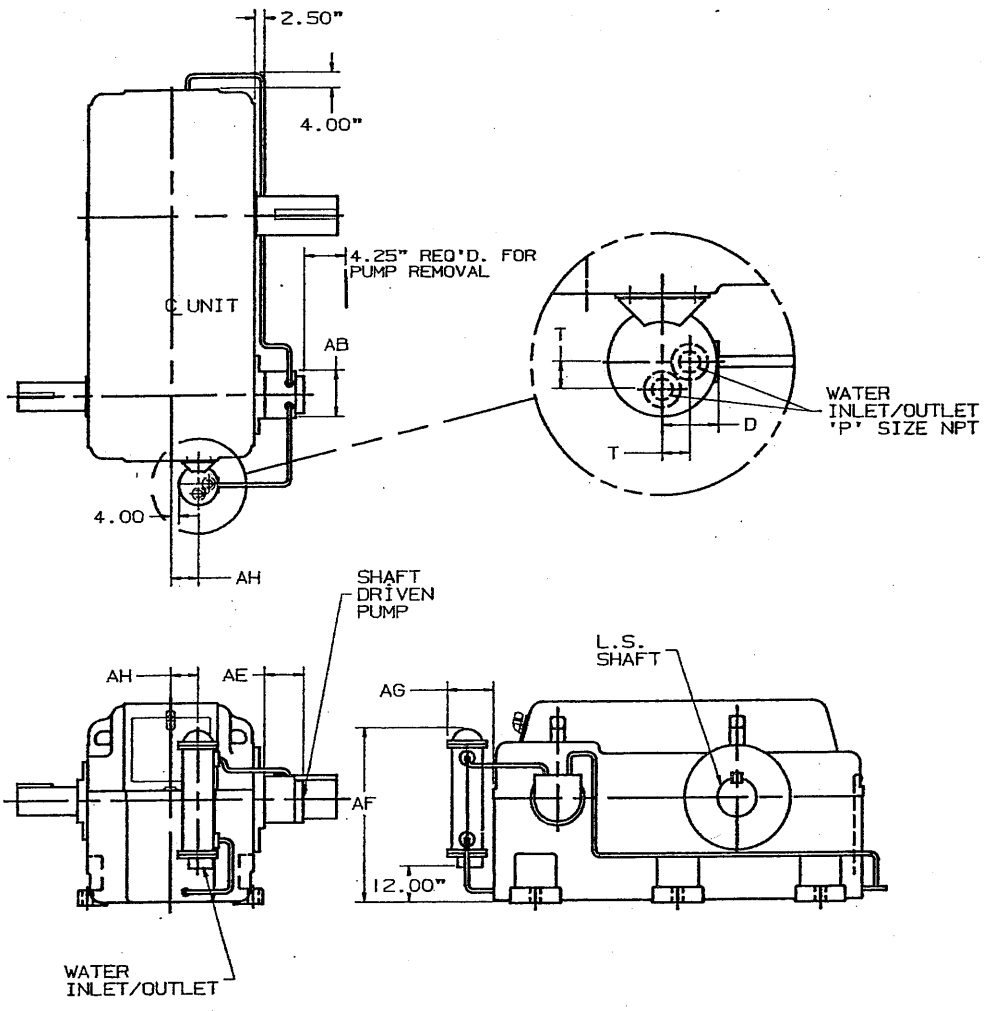
DOUBLE AND TRIPLE REDUCTION

UNIT SIZE	C	FA	FV	FW	FY	DOUBLE P	DOUBLE FX ①	TRIPLE P	TRIPLE FX ①
7	27.7	4.6	8.3	5.0	6.1	3.5	11.8	3.3	11.5
8	34.8	7.0	10.0	7.0	9.1	3.7	13.7	3.3	13.3
9	34.8	9.0	10.0	7.0	7.1	4.0	14.0	3.5	13.5
11	41.2	10.1	13.0	7.0	8.6	4.5	17.5	3.5	16.5
12	44.8	11.4	14.8	8.0	8.6	5.3	20.1	3.8	18.6
13	49.1	12.5	15.5	8.0	9.9	5.6	20.7	4.0	19.1
15	51.3	14.0	15.5	8.0	9.4	6.0	21.6	4.0	19.5
16	57.3	15.5	16.8	9.5	10.5	6.0	22.8	4.0	20.8
18	60.5	17.0	17.8	9.5	10.5	6.5	24.3	4.5	22.3
20	67.0	19.1	18.8	9.5	11.4	6.5	25.3	4.8	23.5
22	70.0	20.7	20.5	11.0	11.3	7.0	27.5	5.3	25.8
25	79.3	26.4	21.0	11.0	12.3	7.3	28.3	5.5	26.5
28	89.7	30.1	23.0	12.0	13.0	8.0	31.0	6.5	29.5
30	94.8	32.2	23.6	12.0	13.7	9.0	33.0	7.0	31.0
32	102.4	34.1	26.0	14.0	15.8	9.0	35.0	7.0	33.0
34	107.3	38.0	27.0	14.0	15.8	10.0	37.0	7.0	34.0
36	115.8	43.1	29.0	16.0	17.2	10.0	39.0	8.0	37.0
38	118.8	44.9	30.0	16.0	17.2	10.0	40.0	8.0	38.0
40	123.3	46.9	31.3	16.0	17.6	10.0	41.3	8.0	39.3

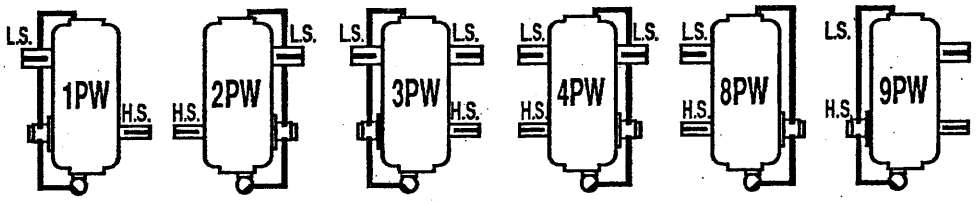
Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

Type TDS
Parallel Shaft Speed Reducers
Water Cooled Units



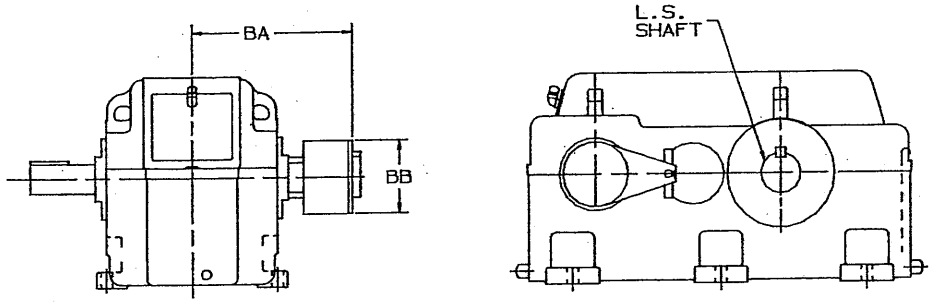
UNIT SIZE	AB	AE	AF	AG	AH	D	T	P
1	5.2	2.8	39.9	7.1	7.0	3.13	1.25	0.75
2	5.2	2.8	39.9	5.6	6.3	2.31	1.00	0.75
3	6.6	3.4	52.8	8.0	7.4	3.44	1.69	1.00
4	6.6	3.4	40.8	8.0	7.4	3.44	1.69	1.00
5	6.5	4.1	65.1	9.1	7.9	4.06	2.00	1.50
6	6.5	4.1	52.8	8.0	7.4	3.44	1.69	1.00



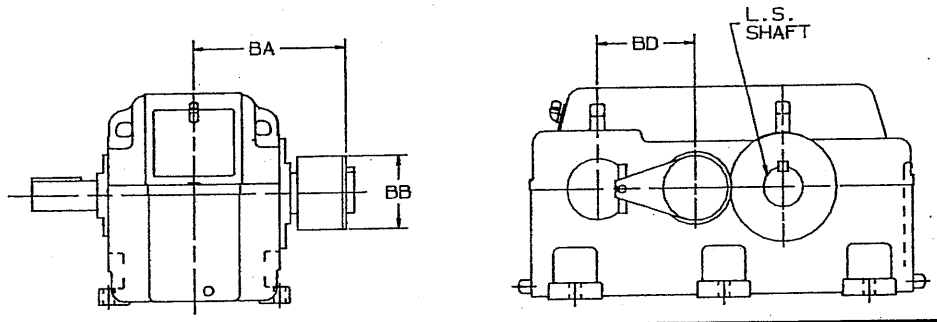
Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

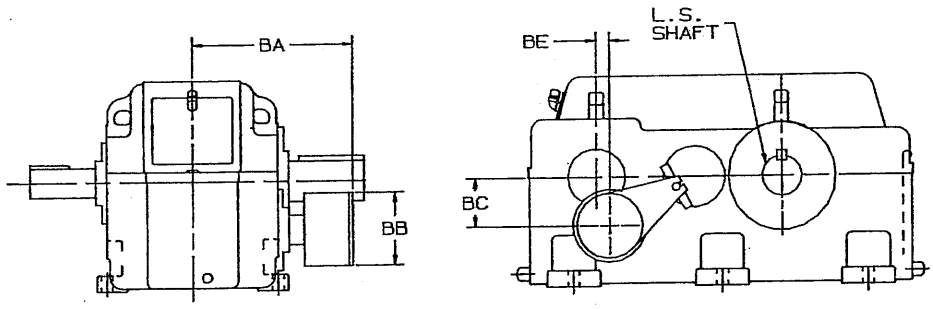
Type TDS
Parallel Shaft Speed Reducers
Backstops



ASSEMBLY A
Backstop mounted on high speed shaft extension.
(Double, Triple, Quadruple Reduction)



ASSEMBLY B
Backstop mounted on intermediate shaft extension.
(Double Reduction)



ASSEMBLY C
Backstop mounted on intermediate shaft extension.
(Triple, Quadruple Reduction)

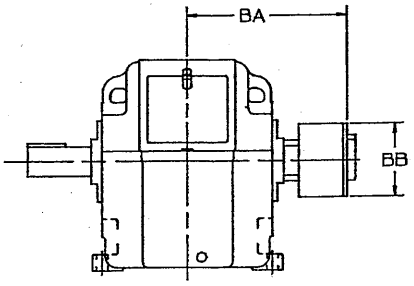
	BACKSTOP MODEL NUMBER						
	B20	B50	B80	B110	B120	B130	B150
TORQUE (x1000 IN. LBS.)	3.6	12.0	26.4	48.0	81.6	138	216
MAXIMUM RPM	2900	2650	2300	2000	1800	1400	1300
BB DIMENSION	3.5	4.3	5.4	7.2	8.8	10.0	12.0

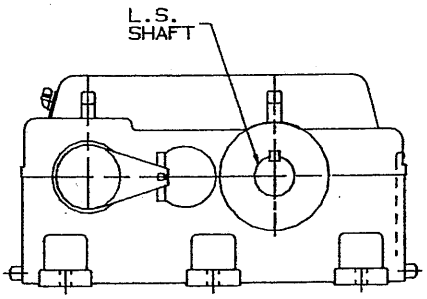
UNIT	BC	BD	BE	BA DIMENSIONS						
7	3.7	1.6	5.0	12.3	14.0					
8	3.8	1.3	6.0	13.3	15.0					
9	4.7	1.8	7.0	13.3	15.0					
11	4.7	1.7	7.5	16.8	18.5	18.8				
12	5.6	2.1	8.5	17.8	19.5	19.8				
13	5.7	1.9	9.5	18.2	19.9	20.2				
15	5.7	1.9	9.5	18.6	20.3	20.6				
16	7.0	2.6	10.6	20.1	21.8	22.1	24.3	26.3		
18	7.0	2.5	11.1	20.3	22.0	22.3	24.5	26.5		

Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

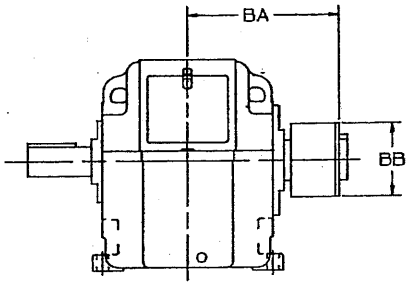
CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

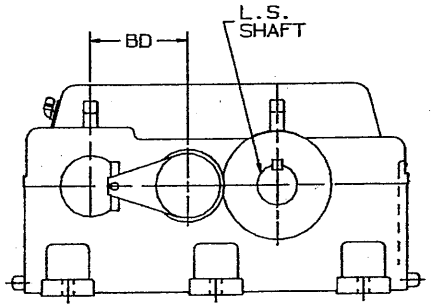
Type TDS
Parallel Shaft Speed Reducers
Backstops



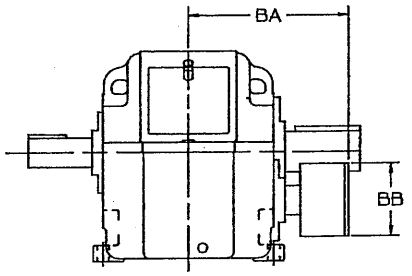


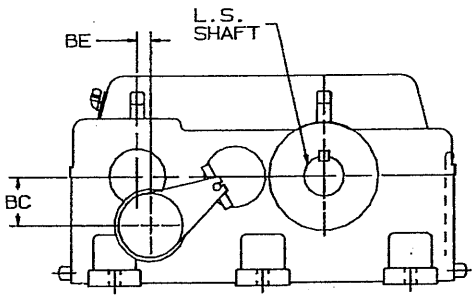
ASSEMBLY A
Backstop mounted on high speed shaft extension.
(Double, Triple, Quadruple Reduction)





ASSEMBLY B
Backstop mounted on intermediate shaft extension.
(Double Reduction)





ASSEMBLY C
Backstop mounted on intermediate shaft extension.
(Triple, Quadruple Reduction)

	BACKSTOP MODEL NUMBER						
	B20	B50	B80	B110	B120	B130	B150
TORQUE (x1000 IN. LBS.)	3.6	12.0	26.4	48.0	81.6	138	216
MAXIMUM RPM	2950	2650	2300	2000	1800	1400	1300
BB DIMENSION	3.5	4.3	5.4	7.2	8.8	10.0	12.0

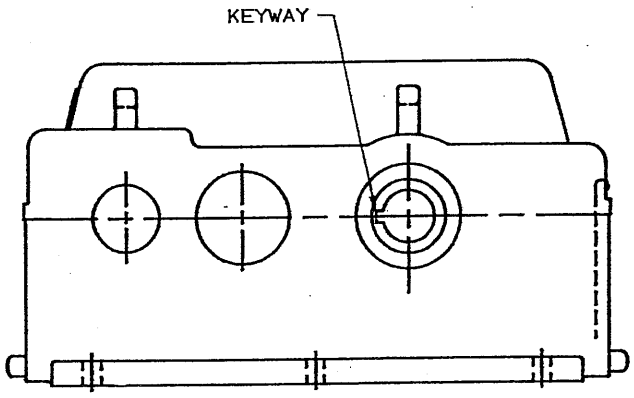
UNIT	BC	BD	BE	BA DIMENSIONS						
20	8.0	3.0	12.3	21.3	23.0	23.3	25.5	27.5		
22	8.0	3.0	12.3	22.6	24.3	24.6	26.8	28.8	29.3	
25	9.0	3.0	15.0	23.1	24.8	25.1	27.3	29.3	29.8	30.6
28	10.6	3.4	18.1	24.8	26.5	26.8	29.0	31.0	31.5	32.3
30	10.6	3.4	18.1	25.6	27.3	27.6	29.8	31.8	32.3	33.1
32	11.7	3.8	20.2	26.8	28.5	28.8	31.0	33.0	33.5	34.3
34	12.8	4.2	21.8	27.8	29.5	29.8	32.0	34.0	34.5	35.3
36	14.3	4.5	24.9	28.8	30.5	30.8	33.0	35.0	35.5	36.3
38	14.3	4.5	24.9	29.8	31.5	31.8	34.0	36.0	36.5	37.3
40	14.3	4.5	24.9	30.8	32.5	32.8	35.0	37.0	37.5	38.3

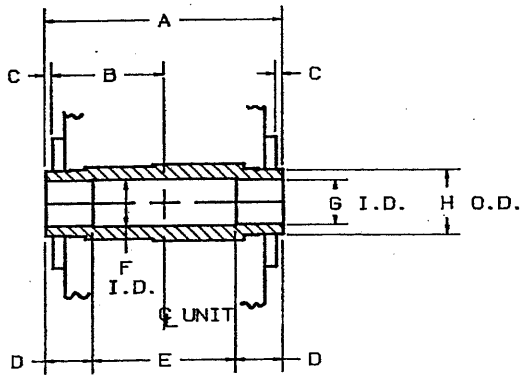
Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

Your Total Drive Source

Type TDS
Parallel Shaft Speed Reducers
Hollow Shaft Construction





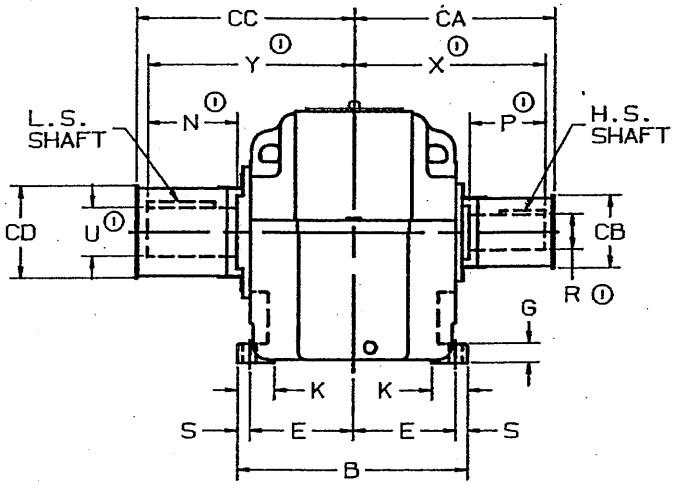
UNIT SIZE ①	A	B	C	D	E	F	G	H	KEYS ②
7	13.1	6.3	.25	3.3	6.50	3.125	2.875	4.250	.750 x .750 x 3.1
8	15.7	7.6	.25	3.9	7.90	3.625	3.375	5.000	.875 x .875 x 3.7
9	15.9	7.7	.25	4.0	7.90	4.125	3.875	5.750	1.000 x 1.000 x 3.8
11	21.9	10.7	.25	5.5	10.90	4.750	4.500	6.750	1.000 x 1.000 x 5.3
12	24.1	11.8	.25	6.0	12.10	5.000	4.750	7.000	1.250 x 1.250 x 5.8
13	24.9	12.2	.25	6.2	12.50	5.250	5.000	7.500	1.250 x 1.250 x 6.0
15	25.5	12.5	.25	6.4	12.70	5.500	5.250	8.000	1.250 x 1.250 x 6.2
16	29.0	14.0	.50	7.3	14.40	5.750	5.500	8.250	1.250 x 1.250 x 7.1
18	30.0	14.5	.50	7.5	15.00	6.250	6.000	9.000	1.500 x 1.500 x 7.3
20	31.4	15.2	.50	7.9	15.60	6.750	6.500	9.750	1.500 x 1.500 x 7.7
22	34.6	16.8	.50	8.6	17.40	7.250	7.000	10.500	1.750 x 1.750 x 8.4
25	35.6	17.3	.50	8.9	17.80	8.250	8.000	12.000	2.000 x 2.000 x 8.7
28	40.6	19.3	1.00	10.1	20.40	9.250	9.000	13.500	2.500 x 2.500 x 9.9
30	41.4	19.7	1.00	10.3	20.80	9.750	9.500	14.000	2.500 x 2.500 x 10.1
32	44.6	21.3	1.00	11.1	22.40	10.750	10.500	16.000	2.500 x 2.500 x 10.9
34	46.6	22.3	1.00	11.6	23.40	11.750	11.500	17.000	3.000 x 3.000 x 11.4
36	50.0	24.0	1.00	12.5	23.00	12.750	12.500	18.750	3.000 x 3.000 x 12.3
38	52.0	25.0	1.00	13.0	25.24	13.500	13.250	20.000	3.500 x 3.500 x 12.8
40	54.0	26.0	1.00	13.5	25.74	14.250	14.000	21.000	3.500 x 3.500 x 13.3

① *Above dimensions for multiple reduction units only. For single reduction, please contact Nuttall Gear*
② *2 Keys Supplied*

Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

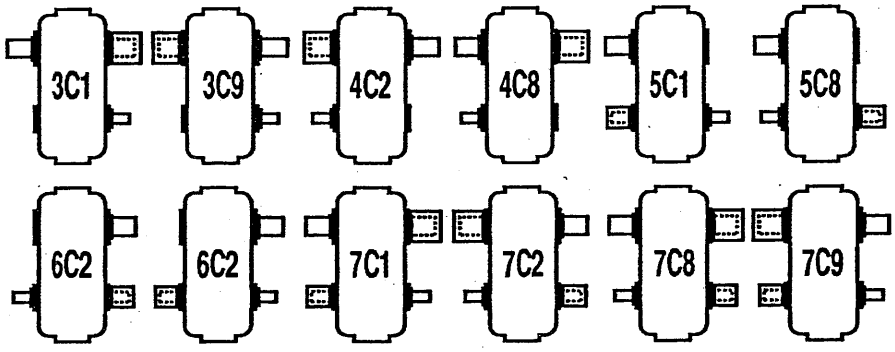
Type TDS
Parallel Shaft Speed Reducers
Shaft Covers



UNIT SIZE	SINGLE REDUCTION CA	CB	CC	CD	DOUBLE, TRIPLE, QUADRUPLE REDUCTION CA	CB	CC	CD
7	11.3	3.87	11.5	5.20	9.8	2.62	11.5	5.12
8	12.0	5.12	13.8	6.62	11.0	3.38	13.9	6.62
9	12.5	5.12	14.5	6.62	11.3	3.38	14.5	6.62
11	15.5	5.62	16.8	7.12	15.3	3.87	18.8	7.12
12	17.0	6.62	19.6	8.12	17.0	4.62	21.5	8.62
13	19.5	7.12	21.5	8.62	18.3	5.00	21.6	8.62
15	18.5	7.12	21.4	8.62	18.5	5.00	23.3	8.62
16	22.2	8.62	23.7	10.62	20.1	5.62	23.8	10.62
18	20.5	8.62	24.1	10.62	20.8	5.62	26.9	10.62
20	21.0	8.62	26.0	12.12	21.8	5.62	28.4	12.12
22	22.0	8.62	27.0	12.12	23.5	6.62	30.5	12.12
25	24.0	10.62	29.3	12.62	24.8	7.12	32.8	12.62
28	24.0	10.62	28.6	13.25	25.8	8.12	35.0	14.62
30	26.0	11.62	30.5	13.62	28.7	8.62	36.0	11.12
32					28.7	8.62	38.5	12.12
34					31.1	9.12	40.5	12.12
36					32.5	9.62	43.5	13.12
38					33.5	10.12	45.5	14.12
40					33.5	10.12	47.5	15.12

① *NOTE: For Dimensions N, P, U, R, X, Y see appropriate unit drawing.*

STANDARD ASSEMBLY POSITIONS



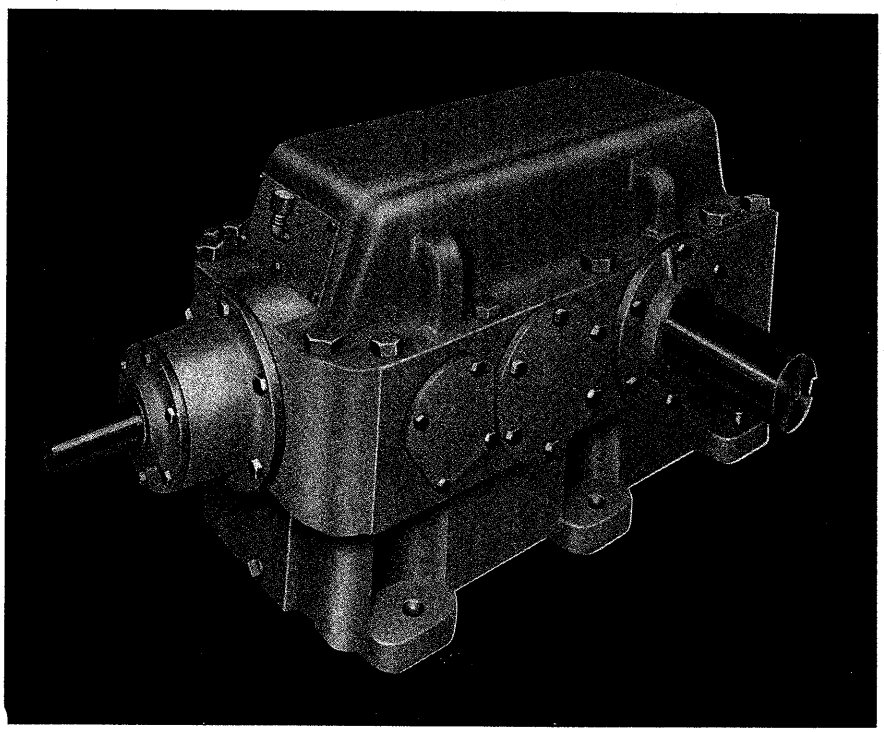
Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ☐ CERTIFIED ☐	BY:		DATE:	

Your Total Drive Source

Type TDS

Right Angle Shaft Speed Reducers



Type **TDS** Right Angle Shaft Speed Reducers are available with torque ratings up to 6,200,000 inch-pounds and standard gear ratios up to 238:1. **TDS** units enclose precision spiral bevel and helical gearing in heavy duty cast iron or steel fabricated housings. Standard features include tapered roller bearings, large inspection plates, a positive splash lubrication system, extra wide bearing spans and center bearing supports; all to provide a rugged reliable unit with proven dependability in virtually every industrial application. **Nuttall Gear Corporation** can supply **TDS** units separately or in completely engineered packages including motors, reducers, couplings, clutches and other accessories mounted on bedplates, ready to install and operate.

For over 100 years **Nuttall Gear** has provided cost effective solutions to application problems in the broad spectrum of industrial machinery.

As a charter member of the American Gear Manufacturers Association (AGMA), **Nuttall Gear** research and field experience have added many advanced concepts to increase efficiency and operational reliability, and to simplify adaptation to the many special application requirements of specific industries in today's industrial environment.

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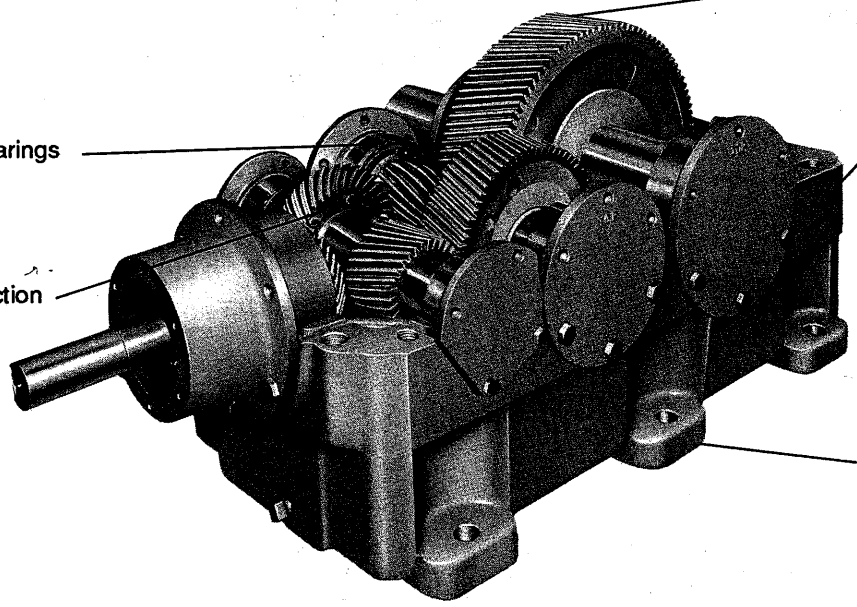
Effective: 15 SEPT 1993
Supersedes: NEW

Type TDS
Right Angle Shaft Speed Reducers
Construction Features



Spiral Bevel and Helical Gears made from high alloy steel for strength and shock resistance, to provide a long trouble free operating life.

Inspection Plate with attached breather permits easy inspection for preventative maintenance check-ups.

Oil Dip Stick provides a foolproof and time-saving method of accurately checking and maintaining the proper oil level.

Recessed Foot Pads reduce floor space requirements. Adequate clearance is provided in the housing recess for standard tools.

Splash Lubricated with oil troughs. Wipers and oil dams are also included when required.

Lifting Lugs can be used to lift the entire reducer safely and easily.

Cast-Iron Housings, corrosion resistant, provide rigid alignment of internal components. The flat top allows for mounting of motors and auxiliary equipment. **TDS Reducers** are also available in fabricated steel housings in standard and special configurations.

Shafts are made of high alloy 4150 ANSI steel. Input and output shafts are fitted with **double lip seals** to keep oil in, and contaminants out.

Type TDS
Right Angle Shaft Speed Reducers
Reducer Selection

REQUIRED APPLICATION DATA

A. Application Type
B. Hours of operation per day
C. Application Horsepower (or torque) required
D. Determine AGMA minimum application factor from tables on Section 330, pages 5 -7
E. Prime mover, type and speed
F. Gear ratio or desired output speed
G. Overhung load requirements, if any
H. Modifications or accessories
I. Mounting position

SELECTION PROCEDURE

Procedure:

A. Using the proper AGMA application factor, determine the minimum equivalent horsepower or torque capacity required. (Equivalent power = application power x application factor)

B. The rating tables are grouped by reduction, and sub-divided by input speeds of 1750, 1170, 870, 720, and 580 RPM. Locate the appropriate pages and find the desired gear ratio or output speed. Read across the page until you have found the horsepower or torque rating that equals or exceeds the equivalent power required. The column heading will indicate the selected unit. The column headings define the units selected. the first letter, **D, T, or Q** indicates the number of reductions, **D**ouble, **T**riple or **Q**uadruple. The second letter, **R,** shows it is a right-angle unit. the number, from **7 to 40,** is the approximate center distance of the low speed gear set. A "W" prefix indicates steel construction.

C. Compare the thermal horsepower rating with the actual prime mover horsepower rating (not the equivalent horsepower rating - see Section 330, page 4 "Thermal Ratings"). If the rating equals or exceeds the prime mover rating then the selection is complete. If the prime mover rating is larger than the thermal capacity, consider the fan cooled unit, an oil-to-water, or oil-to-air heat exchanger, or, in some cases where auxiliary cooling cannot be used, select a larger unit that will meet the requirements.

Example:

A **heavy duty** overland **conveyor, not uniformly loaded,** operates **24 hours per day.** The prime mover is a **75 HP, 1750 RPM** electric motor. The desired output speed is **100 RPM.**

Solution:

1. Application factor is 1.5 (Section 330, page 5)
2. Equivalent horsepower is 112.5 (75 x 1.5)
3. Required ratio is 1750/100 or 17.5:1 (The closest nominal ratio is 17.09:1).
4. Look in the triple reduction section for an input speed of 1750 (Section 330, page 18).
5. Read across the **17.09/100 RPM** line until you reach the bold figure **147** which is greater than the equivalent HP required..
6. Reading the top of the column the type designation is found to be a **TR9.** Reading down the column, we find the basic unit has a **thermal capacity of 68 horsepower,** which is less than the rating of the prime mover; however, the **fan-cooled unit has thermal capacity of 136 horsepower,** which is more than adequate.
7. If auxiliary cooling is not acceptable and the unit must be self cooling, moving to the next larger unit, **TR11,** will provide the thermal capacity needed.
8. If the exact output speed is critical, look at the table at the bottom of the page to determine the **exact gear ratio** for the unit selected. That ratio for the TR9 would be **17.471:1.** If the TR11 were to be used, the ratio would be **17.212:1.** When required, Nuttall Gear can produce special gear ratios to meet your specifications.

MODIFICATION AND ACCESSORIES

Among the many options available are:

A. Complete packaged drive systems with motors, couplings, reducers and accessories mounted and "ready to run" without further assembly of components.
B. Motor mounting with bedplates, scoops, or piggy-back provisions.
C. Special enclosures, steel fabricated housings, sound dampening shrouds, protection from corrosive or abrasive ambient conditions as well as appropriate seals for applications requiring special attention, such as taconite or paper mill duty.
D. Backstops, brakes, clutches, and special couplings can all be supplied and mounted by Nuttall Gear.
E. Temperature detectors to monitor bearing and/or oil sump temperatures, as well as heaters to be used in low temperature locations.
F. Special exact gear ratios.
G. Special shafts.

Type TDS
Right Angle Shaft Speed Reducers
Application

APPLICATION FACTORS

To provide long life and reliability for any given application, a suitable application factor must be applied to the load requirements.

The required equivalent horsepower or equivalent torque necessary to select a reducer from the rating tables is found my multiplying the load horsepower or torque by an application factor.

The gear drive selected will require a rating equal to, or in excess of, the equivalent horsepower or equivalent torque.

Pages 5 through 7, following, list the **minimum recommended** application factors for a broad spectrum of applications. These factors were developed by The American Gear Manufacturers Association, and were derived from data collected from countless installations over many years.

It is not possible to list all possible applications requiring gear drives, but a sufficient variety of types is covered to serve as a guide for other applications.

It should be noted that the values given in the tables are based on field experience of **average** operating conditions for each class of equipment and may not be correct in all cases, due to unique operating conditions or design of the driving or driven equipment.

Proper application factors can be determined if full operational conditions are known. It is necessary to have this data before a final gear drive selection is made. Any drive for use under abnormal conditions must be referred to Nuttall Gear.

The table also indicates the application factors for duration of service. If a single or multi-cylinder engine is used as the prime mover, the factors must be adjusted further. For a single cylinder engine, add .50 to the appropriate factor, if a multi-cylinder engine is used, then only a .25 addition is made.

THERMAL CAPACITY

The thermal horsepower rating represents the **actual** horsepower that a gear drive will transmit continually for more than three (3) hours without overheating. Maximum sump temperature is not to exceed 200°F.

It is not necessary to check thermal horsepower ratings when the continuous operating period is three (3) hours or less, and the shutdown time equals or exceeds the running time. If, however, the running time exceeds the shutdown time, selection must be made on the basis of an adequate thermal rating. It is important that the thermal horsepower be checked prior to application, for if the unit develops heat at a faster rate than can be dissipated, premature failure may occur. Note: **application factors do not apply to thermal ratings.** Only the **actual** transmitted horsepower is subject to thermal horsepower consideration.

In cases where transmitted horsepower exceeds the thermal rating horsepower, additional cooling by means of shaft mounted fans or an oil to water heat exchanger will be necessary at added cost. It should be noted that fan cooling may not be effective in high ambient conditions **or in high attitudes,** and all such applications must be referred to the factory.

The area in which the reducer is located should allow adequate air circulation. Also, the housing should be free from dust or other material which can become an insulator. Gear drives operating outdoors should be provided with a sun shield roof structure to eliminate the effects of solar heating. If these precautions are not taken, over-heating with premature failure may occur.

LOAD CONDITIONS

Basic conditions to be observed before applying application factors are as follows:

1. Excessive Overloads

The maximum momentary or starting load must not exceed 200 percent of rated load (100% overload). Rated load is defined as the unit rating with a service factor of 1.0. Driven equipment with high inertia loading may require higher application factors than indicated because of the high momentary torque required for breakaway. Expected breakaway and shock load torques must not exceed 200% of rated reducer torque.

2. Oversize Prime Mover

The practice of using oversize motors for motor standardization or starting conditions must be given attention due to the potential high starting torque available.

3. Braking Conditions

When the rating of a shaft mounted or motor mounted brake exceeds the motor rating, the rating of the brake must be used in selection of the reducer.

4. Drive-Train Vibrations

Gear reducers are sold with the understanding that the rotating parts are free from serious critical speeds or torsional vibrations. Calculation required to check the entire system is the responsibility of the systems builder. Details of reducer rotating parts for such calculations are available on request at time of order.

5. Pulsating Loads

The responsibility for satisfactory operation of reducers driving or driven by pulsating or reciprocating apparatus such as compressors, pumps, and internal combustion engines is assumed by Nuttall Gear provided that:

a. The gears are not operated with torque reversals at the gear mesh, except when starting and stopping.

b. When loaded, the torque variation at the gear mesh does not exceed ±25% of average transmitted torque.

c. When unloaded, the torque variation at the gear mesh does not exceed ±15% of rated torque with no negative torque.

AMBIENT CONDITIONS

Standard speed reducers are basically designed for horizontal floor mounted operation in a heated building where reasonably clean and dry conditions exist. For conditions other than this, special features may be required. Full data should be provided to insure proper selection.

Low Temperature Operation

Starting and operating gear drives at temperatures below 40°F could result in damage to the gears and bearings if the pour point of the lubricant is higher than the ambient temperature. This is of particular concern when controlled splash lubrication or circulation lube oil systems with pump and piping are employed. In such cases, it may be necessary to provide immersion heaters in the oil sump and provide a method of heating the external oil pump and piping at start-up.

High Temperature Operation

Operation at sustained ambient temperatures in excess of 100°F will greatly affect thermal modifications required to provide a reasonable operating temperature. High oil sump temperatures will drastically reduce the life of most lubricants and require frequent oil changes. Contact Nuttall Gear for lubrication recommendations if this condition is expected.

Type TDS
Right Angle Shaft Speed Reducers
AGMA Application Factors

APPLICATION	LOAD DURATION HOURS PER DAY 0-3	3-10	10+
AGITATORS (Mixers)			
Pure Liquids	1.00	1.00	1.25
Liquids and Solids	1.00	1.25	1.50
Liquids - Variable Density	1.00	1.25	1.50
BLOWERS			
Centrifugal	1.00	1.00	1.25
Lobe	1.00	1.25	1.50
Vane	1.00	1.25	1.50
BREWING AND DISTILLING			
Bottling Machinery	1.00	1.00	1.25
Brew Kettles - Continuous Duty	1.25	1.25	1.25
Cookers - Continuous Duty	1.25	1.25	1.25
Mash Tubs - Continuous Duty	1.25	1.25	1.25
Scale Hopper - Frequent Starts	1.25	1.25	1.50
CAN FILLING MACHINES	1.00	1.00	1.25
CAR DUMPERS	1.50	1.75	2.00
CAR PULLERS	1.00	1.25	1.50
CLARIFIERS	1.00	1.00	1.25
CLASSIFIERS	1.00	1.25	1.50
CLAY WORKING MACHINERY			
Brick Press	1.50	1.75	2.00
Briquette Machine	1.50	1.75	2.00
Pug Mill	1.00	1.25	1.50
COMPACTORS	2.00	2.00	2.00
COMPRESSORS			
Centrifugal	1.00	1.00	1.25
Lobe	1.00	1.25	1.50
Reciprocating, Multi-Cylinder	1.50	1.50	1.75
Reciprocating, Single-Cylinder	1.75	1.75	2.00
CONVEYORS - GENERAL PURPOSE			
Uniformly loaded or fed	1.00	1.00	1.25
Heavy Duty, not uniformly fed	1.00	1.25	1.50
Reciprocating of Shaker	1.50	1.75	2.00
CRANES ①			
Dry Dock			
Main Hoist	2.50	2.50	2.50
Auxiliary Hoist	2.50	2.50	3.00
Boom Hoist	2.50	2.50	3.00
Slewing Drive	2.50	2.50	3.00
Traction Drive	3.00	3.00	3.00
Container			
Main Hoist	3.00	3.00	3.00
Boom Hoist	2.00	2.00	2.00
Trolly Drive			
Gantry Drive	3.00	3.00	3.00
Traction Drive	2.00	2.00	2.00
Mill Duty			
Mian Hoist	3.50	3.50	3.50
Auxiliary	3.50	3.50	3.50
Bridge and	2.50	3.00	3.00
CRANES (cont.)			
Trolley Travel	2.50	3.00	3.00
Industrial Duty			
Main	2.50	2.50	3.00
Auxiliary	2.50	2.50	3.00
Bridge and	2.50	3.00	3.00
Trolley Travel	2.50	3.00	3.00
CRUSHER			
Stone or Ore	1.75	1.75	2.00
DREDGES			
Cable Reels	1.25	1.25	1.50
Conveyors	1.25	1.25	1.50
Cutter Head Drives	2.00	2.00	2.00
Pumps	2.00	2.00	2.00
Screen Drives	1.75	1.75	2.00
Stackers	1.25	1.25	1.50
Winches	1.25	1.25	1.50
ELEVATORS			
Bucket	1.00	1.25	1.50
Centrifugal Discharge	1.00	1.00	1.25
Escalators	1.00	1.00	1.25
Freight	1.00	1.25	1.50
Gravity Discharge	1.00	1.00	1.25
EXTRUDERS			
General	1.50	1.50	1.50
Plastics			
Variable Speed Drive	1.50	1.50	1.50
Fixed Speed Drive	1.75	1.75	1.75
Rubber			
Continuous Screw Operation	1.75	1.75	1.75
Intermittent Screw Operation	1.75	1.75	1.75
FANS			
Centrifugal	1.00	1.00	1.25
Cooling Towers	2.00	2.00	2.00
Forced Draft	1.25	1.25	1.25
Induced Draft	1.50	1.50	1.50
Industrial and Mine	1.50	1.50	1.50
FEEDERS			
Apron	1.00	1.25	1.50
Belt	1.00	1.15	1.50
Disc	1.00	1.00	1.25
Reciprocating	1.50	1.75	2.00
Screw	1.00	1.25	1.50
FOOD INDUSTRY			
Cereal Cooker	1.00	1.00	1.25
Dough Mixer	1.25	1.25	1.50
Meat Grinders	1.25	1.25	1.50
Slicers	1.25	1.25	1.50
GENERATORS AND EXCITERS	1.00	1.00	1.25
HAMMER MILLS	1.75	1.75	2.00
HOISTS			
Heavy Duty	1.75	1.75	2.00

Type TDS
Right Angle Shaft Speed Reducers
AGMA Application Factors

APPLICATION	LOAD DURATION HOURS PER DAY 0-3	3-10	10+
HOISTS (cont.)			
Medium Duty	1.25	1.25	1.50
Skip Hoist	1.25	1.25	1.50
LAUNDRY			
Tumblers	1.25	1.25	1.50
Washers	1.50	1.50	2.00
LUMBER INDUSTRY			
Barkers - Spindle Feed	1.25	1.25	1.50
Main Drive	1.75	1.75	1.75
Conveyors - Burner	1.25	1.25	1.50
Main Drive or Heavy Duty	1.50	1.50	1.50
Main Log	1.75	1.75	2.00
Re-saw, Merry-Go-Round	1.25	1.25	1.50
Slab	1.75	1.75	2.00
Transfer	1.25	1.25	1.50
Chains			
Floor	1.50	1.50	1.50
Green	1.50	1.50	1.75
Cut-Off Saws			
Chain	1.50	1.50	1.75
Drag	1.50	1.50	1.75
Debarking Drums	1.75	1.75	2.00
Feeds			
Edger	1.25	1.25	1.50
Gang	1.75	1.75	1.75
Trimmer	1.25	1.25	1.50
Log Deck	1.75	1.75	1.75
Log Hauls - Incline - Well Type	1.75	1.75	1.75
Log Turning Devices	1.75	1.75	1.75
Planer Feed	1.25	1.25	1.50
Planer Tilting Hoists	1.50	1.50	1.50
Rolls - Live-of brg - Roll Cases	1.75	1.75	1.75
Sorting Table	1.25	1.25	1.50
Tipple Hoist	1.25	1.25	1.50
Transfers			
Chain	1.50	1.50	1.75
Craneway	1.50	1.50	1.75
Tray Drives	1.25	1.25	1.50
Veneer Lathe Drives	1.25	1.25	1.50
METAL MILLS			
Draw Bench Carriage and Main Drive	1.25	1.25	1.50
Runout Table			
Non-Reversing			
Group Drives	1.50	1.50	1.50
Individual Drives	2.00	2.00	2.00
Reversing	2.00	2.00	2.00
Slab Pushers	1.50	1.50	1.50
Shears	2.00	2.00	2.00
Wire Drawing	1.25	1.25	1.50
Wire Winding Machine	1.25	1.50	1.50
METAL STRIP PROCESSING MACHINERY			
Bridles	1.25	1.25	1.50
Coilers and Uncoilers	1.00	1.00	1.25
Edge Trimmers	1.00	1.25	1.50
Flatteners	1.25	1.25	1.50
Loopers (Accumulators)	1.00	1.00	1.25
Pinch Rolls	1.25	1.25	1.50
Scrap Choppers	1.25	1.25	1.50

APPLICATION	LOAD DURATION HOURS PER DAY 0-3	3-10	10+
METAL STRIP PROCESSING MACHINERY (cont.)			
Shears	2.00	2.00	2.00
Slitters	1.00	1.25	1.50
MILLS, ROTARY TYPE			
Ball and Rod			
Spur Ring Gear	2.00	2.00	2.00
Helical Ring Gear	1.50	1.50	1.50
Direct Connected	2.00	2.00	2.00
Cement Kilns	1.50	1.50	1.50
Dryers and Coolers	1.50	1.50	1.50
MIXERS			
Concrete	1.25	1.25	1.50
PAPER MILLS (2)			
Agitator (Mixer)	1.50	1.50	1.50
Agitator for Pure Liquors	1.25	1.25	1.25
Barking Drums	2.00	2.00	2.00
Barkers - Mechanical	2.00	2.00	2.00
Beater	1.50	1.50	1.50
Breaker Stack	1.25	1.25	1.25
Calender (3)	1.25	1.25	1.25
Chipper	2.00	2.00	2.00
Chip Feeder	1.50	1.50	1.50
Coating Rolls	1.25	1.25	1.25
Conveyors			
Chip, Bark, Chemical	1.25	1.25	1.25
Log (including Slab)	2.00	2.00	2.00
Couch Rolls	1.25	1.25	1.25
Cutter	2.00	2.00	2.00
Cylinder Molds	1.25	1.25	1.25
Dryers (3)			
Paper Machine	1.25	1.25	1.25
Conveyor Type	1.25	1.25	1.25
Embosser	1.25	1.25	1.25
Extruder	1.50	1.50	1.50
Fourdriner Rolls (Includes Lump breaker, dandy roll, wire turning, and return rolls)	1.25	1.25	1.25
Jordan	1.50	1.50	1.50
Kiln Drive	1.50	1.50	1.50
Mt. Hope Roll	1.25	1.25	1.25
Paper Rolls	1.25	1.25	1.25
Platter	1.50	1.50	1.50
Presses, Felt and Suction	1.25	1.25	1.25
Pulper	2.00	2.00	2.00
Pumps - Vacuum	1.50	1.50	1.50
Reel (Surface Type)	1.25	1.25	1.25
Screens			
Chip	1.50	1.50	1.50
Rotary	1.50	1.50	1.50
Vibrating	2.00	2.00	2.00
Size Press (4)	1.25	1.25	1.25
Super Calender (4)	1.25	1.25	1.25
Thickener (AC Motor)	1.50	1.50	1.50
Thickener (DC Motor)	1.25	1.25	1.25
Washer (AC Motor)	1.50	1.50	1.50
Washer (DC Motor)	1.25	1.25	1.25
Wind and Unwind Stand	1.00	1.00	1.25
Winders (Surface Type)	1.25	1.25	1.25

Type TDS
Right Angle Shaft Speed Reducers
AGMA Application Factors

APPLICATION	LOAD DURATION HOURS PER DAY 0-3	3-10	10+
PAPER MILLS (cont.)			
Yankee Dryers ③	1.25	1.25	1.25
PLASTICS INDUSTRY			
Primary Processing			
Intensive Internal Mixers			
Batch Mixers	1.75	1.75	1.75
Continuous Mixers	1.50	1.50	1.50
Batch Drop Mill - 2 smooth rolls	1.25	1.25	1.25
Continuous Feed, Holding & Blend Mill	1.25	1.25	1.25
Compounding Mill	1.25	1.25	1.25
Calenders	1.50	1.50	1.50
Secondary Processing			
Blow Molders	1.50	1.50	1.50
Coating	1.25	1.25	1.25
Film	1.25	1.25	1.25
Pipe	1.25	1.25	1.25
Pre-Plasticizers	1.50	1.50	1.50
Rods	1.25	1.25	1.25
Sheet	1.25	1.25	1.25
Tubing	1.25	1.25	1.50
PULLERS - BARGE HAUL	1.25	1.25	1.50
PUMPS			
Centrifugal	1.00	1.00	1.25
Proportioning	1.25	1.25	1.50
Reciprocating			
Single Acting, 3 or more cylinders	1.25	1.25	1.50
Double Acting, 2 or more cylinders	1.25	1.25	1.50
Rotary			
Gear Type	1.00	1.00	1.25
Lobe	1.00	1.00	1.25
Vane	1.00	1.00	1.25
RUBBER INDUSTRY			
Intensive Internal Mixers			
Batch Mixers	1.75	1.75	1.75
Continuous Mixers	1.50	1.50	1.50
Mixing Mill - 2 smooth rolls - (if corrugated rolls are used, then use the seme service factors that are used for a Cracker-Warmer)	1.50	1.50	1.50
Batch Drop Mill - 2 smooth rolls	1.50	1.50	1.50
Cracker-Warmer - 2 rolls; 1 corrugated roll	1.75	1.75	1.75
Cracker - 2 corrugated rolls	2.00	2.00	2.00

APPLICATION	LOAD DURATION HOURS PER DAY 0-3	3-10	10+
RUBBER INDUSTRY (cont.)			
Holding, Feed & blend Mill - 2 rolls	1.25	1.25	1.25
Refiner - 2 rolls	1.50	1.50	1.50
Calenders	1.50	1.50	1.50
SAND MULLER	1.25	1.25	1.50
SEWAGE DISPOSAL EQUIPMENT			
Bar Screens	1.25	1.25	1.25
Chemical Feeders	1.25	1.25	1.25
Dewatering Screens	1.50	1.50	1.50
Scum Breakers	1.50	1.50	1.50
Slow or Rapid Mixers	1.50	1.50	1.50
Sludge Collectors	1.25	1.25	1.25
Thickeners	1.50	1.50	1.50
Vacuum Filters	1.50	1.50	1.50
SCREENS			
Air Washing	1.00	1.00	1.25
Rotary - Stone or Gravel	1.25	1.25	1.50
Traveling Water Intake	1.00	1.00	1.25
SUGAR INDUSTRY			
Beet Slicer	2.00	2.00	2.00
Cane Knives	1.50	1.50	1.50
Crushers	1.50	1.50	1.50
Mills (low speed end)	1.75	1.75	1.75
TEXTILE INDUSTRY			
Batchers	1.25	1.25	1.50
Calenders	1.25	1.25	1.50
Cards	1.25	1.25	1.50
Dry Cans	1.25	1.25	1.50
Dryers	1.25	1.25	1.50
Dyeing Machinery	1.25	1.25	1.50
Looms	1.25	1.25	1.50
Mangles	1.25	1.25	1.50
Nappers	1.25	1.25	1.50
Pads	1.25	1.25	1.50
Slashers	1.25	1.25	1.50
Soapers	1.25	1.25	1.50
Spinners	1.25	1.25	1.50
Tenter Frames	1.25	1.25	1.50
Washers	1.25	1.25	1.50
Winders	1.25	1.25	1.50

NOTES:

① Crane drives are to be selected based on gear tooth bending strength. Contact **Nuttall Gear** for strength ratings. Application factor in durability should be a minimum of 1.0.
NOTE: Application factors shown for cranes are based on tooth bending strength and their use must be coordinated with **Nuttall Gear**. The values shown are consistent with those recommended by C.M.A.A. (Crane Manufacturers Association of America).

② Application factors for paper mill applications are applied to the nameplate rating of the electric drive motor at the motor rated based speed.

③ Anti-Friction Bearings only. Use 1.5 for sleeve bearings.

④ An application Factor of 1.00 may be applied at base speed of a super calender operating over a speed range of part constant horsepower, part constant torque where the constant horsepower speed range is greater than 1.5 to 1. An application factor of 1.25 is applicable to super calenders operating over the entire speed range at constant torque or where the constant horsepower speed range is less than 1.5 to 1.

Type TDS
Right Angle Shaft Speed Reducers
Double Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	DR7	DR8	DR9	DR11	DR12	DR13	DR15	DR16	DR18	DR20
3.375	520	MECH HP	218	337	367	508	711	920	1397	1891	2526	3050
		TORQUE (X1000 IN. LBS.)	26	41	43	59	91	115	162	224	308	358
4.134	420	MECH HP	218	337	367	508	711	920	1391	1891	2526	3050
		TORQUE (X1000 IN. LBS.)	32	50	54	75	105	141	207	282	376	446
5.060	350	MECH HP	206	285	367	508	711	920	1391	1891	2526	3050
		TORQUE (X1000 IN. LBS.)	38	51	66	89	128	170	256	341	441	538
6.200	280	MECH HP	177	237	367	508	711	920	1370	1600	2006	2437
		TORQUE (X1000 IN. LBS.)	39	52	83	111	158	207	298	354	463	556
7.590	230	MECH HP	150	193	322	506	622	867	1132	1306	1701	2103
		TORQUE (X1000 IN. LBS.)	40	53	86	135	176	243	306	363	475	570
9.300	190	MECH HP	121	162	266	414	520	737	932	1141	1406	1695
		TORQUE (X1000 IN. LBS.)	40	54	87	137	180	248	312	372	486	585
11.39	155	MECH HP	103	133	222	330	432	602	787	941	1229	1463
		TORQUE (X1000 IN. LBS.)	41	55	89	139	183	253	319	379	497	595
13.95	125	MECH HP	85	112	183	294	361	512	649	792	1012	1217
		TORQUE (X1000 IN. LBS.)	42	56	90	143	187	258	326	387	507	609

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		DR7	DR8	DR9	DR11	DR12	DR13	DR15	DR16	DR18	DR20
3.375	520	THERMAL HP	35	49	55	91	115	133	152	184	206	241
		WITH FANS	71	97	111	183	231	266	304	368	412	482
4.134	420	THERMAL HP	36	49	57	93	118	135	155	188	210	246
		WITH FANS	72	99	113	187	235	271	310	375	420	492
5.060	350	THERMAL HP	37	50	58	95	120	138	158	191	214	251
		WITH FANS	74	101	115	190	240	276	316	383	428	502
6.200	280	THERMAL HP	38	52	59	97	123	141	162	196	219	257
		WITH FANS	75	103	118	195	246	283	323	392	438	513
7.590	230	THERMAL HP	38	53	60	99	125	144	165	200	224	262
		WITH FANS	76	106	120	198	250	288	330	400	448	524
9.300	190	THERMAL HP	39	54	61	101	128	147	168	204	228	267
		WITH FANS	78	108	122	202	256	294	336	408	456	534
11.39	155	THERMAL HP	40	55	63	104	132	151	173	210	235	275
		WITH FANS	80	110	126	208	264	302	346	420	470	550
13.95	125	THERMAL HP	42	57	66	1008	137	157	180	218	244	285
		WITH FANS	84	114	132	216	274	314	360	436	488	570

EXACT GEAR RATIO

NOMINAL GEAR RATIO	DR7	DR8	DR9	DR11	DR12	DR13	DR15	DR16	DR18	DR20
3.375	3.394	3.459	3.287	3.235	3.564	3.471	3.235	3.297	3.394	3.263
4.134	4.138	4.121	4.146	4.150	4.138	4.267	4.137	4.143	4.138	4.061
5.060	5.120	4.966	5.062	4.865	5.027	5.160	5.097	5.005	4.846	4.897
6.200	6.091	6.080	6.297	6.120	6.205	6.268	6.036	6.142	6.406	6.333
7.590	7.368	7.619	7.400	7.408	7.854	7.778	7.505	7.713	7.750	7.524
9.300	9.125	9.222	9.059	9.180	9.600	9.341	9.294	9.053	9.597	9.582
11.39	11.053	11.429	11.100	11.667	11.743	11.655	11.247	11.175	11.228	11.286
13.95	13.688	13.833	13.588	13.500	14.353	13.978	13.928	13.567	13.905	13.884

Type TDS
Right Angle Shaft Speed Reducers
Double Reduction

MECHANICAL CAPACITY

DR22	WDR25	WDR28	WDR30	WDR32	WDR34	WDR36	WDR38	WDR40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
3451	**5085**	**6624**	**8785**						**MECH HP**	520	3.375
416	613	802	1078						TORQUE (X1000 IN. LBS.)		
3451	**5085**	**6624**	**8785**						**MECH HP**	420	4.134
511	760	980	1298						TORQUE (X1000 IN. LBS.)		
3451	**5085**	**6624**	**8785**						**MECH HP**	350	5.060
638	921	1216	1582						TORQUE (X1000 IN. LBS.)		
2972	**4335**	**5677**	**7349**	**7690**	**9601**	**11047**	**12031**	**14001**	**MECH HP**	280	6.200
667	968	1257	1643	1710	2219	2479	2728	3095	TORQUE (X1000 IN. LBS.)		
2461	**3698**	**4760**	**6251**	**6214**	**8349**	**9747**	**10689**	**11957**	**MECH HP**	230	7.590
685	994	1297	1693	1767	2291	2564	2823	3204	TORQUE (X1000 IN. LBS.)		
2107	**3078**	**3852**	**5164**	**5609**	**7081**	**7910**	**8773**	**9915**	**MECH HP**	190	9.300
703	1018	1329	1736	1830	2352	2639	2907	3299	TORQUE (X1000 IN. LBS.)		
1712	**2572**	**3315**	**4354**	**4410**	**5911**	**6887**	**7557**	**8456**	**MECH HP**	155	11.39
715	1037	1355	1769	1881	2433	2718	2994	3399	TORQUE (X1000 IN. LBS.)		
1462	**2147**	**2688**	**3605**	**3933**	**5026**	**5601**	**6215**	**7029**	**MECH HP**	125	13.95
732	1065	1391	1818	1925	2504	2803	3089	3508	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

DR22	WDR25	WDR28	WDR30	WDR32	WDR34	WDR36	WDR38	WDR40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
273	**310**	**356**	**374**						**THERMAL HP**	520	3.375
547	619	713	747						WITH FANS		
279	**316**	**364**	**381**						**THERMAL HP**	420	4.134
558	631	727	762						WITH FANS		
284	**322**	**371**	**389**						**THERMAL HP**	350	5.060
569	644	742	778						WITH FANS		
291	**329**	**379**	**398**	**412**	**423**	**430**	**426**	**407**	**THERMAL HP**	280	6.200
582	659	759	795	825	846	860	853	814	WITH FANS		
297	**336**	**387**	**406**	**421**	**432**	**439**	**435**	**416**	**THERMAL HP**	230	7.590
595	673	775	812	842	864	878	871	831	WITH FANS		
303	**343**	**395**	**414**	**429**	**440**	**448**	**444**	**424**	**THERMAL HP**	190	9.300
606	686	790	828	858	880	896	888	848	WITH FANS		
312	**353**	**406**	**426**	**442**	**453**	**461**	**457**	**436**	**THERMAL HP**	155	11.39
624	706	812	852	884	906	922	914	872	WITH FANS		
324	**366**	**422**	**442**	**459**	**470**	**478**	**474**	**453**	**THERMAL HP**	125	13.95
648	732	824	884	918	940	956	948	906	WITH FANS		

EXACT GEAR RATIO

DR22	WDR25	WDR28	WDR30	WDR32	WDR34	WDR36	WDR38	WDR40	NOMINAL GEAR RATIO
3.350	3.348	3.366	3.409						3.375
4.114	4.150	4.111	4.103						4.134
5.133	5.029	5.097	5.000						5.060
6.231	6.200	6.148	6.207	6.174	6.417	6.231	6.296	6.138	6.200
7.727	7.462	7.565	7.520	7.895	7.619	7.304	7.333	7.440	7.590
9.263	9.182	9.579	9.333	9.059	9.222	9.263	9.200	9.238	9.300
11.591	11.192	11.348	11.280	11.842	11.429	10.957	11.000	11.160	11.39
13.895	13.773	14.369	14.000	13.588	13.833	13.895	13.800	13.857	13.95

Type TDS
Right Angle Shaft Speed Reducers
Double Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	DR7	DR8	DR9	DR11	DR12	DR13	DR15	DR16	DR18	DR20
3.375	350	MECH HP	151	234	254	353	495	641	973	1346	1819	2160
		TORQUE (X1000 IN. LBS.)	27	43	44	61	95	119	169	239	332	379
4.134	280	MECH HP	151	234	254	353	495	641	973	1346	1819	2160
		TORQUE (X1000 IN. LBS.)	33	52	56	78	110	147	216	300	405	472
5.060	230	MECH HP	145	198	254	353	495	641	973	1346	1819	2160
		TORQUE (X1000 IN. LBS.)	40	53	69	92	134	178	267	362	475	570
6.200	190	MECH HP	121	164	254	353	495	641	959	1121	1408	1706
		TORQUE (X1000 IN. LBS.)	40	54	86	116	165	216	312	371	486	582
7.590	155	MECH HP	103	134	223	350	432	606	786	909	1188	1470
		TORQUE (X1000 IN. LBS.)	41	55	89	140	183	254	318	378	496	596
9.300	125	MECH HP	85	112	184	287	361	512	649	793	980	1183
		TORQUE (X1000 IN. LBS.)	42	56	90	142	187	258	325	387	507	611
11.39	100	MECH HP	70	92	153	229	300	420	546	654	856	1019
		TORQUE (X1000 IN. LBS.)	42	57	92	144	190	264	331	394	518	620
13.95	84	MECH HP	58	77	128	202	249	355	450	548	702	846
		TORQUE (X1000 IN. LBS.)	43	58	94	147	193	268	338	401	526	633

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		DR7	DR8	DR9	DR11	DR12	DR13	DR15	DR16	DR18	DR20
3.375	350	THERMAL HP	70	96	110	181	228	263	300	364	407	477
		WITH FANS	117	160	183	302	381	438	501	607	679	795
4.134	280	THERMAL HP	71	97	111	182	230	265	303	367	410	481
		WITH FANS	118	161	185	304	384	442	506	612	685	802
5.060	230	THERMAL HP	72	98	112	185	233	268	307	372	416	487
		WITH FANS	119	163	187	308	389	447	512	620	694	812
6.200	190	THERMAL HP	73	99	114	187	237	272	311	377	422	494
		WITH FANS	121	166	190	313	395	454	520	629	704	824
7.590	155	THERMAL HP	74	101	115	190	240	276	316	383	428	501
		WITH FANS	124	169	192	317	401	461	528	640	715	837
9.300	125	THERMAL HP	75	103	117	194	244	281	322	390	436	510
		WITH FANS	125	172	195	324	407	469	538	651	728	850
11.39	100	THERMAL HP	76	105	119	197	249	286	327	396	443	519
		WITH FANS	127	175	199	329	416	478	546	661	740	865
13.95	84	THERMAL HP	78	106	122	200	253	291	333	404	451	529
		WITH FANS	174	177	204	334	423	486	556	675	753	883

EXACT GEAR RATIO

NOMINAL GEAR RATIO	DR7	DR8	DR9	DR11	DR12	DR13	DR15	DR16	DR18	DR20
3.375	3.394	3.459	3.287	3.235	3.564	3.471	3.235	3.297	3.394	3.263
4.134	4.138	4.121	4.146	4.150	4.138	4.267	4.137	4.143	4.138	4.061
5.060	5.120	4.966	5.062	4.865	5.027	5.160	5.097	5.005	4.846	4.897
6.200	6.091	6.080	6.297	6.120	6.205	6.268	6.036	6.142	6.406	6.333
7.590	7.368	7.619	7.400	7.408	7.854	7.778	7.505	7.713	7.750	7.524
9.300	9.125	9.222	9.059	9.180	9.600	9.341	9.294	9.053	9.597	9.582
11.39	11.053	11.429	11.100	11.667	11.743	11.655	11.247	11.175	11.228	11.286
13.95	13.688	13.833	13.588	13.500	14.353	13.978	13.928	13.567	13.905	13.884

Type TDS
Right Angle Shaft Speed Reducers
Double Reduction

MECHANICAL CAPACITY

DR22	WDR25	WDR28	WDR30	WDR32	WDR34	WDR36	WDR38	WDR40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
2477	**3669**	**4723**	**6285**						**MECH HP**	350	3.375
446	661	856	1154						TORQUE (X1000 IN. LBS.)		
2477	**3669**	**4723**	**6285**						**MECH HP**	280	4.134
548	820	1045	1389						TORQUE (X1000 IN. LBS.)		
2477	**3669**	**4723**	**6285**						**MECH HP**	230	5.060
685	994	1297	1693						TORQUE (X1000 IN. LBS.)		
2082	**3039**	**3985**	**5168**	**5472**	**6836**	**7871**	**8580**	**9989**	**MECH HP**	190	6.200
699	1015	1320	1728	1820	2363	2642	2910	3303	TORQUE (X1000 IN. LBS.)		
1720	**2594**	**3332**	**4384**	**4408**	**5930**	**6925**	**7599**	**8506**	**MECH HP**	155	7.590
716	1043	1358	1776	1875	2434	2725	3002	3409	TORQUE (X1000 IN. LBS.)		
1471	**2155**	**2689**	**3612**	**3969**	**5020**	**5613**	**6229**	**7045**	**MECH HP**	125	9.300
734	1066	1388	1816	1937	2494	2801	3087	3506	TORQUE (X1000 IN. LBS.)		
1194	**1801**	**2311**	**3044**	**3119**	**4179**	**4867**	**5356**	**5985**	**MECH HP**	100	11.39
746	1086	1413	1850	1990	2573	2873	3174	3598	TORQUE (X1000 IN. LBS.)		
1018	**1498**	**1870**	**2515**	**2773**	**3545**	**3950**	**4386**	**4962**	**MECH HP**	84	13.95
762	1112	1448	1897	2030	2642	2957	3261	3704	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

DR22	WDR25	WDR28	WDR30	WDR32	WDR34	WDR36	WDR38	WDR40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
541	**612**	**705**	**739**						**THERMAL HP**	350	3.375
902	1021	1176	1233						WITH FANS		
545	**617**	**711**	**745**						**THERMAL HP**	280	4.134
910	1030	1186	1244						WITH FANS		
552	**625**	**720**	**755**						**THERMAL HP**	230	5.060
922	1043	1201	1259						WITH FANS		
560	**634**	**731**	**766**	**794**	**814**	**828**	**821**	**784**	**THERMAL HP**	190	6.200
935	1059	1219	1278	1325	1359	1382	1370	1307	WITH FANS		
569	**644**	**741**	**777**	**806**	**826**	**841**	**833**	**795**	**THERMAL HP**	155	7.590
949	1074	1237	1297	1345	1379	1402	1390	1327	WITH FANS		
579	**655**	**755**	**791**	**820**	**841**	**856**	**848**	**809**	**THERMAL HP**	125	9.300
966	1092	1259	1319	1368	1403	1428	1414	1350	WITH FANS		
589	**667**	**768**	**805**	**835**	**856**	**870**	**863**	**823**	**THERMAL HP**	100	11.39
982	1112	1281	1343	1393	1428	1451	1440	1373	WITH FANS		
600	**679**	**782**	**819**	**850**	**871**	**886**	**878**	**838**	**THERMAL HP**	84	13.95
1001	1132	1304	1366	1418	1453	1478	1465	1398	WITH FANS		

EXACT GEAR RATIO

DR22	WDR25	WDR28	WDR30	WDR32	WDR34	WDR36	WDR38	WDR40	NOMINAL GEAR RATIO
3.350	3.348	3.366	3.409						3.375
4.114	4.150	4.111	4.103						4.134
5.133	5.029	5.097	5.000						5.060
6.231	6.200	6.148	6.207	6.174	6.417	6.231	6.296	6.138	6.200
7.727	7.462	7.565	7.520	7.895	7.619	7.304	7.333	7.440	7.590
9.263	9.182	9.579	9.333	9.059	9.222	9.263	9.200	9.238	9.300
11.591	11.192	11.348	11.280	11.842	11.429	10.957	11.000	11.160	11.39
13.895	13.773	14.369	14.000	13.588	13.833	13.895	13.800	13.857	13.95

Type TDS
Right Angle Shaft Speed Reducers
Double Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	DR7	DR8	DR9	DR11	DR12	DR13	DR15	DR16	DR18	DR20
3.375	258	MECH HP	115	178	194	269	378	490	746	1020	1367	1649
		TORQUE (X1000 IN. LBS.)	28	44	46	63	97	123	174	243	336	389
4.134	210	MECH HP	115	178	194	269	378	490	746	1020	1367	1649
		TORQUE (X1000 IN. LBS.)	34	53	58	80	113	151	223	306	409	485
5.060	172	MECH HP	107	150	194	269	378	490	746	1020	1367	1649
		TORQUE (X1000 IN. LBS.)	40	54	71	94	137	183	275	370	480	585
6.200	140	MECH HP	95	124	194	269	378	490	734	860	1081	1310
		TORQUE (X1000 IN. LBS.)	42	55	88	119	169	222	321	383	502	601
7.590	115	MECH HP	78	103	171	268	332	461	603	698	910	1126
		TORQUE (X1000 IN. LBS.)	42	57	92	144	189	260	328	390	511	614
9.300	94	MECH HP	65	85	141	219	276	390	496	606	749	906
		TORQUE (X1000 IN. LBS.)	43	57	93	146	192	264	334	398	521	629
11.39	76	MECH HP	53	70	118	175	229	318	417	500	652	780
		TORQUE (X1000 IN. LBS.)	43	58	95	148	195	269	340	405	531	638
13.95	62	MECH HP	45	58	97	154	190	270	343	420	536	646
		TORQUE (X1000 IN. LBS.)	45	59	96	151	198	274	347	413	540	650

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		DR7	DR8	DR9	DR11	DR12	DR13	DR15	DR16	DR18	DR20
3.375	258	THERMAL HP	107	146	167	275	347	400	457	554	620	726
		WITH FANS	160	219	250	412	520	599	685	830	928	1087
4.134	210	THERMAL HP	109	149	170	281	354	408	467	565	632	740
		WITH FANS	163	223	255	420	530	611	699	846	946	1108
5.060	172	THERMAL HP	111	152	174	286	361	416	476	576	645	755
		WITH FANS	166	227	260	429	541	623	712	863	965	1130
6.200	140	THERMAL HP	113	155	178	293	370	425	486	589	659	772
		WITH FANS	170	233	266	438	553	637	728	882	987	1156
7.590	115	THERMAL HP	116	158	181	298	377	433	496	601	672	787
		WITH FANS	174	237	272	447	564	650	742	900	1006	1178
9.300	94	THERMAL HP	118	162	185	305	385	443	507	614	687	805
		WITH FANS	177	243	278	458	578	665	761	921	1031	1205
11.39	76	THERMAL HP	121	166	189	312	394	453	518	628	702	822
		WITH FANS	182	249	284	468	591	680	777	942	1053	1230
13.95	62	THERMAL HP	124	169	193	319	402	463	530	642	718	841
		WITH FANS	186	254	290	479	603	695	795	963	1077	1262

EXACT GEAR RATIO

NOMINAL GEAR RATIO	DR7	DR8	DR9	DR11	DR12	DR13	DR15	DR16	DR18	DR20
3.375	3.394	3.459	3.287	3.235	3.564	3.471	3.235	3.297	3.394	3.263
4.134	4.138	4.121	4.146	4.150	4.138	4.267	4.137	4.143	4.138	4.061
5.060	5.120	4.966	5.062	4.865	5.027	5.160	5.097	5.005	4.846	4.897
6.200	6.091	6.080	6.297	6.120	6.205	6.268	6.036	6.142	6.406	6.333
7.590	7.368	7.619	7.400	7.408	7.854	7.778	7.505	7.713	7.750	7.524
9.300	9.125	9.222	9.059	9.180	9.600	9.341	9.294	9.053	9.597	9.582
11.39	11.053	11.429	11.100	11.667	11.743	11.655	11.247	11.175	11.228	11.286
13.95	13.688	13.833	13.588	13.500	14.353	13.978	13.928	13.567	13.905	13.884

Type TDS
Right Angle Shaft Speed Reducers
Double Reduction

MECHANICAL CAPACITY

DR22	WDR25	WDR28	WDR30	WDR32	WDR34	WDR36	WDR38	WDR40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
1861	**2753**	**3623**	**4781**						**MECH HP**	258	3.375
451	667	883	1180						TORQUE (X1000 IN. LBS.)		
1861	**2753**	**3623**	**4781**						**MECH HP**	210	4.134
554	827	1078	1421						TORQUE (X1000 IN. LBS.)		
1861	**2753**	**3623**	**4781**						**MECH HP**	172	5.060
692	1003	1338	1732						TORQUE (X1000 IN. LBS.)		
1599	**2333**	**3073**	**3989**	**4248**	**5309**	**6121**	**6674**	**7774**	**MECH HP**	140	6.200
722	1048	1369	1794	1900	2468	2763	3044	3457	TORQUE (X1000 IN. LBS.)		
1320	**1988**	**2563**	**3379**	**3418**	**4598**	**5371**	**5897**	**6601**	**MECH HP**	115	7.590
739	1075	1405	1841	1955	2538	2842	3133	3558	TORQUE (X1000 IN. LBS.)		
1126	**1650**	**2067**	**2783**	**3065**	**3885**	**4336**	**4814**	**5448**	**MECH HP**	94	9.300
756	1098	1435	1882	2012	2596	2910	3209	3646	TORQUE (X1000 IN. LBS.)		
913	**1324**	**1773**	**2339**	**2403**	**3228**	**3759**	**4141**	**4626**	**MECH HP**	76	11.39
767	1114	1458	1912	2062	2673	2984	3300	3740	TORQUE (X1000 IN. LBS.)		
777	**1142**	**1432**	**1930**	**2134**	**2734**	**3049**	**3388**	**3835**	**MECH HP**	62	13.95
783	1140	1491	1958	2101	2740	3070	3387	3850	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

DR22	WDR25	WDR28	WDR30	WDR32	WDR34	WDR36	WDR38	WDR40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
823	**932**	**1073**	**1125**						**THERMAL HP**	258	3.375
1233	1395	1607	1685						WITH FANS		
840	**951**	**1095**	**1148**						**THERMAL HP**	210	4.134
1257	1423	1639	1718						WITH FANS		
856	**969**	**1116**	**1170**						**THERMAL HP**	172	5.060
1282	1451	1672	1752						WITH FANS		
876	**991**	**1142**	**1197**	**1241**	**1272**	**1294**	**1283**	**1224**	**THERMAL HP**	140	6.200
1311	1484	1709	1792	1858	1905	1937	1920	1833	WITH FANS		
892	**1010**	**1163**	**1220**	**1264**	**1297**	**1319**	**1307**	**1247**	**THERMAL HP**	115	7.590
1336	1512	1742	1826	1893	1941	1974	1957	1868	WITH FANS		
913	**1033**	**1190**	**1247**	**1293**	**1326**	**1349**	**1337**	**1276**	**THERMAL HP**	94	9.300
1368	1546	1781	1866	1935	1985	2019	2001	1910	WITH FANS		
933	**1056**	**1216**	**1275**	**1322**	**1356**	**1379**	**1366**	**1304**	**THERMAL HP**	76	11.39
1396	1580	1820	1908	1979	2030	2064	2045	1952	WITH FANS		
954	**1080**	**1243**	**1304**	**1352**	**1386**	**1410**	**1397**	**1333**	**THERMAL HP**	62	13.95
1428	1616	1860	1952	2024	2075	2110	2091	1995	WITH FANS		

EXACT GEAR RATIO

DR22	WDR25	WDR28	WDR30	WDR32	WDR34	WDR36	WDR38	WDR40	NOMINAL GEAR RATIO
3.350	3.348	3.366	3.409						3.375
4.114	4.150	4.111	4.103						4.134
5.133	5.029	5.097	5.000						5.060
6.231	6.200	6.148	6.207	6.174	6.417	6.231	6.296	6.138	6.200
7.727	7.462	7.565	7.520	7.895	7.619	7.304	7.333	7.440	7.590
9.263	9.182	9.579	9.333	9.059	9.222	9.263	9.200	9.238	9.300
11.591	11.192	11.348	11.280	11.842	11.429	10.957	11.000	11.160	11.39
13.895	13.773	14.369	14.000	13.588	13.833	13.895	13.800	13.857	13.95

Type TDS
Right Angle Shaft Speed Reducers
Double Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	DR7	DR8	DR9	DR11	DR12	DR13	DR15	DR16	DR18	DR20
3.375	213	MECH HP	96	126	162	226	318	412	629	860	1155	1392
		TORQUE (X1000 IN. LBS.)	28	38	46	63	99	125	178	248	343	397
4.134	174	MECH HP	96	126	162	226	318	412	629	860	1153	1392
		TORQUE (X1000 IN. LBS.)	34	45	58	82	115	153	227	311	418	494
5.060	142	MECH HP	91	126	162	226	318	412	629	860	1155	1392
		TORQUE (X1000 IN. LBS.)	41	55	71	96	139	186	280	377	490	597
6.200	116	MECH HP	78	105	162	226	318	412	618	723	909	1105
		TORQUE (X1000 IN. LBS.)	42	56	89	121	172	226	327	389	510	613
7.590	95	MECH HP	66	85	143	225	279	389	508	588	768	950
		TORQUE (X1000 IN. LBS.)	43	57	93	146	192	265	334	397	521	626
9.300	77	MECH HP	55	71	118	182	230	329	416	511	630	763
		TORQUE (X1000 IN. LBS.)	44	58	94	147	194	269	339	405	530	640
11.39	63	MECH HP	45	60	97	146	192	269	351	420	556	654
		TORQUE (X1000 IN. LBS.)	44	60	95	150	198	275	346	411	541	641
13.95	52	MECH HP	37	49	81	130	160	278	288	352	451	543
		TORQUE (X1000 IN. LBS.)	45	60	97	154	201	280	352	418	550	660

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		DR7	DR8	DR9	DR11	DR12	DR13	DR15	DR16	DR18	DR20
3.375	213	THERMAL HP	151	207	236	389	491	566	647	784	877	1027
		WITH FANS	213	292	333	550	694	798	913	1106	1237	1449
4.134	174	THERMAL HP	154	211	241	397	501	576	660	799	894	1046
		WITH FANS	217	297	340	560	707	814	931	1128	1261	1477
5.060	142	THERMAL HP	156	214	245	403	509	586	670	812	908	1064
		WITH FANS	221	302	345	569	718	827	946	1146	1282	1501
6.200	116	THERMAL HP	159	218	249	411	519	597	683	827	925	1084
		WITH FANS	225	308	352	580	732	842	964	1168	1306	1529
7.590	95	THERMAL HP	162	222	254	418	527	607	694	841	941	1102
		WITH FANS	229	313	358	589	743	856	978	1186	1327	1555
9.300	77	THERMAL HP	165	226	258	426	537	618	707	857	959	1123
		WITH FANS	233	319	364	601	757	871	997	1208	1352	1585
11.39	63	THERMAL HP	168	230	263	434	547	630	720	873	976	1143
		WITH FANS	237	324	371	612	771	888	1015	1231	1376	1613
13.95	52	THERMAL HP	171	234	268	442	557	641	733	889	994	1164
		WITH FANS	241	330	378	623	785	904	1034	1253	1402	1642

EXACT GEAR RATIO

NOMINAL GEAR RATIO	DR7	DR8	DR9	DR11	DR12	DR13	DR15	DR16	DR18	DR20
3.375	3.394	3.459	3.287	3.235	3.564	3.471	3.235	3.297	3.394	3.263
4.134	4.138	4.121	4.146	4.150	4.138	4.267	4.137	4.143	4.138	4.061
5.060	5.120	4.966	5.062	4.865	5.027	5.160	5.097	5.005	4.846	4.897
6.200	6.091	6.080	6.297	6.120	6.205	6.268	6.036	6.142	6.406	6.333
7.590	7.368	7.619	7.400	7.408	7.854	7.778	7.505	7.713	7.750	7.524
9.300	9.125	9.222	9.059	9.180	9.600	9.341	9.294	9.053	9.597	9.582
11.39	11.053	11.429	11.100	11.667	11.743	11.655	11.247	11.175	11.228	11.286
13.95	13.688	13.833	13.588	13.500	14.353	13.978	13.928	13.567	13.905	13.884

Type TDS
Right Angle Shaft Speed Reducers
Double Reduction

MECHANICAL CAPACITY

DR22	WDR25	WDR28	WDR30	WDR32	WDR34	WDR36	WDR38	WDR40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
1573	**2328**	**3066**	**4057**						**MECH HP**	213	3.375
461	682	903	1210						TORQUE (X1000 IN. LBS.)		
1573	**2328**	**3066**	**4057**						**MECH HP**	174	4.134
566	845	1103	1457						TORQUE (X1000 IN. LBS.)		
1573	**2328**	**3066**	**4057**						**MECH HP**	142	5.060
707	1025	1368	1776						TORQUE (X1000 IN. LBS.)		
1349	**1975**	**2592**	**3360**	**3608**	**4511**	**5195**	**5668**	**6603**	**MECH HP**	116	6.200
736	1072	1395	1826	1950	2534	2834	3124	3548	TORQUE (X1000 IN. LBS.)		
1113	**1677**	**2161**	**2845**	**2898**	**3901**	**4554**	**5002**	**5601**	**MECH HP**	95	7.590
753	1096	1431	1873	2003	2602	2912	3211	3648	TORQUE (X1000 IN. LBS.)		
949	**1391**	**1743**	**2342**	**2597**	**3293**	**3677**	**4084**	**4621**	**MECH HP**	77	9.300
770	1118	1462	1914	2060	2659	2982	3289	3737	TORQUE (X1000 IN. LBS.)		
769	**1157**	**1493**	**1967**	**2038**	**2733**	**3183**	**3509**	**3918**	**MECH HP**	63	11.39
781	1134	1484	1943	2113	2735	3053	3379	3828	TORQUE (X1000 IN. LBS.)		
654	**966**	**1206**	**1623**	**1808**	**2313**	**2581**	**2869**	**3248**	**MECH HP**	52	13.95
796	1165	1518	1990	2151	2801	3140	3466	3940	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

DR22	WDR25	WDR28	WDR30	WDR32	WDR34	WDR36	WDR38	WDR40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
1165	**1318**	**1518**	**1592**						**THERMAL HP**	213	3.375
1644	1861	2143	2247						WITH FANS		
1187	**1344**	**1548**	**1622**						**THERMAL HP**	174	4.134
1676	1897	2184	2290						WITH FANS		
1207	**1366**	**1573**	**1649**						**THERMAL HP**	142	5.060
1703	1928	2220	2327						WITH FANS		
1229	**1391**	**1602**	**1680**	**1742**	**1786**	**1816**	**1801**	**1718**	**THERMAL HP**	116	6.200
1735	1964	2262	2371	2458	2521	2564	2541	2425	WITH FANS		
1250	**1415**	**1630**	**1708**	**1771**	**1816**	**1847**	**1831**	**1747**	**THERMAL HP**	95	7.590
1764	1997	2300	2411	2500	2564	2607	2584	2466	WITH FANS		
1274	**1442**	**1660**	**1741**	**1805**	**1851**	**1882**	**1866**	**1780**	**THERMAL HP**	77	9.300
1798	2035	2342	2457	2547	2612	2656	2633	2512	WITH FANS		
1296	**1467**	**1690**	**1772**	**1837**	**1884**	**1916**	**1899**	**1812**	**THERMAL HP**	63	11.39
1829	2070	2385	2501	2592	2659	2704	2680	2557	WITH FANS		
1320	**1495**	**1721**	**1805**	**1871**	**1919**	**1951**	**1934**	**1846**	**THERMAL HP**	52	13.95
1863	2110	2429	2547	2640	2708	2753	2729	2605	WITH FANS		

EXACT GEAR RATIO

DR22	WDR25	WDR28	WDR30	WDR32	WDR34	WDR36	WDR38	WDR40	NOMINAL GEAR RATIO
3.350	3.348	3.366	3.409						3.375
4.114	4.150	4.111	4.103						4.134
5.133	5.029	5.097	5.000						5.060
6.231	6.200	6.148	6.207	6.174	6.417	6.231	6.296	6.138	6.200
7.727	7.462	7.565	7.520	7.895	7.619	7.304	7.333	7.440	7.590
9.263	9.182	9.579	9.333	9.059	9.222	9.263	9.200	9.238	9.300
11.591	11.192	11.348	11.280	11.842	11.429	10.957	11.000	11.160	11.39
13.895	13.773	14.369	14.000	13.588	13.833	13.895	13.800	13.857	13.95

Nuttall Gear Corporation
2221 Niagara Falls Blvd., P.O. Box 1032, Niagara Falls, N.Y. 14302
716/731-5180 FAX 716/731-9329

Effective: 15 SEPT 1993
Supersedes: NEW

Type TDS
Right Angle Shaft Speed Reducers
Double Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	DR7	DR8	DR9	DR11	DR12	DR13	DR15	DR16	DR18	DR20
3.375	172	MECH HP	79	122	133	185	260	338	516	717	970	1153
		TORQUE (X1000 IN. LBS.)	29	45	47	65	100	127	181	256	357	408
4.134	140	MECH HP	79	122	133	185	260	338	516	717	970	1153
		TORQUE (X1000 IN. LBS.)	35	54	59	83	116	156	231	322	436	508
5.060	115	MECH HP	75	105	133	185	260	338	516	717	970	1153
		TORQUE (X1000 IN. LBS.)	42	57	73	97	142	189	285	390	511	614
6.200	94	MECH HP	63	86	133	185	260	338	507	596	748	906
		TORQUE (X1000 IN. LBS.)	42	57	91	123	175	230	333	398	521	624
7.590	76	MECH HP	53	70	118	185	229	318	415	482	629	781
		TORQUE (X1000 IN. LBS.)	43	58	95	149	196	269	339	404	530	639
9.300	62	MECH HP	44	58	96	151	189	269	342	418	518	626
		TORQUE (X1000 IN. LBS.)	44	59	95	151	198	274	346	412	541	652
11.39	51	MECH HP	37	48	80	121	157	219	288	345	450	537
		TORQUE (X1000 IN. LBS.)	45	60	97	154	201	278	352	420	550	659
13.95	42	MECH HP	30	40	66	107	130	186	236	288	370	446
		TORQUE (X1000 IN. LBS.)	46	61	98	157	204	283	358	425	560	673

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		DR7	DR8	DR9	DR11	DR12	DR13	DR15	DR16	DR18	DR20
3.375	172	THERMAL HP	211	289	330	545	687	791	905	1096	1226	1436
		WITH FANS	281	385	440	725	915	1053	1205	1460	1633	1912
4.134	140	THERMAL HP	220	302	345	569	717	826	945	1144	1280	1499
		WITH FANS	293	401	459	757	955	1099	1258	1523	1704	1995
5.060	115	THERMAL HP	230	314	359	593	748	861	985	1193	1334	1562
		WITH FANS	306	418	479	789	996	1146	1311	1588	1776	2080
6.200	94	THERMAL HP	240	329	376	620	782	900	1029	1247	1395	1633
		WITH FANS	320	438	500	825	1041	1198	1371	1660	1857	2175
7.590	76	THERMAL HP	247	338	387	638	805	926	1059	1284	1435	1681
		WITH FANS	329	450	515	849	1071	1232	1411	1708	1911	2238
9.300	62	THERMAL HP	253	347	397	654	825	950	1086	1317	1472	1724
		WITH FANS	336	462	528	870	1097	1264	1448	1752	1958	2295
11.39	51	THERMAL HP	258	353	404	666	841	967	1107	1341	1499	1756
		WITH FANS	343	469	537	886	1119	1286	1472	1784	1994	2337
13.95	42	THERMAL HP	262	359	411	677	855	983	1125	1363	1524	1786
		WITH FANS	348	477	547	900	1138	1307	1496	1813	2027	2377

EXACT GEAR RATIO

NOMINAL GEAR RATIO	DR7	DR8	DR9	DR11	DR12	DR13	DR15	DR16	DR18	DR20
3.375	3.394	3.459	3.287	3.235	3.564	3.471	3.235	3.297	3.394	3.263
4.134	4.138	4.121	4.146	4.150	4.138	4.267	4.137	4.143	4.138	4.061
5.060	5.120	4.966	5.062	4.865	5.027	5.160	5.097	5.005	4.846	4.897
6.200	6.091	6.080	6.297	6.120	6.205	6.268	6.036	6.142	6.406	6.333
7.590	7.368	7.619	7.400	7.408	7.854	7.778	7.505	7.713	7.750	7.524
9.300	9.125	9.222	9.059	9.180	9.600	9.341	9.294	9.053	9.597	9.582
11.39	11.053	11.429	11.100	11.667	11.743	11.655	11.247	11.175	11.228	11.286
13.95	13.688	13.833	13.588	13.500	14.353	13.978	13.928	13.567	13.905	13.884

Type TDS
Right Angle Shaft Speed Reducers
Double Reduction

MECHANICAL CAPACITY

DR22	WDR25	WDR28	WDR30	WDR32	WDR34	WDR36	WDR38	WDR40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
1324	**1967**	**2536**	**3380**						**MECH HP**	172	3.375
481	715	927	1252						TORQUE (X1000 IN. LBS.)		
1324	**1967**	**2536**	**3380**						**MECH HP**	140	4.134
591	887	1132	1506						TORQUE (X1000 IN. LBS.)		
1324	**1967**	**2536**	**3388**						**MECH HP**	115	5.060
739	1075	1405	1841						TORQUE (X1000 IN. LBS.)		
1112	**1622**	**2137**	**2778**	**2985**	**3738**	**4315**	**4708**	**5485**	**MECH HP**	94	6.200
753	1093	1428	1874	2003	2607	2922	3221	3659	TORQUE (X1000 IN. LBS.)		
915	**1380**	**1779**	**2348**	**2400**	**3231**	**3773**	**4145**	**4643**	**MECH HP**	76	7.590
769	1119	1463	1919	2059	2675	2995	3303	3754	TORQUE (X1000 IN. LBS.)		
779	**1140**	**1430**	**1927**	**2146**	**2725**	**3053**	**3385**	**3830**	**MECH HP**	62	9.300
785	1138	1489	1955	2113	2731	3073	3384	3845	TORQUE (X1000 IN. LBS.)		
632	**951**	**1227**	**1621**	**1673**	**2258**	**2632**	**2893**	**3242**	**MECH HP**	51	11.39
796	1157	1514	1987	2154	2805	3134	3459	3932	TORQUE (X1000 IN. LBS.)		
537	**789**	**990**	**1335**	**1481**	**1908**	**2122**	**2359**	**2671**	**MECH HP**	42	13.95
811	1181	1547	2031	2187	2869	3205	3538	4023	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

DR22	WDR25	WDR28	WDR30	WDR32	WDR34	WDR36	WDR38	WDR40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
1629	**1844**	**2124**	**2226**						**THERMAL HP**	172	3.375
2169	2455	2827	2964						WITH FANS		
1700	**1925**	**2216**	**2324**						**THERMAL HP**	140	4.134
2264	2562	2951	3094						WITH FANS		
1772	**2006**	**2310**	**2422**						**THERMAL HP**	115	5.060
2360	2671	3076	3225						WITH FANS		
1853	**2098**	**2416**	**2533**	**2626**	**2693**	**2738**	**2714**	**2590**	**THERMAL HP**	94	6.200
2467	2793	3216	3372	3496	3585	3646	3614	3449	WITH FANS		
1907	**2159**	**2486**	**2606**	**2702**	**2771**	**2818**	**2794**	**2666**	**THERMAL HP**	76	7.590
2539	2874	3310	3470	3598	3690	3752	3719	3550	WITH FANS		
1956	**2214**	**2550**	**2673**	**2772**	**2842**	**2891**	**2865**	**2735**	**THERMAL HP**	62	9.300
2604	2947	3395	3558	3690	3783	3849	3814	3641	WITH FANS		
1992	**2255**	**2597**	**2723**	**2823**	**2895**	**2944**	**2918**	**2785**	**THERMAL HP**	51	11.39
2652	3002	3457	3625	3758	3854	3919	3885	3708	WITH FANS		
2025	**2292**	**2640**	**2768**	**2870**	**2943**	**2993**	**2967**	**2831**	**THERMAL HP**	42	13.95
2696	3051	3514	3685	3821	3918	3985	3950	3769	WITH FANS		

EXACT GEAR RATIO

DR22	WDR25	WDR28	WDR30	WDR32	WDR34	WDR36	WDR38	WDR40	NOMINAL GEAR RATIO
3.350	3.348	3.366	3.409						3.375
4.114	4.150	4.111	4.103						4.134
5.133	5.029	5.097	5.000						5.060
6.231	6.200	6.148	6.207	6.174	6.417	6.231	6.296	6.138	6.200
7.727	7.462	7.565	7.520	7.895	7.619	7.304	7.333	7.440	7.590
9.263	9.182	9.579	9.333	9.059	9.222	9.263	9.200	9.238	9.300
11.591	11.192	11.348	11.280	11.842	11.429	10.957	11.000	11.160	11.39
13.895	13.773	14.369	14.000	13.588	13.833	13.895	13.800	13.857	13.95

Type TDS
Right Angle Shaft Speed Reducers
Triple Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	TR7	TR8	TR9	TR11	TR12	TR13	TR15	TR16	TR18	TR20
17.09	100	MECH HP	66	94	147	233	314	434	525	636	844	1008
		TORQUE (X1000 IN. LBS.)	42	57	93	145	189	263	332	395	517	620
20.93	84	MECH HP	56	78	127	196	263	375	436	534	696	834
		TORQUE (X1000 IN. LBS.)	43	58	94	147	193	266	335	402	525	633
25.63	68	MECH HP	46	64	103	165	215	293	370	440	598	718
		TORQUE (X1000 IN. LBS.)	44	59	96	151	197	273	344	409	534	646
31.39	56	MECH HP	39	54	86	133	182	246	298	362	476	570
		TORQUE (X1000 IN. LBS.)	45	60	97	153	200	279	351	418	546	658
38.44	45	MECH HP	32	45	71	111	151	199	248	300	389	467
		TORQUE (X1000 IN. LBS.)	46	61	99	155	203	283	356	423	553	668
47.08	37	MECH HP	26	37	59	91	125	168	205	248	333	400
		TORQUE (X1000 IN. LBS.)	46	62	100	158	206	287	362	430	562	679
57.66	30	MECH HP	22	31	49	77	104	137	171	209	277	331
		TORQUE (X1000 IN. LBS.)	47	63	103	162	210	292	370	443	579	696

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		TR7	TR8	TR9	TR11	TR12	TR13	TR15	TR16	TR18	TR20
17.09	100	THERMAL HP	43	59	68	112	141	163	186	226	252	296
		WITH FANS	86	118	136	224	282	326	372	452	504	592
20.93	84	THERMAL HP	45	61	70	116	146	168	193	233	261	306
		WITH FANS	90	122	140	232	292	336	386	466	522	612
25.63	68	THERMAL HP	47	64	73	120	152	175	200	242	271	317
		WITH FANS	94	128	146	240	304	350	400	484	542	634
31.39	56	THERMAL HP	48	65	75	123	155	178	204	247	276	324
		WITH FANS	96	130	150	246	310	356	408	494	552	648
38.44	45	THERMAL HP	49	67	77	127	160	185	211	256	286	335
		WITH FANS	98	134	154	254	320	370	422	512	572	670
47.08	37	THERMAL HP	50	68	78	129	163	187	214	260	291	340
		WITH FANS	100	136	156	258	326	374	428	520	582	680
57.66	30	THERMAL HP	51	69	79	131	165	190	217	263	294	344
		WITH FANS	102	138	158	262	330	380	434	526	588	688

EXACT GEAR RATIO

NOMINAL GEAR RATIO	TR7	TR8	TR9	TR11	TR12	TR13	TR15	TR16	TR18	TR20
17.09	17.488	16.723	17.471	17.212	16.686	16.799	17.550	17.230	16.992	17.079
20.93	21.333	20.400	20.462	20.738	20.374	19.690	21.292	20.902	20.936	21.073
25.63	26.517	25.357	25.717	25.393	25.346	25.828	25.765	25.800	24.793	24.956
31.39	31.765	30.375	31.111	31.821	30.379	31.481	32.612	32.016	31.831	32.041
38.44	38.865	37.165	38.528	38.516	37.189	39.397	39.862	39.133	39.420	39.679
47.08	47.647	45.563	46.667	47.731	45.568	47.222	48.918	48.024	46.811	47.119
57.66	58.298	55.747	57.792	57.775	55.783	59.095	59.792	58.700	57.971	58.352

Type TDS
Right Angle Shaft Speed Reducers
Triple Reduction

MECHANICAL CAPACITY

TR22	WTR25	WTR28	WTR30	WTR32	WTR34	WTR36	WTR38	WTR40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
1162	**1679**	**2279**	**3030**	**3324**	**4250**	**4694**	**5191**	**5828**	**MECH HP**	100	17.09
746	1086	1413	1850	1990	2573	2873	3174	3598	TORQUE (X1000 IN. LBS.)		
1046	**1468**	**1842**	**2577**	**2717**	**3602**	**3987**	**4401**	**4951**	**MECH HP**	84	20.93
762	1112	1448	1897	2030	2642	2957	3261	3704	TORQUE (X1000 IN. LBS.)		
848	**1190**	**1619**	**2153**	**2311**	**2990**	**3311**	**3677**	**4136**	**MECH HP**	68	25.63
777	1133	1480	1938	2095	2704	3028	3359	3815	TORQUE (X1000 IN. LBS.)		
714	**1037**	**1323**	**1816**	**1817**	**2545**	**2831**	**3145**	**3539**	**MECH HP**	56	31.39
792	1157	1507	1975	2149	2770	3116	3458	3929	TORQUE (X1000 IN. LBS.)		
585	**850**	**1083**	**1440**	**1546**	**2108**	**2355**	**2618**	**2946**	**MECH HP**	45	38.44
804	1176	1535	2012	2192	2824	3190	3542	4025	TORQUE (X1000 IN. LBS.)		
492	**715**	**948**	**1283**	**1294**	**1774**	**1968**	**2187**	**2462**	**MECH HP**	37	47.08
817	1195	1565	2052	2218	2896	3249	3607	4100	TORQUE (X1000 IN. LBS.)		
407	**584**	**756**	**989**	**1115**	**1480**	**1652**	**1836**	**2069**	**MECH HP**	30	57.66
836	1210	1605	2103	2255	2974	3356	3727	4239	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

TR22	WTR25	WTR28	WTR30	WTR32	WTR34	WTR36	WTR38	WTR40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
335	**380**	**437**	**458**	**475**	**487**	**495**	**491**	**469**	**THERMAL HP**	100	17.09
670	760	874	916	950	974	990	982	938	WITH FANS		
347	**392**	**452**	**474**	**491**	**504**	**512**	**508**	**485**	**THERMAL HP**	84	20.93
694	784	904	948	982	1008	1024	1016	970	WITH FANS		
360	**407**	**469**	**491**	**510**	**523**	**531**	**527**	**503**	**THERMAL HP**	68	25.63
720	814	938	982	1020	1046	1062	1054	1006	WITH FANS		
367	**416**	**479**	**502**	**521**	**534**	**543**	**538**	**514**	**THERMAL HP**	56	31.39
734	832	958	1004	1042	1068	1086	1076	1028	WITH FANS		
380	**430**	**495**	**519**	**538**	**552**	**561**	**557**	**531**	**THERMAL HP**	45	38.44
760	860	990	1038	1076	1104	1122	1114	1062	WITH FANS		
386	**437**	**503**	**528**	**547**	**561**	**570**	**565**	**540**	**THERMAL HP**	37	47.08
772	874	1006	1056	1094	1122	1140	1130	1080	WITH FANS		
391	**442**	**509**	**534**	**554**	**568**	**577**	**572**	**546**	**THERMAL HP**	30	57.66
782	884	1018	1068	1108	1136	1154	1144	1092	WITH FANS		

EXACT GEAR RATIO

TR22	WTR25	WTR28	WTR30	WTR32	WTR34	WTR36	WTR38	WTR40	NOMINAL GEAR RATIO
17.823	17.952	17.209	16.949	16.621	16.808	16.995	16.977	17.141	17.09
20.214	21.025	21.826	20.438	20.739	20.366	20.593	20.572	20.770	20.93
25.443	26.425	25.373	24.988	25.172	25.110	25.390	25.364	25.608	25.63
30.779	30.958	31.607	30.189	32.833	30.219	30.557	30.525	30.819	31.39
38.116	38.393	39.329	38.790	39.359	37.186	37.601	37.561	37.925	38.44
46.057	46.392	45.794	44.396	47.570	45.329	45.835	45.787	46.229	47.08
56.988	57.451	58.937	59.045	56.135	55.779	56.402	56.343	56.887	57.66

Type TDS
Right Angle Shaft Speed Reducers
Triple Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	TR7	TR8	TR9	TR11	TR12	TR13	TR15	TR16	TR18	TR20
17.09	68	MECH HP	46	65	100	161	218	300	363	440	585	700
		TORQUE (X1000 IN. LBS.)	44	59	95	150	196	272	344	409	536	644
20.93	56	MECH HP	38	53	87	136	181	260	302	369	481	577
		TORQUE (X1000 IN. LBS.)	44	59	96	152	199	276	347	416	543	656
25.63	45	MECH HP	32	44	71	113	148	202	256	304	414	496
		TORQUE (X1000 IN. LBS.)	46	61	99	155	203	282	356	423	553	668
31.39	37	MECH HP	26	37	59	92	125	169	206	249	328	394
		TORQUE (X1000 IN. LBS.)	46	62	100	158	206	287	362	431	564	680
38.44	30	MECH HP	22	31	49	77	104	138	172	208	270	375
		TORQUE (X1000 IN. LBS.)	47	63	102	161	210	293	371	439	574	695
47.08	25	MECH HP	19	26	41	64	88	118	145	175	234	281
		TORQUE (X1000 IN. LBS.)	49	65	105	166	216	302	382	453	592	715
57.66	20	MECH HP	15	22	34	54	73	96	121	148	196	234
		TORQUE (X1000 IN. LBS.)	50	67	108	171	221	308	391	468	612	736

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		TR7	TR8	TR9	TR11	TR12	TR13	TR15	TR16	TR18	TR20
17.09	68	THERMAL HP	79	109	124	205	259	298	340	413	461	540
		WITH FANS	132	182	207	342	433	498	568	690	770	902
20.93	56	THERMAL HP	81	111	127	210	265	305	348	422	472	553
		WITH FANS	135	185	212	351	443	509	581	705	788	921
25.63	45	THERMAL HP	83	113	130	214	270	310	355	430	481	563
		WITH FANS	139	189	217	357	451	518	593	718	803	940
31.39	37	THERMAL HP	85	116	133	219	276	318	364	441	493	577
		WITH FANS	142	194	222	366	461	531	608	736	823	964
38.44	30	THERMAL HP	86	118	135	223	281	324	370	449	502	588
		WITH FANS	144	197	225	372	469	541	618	750	838	982
47.08	25	THERMAL HP	88	120	137	227	286	329	376	456	510	597
		WITH FANS	147	200	229	379	478	549	628	762	852	997
57.66	20	THERMAL HP	89	122	140	230	290	334	382	463	518	607
		WITH FANS	149	204	234	384	484	558	638	773	865	1014

EXACT GEAR RATIO

NOMINAL GEAR RATIO	TR7	TR8	TR9	TR11	TR12	TR13	TR15	TR16	TR18	TR20
17.09	17.488	16.723	17.471	17.212	16.686	16.799	17.550	17.230	16.992	17.079
20.93	21.333	20.400	20.462	20.738	20.374	19.690	21.292	20.902	20.936	21.073
25.63	26.517	25.357	25.717	25.393	25.346	25.828	25.765	25.800	24.793	24.956
31.39	31.765	30.375	31.111	31.821	30.379	31.481	32.612	32.016	31.831	32.041
38.44	38.865	37.165	38.528	38.516	37.189	39.397	39.862	39.133	39.420	39.679
47.08	47.647	45.563	46.667	47.731	45.568	47.222	48.918	48.024	46.811	47.119
57.66	58.298	55.747	57.792	57.775	55.783	59.095	59.792	58.700	57.971	58.352

Type TDS
Right Angle Shaft Speed Reducers
Triple Reduction

MECHANICAL CAPACITY

TR22	WTR25	WTR28	WTR30	WTR32	WTR34	WTR36	WTR38	WTR40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
809	**1171**	**1596**	**2122**	**2339**	**2986**	**3307**	**3673**	**4131**	**MECH HP**	68	17.09
777	1133	1480	1938	2095	2704	3028	3359	3815	TORQUE (X1000 IN. LBS.)		
727	**1021**	**1281**	**1793**	**1923**	**2524**	**2809**	**3120**	**3511**	**MECH HP**	56	20.93
792	1157	1507	1975	2149	2770	3116	3458	3929	TORQUE (X1000 IN. LBS.)		
587	**825**	**1123**	**1494**	**1609**	**2095**	**2321**	**2580**	**2903**	**MECH HP**	45	25.63
805	1175	1535	2012	2183	2834	3175	3525	4005	TORQUE (X1000 IN. LBS.)		
494	**716**	**916**	**1258**	**1255**	**1779**	**1980**	**2201**	**2478**	**MECH HP**	37	31.39
819	1195	1561	2047	2221	2897	3260	3620	4115	TORQUE (X1000 IN. LBS.)		
406	**583**	**756**	**1005**	**1066**	**1476**	**1655**	**1840**	**2073**	**MECH HP**	30	38.44
835	1207	1603	2101	2260	2957	3353	3724	4236	TORQUE (X1000 IN. LBS.)		
346	**488**	**671**	**897**	**891**	**1258**	**1396**	**1552**	**1749**	**MECH HP**	25	47.08
859	1220	1657	2147	2284	3073	3447	3829	4356	TORQUE (X1000 IN. LBS.)		
288	**398**	**535**	**681**	**766**	**1057**	**1180**	**1312**	**1479**	**MECH HP**	20	57.66
885	1234	1701	2167	2317	3176	3585	3983	4533	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

TR22	WTR25	WTR28	WTR30	WTR32	WTR34	WTR36	WTR38	WTR40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
613	**694**	**799**	**838**	**868**	**891**	**906**	**898**	**857**	**THERMAL HP**	68	17.09
1024	1159	1334	1399	1450	1488	1513	1500	1431	WITH FANS		
627	**710**	**818**	**857**	**889**	**911**	**927**	**919**	**877**	**THERMAL HP**	56	20.93
1047	1186	1366	1431	1485	1521	1548	1535	1465	WITH FANS		
639	**723**	**833**	**873**	**905**	**928**	**944**	**936**	**893**	**THERMAL HP**	45	25.63
1067	1207	1391	1458	1511	1550	1576	1563	1491	WITH FANS		
655	**741**	**853**	**895**	**927**	**951**	**967**	**959**	**915**	**THERMAL HP**	37	31.39
1094	1237	1425	1495	1548	1588	1615	1602	1528	WITH FANS		
667	**755**	**870**	**912**	**945**	**969**	**986**	**977**	**933**	**THERMAL HP**	30	38.44
1114	1261	1453	1523	1578	1618	1647	1632	1558	WITH FANS		
677	**767**	**883**	**926**	**960**	**984**	**1001**	**992**	**947**	**THERMAL HP**	25	47.08
1131	1281	1475	1546	1603	1643	1672	1657	1581	WITH FANS		
688	**779**	**897**	**941**	**975**	**1000**	**1017**	**1008**	**962**	**THERMAL HP**	20	57.66
1149	1301	1498	1571	1628	1670	1698	1683	1607	WITH FANS		

EXACT GEAR RATIO

TR22	WTR25	WTR28	WTR30	WTR32	WTR34	WTR36	WTR38	WTR40	NOMINAL GEAR RATIO
17.823	17.952	17.209	16.949	16.621	16.808	16.995	16.977	17.141	17.09
20.214	21.025	21.826	20.438	20.739	20.366	20.593	20.572	20.770	20.93
25.443	26.425	25.373	24.988	25.172	25.110	25.390	25.364	25.608	25.63
30.779	30.958	31.607	30.189	32.833	30.219	30.557	30.525	30.819	31.39
38.116	38.393	39.329	38.790	39.359	37.186	37.601	37.561	37.925	38.44
46.057	46.392	45.794	44.396	47.570	45.329	45.835	45.787	46.229	47.08
56.988	57.451	58.937	59.045	56.135	55.779	56.402	56.343	56.887	57.66

Type TDS
Right Angle Shaft Speed Reducers
Triple Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	TR7	TR8	TR9	TR11	TR12	TR13	TR15	TR16	TR18	TR20
17.09	51	MECH HP	35	49	76	123	166	229	276	337	445	534
		TORQUE (X1000 IN. LBS.)	45	60	97	154	201	279	352	421	548	661
20.93	42	MECH HP	29	41	66	103	138	197	230	282	367	438
		TORQUE (X1000 IN. LBS.)	46	61	98	155	204	282	356	427	557	669
25.63	34	MECH HP	24	34	54	86	113	154	195	231	315	379
		TORQUE (X1000 IN. LBS.)	47	63	101	159	208	289	365	433	566	686
31.39	27.5	MECH HP	20	29	46	71	96	130	159	193	254	304
		TORQUE (X1000 IN. LBS.)	48	64	104	164	213	298	376	448	586	707
38.44	22.5	MECH HP	17	24	38	60	81	107	133	161	209	252
		TORQUE (X1000 IN. LBS.)	49	66	107	168	219	306	386	457	598	725
47.08	18.5	MECH HP	14	20	32	49	68	91	112	135	181	218
		TORQUE (X1000 IN. LBS.)	50	68	109	172	225	314	397	471	617	745
57.66	15.0	MECH HP	12	17	27	42	56	75	93	114	151	181
		TORQUE (X1000 IN. LBS.)	52	69	113	177	230	321	406	487	637	767

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		TR7	TR8	TR9	TR11	TR12	TR13	TR15	TR16	TR18	TR20
17.09	51	THERMAL HP	127	173	198	327	412	474	543	657	735	861
		WITH FANS	191	260	297	491	618	711	815	986	1103	1292
20.93	42	THERMAL HP	129	177	203	334	422	485	555	673	752	881
		WITH FANS	194	266	305	501	633	728	833	1010	1128	1322
25.63	34	THERMAL HP	132	181	207	341	430	494	566	685	766	898
		WITH FANS	198	272	311	512	645	741	849	1028	1149	1347
31.39	27.5	THERMAL HP	134	183	209	345	435	501	573	694	776	909
		WITH FANS	201	275	314	518	653	752	860	1041	1164	1364
38.44	22.5	THERMAL HP	135	185	211	348	439	506	578	701	784	918
		WITH FANS	203	278	317	522	659	759	867	1052	1176	1377
47.08	18.5	THERMAL HP	136	186	212	350	442	508	581	705	788	923
		WITH FANS	204	279	318	525	663	762	872	1058	1182	1385
57.66	15.0	THERMAL HP	136	187	213	352	444	511	584	708	791	927
		WITH FANS	204	281	320	528	666	767	876	1062	1187	1391

EXACT GEAR RATIO

NOMINAL GEAR RATIO	TR7	TR8	TR9	TR11	TR12	TR13	TR15	TR16	TR18	TR20
17.09	17.488	16.723	17.471	17.212	16.686	16.799	17.550	17.230	16.992	17.079
20.93	21.333	20.400	20.462	20.738	20.374	19.690	21.292	20.902	20.936	21.073
25.63	26.517	25.357	25.717	25.393	25.346	25.828	25.765	25.800	24.793	24.956
31.39	31.765	30.375	31.111	31.821	30.379	31.481	32.612	32.016	31.831	32.041
38.44	38.865	37.165	38.528	38.516	37.189	39.397	39.862	39.133	39.420	39.679
47.08	47.647	45.563	46.667	47.731	45.568	47.222	48.918	48.024	46.811	47.119
57.66	58.298	55.747	57.792	57.775	55.783	59.095	59.792	58.700	57.971	58.352

Type TDS
Right Angle Shaft Speed Reducers
Triple Reduction

MECHANICAL CAPACITY

TR22	WTR25	WTR28	WTR30	WTR32	WTR34	WTR36	WTR38	WTR40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
616	**889**	**1214**	**1618**	**1788**	**2303**	**2545**	**2812**	**3166**	**MECH HP**	51	17.09
796	1157	1514	1987	2154	2805	3134	3459	3932	TORQUE (X1000 IN. LBS.)		
553	**775**	**978**	**1371**	**1455**	**1944**	**2148**	**2374**	**2673**	**MECH HP**	42	20.93
811	1181	1547	2031	2187	2869	3205	3538	4023	TORQUE (X1000 IN. LBS.)		
447	**626**	**859**	**1142**	**1225**	**1608**	**1783**	**1982**	**2231**	**MECH HP**	34	25.63
825	1199	1579	2068	2234	2926	3280	3642	4140	TORQUE (X1000 IN. LBS.)		
380	**541**	**709**	**973**	**954**	**1379**	**1538**	**1710**	**1926**	**MECH HP**	27.5	31.39
849	1214	1625	2129	2269	3020	3405	3782	4300	TORQUE (X1000 IN. LBS.)		
315	**440**	**587**	**766**	**808**	**1153**	**1293**	**1437**	**1620**	**MECH HP**	22.5	38.44
871	1225	1674	2155	2306	3106	3522	3912	4452	TORQUE (X1000 IN. LBS.)		
268	**368**	**520**	**677**	**675**	**981**	**1089**	**1211**	**1359**	**MECH HP**	18.5	47.08
895	1238	1728	2179	2328	3223	3617	4018	4554	TORQUE (X1000 IN. LBS.)		
223	**300**	**415**	**513**	**580**	**823**	**919**	**1022**	**1122**	**MECH HP**	15.0	57.66
922	1250	1774	2198	2359	3327	3757	4174	4625	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

TR22	WTR25	WTR28	WTR30	WTR32	WTR34	WTR36	WTR38	WTR40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
977	**1106**	**1273**	**1335**	**1384**	**1419**	**1444**	**1431**	**1366**	**THERMAL HP**	51	17.09
1466	1659	1910	2003	2076	2129	2166	2147	2049	WITH FANS		
1000	**1132**	**1303**	**1366**	**1417**	**1453**	**1477**	**1464**	**1398**	**THERMAL HP**	42	20.93
1500	1698	1955	2049	2126	2180	2216	2196	2097	WITH FANS		
1018	**1153**	**1328**	**1392**	**1443**	**1480**	**1505**	**1492**	**1424**	**THERMAL HP**	34	25.63
1527	1730	1992	2088	2165	2220	2258	2238	2136	WITH FANS		
1031	**1167**	**1344**	**1409**	**1461**	**1498**	**1523**	**1510**	**1441**	**THERMAL HP**	27.5	31.39
1547	1751	2016	2114	2192	2247	2285	2265	2162	WITH FANS		
1041	**1179**	**1358**	**1423**	**1476**	**1513**	**1539**	**1525**	**1456**	**THERMAL HP**	22.5	38.44
1562	1769	2037	2135	2214	2270	2309	2288	2184	WITH FANS		
1047	**1185**	**1365**	**1431**	**1484**	**1521**	**1547**	**1534**	**1464**	**THERMAL HP**	18.5	47.08
1571	1778	2048	2147	2226	2282	2321	2301	2196	WITH FANS		
1052	**1191**	**1371**	**1437**	**1490**	**1528**	**1554**	**1540**	**1470**	**THERMAL HP**	15.0	57.66
1578	1787	2057	2156	2235	2292	2331	2310	2205	WITH FANS		

EXACT GEAR RATIO

TR22	WTR25	WTR28	WTR30	WTR32	WTR34	WTR36	WTR38	WTR40	NOMINAL GEAR RATIO
17.823	17.952	17.209	16.949	16.621	16.808	16.995	16.977	17.141	17.09
20.214	21.025	21.826	20.438	20.739	20.366	20.593	20.572	20.770	20.93
25.443	26.425	25.373	24.988	25.172	25.110	25.390	25.364	25.608	25.63
30.779	30.958	31.607	30.189	32.833	30.219	30.557	30.525	30.819	31.39
38.116	38.393	39.329	38.790	39.359	37.186	37.601	37.561	37.925	38.44
46.057	46.392	45.794	44.396	47.570	45.329	45.835	45.787	46.229	47.08
56.988	57.451	58.937	59.045	56.135	55.779	56.402	56.343	56.887	57.66

Type TDS
Right Angle Shaft Speed Reducers
Triple Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	TR7	TR8	TR9	TR11	TR12	TR13	TR15	TR16	TR18	TR20
17.09	42	MECH HP	29	41	64	102	139	193	233	281	374	447
		TORQUE (X1000 IN. LBS.)	45	61	99	155	204	284	358	425	557	669
20.93	34	MECH HP	24	34	55	86	115	166	193	235	308	369
		TORQUE (X1000 IN. LBS.)	46	61	100	157	206	287	360	431	565	682
25.63	28	MECH HP	20	28	46	73	95	130	165	197	268	322
		TORQUE (X1000 IN. LBS.)	48	64	104	163	212	296	374	445	582	705
31.39	23	MECH HP	17	24	39	60	82	110	135	164	215	258
		TORQUE (X1000 IN. LBS.)	49	66	107	168	219	305	386	460	601	726
38.44	19	MECH HP	14	20	32	51	69	90	113	136	177	214
		TORQUE (X1000 IN. LBS.)	50	67	109	172	225	313	396	469	614	744
47.08	15	MECH HP	12	17	27	42	57	77	95	114	154	185
		TORQUE (X1000 IN. LBS.)	52	69	112	177	231	322	408	483	633	764
57.66	12.5	MECH HP	10	14	22	36	48	63	79	97	128	154
		TORQUE (X1000 IN. LBS.)	53	71	115	182	236	329	417	499	653	787

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		TR7	TR8	TR9	TR11	TR12	TR13	TR15	TR16	TR18	TR20
17.09	42	THERMAL HP	174	239	273	451	568	654	748	907	1014	1188
		WITH FANS	245	337	385	636	801	922	1055	1279	1430	1675
20.93	34	THERMAL HP	178	244	279	460	580	667	763	925	1034	1212
		WITH FANS	251	344	393	649	818	940	1076	1304	1458	1709
25.63	28	THERMAL HP	181	248	283	467	589	678	775	939	1050	1230
		WITH FANS	255	350	399	658	830	956	1093	1324	1481	1734
31.39	23	THERMAL HP	183	250	286	472	595	685	784	950	1062	1244
		WITH FANS	258	353	403	666	839	966	1105	1340	1497	1754
38.44	19	THERMAL HP	184	253	289	476	601	691	791	958	1072	1255
		WITH FANS	259	357	407	671	847	974	1115	1351	1512	1770
47.08	15	THERMAL HP	185	254	290	478	604	695	795	963	1077	1262
		WITH FANS	261	358	409	674	852	980	1121	1358	1519	1779
57.66	12.5	THERMAL HP	186	255	291	481	606	698	798	967	1082	1267
		WITH FANS	262	360	410	678	854	984	1125	1363	1526	1786

EXACT GEAR RATIO

NOMINAL GEAR RATIO	TR7	TR8	TR9	TR11	TR12	TR13	TR15	TR16	TR18	TR20
17.09	17.488	16.723	17.471	17.212	16.686	16.799	17.550	17.230	16.992	17.079
20.93	21.333	20.400	20.462	20.738	20.374	19.690	21.292	20.902	20.936	21.073
25.63	26.517	25.357	25.717	25.393	25.346	25.828	25.765	25.800	24.793	24.956
31.39	31.765	30.375	31.111	31.821	30.379	31.481	32.612	32.016	31.831	32.041
38.44	38.865	37.165	38.528	38.516	37.189	39.397	39.862	39.133	39.420	39.679
47.08	47.647	45.563	46.667	47.731	45.568	47.222	48.918	48.024	46.811	47.119
57.66	58.298	55.747	57.792	57.775	55.783	59.095	59.792	58.700	57.971	58.352

Type TDS
Right Angle Shaft Speed Reducers
Triple Reduction

MECHANICAL CAPACITY

TR22	WTR25	WTR28	WTR30	WTR32	WTR34	WTR36	WTR38	WTR40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
519	**751**	**1027**	**1368**	**1503**	**1950**	**2154**	**2380**	**2681**	**MECH HP**	42	17.09
811	1181	1547	2031	2187	2869	3205	3538	4023	TORQUE (X1000 IN. LBS.)		
466	**651**	**826**	**1155**	**1230**	**1641**	**1819**	**2022**	**2277**	**MECH HP**	34	20.93
825	1199	1579	2068	2234	2926	3286	3642	4140	TORQUE (X1000 IN. LBS.)		
380	**523**	**731**	**972**	**1027**	**1371**	**1519**	**1689**	**1900**	**MECH HP**	28	25.63
847	1211	1624	2128	2264	3014	3376	3750	4260	TORQUE (X1000 IN. LBS.)		
324	**452**	**603**	**814**	**799**	**1177**	**1313**	**1460**	**1645**	**MECH HP**	23	31.39
873	1225	1670	2153	2299	3115	3513	3902	4440	TORQUE (X1000 IN. LBS.)		
268	**367**	**499**	**640**	**677**	**983**	**1102**	**1226**	**1373**	**MECH HP**	19	38.44
895	1236	1720	2176	2333	3202	3630	4034	4561	TORQUE (X1000 IN. LBS.)		
227	**307**	**442**	**565**	**565**	**836**	**928**	**1032**	**1139**	**MECH HP**	15	47.08
919	1248	1775	2198	2355	3319	3726	4140	4610	TORQUE (X1000 IN. LBS.)		
189	**250**	**352**	**428**	**485**	**701**	**783**	**866**	**939**	**MECH HP**	12.5	57.66
946	1260	1818	2217	2385	3424	3867	4271	4679	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

TR22	WTR25	WTR28	WTR30	WTR32	WTR34	WTR36	WTR38	WTR40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
1347	**1525**	**1756**	**1841**	**1909**	**1958**	**1991**	**1973**	**1883**	**THERMAL HP**	42	17.09
1899	2150	2476	2596	2692	2761	2807	2782	2655	WITH FANS		
1374	**1556**	**1791**	**1878**	**1947**	**1997**	**2031**	**2013**	**1921**	**THERMAL HP**	34	20.93
1937	2194	2525	2648	2745	2816	2864	2838	2709	WITH FANS		
1396	**1580**	**1819**	**1907**	**1977**	**2028**	**2062**	**2044**	**1951**	**THERMAL HP**	28	25.63
1968	2228	2565	2689	2788	2859	2907	2882	2751	WITH FANS		
1411	**1598**	**1840**	**1929**	**2000**	**2051**	**2085**	**2067**	**1973**	**THERMAL HP**	23	31.39
1990	2253	2594	2720	2820	2892	2940	2914	2782	WITH FANS		
1424	**1612**	**1856**	**1946**	**2017**	**2069**	**2104**	**2085**	**1990**	**THERMAL HP**	19	38.44
2008	2273	2617	2744	2844	2917	2967	2940	2806	WITH FANS		
1431	**1620**	**1865**	**1956**	**2027**	**2079**	**2114**	**2096**	**2000**	**THERMAL HP**	15	47.08
2018	2284	2630	2758	2858	2931	2981	2955	2820	WITH FANS		
1437	**1627**	**1874**	**1964**	**2036**	**2088**	**2124**	**2105**	**2009**	**THERMAL HP**	12.5	57.66
2026	2294	2642	2769	2871	2944	2995	2968	2833	WITH FANS		

EXACT GEAR RATIO

TR22	WTR25	WTR28	WTR30	WTR32	WTR34	WTR36	WTR38	WTR40	NOMINAL GEAR RATIO
17.823	17.952	17.209	16.949	16.621	16.808	16.995	16.977	17.141	17.09
20.214	21.025	21.826	20.438	20.739	20.366	20.593	20.572	20.770	20.93
25.443	26.425	25.373	24.988	25.172	25.110	25.390	25.364	25.608	25.63
30.779	30.958	31.607	30.189	32.833	30.219	30.557	30.525	30.819	31.39
38.116	38.393	39.329	38.790	39.359	37.186	37.601	37.561	37.925	38.44
46.057	46.392	45.794	44.396	47.570	45.329	45.835	45.787	46.229	47.08
56.988	57.451	58.937	59.045	56.135	55.779	56.402	56.343	56.887	57.66

Type TDS
Right Angle Shaft Speed Reducers
Triple Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	TR7	TR8	TR9	TR11	TR12	TR13	TR15	TR16	TR18	TR20
17.09	34	MECH HP	24	34	52	85	114	156	190	231	306	368
		TORQUE (X1000 IN. LBS.)	46	62	99	160	208	286	363	434	565	683
20.93	28	MECH HP	20	28	46	71	95	136	160	196	254	306
		TORQUE (X1000 IN. LBS.)	47	63	103	161	212	292	372	447	580	701
25.63	22.6	MECH HP	17	24	38	60	79	108	137	163	222	267
		TORQUE (X1000 IN. LBS.)	49	66	107	168	219	305	386	458	600	726
31.39	18.5	MECH HP	14	20	32	50	68	91	112	136	179	214
		TORQUE (X1000 IN. LBS.)	50	68	110	173	225	314	398	474	620	748
38.44	15.1	MECH HP	12	17	26	42	57	75	94	113	147	177
		TORQUE (X1000 IN. LBS.)	52	69	112	177	231	323	408	483	633	767
47.08	12.3	MECH HP	10	14	22	35	48	64	78	95	128	153
		TORQUE (X1000 IN. LBS.)	53	71	115	182	238	331	418	498	651	787
57.66	10.1	MECH HP	8.5	11	18	29	39	52	65	79	105	125
		TORQUE (X1000 IN. LBS.)	54	72	117	184	241	336	423	506	662	798

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		TR7	TR8	TR9	TR11	TR12	TR13	TR15	TR16	TR18	TR20
17.09	34	THERMAL HP	266	364	417	687	867	997	1141	1382	1545	1811
		WITH FANS	354	484	555	914	1153	1326	1518	1838	2055	2409
20.93	28	THERMAL HP	569	368	421	694	876	1008	1153	1397	1562	1830
		WITH FANS	358	478	560	923	1165	1341	1533	1858	2077	2434
25.63	22.6	THERMAL HP	271	371	424	699	882	1015	1161	1407	1574	1844
		WITH FANS	360	493	564	930	1173	1350	1544	1871	2093	2453
31.39	18.5	THERMAL HP	271	371	425	700	883	1017	1163	1409	1576	1846
		WITH FANS	360	493	565	931	1174	1353	1547	1874	2096	2455
38.44	15.1	THERMAL HP	271	371	425	700	883	1017	1163	1409	1576	1846
		WITH FANS	360	493	565	931	1174	1353	1547	1874	2096	2455
47.08	12.3	THERMAL HP	271	371	425	700	883	1017	1163	1409	1576	1846
		WITH FANS	360	493	565	931	1174	1353	1547	1874	2096	2455
57.66	10.1	THERMAL HP	271	371	425	700	883	1017	1163	1409	1576	1846
		WITH FANS	360	493	565	931	1174	1353	1547	1874	2096	2455

EXACT GEAR RATIO

NOMINAL GEAR RATIO	TR7	TR8	TR9	TR11	TR12	TR13	TR15	TR16	TR18	TR20
17.09	17.488	16.723	17.471	17.212	16.686	16.799	17.550	17.230	16.992	17.079
20.93	21.333	20.400	20.462	20.738	20.374	19.690	21.292	20.902	20.936	21.073
25.63	26.517	25.357	25.717	25.393	25.346	25.828	25.765	25.800	24.793	24.956
31.39	31.765	30.375	31.111	31.821	30.379	31.481	32.612	32.016	31.831	32.041
38.44	38.865	37.165	38.528	38.516	37.189	39.397	39.862	39.133	39.420	39.679
47.08	47.647	45.563	46.667	47.731	45.568	47.222	48.918	48.024	46.811	47.119
57.66	58.298	55.747	57.792	57.775	55.783	59.095	59.792	58.700	57.971	58.352

Type TDS
Right Angle Shaft Speed Reducers
Triple Reduction

MECHANICAL CAPACITY

TR22	WTR25	WTR28	WTR30	WTR32	WTR34	WTR36	WTR38	WTR40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
426	**614**	**844**	**1122**	**1236**	**1602**	**1776**	**1974**	**2222**	**MECH HP**	34	17.09
825	1199	1579	2068	2234	2926	3280	3642	4140	TORQUE (X1000 IN. LBS.)		
385	**530**	**684**	**958**	**1004**	**1361**	**1508**	**1677**	**1887**	**MECH HP**	28	20.93
847	1211	1624	2128	2264	3014	3376	3750	4760	TORQUE (X1000 IN. LBS.)		
315	**426**	**607**	**792**	**840**	**1144**	**1268**	**1410**	**1589**	**MECH HP**	22.6	25.63
873	1225	1676	2153	2298	3123	3499	3887	4423	TORQUE (X1000 IN. LBS.)		
268	**368**	**501**	**663**	**653**	**982**	**1095**	**1218**	**1362**	**MECH HP**	18.5	31.39
899	1238	1723	2177	2330	3225	3637	4041	4564	TORQUE (X1000 IN. LBS.)		
222	**299**	**414**	**521**	**552**	**819**	**919**	**1022**	**1122**	**MECH HP**	15.1	38.44
922	1248	1773	2198	2364	3312	3756	4173	4625	TORQUE (X1000 IN. LBS.)		
189	**249**	**366**	**460**	**461**	**696**	**773**	**857**	**929**	**MECH HP**	12.3	47.08
946	1260	1822	2221	2384	3431	3852	4265	4671	TORQUE (X1000 IN. LBS.)		
155	**203**	**288**	**348**	**395**	**578**	**644**	**706**	**766**	**MECH HP**	10.1	57.66
965	1271	1846	2237	2412	3507	3951	4323	4737	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

TR22	WTR25	WTR28	WTR30	WTR32	WTR34	WTR36	WTR38	WTR40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
2054	**2325**	**2677**	**2807**	**2910**	**2984**	**3035**	**3008**	**2871**	**THERMAL HP**	34	17.09
2732	3092	3560	3733	3870	3969	4037	4001	3818	WITH FANS		
2076	**2350**	**2706**	**2837**	**2941**	**3016**	**3068**	**3041**	**2902**	**THERMAL HP**	28	20.93
2761	3126	3599	3773	3912	4011	4080	4110	3860	WITH FANS		
2091	**2367**	**2726**	**2858**	**2963**	**3038**	**3090**	**3063**	**2923**	**THERMAL HP**	22.6	25.63
2781	3148	3626	3801	3941	4041	4074	4074	3888	WITH FANS		
2094	**2370**	**2729**	**2861**	**2966**	**3042**	**3094**	**3067**	**2927**	**THERMAL HP**	18.5	31.39
2785	3152	3629	3805	3945	4046	4115	4079	3888	WITH FANS		
2094	**2370**	**2729**	**2861**	**2966**	**3042**	**3094**	**3067**	**2927**	**THERMAL HPS**	15.1	38.44
2785	3152	3629	3805	3945	4046	4115	4079	3888	WITH FAN		
2094	**2370**	**2729**	**2861**	**2966**	**3042**	**3094**	**3067**	**2927**	**THERMAL HP**	12.3	47.08
2785	3152	3629	3805	3945	4046	4115	4079	3888	WITH FANS		
2094	**2370**	**2729**	**2861**	**2966**	**3042**	**3094**	**3067**	**2927**	**THERMAL HP**	10.1	57.66
2785	3152	3629	3805	3945	4046	4115	4079	3888	WITH FANS		

EXACT GEAR RATIO

TR22	WTR25	WTR28	WTR30	WTR32	WTR34	WTR36	WTR38	WTR40	NOMINAL GEAR RATIO
17.823	17.952	17.209	16.949	16.621	16.808	16.995	16.977	17.141	17.09
20.214	21.025	21.826	20.438	20.739	20.366	20.593	20.572	20.770	20.93
25.443	26.425	25.373	24.988	25.172	25.110	25.390	25.364	25.608	25.63
30.779	30.958	31.607	30.189	32.833	30.219	30.557	30.525	30.819	31.39
38.116	38.393	39.329	38.790	39.359	37.186	37.601	37.561	37.925	38.44
46.057	46.392	45.794	44.396	47.570	45.329	45.835	45.787	46.229	47.08
56.988	57.451	58.937	59.045	56.135	55.779	56.402	56.343	56.887	57.66

Type TDS
Right Angle Shaft Speed Reducers
Quadruple Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	QR7	QR8	QR9	QR11	QR12	QR13	QR15	QR16	QR18	QR20
70.62	25	MECH HP	18	25	41	66	87	121	148	172	234	278
		TORQUE (X1000 IN. LBS.)	48	65	105	166	217	303	383	455	596	714
86.50	20	MECH HP	16	21	35	56	73	97	122	142	195	234
		TORQUE (X1000 IN. LBS.)	50	67	108	171	221	309	390	465	608	734
105.9	16.5	MECH HP	13	17	29	47	61	86	106	124	163	194
		TORQUE (X1000 IN. LBS.)	51	69	112	175	230	320	405	482	630	755
129.7	13.5	MECH HP	11	14	24	38	49	70	90	105	140	166
		TORQUE (X1000 IN. LBS.)	52	70	114	180	235	328	416	496	649	778
158.9	11.0	MECH HP	9.4	12	20	32	40	59	73	86	116	138
		TORQUE (X1000 IN. LBS.)	53	72	116	183	240	335	422	503	658	793
194.6	9.0	MECH HP	8.0	10	16	26	34	48	61	72	96	114
		TORQUE (X1000 IN. LBS.)	54	72	117	185	244	340	427	510	667	804
238.4	7.5	MECH HP	6.5	8.4	13	22	28	40	50	60	80	95
		TORQUE (X1000 IN. LBS.)	55	74	119	189	248	343	436	523	686	815

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		QR7	QR8	QR9	QR11	QR12	QR13	QR15	QR16	QR18	QR20
70.62	25	THERMAL HP	51	70	80	131	166	191	218	264	295	346
		WITH FANS	102	140	160	262	332	382	436	528	590	692
86.50	20	THERMAL HP	51	70	80	132	166	191	219	265	296	347
		WITH FANS	102	140	160	264	332	382	438	530	592	694
105.9	16.5	THERMAL HP	51	70	80	132	167	192	220	266	297	348
		WITH FANS	102	140	160	264	334	384	440	532	594	696
129.7	13.5	THERMAL HP	51	70	81	133	168	193	221	267	299	350
		WITH FANS	102	140	162	266	336	386	442	534	598	700
158.9	11.0	THERMAL HP	52	71	81	133	168	194	222	269	300	352
		WITH FANS	104	142	162	266	336	388	444	538	600	704
194.6	9.0	THERMAL HP	52	71	82	134	170	195	223	270	302	354
		WITH FANS	104	142	164	268	340	390	446	540	604	708
238.4	7.5	THERMAL HP	52	72	82	135	171	197	225	273	305	357
		WITH FANS	104	144	164	270	342	394	450	546	610	714

EXACT GEAR RATIO

NOMINAL GEAR RATIO	QR7	QR8	QR9	QR11	QR12	QR13	QR15	QR16	QR18	QR20
70.62	71.744	70.455	70.909	69.682	68.651	69.396	71.529	73.122	70.670	71.135
86.50	85.115	86.625	85.655	84.173	83.747	87.891	88.696	90.476	86.291	86.859
105.9	109.181	108.675	105.120	103.301	104.095	102.540	105.668	107.633	107.346	108.052
129.7	125.226	131.305	132.000	129.716	133.011	128.582	128.000	130.208	128.664	129.510
158.9	157.315	162.422	160.000	157.232	164.185	155.708	158.706	161.248	157.506	158.542
194.6	187.839	196.958	198.000	194.574	199.516	192.872	192.000	195.312	192.996	194.265
238.4	235.973	243.633	240.000	235.848	246.277	233.563	238.059	241.873	236.259	237.813

Type TDS
Right Angle Shaft Speed Reducers
Quadruple Reduction

MECHANICAL CAPACITY

QR22	WQR25	WQR28	WQR30	WQR32	WQR34	WQR36	WQR38	WQR40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
328	**477**	**618**	**834**	**917**	**1205**	**1311**	**1458**	**1728**	**MECH HP**	25	70.62
857	1222	1654	2146	2284	3058	3472	3857	4388	TORQUE (X1000 IN. LBS.)		
282	**396**	**506**	**682**	**755**	**1071**	**1185**	**1276**	**1438**	**MECH HP**	20	86.50
882	1230	1691	2163	2316	3188	3560	3954	4500	TORQUE (X1000 IN. LBS.)		
239	**331**	**430**	**583**	**646**	**875**	**984**	**1090**	**1206**	**MECH HP**	16.5	105.9
908	1245	1748	2187	2347	3272	3715	4113	4594	TORQUE (X1000 IN. LBS.)		
198	**264**	**366**	**459**	**509**	**747**	**839**	**931**	**1011**	**MECH HP**	13.5	129.7
936	1257	1807	2211	2375	3381	3838	4253	4659	TORQUE (X1000 IN. LBS.)		
169	**217**	**309**	**373**	**415**	**620**	**692**	**760**	**825**	**MECH HP**	11.0	158.9
958	1267	1830	2226	2399	3472	3923	4301	4712	TORQUE (X1000 IN. LBS.)		
137	**179**	**265**	**317**	**353**	**521**	**582**	**636**	**690**	**MECH HP**	9.0	194.6
971	1277	1855	2246	2423	3527	3985	4350	4766	TORQUE (X1000 IN. LBS.)		
115	**147**	**210**	**258**	**288**	**437**	**482**	**520**	**576**	**MECH HP**	7.5	238.4
982	1285	1872	2267	2449	3603	4086	4402	4923	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

QR22	WQR25	WQR28	WQR30	WQR32	WQR34	WQR36	WQR38	WQR40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
393	**444**	**512**	**537**	**556**	**570**	**580**	**576**	**549**	**THERMAL HP**	25	70.62
786	888	1024	1074	1112	1140	1160	1152	1098	WITH FANS		
394	**446**	**513**	**538**	**558**	**522**	**582**	**578**	**550**	**THERMAL HP**	20	86.50
788	892	1026	1076	1116	1144	1164	1156	1100	WITH FANS		
395	**447**	**515**	**540**	**560**	**574**	**584**	**580**	**553**	**THERMAL HP**	16.5	105.9
790	894	1030	1080	1170	1148	1168	1160	1106	WITH FANS		
397	**449**	**518**	**543**	**563**	**577**	**587**	**583**	**555**	**THERMAL HP**	13.5	129.7
794	898	1036	1086	1126	1154	1174	1166	1110	WITH FANS		
399	**452**	**520**	**546**	**566**	**580**	**590**	**586**	**558**	**THERMAL HP**	11.0	158.9
798	904	1040	1092	1132	1160	1180	1172	1116	WITH FANS		
402	**455**	**524**	**549**	**569**	**584**	**594**	**590**	**562**	**THERMAL HP**	9.0	194.6
804	910	1048	1098	1138	1168	1188	1180	1124	WITH FANS		
405	**459**	**528**	**554**	**574**	**589**	**599**	**595**	**566**	**THERMAL HP**	7.5	238.4
810	918	1056	1108	1148	1178	1198	1190	1132	WITH FANS		

EXACT GEAR RATIO

QR22	WQR25	WQR28	WQR30	WQR32	WQR34	WQR36	WQR38	WQR40	NOMINAL GEAR RATIO
72.437	71.073	74.282	71.390	69.100	70.411	73.518	73.440	70.482	70.62
86.723	86.222	92.762	87.959	85.137	82.581	83.381	86.009	86.840	86.50
105.401	104.337	112.668	104.167	100.825	103.793	104.799	104.689	105.700	105.9
130.872	132.065	137.071	133.737	129.447	125.560	126.962	126.828	127.867	129.7
157.014	161.424	164.380	165.619	160.306	155.493	157.229	157.064	158.580	158.9
196.309	198.098	194.324	196.672	190.363	187.725	189.984	189.784	191.617	194.6
235.521	242.136	246.571	243.556	235.744	228.667	235.072	234.826	237.298	238.4

Type TDS
Right Angle Shaft Speed Reducers
Quadruple Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	QR7	QR8	QR9	QR11	QR12	QR13	QR15	QR16	QR18	QR20
70.62	16	MECH HP	13	17	29	46	61	85	104	122	165	197
		TORQUE (X1000 IN. LBS.)	51	68	111	175	229	320	404	481	629	755
86.50	13.5	MECH HP	11	15	24	39	51	68	86	100	138	165
		TORQUE (X1000 IN. LBS.)	52	70	114	180	233	326	412	491	642	775
105.9	11.0	MECH HP	9.0	12	20	32	43	60	74	86	113	136
		TORQUE (X1000 IN. LBS.)	53	72	116	183	241	335	422	503	658	792
129.7	9.0	MECH HP	8.0	10	16	26	33	48	61	72	96	115
		TORQUE (X1000 IN. LBS.)	54	73	117	185	243	339	427	510	668	804
158.9	7.5	MECH HP	6.5	8.5	13	22	28	40	51	60	80	95
		TORQUE (X1000 IN. LBS.)	55	74	120	189	248	343	437	521	681	818
194.6	6.0	MECH HP	5.5	7.2	11	18	23	33	43	50	67	80
		TORQUE (X1000 IN. LBS.)	56	76	123	194	255	346	449	535	699	840
238.4	5.0	MECH HP	4.6	5.9	9.7	15	19	27	35	42	56	67
		TORQUE (X1000 IN. LBS.)	58	77	125	198	261	347	458	550	719	858

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		QR7	QR8	QR9	QR11	QR12	QR13	QR15	QR16	QR18	QR20
70.62	16	THERMAL HP	90	123	140	232	292	336	385	466	521	611
		WITH FANS	150	205	234	387	488	561	643	778	870	1020
86.50	13.5	THERMAL HP	90	123	141	232	293	337	386	468	523	613
		WITH FANS	150	205	235	387	489	563	645	782	873	1024
105.9	11.0	THERMAL HP	90	124	142	233	294	339	388	470	525	615
		WITH FANS	150	207	237	389	491	566	648	785	877	1027
129.7	9.0	THERMAL HP	91	124	142	235	296	341	390	472	528	618
		WITH FANS	152	207	237	392	494	569	651	788	882	1032
158.9	7.5	THERMAL HP	91	125	143	236	298	343	392	475	531	622
		WITH FANS	152	209	239	394	498	573	655	793	887	1039
194.6	6.0	THERMAL HP	92	126	144	238	300	345	395	479	535	627
		WITH FANS	154	210	240	397	501	576	660	800	893	1047
238.4	5.0	THERMAL HP	93	127	146	240	303	348	398	483	540	633
		WITH FANS	155	212	244	401	506	581	665	807	902	1057

EXACT GEAR RATIO

NOMINAL GEAR RATIO	QR7	QR8	QR9	QR11	QR12	QR13	QR15	QR16	QR18	QR20
70.62	71.744	70.455	70.909	69.682	68.651	69.396	71.529	73.122	70.670	71.135
86.50	85.115	86.625	85.655	84.173	83.747	87.891	88.696	90.476	86.291	86.859
105.9	109.181	108.675	105.120	103.301	104.095	102.540	105.668	107.633	107.346	108.052
129.7	125.226	131.305	132.000	129.716	133.011	128.582	128.000	130.208	128.664	129.510
158.9	157.315	162.422	160.000	157.232	164.185	155.708	158.706	161.248	157.506	158.542
194.6	187.839	196.958	198.000	194.574	199.516	192.872	192.000	195.312	192.996	194.265
238.4	235.973	243.633	240.000	235.848	246.277	233.563	238.059	241.873	236.259	237.813

Type TDS
Right Angle Shaft Speed Reducers
Quadruple Reduction

MECHANICAL CAPACITY

QR22	WQR25	WQR28	WQR30	WQR32	WQR34	WQR36	WQR38	WQR40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
232	**325**	**437**	**569**	**629**	**860**	**935**	**1040**	**1211**	**MECH HP**	16	70.62
907	1245	1752	2189	2344	3262	3704	4115	4599	TORQUE (X1000 IN. LBS.)		
199	**269**	**358**	**465**	**517**	**763**	**844**	**909**	**992**	**MECH HP**	13.5	86.50
932	1253	1789	2204	2373	3394	3792	4214	4643	TORQUE (X1000 IN. LBS.)		
168	**225**	**301**	**396**	**442**	**621**	**693**	**762**	**826**	**MECH HP**	11.0	105.9
957	1266	1832	2227	2401	3475	3916	4297	4708	TORQUE (X1000 IN. LBS.)		
137	**179**	**251**	**312**	**348**	**522**	**584**	**636**	**692**	**MECH HP**	9.0	129.7
971	1277	1857	2249	2427	3536	3994	4351	4767	TORQUE (X1000 IN. LBS.)		
116	**147**	**211**	**253**	**283**	**429**	**482**	**519**	**563**	**MECH HP**	7.5	158.9
983	1286	1868	2261	2448	3601	4083	4394	4815	TORQUE (X1000 IN. LBS.)		
93	**120**	**179**	**215**	**240**	**366**	**402**	**434**	**471**	**MECH HP**	6.0	194.6
990	1290	1883	2280	2470	3701	4122	4438	4864	TORQUE (X1000 IN. LBS.)		
78	**99**	**143**	**175**	**196**	**309**	**328**	**354**	**384**	**MECH HP**	5.0	238.4
996	1303	1899	2300	2494	3813	4163	4485	4916	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

QR22	WQR25	WQR28	WQR30	WQR32	WQR34	WQR36	WQR38	WQR40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
693	**784**	**903**	**946**	**981**	**1006**	**1023**	**1017**	**968**	**THERMAL HP**	16	70.62
1157	1309	1508	1580	1638	1680	1708	1696	1617	WITH FANS		
695	**787**	**906**	**950**	**985**	**1010**	**1027**	**1020**	**971**	**THERMAL HP**	13.5	86.50
1161	1314	1513	1587	1645	1687	1715	1701	1622	WITH FANS		
698	**790**	**910**	**953**	**989**	**1014**	**1031**	**1025**	**975**	**THERMAL HP**	11.0	105.9
1166	1319	1520	1592	1652	1693	1722	1712	1628	WITH FANS		
701	**794**	**914**	**959**	**994**	**1019**	**1037**	**1030**	**980**	**THERMAL HP**	9.0	129.7
1171	1326	1526	1602	1660	1702	1732	1720	1637	WITH FANS		
706	**799**	**920**	**964**	**1000**	**1025**	**1043**	**1036**	**986**	**THERMAL HP**	7.5	158.9
1179	1334	1536	1610	1670	1712	1742	1730	1647	WITH FANS		
711	**805**	**927**	**972**	**1008**	**1033**	**1051**	**1044**	**994**	**THERMAL HP**	6.0	194.6
1187	1344	1548	1623	1683	1725	1755	1743	1660	WITH FANS		
718	**812**	**935**	**981**	**1017**	**1043**	**1061**	**1054**	**1003**	**THERMAL HP**	5.0	238.4
1199	1356	1561	1638	1698	1742	1772	1760	1675	WITH FANS		

EXACT GEAR RATIO

QR22	WQR25	WQR28	WQR30	WQR32	WQR34	WQR36	WQR38	WQR40	NOMINAL GEAR RATIO
72.437	71.073	74.282	71.390	69.100	70.411	73.518	73.440	70.482	70.62
86.723	86.222	92.762	87.959	85.137	82.581	83.381	86.009	86.840	86.50
105.401	104.337	112.668	104.167	100.825	103.793	104.799	104.689	105.700	105.9
130.872	132.065	137.071	133.737	129.447	125.560	126.962	126.828	127.867	129.7
157.014	161.424	164.380	165.619	160.306	155.493	157.229	157.064	158.580	158.9
196.309	198.098	194.324	196.672	190.363	187.725	189.984	189.784	191.617	194.6
235.521	242.136	246.571	243.556	235.744	228.667	235.072	234.826	237.298	238.4

Type TDS
Right Angle Shaft Speed Reducers
Quadruple Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	QR7	QR8	QR9	QR11	QR12	QR13	QR15	QR16	QR18	QR20
70.62	12.5	MECH HP	10	13	22	36	47	66	80	94	127	152
		TORQUE (X1000 IN. LBS.)	53	71	115	182	238	332	419	500	653	785
86.50	10.0	MECH HP	8.8	11	18	30	39	52	65	77	105	126
		TORQUE (X1000 IN. LBS.)	54	72	117	184	241	336	423	505	660	797
105.9	8.2	MECH HP	6.8	9.3	15	25	32	46	56	65	86	103
		TORQUE (X1000 IN. LBS.)	54	73	119	187	245	342	432	514	672	808
129.7	6.7	MECH HP	6.1	7.9	12	20	26	36	48	56	74	88
		TORQUE (X1000 IN. LBS.)	55	75	121	191	251	344	446	529	691	829
158.9	5.5	MECH HP	5.0	6.5	10	17	21	30	39	46	62	73
		TORQUE (X1000 IN. LBS.)	57	77	124	196	257	347	453	541	707	849
194.6	4.5	MECH HP	4.3	5.4	8.9	14	18	25	33	39	51	62
		TORQUE (X1000 IN. LBS.)	58	77	127	201	264	349	465	555	725	872
238.4	3.6	MECH HP	3.5	4.4	7.5	12	15	20	27	32	43	51
		TORQUE (X1000 IN. LBS.)	60	78	130	206	270	350	476	563	746	887

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		QR7	QR8	QR9	QR11	QR12	QR13	QR15	QR16	QR18	QR20
70.62	12.5	THERMAL HP	137	187	214	353	445	512	586	710	794	930
		WITH FANS	206	281	321	530	668	768	879	1065	1191	1395
86.50	10.0	THERMAL HP	137	188	215	354	447	514	588	713	797	933
		WITH FANS	206	282	323	531	671	771	882	1070	1196	1400
105.9	8.2	THERMAL HP	138	189	216	355	449	516	590	716	800	937
		WITH FANS	207	284	324	533	674	774	885	1074	1200	1406
129.7	6.7	THERMAL HP	138	190	217	357	451	519	593	719	804	942
		WITH FANS	207	285	326	536	677	779	890	1079	1206	1413
158.9	5.5	THERMAL HP	139	191	218	359	454	522	597	724	809	948
		WITH FANS	209	287	327	539	681	783	896	1086	1214	1422
194.6	4.5	THERMAL HP	140	192	220	362	457	526	602	729	815	955
		WITH FANS	210	288	330	543	686	789	903	1094	1223	1433
238.4	3.6	THERMAL HP	142	194	222	365	461	531	607	735	822	963
		WITH FANS	213	291	333	548	692	797	911	1103	1233	1445

EXACT GEAR RATIO

NOMINAL GEAR RATIO	QR7	QR8	QR9	QR11	QR12	QR13	QR15	QR16	QR18	QR20
70.62	71.744	70.455	70.909	69.682	68.651	69.396	71.529	73.122	70.670	71.135
86.50	85.115	86.625	85.655	84.173	83.747	87.891	88.696	90.476	86.291	86.859
105.9	109.181	108.675	105.120	103.301	104.095	102.540	105.668	107.633	107.346	108.052
129.7	125.226	131.305	132.000	129.716	133.011	128.582	128.000	130.208	128.664	129.510
158.9	157.315	162.422	160.000	157.232	164.185	155.708	158.706	161.248	157.506	158.542
194.6	187.839	196.958	198.000	194.574	199.516	192.872	192.000	195.312	192.996	194.265
238.4	235.973	243.633	240.000	235.848	246.277	233.563	238.059	241.873	236.259	237.813

Type TDS
Right Angle Shaft Speed Reducers
Quadruple Reduction

MECHANICAL CAPACITY

QR22	WQR25	WQR28	WQR30	WQR32	WQR34	WQR36	WQR38	WQR40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
180	**244**	**338**	**428**	**476**	**669**	**727**	**803**	**917**	**MECH HP**	12.5	70.62
945	1261	1820	2218	2384	3414	3876	4275	4683	TORQUE (X1000 IN. LBS.)		
153	**203**	**273**	**350**	**390**	**587**	**651**	**692**	**750**	**MECH HP**	10.0	86.50
963	1268	1840	2232	2411	3513	3935	4312	4724	TORQUE (X1000 IN. LBS.)		
127	**169**	**228**	**298**	**333**	**473**	**530**	**575**	**624**	**MECH HP**	8.2	105.9
976	1281	1861	2254	2437	3559	4027	4367	4784	TORQUE (X1000 IN. LBS.)		
104	**134**	**189**	**234**	**262**	**402**	**446**	**480**	**522**	**MECH HP**	6.7	129.7
987	1291	1878	2274	2461	3661	4107	4416	4841	TORQUE (X1000 IN. LBS.)		
87	**111**	**158**	**190**	**213**	**333**	**363**	**391**	**425**	**MECH HP**	5.5	158.9
993	1300	1888	2287	2482	3755	4142	4457	4884	TORQUE (X1000 IN. LBS.)		
70	**91**	**135**	**161**	**181**	**282**	**303**	**327**	**355**	**MECH HP**	4.5	194.6
1000	1309	1902	2304	2502	3840	4177	4498	4930	TORQUE (X1000 IN. LBS.)		
58	**75**	**107**	**131**	**147**	**233**	**247**	**267**	**289**	**MECH HP**	3.6	238.4
1005	1316	1917	2323	2524	3874	4215	4542	4979	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

QR22	WQR25	WQR28	WQR30	WQR32	WQR34	WQR36	WQR38	WQR40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
1055	**1194**	**1376**	**1442**	**1495**	**1533**	**1560**	**1546**	**1475**	**THERMAL HP**	12.5	70.62
1583	1791	2064	2138	2243	2300	2340	2319	2213	WITH FANS		
1059	**1198**	**1380**	**1447**	**1500**	**1538**	**1565**	**1551**	**1480**	**THERMAL HP**	10.0	86.50
1589	1797	2070	2171	2250	2307	2348	2327	2220	WITH FANS		
1063	**1203**	**1386**	**1453**	**1506**	**1545**	**1571**	**1557**	**1486**	**THERMAL HP**	8.2	105.9
1595	1805	2079	2180	2259	2318	2357	2336	2229	WITH FANS		
1069	**1210**	**1393**	**1460**	**1514**	**1553**	**1579**	**1565**	**1494**	**THERMAL HP**	6.7	129.7
1604	1815	2090	2190	2271	2330	2369	2348	2241	WITH FANS		
1075	**1217**	**1401**	**1469**	**1523**	**1562**	**1589**	**1575**	**1503**	**THERMAL HP**	5.5	158.9
1613	1826	2102	2204	2285	2343	2384	2363	2255	WITH FANS		
1083	**1226**	**1412**	**1480**	**1535**	**1574**	**1601**	**1586**	**1514**	**THERMAL HP**	4.5	194.6
1625	1839	2118	2220	2303	2361	2402	2379	2271	WITH FANS		
1093	**1237**	**1425**	**1493**	**1548**	**1588**	**1615**	**1601**	**1527**	**THERMAL HP**	3.6	238.4
1640	1856	2138	2240	2322	2382	2423	2402	2291	WITH FANS		

EXACT GEAR RATIO

QR22	WQR25	WQR28	WQR30	WQR32	WQR34	WQR36	WQR38	WQR40	NOMINAL GEAR RATIO
72.437	71.073	74.282	71.390	69.100	70.411	73.518	73.440	70.482	70.62
86.723	86.222	92.762	87.959	85.137	82.581	83.381	86.009	86.840	86.50
105.401	104.337	112.668	104.167	100.825	103.793	104.799	104.689	105.700	105.9
130.872	132.065	137.071	133.737	129.447	125.560	126.962	126.828	127.867	129.7
157.014	161.424	164.380	165.619	160.306	155.493	157.229	157.064	158.580	158.9
196.309	198.098	194.324	196.672	190.363	187.725	189.984	189.784	191.617	194.6
235.521	242.136	246.571	243.556	235.744	228.667	235.072	234.826	237.298	238.4

Type TDS
Right Angle Shaft Speed Reducers
Quadruple Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	QR7	QR8	QR9	QR11	QR12	QR13	QR15	QR16	QR18	QR20
70.62	10	MECH HP	8.6	11	18	30	40	55	67	79	106	127
		TORQUE (X1000 IN. LBS.)	54	72	116	184	242	337	424	506	661	796
86.50	8.3	MECH HP	7.2	9.6	15	25	33	44	55	64	88	106
		TORQUE (X1000 IN. LBS.)	54	73	118	186	244	340	428	511	668	807
105.9	6.8	MECH HP	5.9	7.9	13	21	27	38	47	55	73	87
		TORQUE (X1000 IN. LBS.)	56	75	121	191	251	344	442	527	688	825
129.7	5.6	MECH HP	5.2	6.7	10	17	22	30	40	47	62	74
		TORQUE (X1000 IN. LBS.)	57	77	124	196	257	346	453	541	708	849
158.9	4.5	MECH HP	4.2	5.4	9.1	14	18	25	33	39	52	62
		TORQUE (X1000 IN. LBS.)	58	77	127	201	263	348	464	554	724	870
194.6	3.7	MECH HP	3.6	4.9	7.5	12	15	20	28	32	44	52
		TORQUE (X1000 IN. LBS.)	60	77	130	206	270	351	476	562	743	887
238.4	3.0	MECH HP	3.0	3.7	6.3	10	12	17	23	26	36	42
		TORQUE (X1000 IN. LBS.)	61	78	133	210	271	352	487	566	763	892

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		QR7	QR8	QR9	QR11	QR12	QR13	QR15	QR16	QR18	QR20
70.62	10	THERMAL HP	186	255	292	481	607	699	799	969	1083	1269
		WITH FANS	262	360	412	678	856	986	1127	1366	1527	1789
86.50	8.3	THERMAL HP	187	256	292	482	608	700	800	970	1084	1270
		WITH FANS	264	361	412	680	857	987	1128	1368	1528	1791
105.9	6.8	THERMAL HP	187	256	292	482	608	700	801	971	1085	1271
		WITH FANS	264	361	412	680	857	987	1129	1369	1530	1792
129.7	5.6	THERMAL HP	187	256	293	483	609	701	802	972	1087	1273
		WITH FANS	264	361	413	681	859	988	1131	1370	1533	1795
158.9	4.5	THERMAL HP	187	257	293	484	610	702	803	973	1088	1275
		WITH FANS	264	362	413	682	860	990	1132	1372	1534	1798
194.6	3.7	THERMAL HP	188	257	294	484	611	703	805	975	1090	1277
		WITH FANS	265	362	415	682	862	991	1135	1375	1537	1801
238.4	3.0	THERMAL HP	188	258	294	486	613	705	806	977	1093	1280
		WITH FANS	265	364	415	685	864	994	1136	1378	1541	1805

EXACT GEAR RATIO

NOMINAL GEAR RATIO	QR7	QR8	QR9	QR11	QR12	QR13	QR15	QR16	QR18	QR20
70.62	71.744	70.455	70.909	69.682	68.651	69.396	71.529	73.122	70.670	71.135
86.50	85.115	86.625	85.655	84.173	83.747	87.891	88.696	90.476	86.291	86.859
105.9	109.181	108.675	105.120	103.301	104.095	102.540	105.668	107.633	107.346	108.052
129.7	125.226	131.305	132.000	129.716	133.011	128.582	128.000	130.208	128.664	129.510
158.9	157.315	162.422	160.000	157.232	164.185	155.708	158.706	161.248	157.506	158.542
194.6	187.839	196.958	198.000	194.574	199.516	192.872	192.000	195.312	192.996	194.265
238.4	235.973	243.633	240.000	235.848	246.277	233.563	238.059	241.873	236.259	237.813

Type TDS
Right Angle Shaft Speed Reducers
Quadruple Reduction

MECHANICAL CAPACITY

QR22	WQR25	WQR28	WQR30	WQR32	WQR34	WQR36	WQR38	WQR40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
151	**204**	**283**	**357**	**398**	**566**	**613**	**672**	**767**	**MECH HP**	10	70.62
962	1270	1844	2236	2409	3493	3947	4321	4734	TORQUE (X1000 IN. LBS.)		
128	**169**	**228**	**292**	**326**	**493**	**547**	**578**	**627**	**MECH HP**	8.3	86.50
975	1277	1858	2250	2434	3566	3996	4356	4773	TORQUE (X1000 IN. LBS.)		
106	**141**	**190**	**249**	**278**	**401**	**447**	**481**	**522**	**MECH HP**	6.8	105.9
986	1290	1875	2270	2459	3649	4103	4408	4831	TORQUE (X1000 IN. LBS.)		
86	**112**	**157**	**195**	**219**	**342**	**372**	**401**	**436**	**MECH HP**	5.6	129.7
993	1300	1891	2290	2482	3760	4143	4456	4883	TORQUE (X1000 IN. LBS.)		
72	**92**	**132**	**158**	**178**	**282**	**303**	**326**	**354**	**MECH HP**	4.5	158.9
999	1308	1901	2302	2502	3839	4177	4494	4926	TORQUE (X1000 IN. LBS.)		
58	**75**	**112**	**134**	**151**	**235**	**253**	**272**	**296**	**MECH HP**	3.7	194.6
1006	1317	1914	2319	2522	3870	4210	4534	4971	TORQUE (X1000 IN. LBS.)		
49	**62**	**89**	**109**	**123**	**195**	**206**	**222**	**241**	**MECH HP**	3.0	238.4
1011	1323	1929	2337	2543	3903	4247	4577	5017	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

QR22	WQR25	WQR28	WQR30	WQR32	WQR34	WQR36	WQR38	WQR40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
1439	**1629**	**1877**	**1967**	**2040**	**2091**	**2127**	**2108**	**2012**	**THERMAL HP**	10	70.62
2029	2297	2646	2773	2876	2948	2999	2972	2837	WITH FANS		
1441	**1631**	**1878**	**1969**	**2041**	**2093**	**2129**	**2110**	**2014**	**THERMAL HP**	8.3	86.50
2032	2300	2648	2776	2878	2951	3002	2975	2840	WITH FANS		
1442	**1632**	**1880**	**1971**	**2043**	**2095**	**2131**	**2112**	**2016**	**THERMAL HP**	6.8	105.9
2033	2301	2651	2779	2881	2954	3005	2978	2843	WITH FANS		
1444	**1634**	**1882**	**1973**	**2046**	**2098**	**2134**	**2115**	**2018**	**THERMAL HP**	5.6	129.7
2036	2304	2654	2782	2885	2958	3009	2982	2845	WITH FANS		
1446	**1637**	**1885**	**1976**	**2049**	**2101**	**2137**	**2118**	**2021**	**THERMAL HP**	4.5	158.9
2039	2308	2658	2786	2889	2962	3013	2986	2850	WITH FANS		
1449	**1640**	**1889**	**1980**	**2053**	**2105**	**2141**	**2122**	**2025**	**THERMAL HP**	3.7	194.6
2043	2312	2663	2792	2895	2968	3019	2992	2855	WITH FANS		
1452	**1644**	**1893**	**1984**	**2057**	**2110**	**2146**	**2127**	**2030**	**THERMAL HP**	3.0	238.4
2047	2318	2669	2797	2900	2975	3026	2999	2862	WITH FANS		

EXACT GEAR RATIO

QR22	WQR25	WQR28	WQR30	WQR32	WQR34	WQR36	WQR38	WQR40	NOMINAL GEAR RATIO
72.437	71.073	74.282	71.390	69.100	70.411	73.518	73.440	70.482	70.62
86.723	86.222	92.762	87.959	85.137	82.581	83.381	86.009	86.840	86.50
105.401	104.337	112.668	104.167	100.825	103.793	104.799	104.689	105.700	105.9
130.872	132.065	137.071	133.737	129.447	125.560	126.962	126.828	127.867	129.7
157.014	161.424	164.380	165.619	160.306	155.493	157.229	157.064	158.580	158.9
196.309	198.098	194.324	196.672	190.363	187.725	189.984	189.784	191.617	194.6
235.521	242.136	246.571	243.556	235.744	228.667	235.072	234.826	237.298	238.4

Type TDS
Right Angle Shaft Speed Reducers
Quadruple Reduction

MECHANICAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED	REDUCER SIZE	QR7	QR8	QR9	QR11	QR12	QR13	QR15	QR16	QR18	QR20
70.62	8.2	MECH HP	6.9	9.5	15	24	32	45	55	64	87	104
		TORQUE (X1000 IN. LBS.)	54	73	118	186	245	342	431	514	671	807
86.50	6.7	MECH HP	6.1	8.0	13	20	27	36	45	53	72	87
		TORQUE (X1000 IN. LBS.)	56	75	121	191	249	344	438	524	684	826
105.9	5.5	MECH HP	4.8	6.5	10	17	22	31	39	46	60	72
		TORQUE (X1000 IN. LBS.)	57	77	125	196	258	347	454	541	708	848
129.7	4.5	MECH HP	4.3	5.4	8.9	14	18	25	33	39	52	62
		TORQUE (X1000 IN. LBS.)	58	77	127	201	264	349	465	556	727	873
158.9	3.7	MECH HP	3.5	4.4	7.5	12	15	20	27	32	43	51
		TORQUE (X1000 IN. LBS.)	60	78	131	206	270	351	476	563	744	888
194.6	3.0	MECH HP	3.0	3.6	6.2	10	12	16	23	26	36	47
		TORQUE (X1000 IN. LBS.)	61	78	133	211	271	353	489	566	763	893
238.4	2.4	MECH HP	2.5	7.9	5.2	8.4	10	14	19	21	30	34
		TORQUE (X1000 IN. LBS.)	63	78	135	216	273	356	500	574	783	898

THERMAL CAPACITY

NOMINAL GEAR RATIO	NOMINAL OUTPUT SPEED		QR7	QR8	QR9	QR11	QR12	QR13	QR15	QR16	QR18	QR20
70.62	8.2	THERMAL HP	271	371	425	700	883	1017	1163	1409	1576	1846
		WITH FANS	360	493	565	931	1174	1353	1547	1874	2096	2455
86.50	6.7	THERMAL HP	271	371	425	700	883	1017	1163	1409	1576	1846
		WITH FANS	360	493	565	931	1174	1353	1547	1874	2096	2455
105.9	5.5	THERMAL HP	271	371	425	700	883	1017	1163	1409	1576	1846
		WITH FANS	360	493	565	931	1174	1353	1547	1874	2096	2455
129.7	4.5	THERMAL HP	271	371	425	700	883	1017	1163	1409	1576	1846
		WITH FANS	360	493	565	931	1174	1353	1547	1874	2096	2455
158.9	3.7	THERMAL HP	271	371	425	700	883	1017	1163	1409	1576	1846
		WITH FANS	360	493	565	931	1174	1353	1547	1874	2096	2455
194.6	3.0	THERMAL HP	271	371	425	700	883	1017	1163	1409	1576	1846
		WITH FANS	360	493	565	931	1174	1353	1547	1874	2096	2455
238.4	2.4	THERMAL HP	271	371	425	700	883	1017	1163	1409	1576	1846
		WITH FANS	360	493	565	931	1174	1353	1547	1874	2096	2455

EXACT GEAR RATIO

NOMINAL GEAR RATIO	QR7	QR8	QR9	QR11	QR12	QR13	QR15	QR16	QR18	QR20
70.62	71.744	70.455	70.909	69.682	68.651	69.396	71.529	73.122	70.670	71.135
86.50	85.115	86.625	85.655	84.173	83.747	87.891	88.696	90.476	86.291	86.859
105.9	109.181	108.675	105.120	103.301	104.095	102.540	105.668	107.633	107.346	108.052
129.7	125.226	131.305	132.000	129.716	133.011	128.582	128.000	130.208	128.664	129.510
158.9	157.315	162.422	160.000	157.232	164.185	155.708	158.706	161.248	157.506	158.542
194.6	187.839	196.958	198.000	194.574	199.516	192.872	192.000	195.312	192.996	194.265
238.4	235.973	243.633	240.000	235.848	246.277	233.563	238.059	241.873	236.259	237.813

Type TDS
Right Angle Shaft Speed Reducers
Quadruple Reduction

MECHANICAL CAPACITY

QR22	WQR25	WQR28	WQR30	WQR32	WQR34	WQR36	WQR38	WQR40	REDUCER SIZE	NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
124	**165**	**230**	**290**	**324**	**464**	**502**	**547**	**625**	**MECH HP**	8.2	70.62
976	1281	1863	2254	2435	3555	4017	4370	4789	TORQUE (X1000 IN. LBS.)		
104	**137**	**185**	**237**	**265**	**409**	**451**	**471**	**511**	**MECH HP**	6.7	86.50
986	1287	1873	2268	2460	3676	4093	4404	4826	TORQUE (X1000 IN. LBS.)		
86	**114**	**154**	**202**	**226**	**333**	**363**	**391**	**425**	**MECH HP**	5.5	105.9
993	1299	1889	2288	2483	3762	4144	4454	4881	TORQUE (X1000 IN. LBS.)		
70	**91**	**127**	**158**	**178**	**281**	**303**	**326**	**354**	**MECH HP**	4.5	129.7
1000	1309	1905	2307	2505	3845	4183	4499	4931	TORQUE (X1000 IN. LBS.)		
59	**75**	**107**	**128**	**144**	**229**	**246**	**265**	**288**	**MECH HP**	3.7	158.9
1006	1317	1914	2319	2524	3874	4215	4536	4972	TORQUE (X1000 IN. LBS.)		
47	**61**	**91**	**109**	**122**	**191**	**205**	**221**	**240**	**MECH HP**	3.0	194.6
1013	1326	1927	2335	2543	3904	4247	4574	5014	TORQUE (X1000 IN. LBS.)		
39	**50**	**72**	**89**	**100**	**158**	**168**	**181**	**197**	**MECH HP**	2.4	238.4
1018	1336	1954	2368	2571	3935	4293	4642	5089	TORQUE (X1000 IN. LBS.)		

THERMAL CAPACITY

QR22	WQR25	WQR28	WQR30	WQR32	WQR34	WQR36	WQR38	WQR40		NOMINAL OUTPUT SPEED	NOMINAL GEAR RATIO
2094	**2370**	**2729**	**2861**	**2966**	**3042**	**3094**	**3067**	**2927**	**THERMAL HP**	8.2	70.62
2785	3152	3630	3805	3945	4046	4115	4079	3893	WITH FANS		
2094	**2370**	**2729**	**2861**	**2966**	**3042**	**3094**	**3067**	**2927**	**THERMAL HP**	6.7	86.50
2785	3152	3630	3805	3945	4046	4115	4079	3893	WITH FANS		
2094	**2370**	**2729**	**2861**	**2966**	**3042**	**3094**	**3067**	**2927**	**THERMAL HP**	5.5	105.9
2785	3152	3630	3805	3945	4046	4115	4079	3893	WITH FANS		
2094	**2370**	**2729**	**2861**	**2966**	**3042**	**3094**	**3067**	**2927**	**THERMAL HP**	4.5	129.7
2785	3152	3630	3805	3945	4046	4115	4079	3893	WITH FANS		
2094	**2370**	**2729**	**2861**	**2966**	**3042**	**3094**	**3067**	**2927**	**THERMAL HP**	3.7	158.9
2785	3152	3630	3805	3945	4046	4115	4079	3893	WITH FANS		
2094	**2370**	**2729**	**2861**	**2966**	**3042**	**3094**	**3067**	**2927**	**THERMAL HP**	3.0	194.6
2785	3152	3630	3805	3945	4046	4115	4079	3893	WITH FANS		
2094	**2370**	**2729**	**2861**	**2966**	**3042**	**3094**	**3067**	**2927**	**THERMAL HP**	2.4	238.4
2785	3152	3630	3805	3945	4046	4115	4079	3893	WITH FANS		

EXACT GEAR RATIO

QR22	WQR25	WQR28	WQR30	WQR32	WQR34	WQR36	WQR38	WQR40	NOMINAL GEAR RATIO
72.437	71.073	74.282	71.390	69.100	70.411	73.518	73.440	70.482	70.62
86.723	86.222	92.762	87.959	85.137	82.581	83.381	86.009	86.840	86.50
105.401	104.337	112.668	104.167	100.825	103.793	104.799	104.689	105.700	105.9
130.872	132.065	137.071	133.737	129.447	125.560	126.962	126.828	127.867	129.7
157.014	161.424	164.380	165.619	160.306	155.493	157.229	157.064	158.580	158.9
196.309	198.098	194.324	196.672	190.363	187.725	189.984	189.784	191.617	194.6
235.521	242.136	246.571	243.556	235.744	228.667	235.072	234.826	237.298	238.4

Type TDS
Right Angle Shaft Speed Reducers

NOTES

Type TDS
Right Angle Shaft Speed Reducers
Additional Thermal Capacity

A. Increased Thermal Rating Capacity by fan Cooling

Cooling fans mounted externally on the extensions of a double extended high speed shaft provide a method of increasing the heat dissipation of the gear housing thereby permitting increased thermal ratings.

Thermal Ratings with Fans are shown in the Selection Tables (Section 330).

B. Increased Thermal Rating Capacity by Water Cooling

If the required thermal rating is beyond the range of cooling fans, a circulating lube oil system will be required. This method requires the user to supply cooling water for removal of excess heat.

The circulating lube oil system includes — shaft driven lube oil pump, oil to water heat exchanger (for 85°F max. water temp. fouling factor .001) cleanable oil strainer, flow switch, necessary pipe and pipe fittings to provide a complete assembly.

For thermal increase greater than shown, refer to Nuttall Gear. If cooling water is not available, oil-to-air heat exchangers can be furnished. Refer to Nuttall Gear.

ADDITIONAL THERMAL HORSEPOWER CAPACITY ①

INPUT SPEED	REDUC.	COOLING UNIT SIZES 1	2	3	4	5	6
1750	Double Triple Quadruple	245 163 122		489 326 245		1101 734 551	
1170	Double Triple		184 122		306 204		734 489
870	Double Triple				245 163		551 367
720	Double				184		428
580	Double				184		367

WATER FLOW REQUIRED ②

1750	All Reductions	4	8	18
1170		3	5	12
870		—	4	9
720		—	4	7
580		—	4	6

① Ratios 11.39, 13.95, 47.08, 57.66, 194.6, and 238.4 contain 3:1 bevel sets. Units with these ratios may reduce the rating of the cooling capacity of the packages listed. Please contact Nuttall Gear for application assistance.

② In GPM with a maximum temperature of 85°F.

SELECTION OF PUMP AND COOLER UNITS

1. Determine the thermal horsepower capacity that is required. This is usually the horsepower rating of the prime mover.
2. Use the rating tables (Section 330) to determine the thermal capacity of the selected unit (the rating without fans).
3. Subtracting the unit's thermal rating from the thermal requirement results in the additional cooling that is needed.
4. In the Cooling Capacity Table, locate the input speed in the far left column, and within that speed group, select the number of reductions — double, triple, or quadruple. Reading to the right on the appropriate line, select the first size that **exceeds** the additional cooling needed.
5. Determine the water flow required for the unit selected, using the adjacent table, and insure that there is an adequate supply available. Please refer to Nuttall Gear for application assistance.

Type TDS
Right Angle Shaft Speed Reducers
Backstop Ratings

Backstops are required for applications in which rotation in one direction must be prevented — for example, on conveyor drives.

The instant the shaft attempts to change direction, the backstop sprags grip, thereby preventing reverse rotation. This action is fully automatic.

A backstop is generally located on one end of an intermediate speed shaft.

SELECTION

1. Calculate the required torque. Use the formula below. Since the backstop cannot be mounted on the input shaft, the formula must be modified to reflect the spiral bevel set ratio.

$$T = \frac{63{,}000 \times \text{Motor HP}}{\text{Input Speed}} \times \text{Spiral Bevel Ratio}\ ①$$

2. Refer to the backstop selection table and read down the column until the listed torque rating is equal to or greater than the required torque calculated in step 1. Read to the left to determine the model number of the required backstop.

3. The maximum allowable backstop speed must be equal to or greater than the speed of the shaft upon which the backstop is mounted. If this is not the case, refer to Nuttall Gear.

4. Specify the direction of rotation of the reducer output shaft when ordering a backstop (clockwise or counter-clockwise when facing the end of the low speed shaft).

BACKSTOP SELECTION TABLE		
MODEL No.	**MAX. RPM**	**TORQUE RATING**
B20	2,900	3,600
B50	2,650	12,000
B80	2,300	26,400
B110	2,000	48,000
B120	1,800	81,600
B130	1,400	138,000
B150	1,300	216,000

① Ratios 11.39, 13.95, 47.08, 57.66, 194.6, and 238.4 use a spiral bevel ratio of 3:1, all other ratios use a 2:1 spiral bevel set.

Type TDS
Right Angle Shaft Speed Reducers
WK²

NOM. GEAR RATIO	UNIT SIZE 7	8	9	11	12	13	15	16	18	20	22	25	28	30
DOUBLE REDUCTION														
3.38	1.71	3.85	5.12	9.86	19.30	29.31	80.36							
4.13	1.61	3.64	4.81	9.15	17.88	27.33	75.97							
5.06	1.50	3.42	4.38	8.55	16.52	25.74	72.91							
6.20	1.40	3.23	4.14	8.02	15.56	24.38	70.47	76.59						
7.59	1.31	1.58	3.43	7.55	14.80	23.12	67.94	72.29	78.84					
9.30	.59	1.47	3.27	7.27	14.11	22.23	24.27	70.44	74.88					
11.39	.47	1.03	2.20	5.01	8.72	15.66	23.24	31.19	34.15					
13.95	.45	.98	2.13	2.99	5.52	8.98	16.37	24.45	32.40	33.24				
TRIPLE REDUCTION														
17.09	.36	.66	1.74	3.94	5.13	10.16	13.45	20.51	35.18	36.50	73.00	106.10		
20.93	.32	.59	.92	2.16	4.59	9.24	11.95	18.66	25.55	32.82	65.64	96.17		
25.63	.19	.31	.78	1.87	2.60	5.50	7.79	11.19	22.13	22.64	44.30	87.78	108.16	
31.39	.16	.27	.69	1.66	2.25	4.79	6.71	7.15	13.91	20.31	38.44	80.90	95.41	98.05
38.44	.14	.16	.39	.85	1.96	2.80	5.76	6.03	12.21	12.65	27.43	33.06	87.67	89.68
47.08	.10	.11	.35	.63	1.33	1.80	2.66	3.89	8.40	8.73	17.50	23.08	36.10	43.03
57.66	.05	.10	.21	.42	.77	1.58	2.24	3.38	5.54	7.64	12.15	14.43	32.60	39.28
QUADRUPLE REDUCTION														
70.62	.06	.08	.18	.31	.74	.86	1.93	2.07	4.87	5.53	8.06	14.48	25.57	39.98
86.50	.04	.07	.15	.27	.43	.75	1.06	1.86	2.90	4.88	6.96	12.53	22.61	29.03
105.9	.03	.06	.10	.15	.37	.67	.93	1.00	2.50	2.85	5.92	8.47	14.34	24.96
129.7	.03	.04	.08	.13	.32	.37	.82	.87	2.18	2.45	3.66	7.12	9.69	16.17
158.9	.02	.03	.07	.12	.20	.33	.50	.78	1.27	2.16	3.14	4.66	8.61	14.13
194.6	.02	.02	.05	.09	.14	.21	.32	.46	.90	1.05	2.07	2.99	5.54	8.18
238.4	.02	.02	.05	.05	.13	.19	.28	.43	.65	.92	1.84	2.56	4.87	6.52

NOM. GEAR RATIO	UNIT SIZE 32	34	36	38	40
QUADRUPLE REDUCTION					
70.62	40.96	109.66	136.39	153.15	
86.50	35.75	53.19	120.73	132.96	185.54
105.9	25.11	38.95	107.80	118.22	159.16
129.7	16.57	32.75	51.68	58.92	136.61
158.9	14.37	22.40	37.19	49.40	71.50
194.6	10.18	15.73	24.35	34.66	50.02
238.4	7.17	13.12	20.88	23.33	34.89

The WK² values listed are in pound-feet² at the high speed shaft. These values include rotating parts of the standard reducer but do not include values for couplings, clutches, fans, brake wheels or other external devices. Special ratios, extended shafts and shaft driven pumps will also affect actual values, and can be calculated at time of order engineering, if required.

Type TDS
Right Angle Shaft Speed Reducers
Overhung Load Ratings

Overhung Load Capacities
When a pulley, sprocket or pinion is to be mounted on the input or output shaft of a reducer, the overhung load capacity of the reducer must be checked. The magnitude of the overhung load varies with the type of connection and its location from the shaft bearing. Use the following overhung load formula after selecting appropriate Lc and Lf factors from the tables.

Overhung Load Formula

$$\text{OHL (lbs)} = \frac{\text{Motor Hp} \times 126{,}000 \times \text{Lc}}{\text{Shaft RPM} \times \text{Pitch Diameter (Inches)} \times \text{Lf}}$$

Compare the calculated overhung load with the overhung load table applicable to the reducer type, size and shaft. If the calculated overhung load is greater than that listed, contact Nuttall Gear.

Load Connection Factor • Lc

Type of Load Connection	Factor, Lc
Sprocket	1.00
Pinion	1.25
V-Belt	1.50
Flat Belt	2.50

Load Location Factor • Lf
See table below for low speed shafts.

EXAMPLE

A belt conveyor is to be driven by a TR11 reducer at 68 RPM, and requires 100 Hp. A sprocket with a 12 inch pitch diameter is mounted 4 inches from the end cap.

Calculate the overhung load.

Lc = 1.00 from table
Lf = .99 from table

$$\frac{100 \times 126{,}000 \times 1.00}{68 \times 12 \times .99} = 15{,}597 \text{ lbs.}$$

Refer to the "low speed shaft overhung rating" table. The TR11 reducer at 68 RPM has a rating of 22,500 pounds and is suitable for the application.

Lf - LOAD LOCATION FACTORS - LOW SPEED SHAFT

① IN. \ UNIT SIZE	7	8	9	11	12	13	15	16	18	20	22	25	28	30	32	34	36	38	40
1	1.13	1.13	1.18	1.16	1.16	1.22	1.17	1.16	1.18	1.17	1.17	1.19	1.20	1.20	1.21	1.19	1.20	1.19	1.18
2	1.04	1.06	1.10	1.10	1.11	1.16	1.12	1.11	1.13	1.13	1.13	1.15	1.16	1.17	1.17	1.17	1.17	1.16	1.15
3	0.96	0.99	1.03	1.05	1.06	1.11	1.07	1.07	1.09	1.09	1.10	1.12	1.13	1.13	1.15	1.14	1.14	1.13	1.13
4	0.89	0.93	0.96	0.99	1.01	1.06	1.02	1.02	1.05	1.06	1.06	1.08	1.10	1.10	1.12	1.12	1.11	1.11	1.10
5	0.84	0.88	0.91	0.95	0.97	1.02	0.99	0.99	1.01	1.02	1.03	1.05	1.07	1.07	1.09	1.09	1.09	1.09	1.08
6			0.86	0.91	0.93	0.99	0.95	0.95	0.98	0.99	1.00	1.02	1.04	1.05	1.06	1.06	1.07	1.07	1.06
7				0.87	0.89	0.94	0.92	0.92	0.95	0.96	0.97	0.99	1.01	1.02	1.03	1.04	1.04	1.04	1.04
8					0.86	0.91	0.88	0.90	0.92	0.93	0.94	0.97	0.99	1.00	1.01	1.01	1.02	1.02	1.02
9						0.88	0.86	0.87	0.89	0.91	0.92	0.94	0.96	0.97	0.99	1.00	1.00	1.00	1.00
10									0.86	0.88	0.90	0.92	0.94	0.95	0.97	0.97	0.98	0.98	0.98
11										0.85	0.87	0.89	0.92	0.93	0.95	0.95	0.96	0.96	0.96
12											0.85	0.87	0.90	0.91	0.93	0.94	0.94	0.95	0.95
13												0.85	0.88	0.89	0.91	0.92	0.92	0.93	0.93
14													0.86	0.87	0.90	0.90	0.90	0.91	0.91
15													0.84	0.85	0.87	0.88	0.89	0.90	0.90
16														0.83	0.86	0.87	0.87	0.88	0.88

① Center of applied load in inches from the end cap.

LOW SPEED SHAFT OVERHUNG LOAD RATINGS ②

OUTPUT SPEED \ UNIT SIZE	7	8	9	11	12	13	15	16	18	20	22	25	28	30	32	34	36	38	40
640	3.6	6.7	5.3	8.8	9.0	8.6	7.7	10.9	9.3	15.0	13.8	16.8	28.1	26.2					
520	4.3	7.4	6.3	9.8	10.7	10.5	9.6	13.7	11.8	17.0	16.8	19.5	32.5	31.1					
420	4.8	8.3	7.0	10.8	11.9	12.0	11.0	15.6	13.6	20.1	19.0	22.6	37.8	36.0					
350	5.1	9.1	7.6	11.7	13.4	14.2	11.9	18.1	14.6	22.6	21.5	26.6	42.1	40.4					
280	4.8	8.3	6.9	12.6	13.6	10.5	6.3	10.8	14.3	13.4	21.2	16.7	34.2	30.6	43.3	67.5	57.0	63.0	81.0
230	5.2	9.1	7.7	13.9	13.6	11.8	7.5	12.0	15.7	15.2	23.0	19.7	38.4	35.1	47.6	72.8	63.0	70.0	89.0
190	5.6	9.8	8.0	14.9	16.0	14.1	8.4	12.9	17.1	17.2	25.1	21.7	41.9	38.4	52.8	72.5	69.0	76.0	96.0
155	6.1	10.6	8.9	16.2	17.3	15.0	9.4	14.5	19.1	18.1	27.5	23.1	44.5	40.8	57.3	79.6	75.0	83.0	104.0
125	6.7	11.5	9.6	17.8	18.8	16.8	10.8	15.5	20.6	20.2	29.8	26.1	49.4	47.2	60.6	86.1	84.0	92.0	115.0
100	7.2	12.6	10.5	19.3	20.0	18.3	11.7	17.3	22.5	21.7	31.1	28.7	53.6	52.5	67.2	91.6	91.0	100.0	124.0
84	8.0	13.3	11.4	20.4	21.7	19.4	12.8	19.0	24.7	24.2	36.3	30.7	56.9	55.9	73.5	95.0	103.0	113.0	139.0
68	8.6	14.5	12.4	22.5	23.5	21.6	14.1	20.6	27.1	26.4	38.2	35.2	93.5	60.7	75.0	95.0	109.0	119.0	147.0
56	9.3	15.5	13.6	24.3	25.6	23.5	15.8	23.2	30.0	29.1	41.4	38.0	68.6	65.6	75.0	95.0	120.0	135.0	160.0
45	10.1	16.7	14.6	26.1	27.6	25.4	17.4	24.6	31.8	31.4	45.0	41.2	74.4	71.0	75.0	95.0	120.0	140.0	160.0
③ 37	10.8	18.0	15.8	28.0	29.8	27.4	19.1	27.1	34.9	33.8	48.8	45.1	81.3	77.8	75.0	89.5	120.0	140.0	160.0

② X 1000 Pounds ③ And all lower speeds

Your Total Drive Source

Type TDS
Right Angle Shaft Speed Reducers
Dimensions

CAST IRON HOUSINGS			FABRICATED STEEL HOUSINGS	
UNIT	**PAGE**		**UNIT**	**PAGE**
DR7 - DR9	1	**DOUBLE REDUCTION**	WDR7 - WDR9	7
DR11 - DR22	2		WDR11 - WDR25	8
			WDR28 - WDR40	9
TR7 - TR9	3	**TRIPLE REDUCTION**	WTR7 - WTR9	10
TR11 - TR22	4		WTR11 - WTR25	11
			WTR28 - WTR40	12
QR7 - QR9	5	**QUADRUPLE REDUCTION**	WQR7 - WQR9	13
QR11 - QR22	6		WQR11 - WQR25	14
			WQR28 - WQR40	15

ACCESSORIES AND AUXILIARY EQUIPMENT

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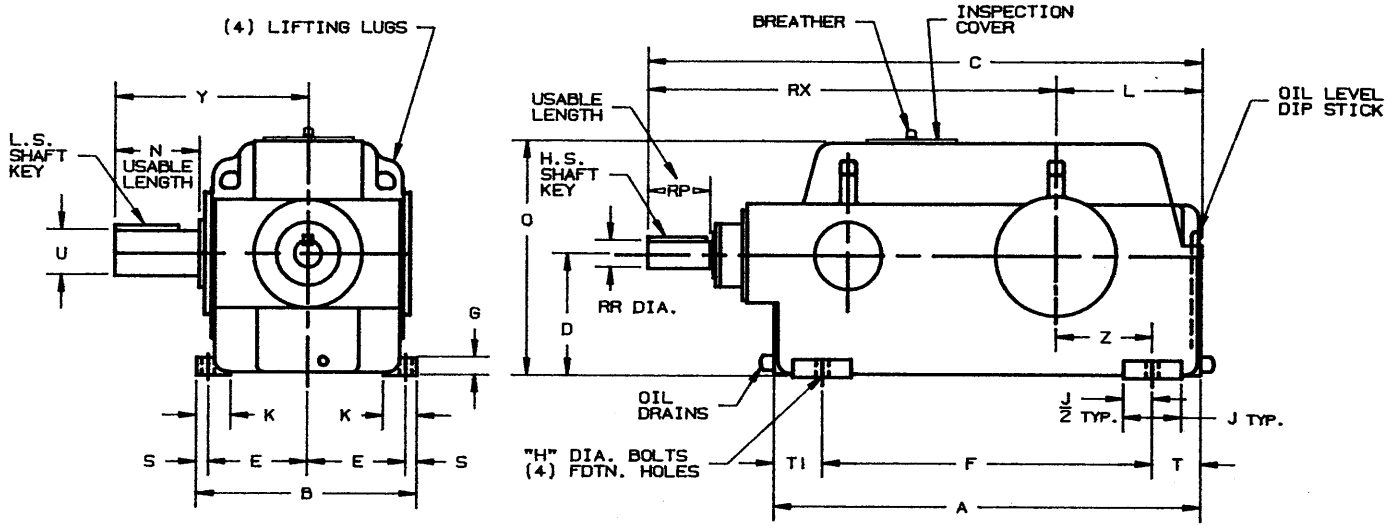
BACKSTOPS	19, 20
BEDPLATES	23 - 28
HOLLOW SHAFTS	21
SHAFT COVERS	22

Type TDS
Right Angle Shaft Speed Reducers
Double Reduction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

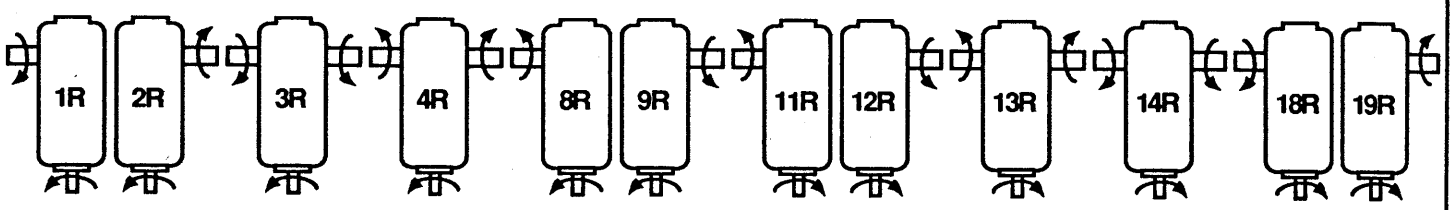
UNIT SIZE	A	B	C	D ②	E	F	G	H	J	K	L	O	S	T	T1	Z	APPROX WT. LBS.
DR7	27.0	12.8	33.7	8.25	5.50	20.00	1.1	0.75	3.5	2.4	9.1	15.8	0.9	3.0	4.0	6.00	600
DR8	35.4	15.0	41.9	10.25	6.50	25.50	1.5	1.00	4.0	2.8	11.1	20.0	1.0	3.8	6.1	7.25	950
DR9	35.4	15.0	43.4	10.25	6.50	25.50	1.5	1.00	4.0	2.8	11.1	20.0	1.0	3.8	6.1	7.25	1,100

UNIT SIZE	LOW SPEED SHAFT U ①	KEY	N	Y	HIGH SPEED SHAFT RR ①	KEY	RP	RX
DR7	2.875	.750 x .750 x 4.0	5.0	11.3	1.375	.312 x .312 x 2.5	3.5	24.6
DR8	3.375	.875 x .875 x 4.5	6.0	13.6	1.500	.375 x .375 x 2.5	3.7	30.8
DR9	3.875	1.000 x 1.000 x 5.3	6.6	14.3	1.875	.500 x .500 x 3.0	4.0	32.3

① **TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

② **THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

STANDARD ASSEMBLY POSITIONS

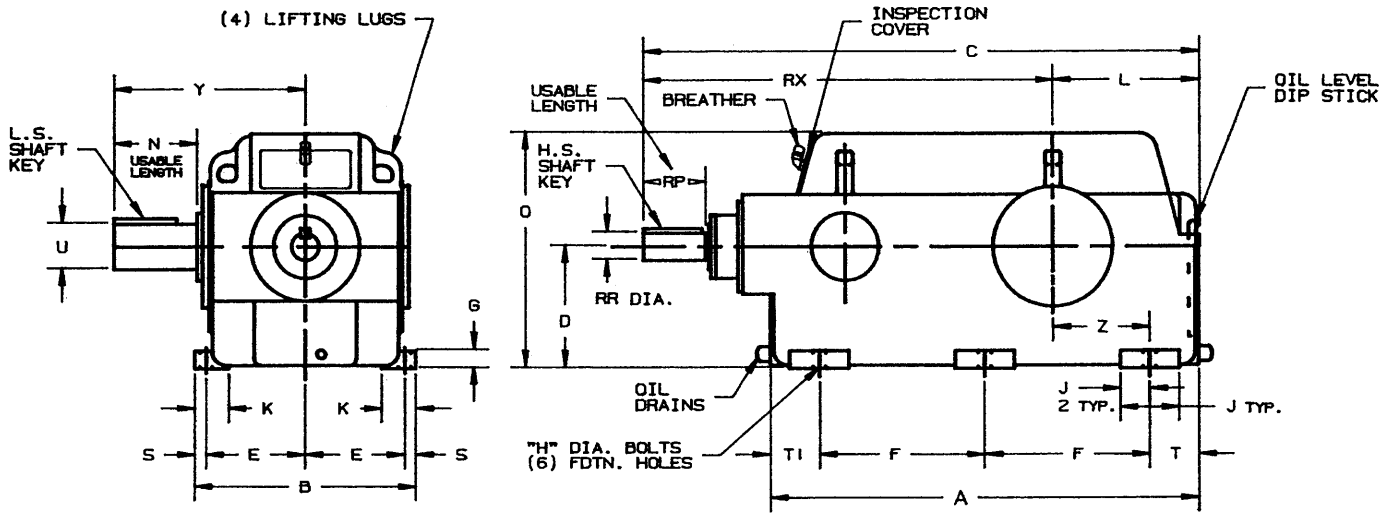


Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

Effective: 15 SEPT 1993
Supersedes: 15 DEC 1991

Type TDS
Right Angle Shaft Speed Reducers
Double Reduction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

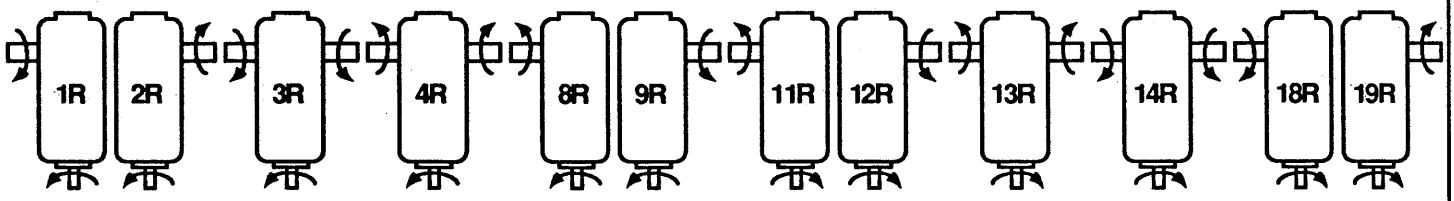
UNIT SIZE	A	B	C	D ②	E	F	G	H	J	K	L	O	S	T	T1	Z	APPROX WT. LBS.
DR11	42.3	21.0	51.2	11.50	9.25	14.75	1.8	1.00	5.8	3.8	14.0	23.0	1.3	5.0	7.8	8.88	1850
DR12	44.5	23.0	54.9	12.50	10.25	16.25	2.0	1.25	6.5	3.8	15.3	25.0	1.3	5.3	6.8	9.88	2550
DR13	49.5	23.8	60.1	13.50	10.63	18.25	2.0	1.25	6.5	3.8	16.2	27.0	1.3	5.4	7.6	10.70	3050
DR15	54.6	25.0	66.8	15.00	11.00	19.25	2.3	1.50	7.3	4.3	17.4	30.0	1.5	5.5	10.6	11.75	3550
DR16	58.8	28.5	71.1	16.50	12.50	21.88	2.5	1.50	7.5	5.0	19.6	33.0	1.8	5.9	9.1	13.62	5000
DR18	66.0	29.0	78.3	18.00	12.75	23.00	2.8	1.75	8.5	5.0	20.8	35.5	1.8	6.4	13.6	14.25	5850
DR20	70.5	31.0	83.3	20.00	13.75	25.50	3.0	1.75	9.3	5.8	23.1	39.5	1.8	7.1	12.4	15.88	6100
DR22	78.8	33.0	92.8	22.00	14.50	26.50	3.3	2.00	9.8	6.3	24.6	43.5	2.0	7.6	17.7	16.88	7250

UNIT SIZE	LOW SPEED SHAFT U ①	KEY	N	Y	HIGH SPEED SHAFT RR ①	KEY	RP	RX
DR11	4.500	1.000 x 1.000 x 6.0	7.8	18.5	2.125	.500 x .500 x 3.5	4.5	37.2
DR12	4.750	1.250 x 1.250 x 6.8	8.5	20.3	2.625	.625 x .625 x 4.0	5.3	39.6
DR13	5.000	1.250 x 1.250 x 7.0	9.1	21.3	2.875	.750 x .750 x 4.3	5.6	43.9
DR15	5.250	1.250 x 1.250 x 7.8	9.5	22.0	3.125	.750 x .750 x 4.8	6.0	49.4
DR16	5.500	1.250 x 1.250 x 8.3	9.5	23.5	3.375	.875 x .875 x 4.8	6.0	51.5
DR18	6.000	1.500 x 1.500 x 8.8	10.5	25.0	3.375	.875 x .875 x 5.0	6.5	57.5
DR20	6.500	1.500 x 1.500 x 9.3	11.3	26.5	3.375	.875 x .875 x 5.0	6.5	60.2
DR22	7.000	1.750 x 1.750 x 9.8	12.0	28.8	3.625	.875 x .875 x 5.0	7.0	68.2

① **TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

② **THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

STANDARD ASSEMBLY POSITIONS

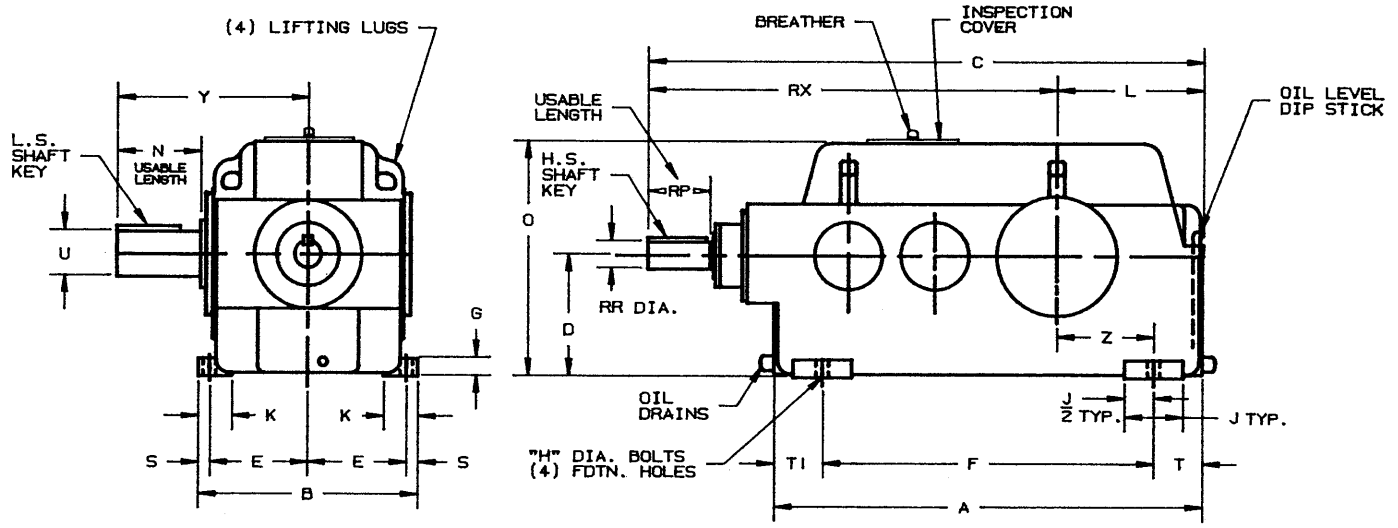


Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

Your Total Drive Source

Type TDS
Right Angle Shaft Speed Reducers
Triple Reduction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

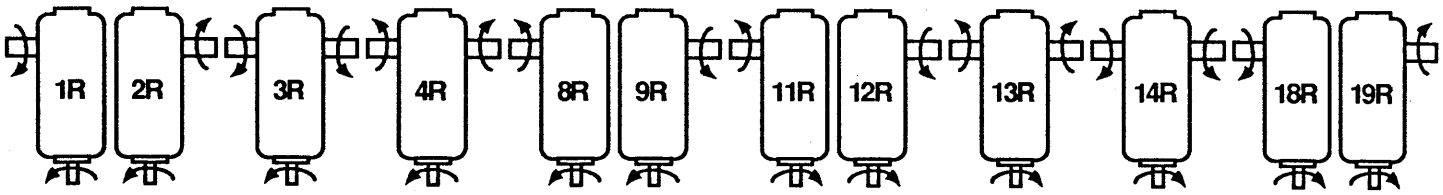
UNIT SIZE	A	B	C	D②	E	F	G	H	J	K	L	O	S	T	T1	Z	APPROX WT. LBS.
TR7	27.0	12.8	35.6	8.25	5.5	20.00	1.1	0.75	3.5	2.4	9.1	15.8	0.9	3.0	4.0	6.00	650
TR8	35.4	15.0	42.4	10.25	6.5	25.50	1.5	1.00	4.0	2.8	11.1	20.0	1.0	3.8	6.1	7.25	1,000
TR9	35.4	15.0	45.4	10.25	6.5	25.50	1.5	1.00	4.0	2.8	11.1	20.0	1.0	3.8	6.1	7.25	1,200

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT RR①	KEY	RP	RX
TR7	2.875	.750 x .750 x 4.0	5.0	11.3	1.125	.250 x .250 x 2.5	3.3	26.5
TR8	3.375	.875 x .875 x 4.5	6.0	13.6	1.125	.250 x .250 x 2.5	3.3	31.3
TR9	3.875	1.000 x 1.000 x 5.3	6.6	14.3	1.375	.312 x .312 x 2.5	3.5	34.3

①**TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

②**THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

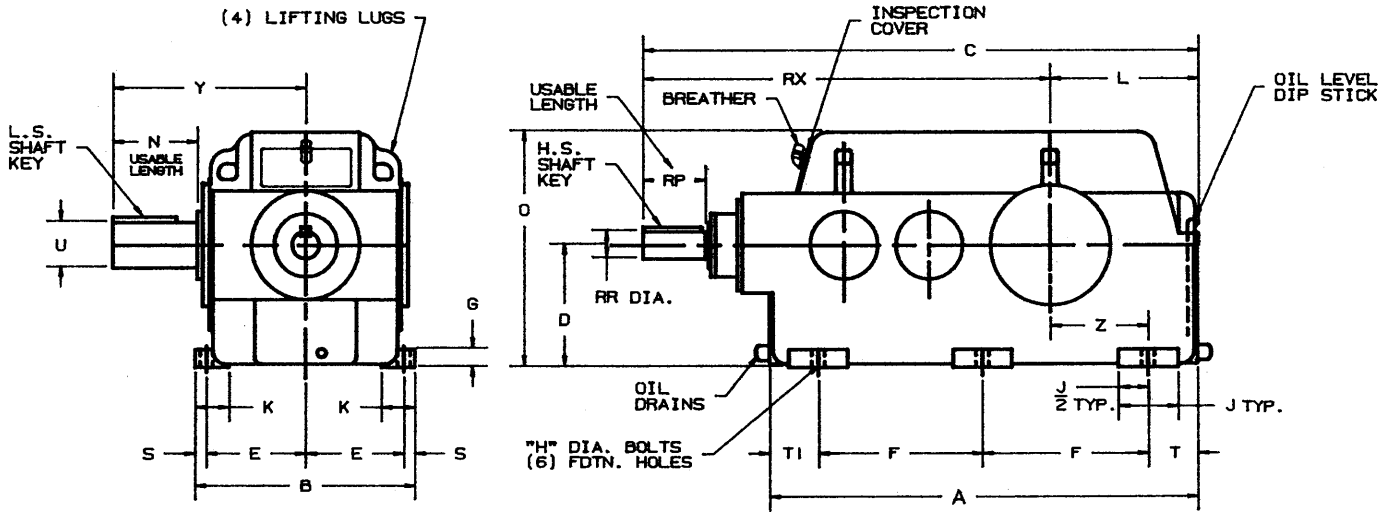
STANDARD ASSEMBLY POSITIONS



Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

Type TDS
Right Angle Shaft Speed Reducers
Triple Reduction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

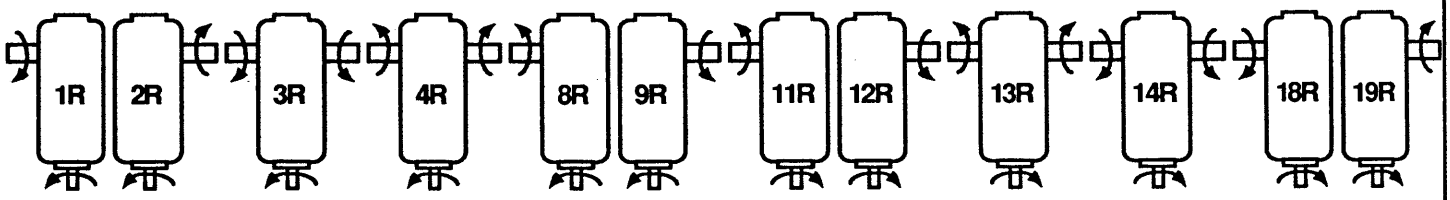
UNIT SIZE	A	B	C	D②	E	F	G	H	J	K	L	O	S	T	T1	Z	APPROX WT. LBS.
TR11	42.3	21.0	53.5	11.50	9.25	14.75	1.8	1.00	5.8	3.8	14.0	23.0	1.3	5.0	7.8	8.88	1,950
TR12	44.5	23.0	58.3	12.50	10.25	16.25	2.0	1.25	6.5	3.8	15.3	25.0	1.3	5.3	6.8	9.88	2,650
TR13	49.5	23.8	64.1	13.50	10.63	18.25	2.0	1.25	6.5	3.8	16.2	27.0	1.3	5.4	7.6	10.70	3,200
TR15	54.0	25.0	69.5	15.00	11.00	19.25	2.3	1.50	7.3	4.3	17.4	30.0	1.5	5.5	10.6	11.75	3,700
TR16	58.8	28.5	75.1	16.50	12.50	21.88	2.5	1.50	7.5	5.0	19.6	33.0	1.8	5.9	9.1	13.62	5,150
TR18	66.0	29.0	82.3	18.00	12.75	23.00	2.8	1.75	8.5	5.0	20.8	35.5	1.8	6.4	13.6	14.25	6,050
TR20	70.3	31.0	87.3	20.00	13.75	25.50	3.0	1.75	9.3	5.8	23.1	39.5	1.8	7.1	12.4	15.88	6,300
TR22	78.8	33.0	96.3	22.00	14.50	26.50	3.3	2.00	9.8	6.3	24.6	43.5	2.0	7.6	18.2	16.88	7,500

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT RR①	KEY	RP	RX
TR11	4.500	1.000 x 1.000 x 6.0	7.8	18.5	1.375	.312 x .312 x 2.5	3.5	39.5
TR12	4.750	1.250 x 1.250 x 6.8	8.5	20.3	1.625	.375 x .375 x 2.8	3.8	43.0
TR13	5.000	1.250 x 1.250 x 7.0	9.1	21.3	1.625	.375 x .375 x 2.8	4.0	47.9
TR15	5.250	1.250 x 1.250 x 7.8	9.5	22.0	1.875	.500 x .500 x 3.0	4.0	52.1
TR16	5.500	1.250 x 1.250 x 8.3	9.5	23.5	2.125	.500 x .500 x 3.0	4.0	55.5
TR18	6.000	1.500 x 1.500 x 8.8	10.5	25.0	2.125	.500 x .500 x 3.5	4.5	61.5
TR20	6.500	1.500 x 1.500 x 9.3	11.3	26.5	2.375	.625 x .625 x 3.8	4.8	64.2
TR22	7.000	1.750 x 1.750 x 9.8	12.0	28.8	2.625	.625 x .625 x 4.0	5.3	72.2

①**TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

②**THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

STANDARD ASSEMBLY POSITIONS

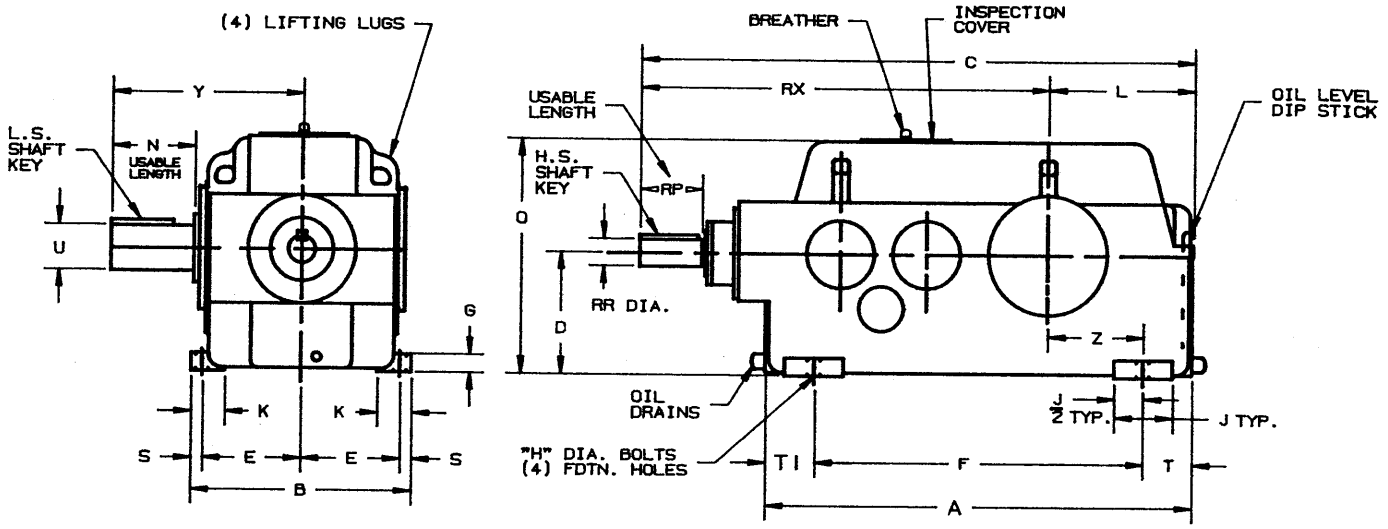


Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

Your Total Drive Source

Type TDS
Right Angle Shaft Speed Reducers
Quadruple Reduction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

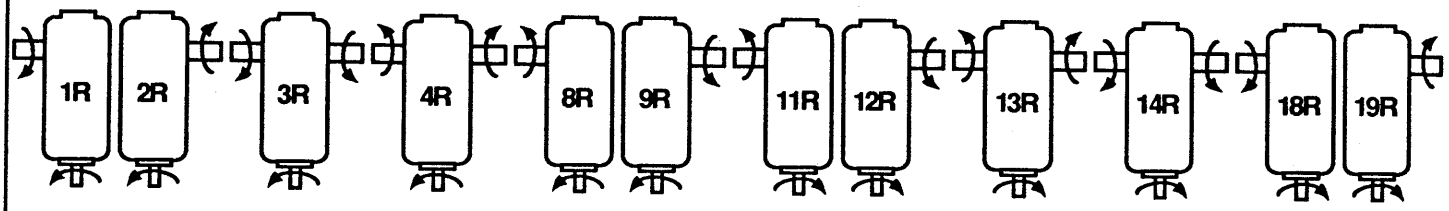
UNIT SIZE	A	B	C	D②	E	F	G	H	J	K	L	O	S	T	T1	Z	APPROX WT. LBS.
QR7	27.0	12.8	35.6	8.25	5.5	20.00	1.1	0.75	3.5	2.4	9.1	15.8	0.9	3.0	4.0	6.00	700
QR8	35.4	15.0	42.4	10.25	6.5	25.50	1.5	1.00	4.0	2.8	11.1	20.0	1.0	3.8	6.1	7.25	1,050
QR9	35.4	15.0	45.4	10.25	6.5	25.50	1.5	1.00	4.0	2.8	11.1	20.0	1.0	3.8	6.1	7.25	1,300

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT RR①	KEY	RP	RX
QR7	2.875	.750 x .750 x 4.0	5.0	11.3	1.125	.250 x .250 x 2.5	3.3	26.5
QR8	3.375	.875 x .875 x 4.5	6.0	13.6	1.125	.250 x .250 x 2.5	3.3	31.3
QR9	3.875	1.000 x 1.000 x 5.3	6.6	14.3	1.375	.312 x .312 x 2.5	3.5	34.3

①**TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

②**THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

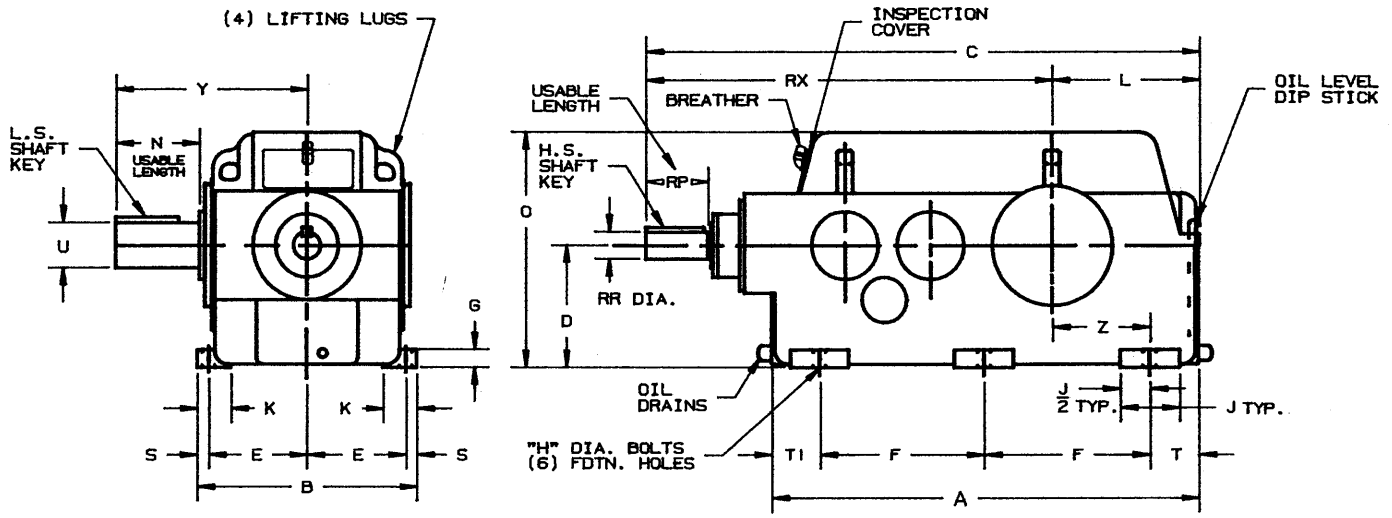
STANDARD ASSEMBLY POSITIONS



Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

Type TDS
Right Angle Shaft Speed Reducers
Quadruple Reduction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

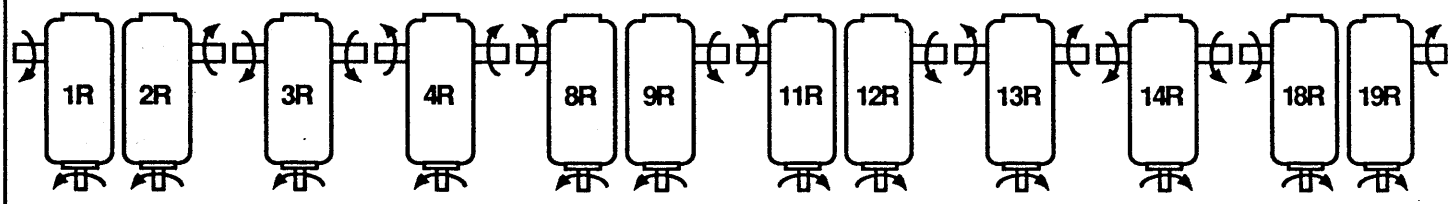
UNIT SIZE	A	B	C	D②	E	F	G	H	J	K	L	O	S	T	T1	Z	APPROX WT. LBS.
QR11	42.3	21.0	53.5	11.50	9.25	14.75	1.8	1.00	5.8	3.8	14.0	23.0	1.3	5.0	7.8	8.88	2,050
QR12	44.5	23.0	58.3	12.50	10.25	16.25	2.0	1.25	6.5	3.8	15.3	25.0	1.3	5.3	6.8	9.88	2,750
QR13	49.5	23.8	64.1	13.50	10.63	18.25	2.0	1.25	6.5	3.8	16.2	27.0	1.3	5.4	7.6	10.70	3,350
QR15	54.6	25.0	69.5	15.00	11.00	19.25	2.3	1.50	7.3	4.3	17.4	30.0	1.5	5.5	10.0	11.75	3,850
QR16	58.8	28.5	75.1	16.50	12.50	21.88	2.5	1.50	7.5	5.0	19.6	33.0	1.8	5.9	9.1	13.62	5,300
QR18	65.8	29.0	82.3	18.00	12.75	23.00	2.8	1.75	8.5	5.0	20.8	35.5	1.8	6.4	13.4	14.25	6,250
QR20	70.5	31.0	87.3	20.00	13.75	25.50	3.0	1.75	9.3	5.8	23.1	39.5	1.8	7.1	12.2	15.88	6,500
QR22	78.8	33.0	96.8	22.00	14.50	26.50	3.3	2.00	9.8	6.3	24.6	43.5	2.0	7.6	17.7	16.88	7,750

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT RR①	KEY	RP	RX
QR11	4.500	1.000 x 1.000 x 6.0	7.8	18.5	1.375	.312 x .312 x 2.5	3.5	39.5
QR12	4.750	1.250 x 1.250 x 6.8	8.5	20.3	1.625	.375 x .375 x 2.8	3.8	43.0
QR13	5.000	1.250 x 1.250 x 7.0	9.1	21.3	1.625	.375 x .375 x 2.8	4.0	47.9
QR15	5.250	1.250 x 1.250 x 7.8	9.5	22.0	1.875	.500 x .500 x 3.0	4.0	52.1
QR16	5.500	1.250 x 1.250 x 8.3	9.5	23.5	2.125	.500 x .500 x 3.0	4.0	55.5
QR18	6.000	1.500 x 1.500 x 8.8	10.5	25.0	2.125	.500 x .500 x 3.5	4.5	61.5
QR20	6.500	1.500 x 1.500 x 9.3	11.3	26.5	2.375	.625 x .625 x 3.8	4.8	64.2
QR22	7.000	1.750 x 1.750 x 9.8	12.0	28.8	2.625	.625 x .625 x 4.0	5.3	72.2

①**TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

②**THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

STANDARD ASSEMBLY POSITIONS

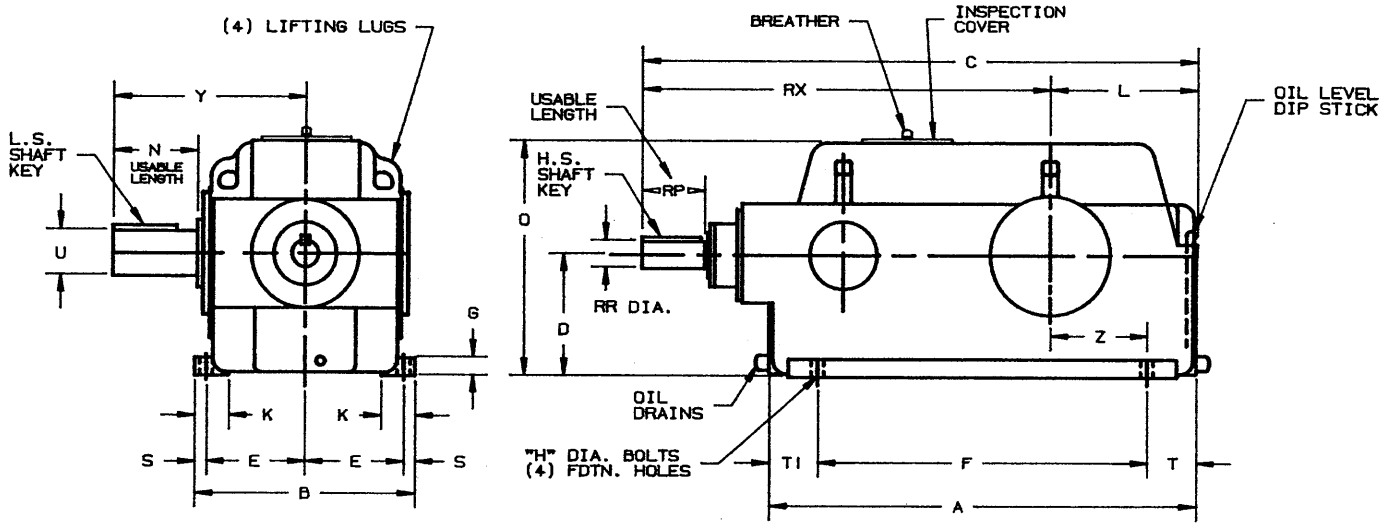


Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

Your Total Drive Source

Type TDS
Right Angle Shaft Speed Reducers
Double Reduction-Steel Construction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

UNIT SIZE	A	B	C	D②	E	F	G	H	K	L	O	S	T	T1	Z	APPROX WT. LBS.
WDR7	27.0	15.3	33.7	8.25	6.75	20.00	1.1	0.75	3.7	9.1	15.8	0.9	3.0	4.0	6.00	800
WDR8	35.4	18.0	41.9	10.25	8.00	25.50	1.5	1.00	4.3	11.1	20.0	1.0	3.8	6.1	7.25	1,150
WDR9	35.4	18.0	43.4	10.25	8.00	25.50	1.5	1.00	4.3	11.1	20.0	1.0	3.8	6.1	7.25	1,300

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT RR①	KEY	RP	RX
WDR7	2.875	.750 x .750 x 4.0	5.0	11.3	1.375	.312 x .312 x 2.5	3.5	24.6
WDR8	3.375	.875 x .875 x 4.5	6.0	13.6	1.500	.375 x .375 x 2.5	3.7	30.8
WDR9	3.875	1.000 x 1.000 x 5.3	6.6	14.3	1.875	.500 x .500 x 3.0	4.0	32.3

①**TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

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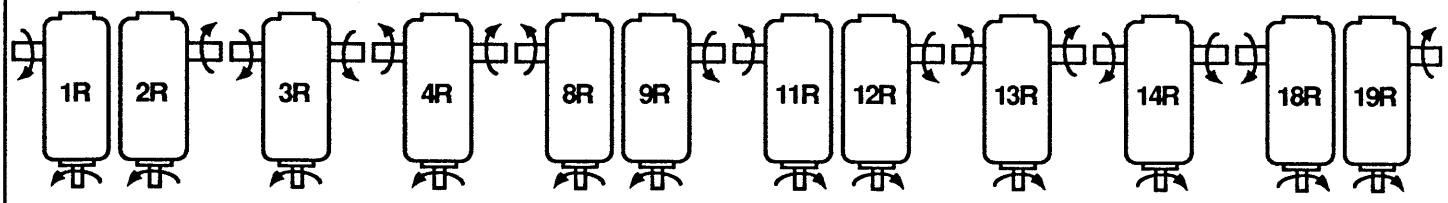
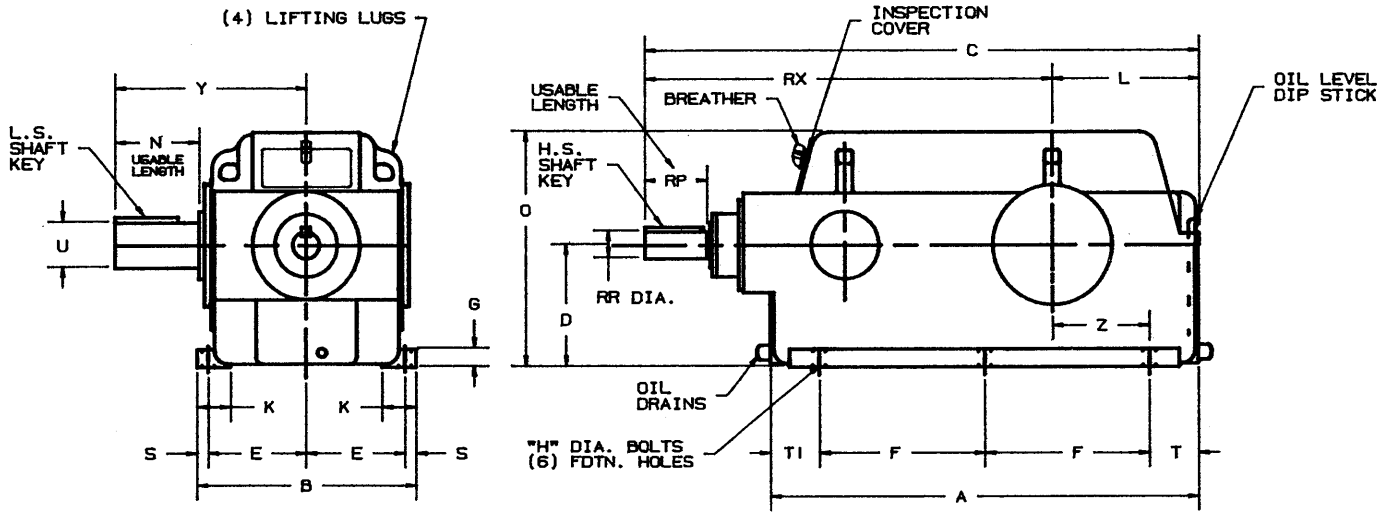
STANDARD ASSEMBLY POSITIONS



Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

Type TDS
Right Angle Shaft Speed Reducers
Double Reduction-Steel Construction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

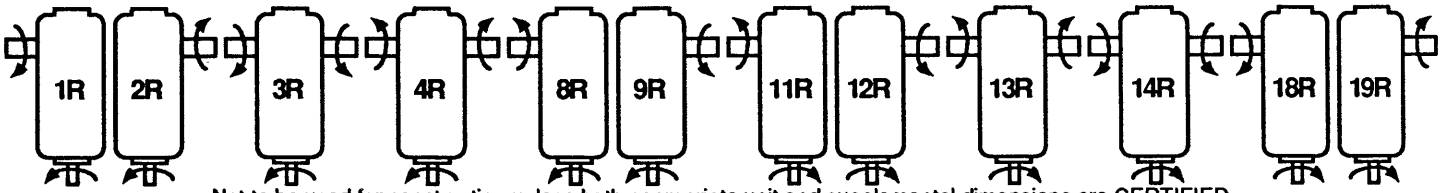
UNIT SIZE	A	B	C	D②	E	F	G	H	K	L	O	S	T	T1	Z	APPROX WT. LBS.
WDR11	42.3	25.0	51.2	11.50	11.25	14.75	1.8	1.00	5.8	14.0	23.0	1.3	5.0	7.8	8.88	2,200
WDR12	44.5	27.0	54.9	12.50	12.25	16.25	2.0	1.25	5.8	15.3	25.0	1.3	5.3	6.8	9.88	3,050
WDR13	49.5	28.0	60.1	13.50	12.75	18.25	2.0	1.25	5.9	16.2	27.0	1.3	5.4	7.6	10.70	3,550
WDR15	54.6	29.5	66.8	15.00	13.25	19.25	2.3	1.50	6.5	17.4	30.0	1.5	5.5	10.6	11.75	4,150
WDR16	58.8	33.0	71.1	16.50	14.75	21.88	2.5	1.50	7.3	19.6	33.0	1.8	5.9	9.1	13.62	5,800
WDR18	66.0	29.0	78.3	18.00	12.75	23.00	2.8	1.75	5.0	20.8	35.5	1.8	6.4	13.6	14.25	6,850
WDR20	70.5	31.0	83.3	20.00	13.75	25.50	3.0	1.75	5.8	23.1	39.5	1.8	7.1	12.4	15.88	7,300
WDR22	78.8	33.0	92.8	22.00	14.50	26.50	3.3	2.00	6.3	24.6	43.5	2.0	7.6	18.2	16.88	8,750
WDR25	83.0	35.0	97.6	25.00	15.25	30.50	3.5	2.25	7.0	27.1	49.5	2.3	8.3	13.7	18.75	10,450

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT RR①	KEY	RP	RX
WDR11	4.500	1.000 x 1.000 x 6.0	7.8	18.5	2.125	.500 x .500 x 3.5	4.5	37.2
WDR12	4.750	1.250 x 1.250 x 6.8	8.5	20.3	2.625	.625 x .625 x 4.0	5.3	39.6
WDR13	5.000	1.250 x 1.250 x 7.0	9.1	21.3	2.875	.750 x .750 x 4.3	5.6	43.9
WDR15	5.250	1.250 x 1.250 x 7.8	9.5	22.0	3.125	.750 x .750 x 4.8	6.0	49.4
WDR16	5.500	1.250 x 1.250 x 8.3	9.5	23.5	3.375	.875 x .875 x 4.8	6.0	51.5
WDR18	6.000	1.500 x 1.500 x 8.8	10.5	25.0	3.375	.875 x .875 x 5.0	6.5	57.5
WDR20	6.500	1.500 x 1.500 x 9.3	11.3	26.5	3.375	.875 x .875 x 5.0	6.5	60.2
WDR22	7.000	1.750 x 1.750 x 9.8	12.0	28.8	3.625	.875 x .875 x 5.0	7.0	68.2
WDR25	8.000	2.000 x 2.000 x 10.8	13.5	30.8	3.875	1.000 x 1.000 x 5.8	7.3	71.5

①**TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

②**THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

STANDARD ASSEMBLY POSITIONS

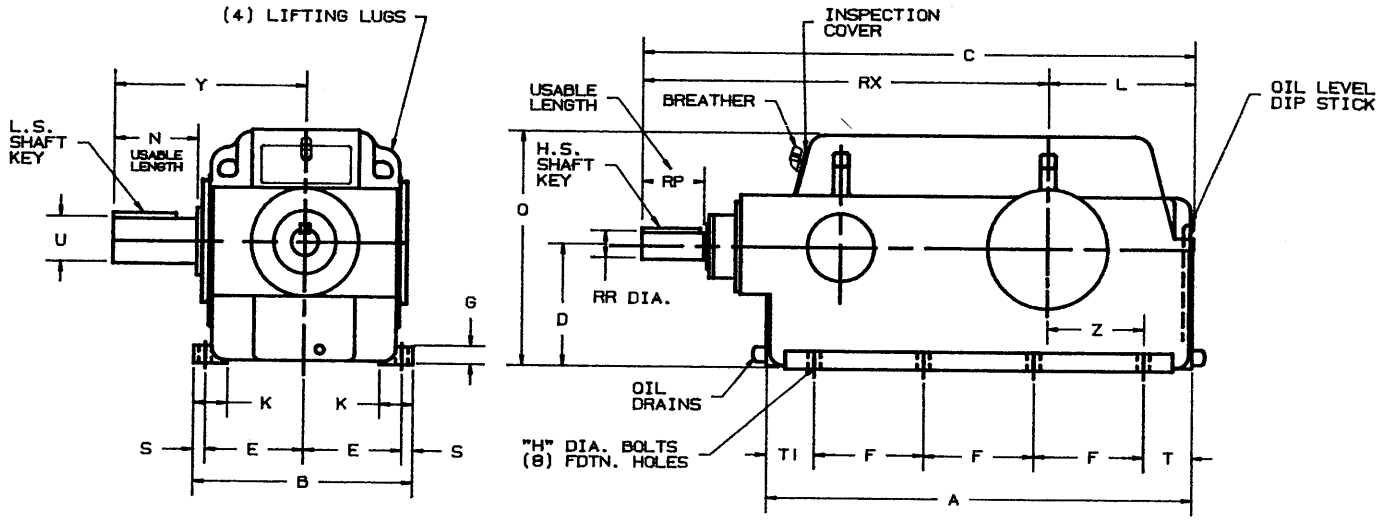


Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

Your Total Drive Source

Type TDS
Right Angle Shaft Speed Reducers
Double Reduction-Steel Construction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

UNIT SIZE	A	B	C	D②	E	F	G	H	K	L	O	S	T	T1	Z	APPROX WT. LBS.
WDR28	95.3	40.5	114.0	28.00	17.75	23.50	3.5	2.25	7.5	30.6	55.5	2.5	8.8	16.0	21.75	12,100
WDR30	103.0	42.8	121.0	30.00	18.62	24.50	3.6	2.50	8.1	32.9	59.0	2.8	9.8	19.8	23.00	15,100
WDR32	106.2	45.0	124.2	32.0	19.75	25.75	3.1	2.50	8.3	34.3	63.0	2.8	11.7	17.3	21.55	18,800
WDR34	117.8	47.5	137.8	34.0	20.75	27.00	3.1	2.75	9.0	36.0	67.0	3.0	12.3	24.5	23.50	22,050
WDR36	121.3	49.0	141.3	36.0	21.50	29.50	3.1	2.75	9.0	37.5	71.0	3.0	12.8	20.0	24.50	26,050
WDR38	126.3	51.0	146.3	38.0	22.25	30.50	3.1	3.00	9.8	39.0	75.0	3.3	12.8	22.0	26.00	30,450
WDR40	130.1	53.0	150.1	40.0	23.25	32.00	3.1	3.00	9.8	40.8	79.0	3.3	12.8	21.4	27.75	36,100

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT RR①	KEY	RP	RX
WDR28	9.000	2.500 x 2.500 x12.3	15.0	34.3	4.500	1.000 x 1.000 x 6.0	8.0	83.4
WDR30	9.500	2.500 x 2.500 x 12.5	15.8	35.5	5.000	1.250 x 1.250 x 7.0	9.0	88.1
WDR32	10.500	2.500 x 2.500 x 13.5	17.0	38.3	5.000	1.250 x 1.250 x 7.0	9.0	90.0
WDR34	11.500	3.000 x 3.000 x 14.3	18.0	40.3	5.250	1.250 x 1.250 x 8.0	10.0	101.8
WDR36	12.500	3.000 x 3.000 x 15.0	19.0	43.0	5.500	1.500 x 1.500 x 8.0	10.0	103.8
WDR38	13.250	3.500 x 3.500 x 16.0	20.0	45.0	5.750	1.500 x 1.500 x 8.0	10.0	107.3
WDR40	14.000	3.500 x 3.500 x 17.0	21.0	47.0	5.750	1.500 x 1.500 x 8.0	10.0	109.3

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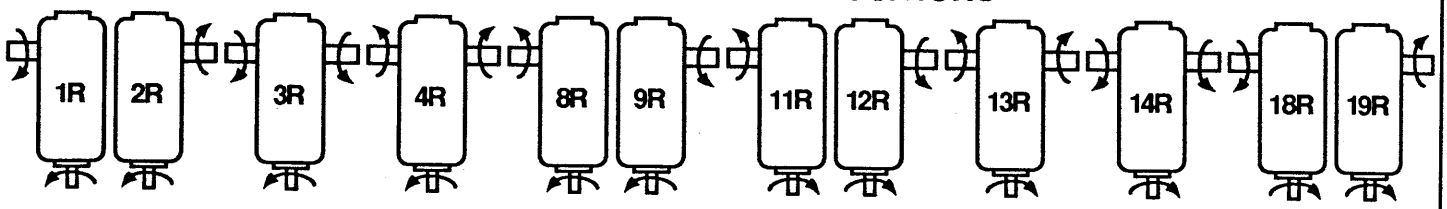
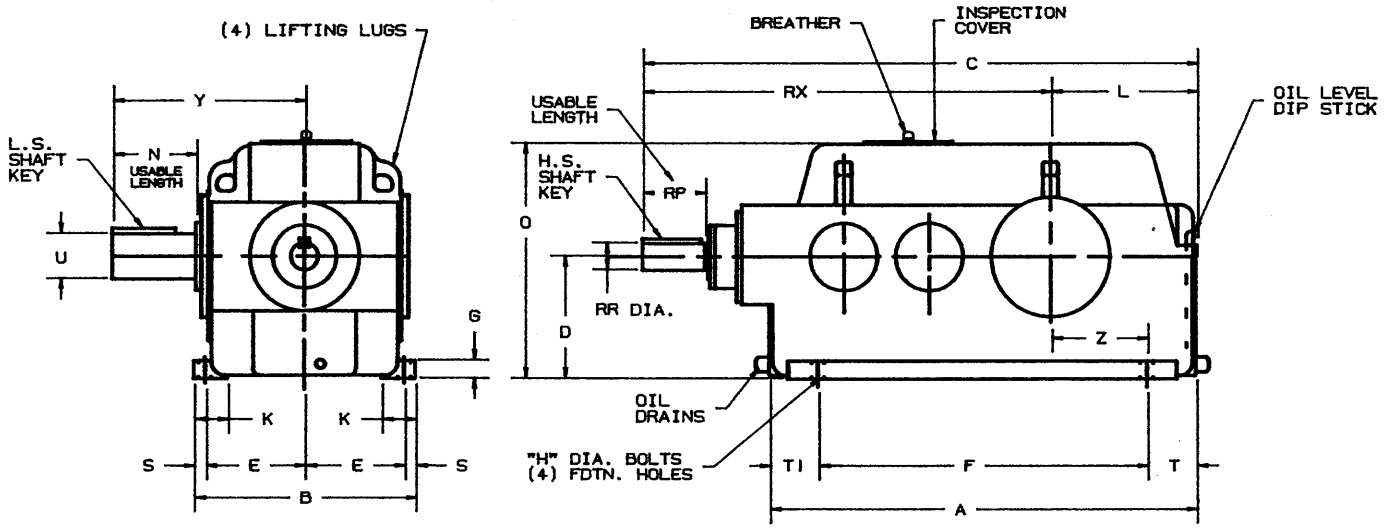
STANDARD ASSEMBLY POSITIONS



Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

Type TDS
Right Angle Shaft Speed Reducers
Triple Reduction-Steel Construction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

UNIT SIZE	A	B	C	D②	E	F	G	H	K	L	O	S	T	T1	Z	APPROX WT. LBS.
WTR7	27.0	15.3	35.6	8.25	6.75	20.00	1.1	0.75	3.7	9.1	15.8	0.9	3.0	4.0	6.00	850
WTR8	35.4	18.0	42.4	10.25	8.00	25.50	1.5	1.00	4.3	11.1	20.0	1.0	3.8	6.1	7.25	1,200
WTR9	35.4	18.0	45.4	10.25	8.00	25.50	1.5	1.00	4.3	11.1	20.0	1.0	3.8	6.1	7.25	1,400

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT RR①	KEY	RP	RX
WTR7	2.875	.750 x .750 x 4.0	5.0	11.3	1.125	.250 x .250 x 2.5	3.3	26.5
WTR8	3.375	.875 x .875 x 4.5	6.0	13.6	1.125	.250 x .250 x 2.5	3.3	31.3
WTR9	3.875	1.000 x 1.000 x 5.3	6.6	14.3	1.375	.312 x .312 x 2.5	3.5	34.3

①**TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

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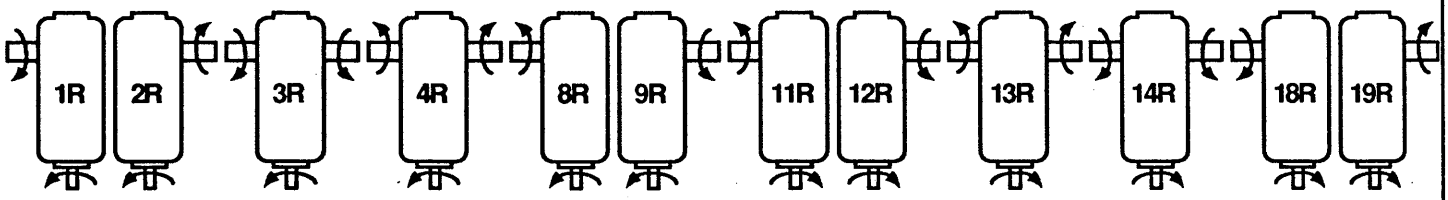
STANDARD ASSEMBLY POSITIONS

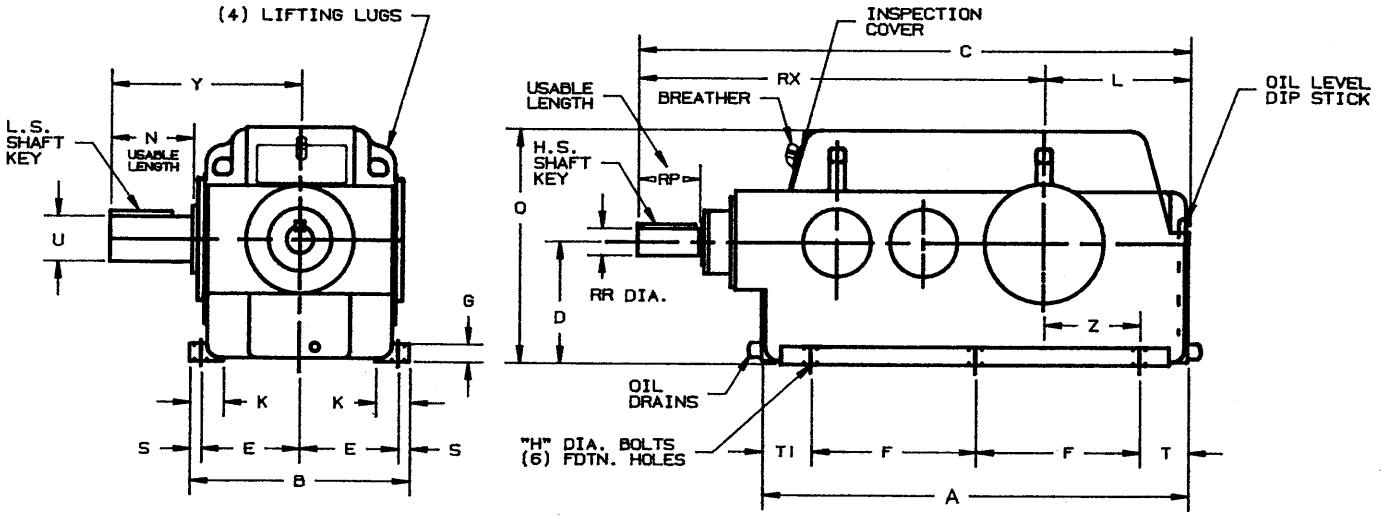


Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

Your Total Drive Source

Type TDS
Right Angle Shaft Speed Reducers
Triple Reduction-Steel Construction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

UNIT SIZE	A	B	C	D ②	E	F	G	H	K	L	O	S	T	T1	Z	APPROX WT. LBS.
WTR11	42.3	25.0	53.5	11.50	11.25	14.75	1.8	1.00	5.8	14.0	23.0	1.3	5.0	7.8	8.88	2,300
WTR12	44.5	27.0	58.3	12.50	12.25	16.25	2.0	1.25	5.8	15.3	25.0	1.3	5.3	6.8	9.88	3,150
WTR13	49.5	28.0	64.1	13.50	12.75	18.25	2.0	1.25	5.9	16.2	27.0	1.3	5.4	7.6	10.70	3,750
WTR15	54.6	29.5	69.5	15.00	13.25	19.25	2.3	1.50	6.5	17.4	30.0	1.5	5.5	10.6	11.75	4,300
WTR16	58.8	33.0	75.1	16.50	14.75	21.88	2.5	1.50	7.3	19.6	33.0	1.8	5.9	9.1	13.62	5,850
WTR18	66.0	29.0	82.3	18.00	12.75	23.00	2.8	1.75	5.0	20.8	35.5	1.8	6.4	13.6	14.25	7,050
WTR20	70.5	31.0	87.3	20.00	13.75	25.50	3.0	1.75	5.8	23.1	39.5	1.8	7.1	12.4	15.88	7,500
WTR22	78.8	33.0	96.8	22.00	14.50	26.50	3.3	2.00	6.3	24.6	43.5	2.0	7.6	18.2	16.88	9,000
WTR25	84.0	35.0	103.2	25.00	15.25	30.50	3.5	2.25	7.0	27.1	49.5	2.3	8.3	14.8	18.75	10,750

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT RR①	KEY	RP	RX
WTR11	4.500	1.000 x 1.000 x 6.0	7.8	18.5	1.375	.312 x .312 x 2.5	3.5	39.5
WTR12	4.750	1.250 x 1.250 x 6.8	8.5	20.3	1.625	.375 x .375 x 2.8	3.8	43.0
WTR13	5.000	1.250 x 1.250 x 7.0	9.1	21.3	1.625	.375 x .375 x 2.8	4.0	47.9
WTR15	5.250	1.250 x 1.250 x 7.8	9.5	22.0	1.875	.500 x .500 x 3.0	4.0	52.1
WTR16	5.500	1.250 x 1.250 x 8.3	9.5	23.5	2.125	.500 x .500 x 3.0	4.0	55.5
WTR18	6.000	1.500 x 1.500 x 8.8	10.5	25.0	2.125	.500 x .500 x 3.5	4.5	61.5
WTR20	6.500	1.500 x 1.500 x 9.3	11.3	26.5	2.375	.625 x .625 x 3.8	4.8	64.2
WTR22	7.000	1.750 x 1.750 x 9.8	12.0	28.8	2.625	.625 x .625 x 4.0	5.3	72.2
WTR25	8.000	2.000 x 2.000 x10.8	13.5	30.8	2.875	.750 x .750 x 4.0	5.5	76.1

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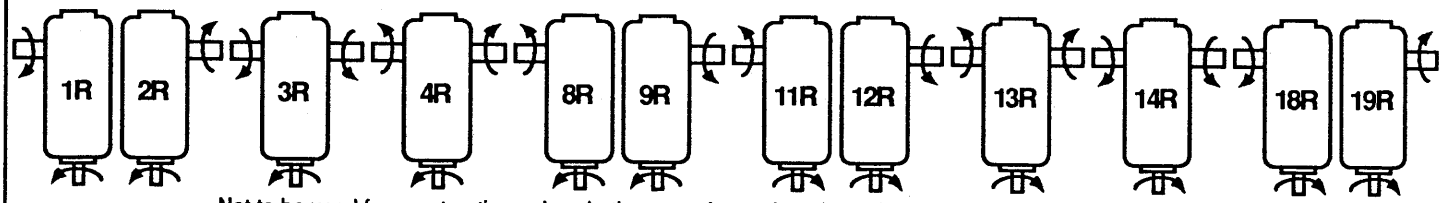
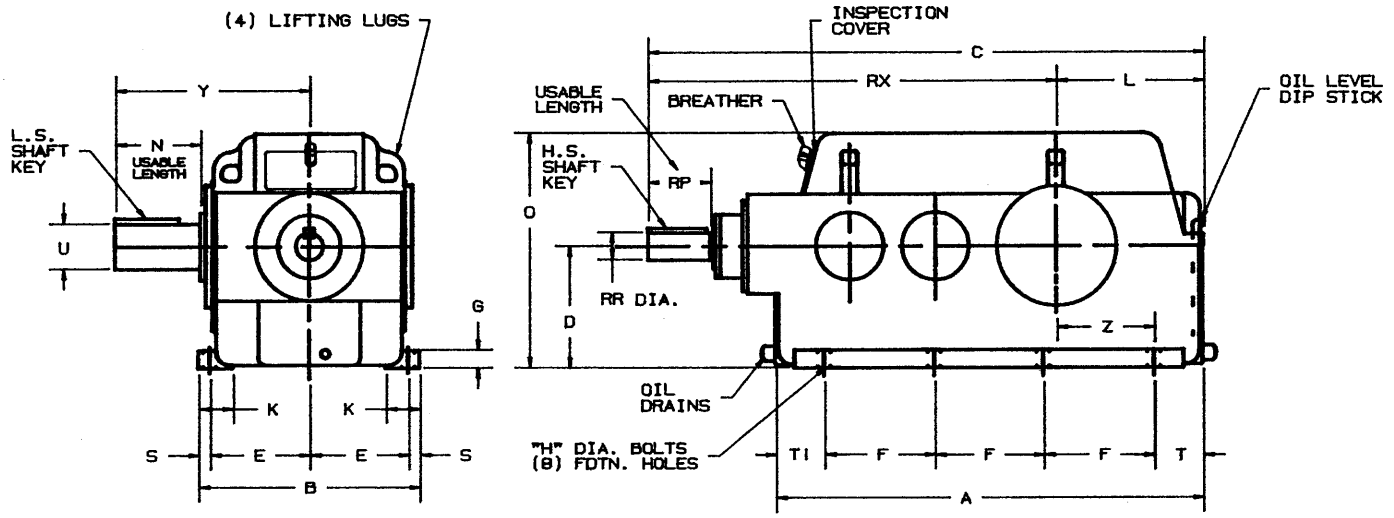
STANDARD ASSEMBLY POSITIONS



Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

Type TDS
Right Angle Shaft Speed Reducers
Triple Reduction-Steel Construction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

UNIT SIZE	A	B	C	D②	E	F	G	H	K	L	O	S	T	T1	Z	APPROX WT. LBS.
WTR28	95.3	40.5	117.8	28.00	17.75	23.50	3.5	2.25	7.5	30.6	55.5	2.5	8.8	16.0	21.75	12,450
WTR30	103.0	42.8	127.5	30.00	18.62	24.50	3.6	2.50	8.1	32.9	59.0	2.8	9.8	19.8	23.00	15,450
WTR32	106.2	45.0	130.7	32.00	19.75	25.75	3.1	2.50	8.4	34.0	61.00	2.8	11.7	17.2	21.55	19,200
WTR34	117.8	47.5	142.3	34.00	20.75	26.75	3.1	2.75	8.0	36.0	67.00	2.8	11.7	25.9	23.65	22,450
WTR36	121.3	49.0	149.3	36.00	21.50	29.00	3.1	2.75	8.0	37.5	69.00	2.8	11.0	23.3	25.75	26,500
WTR38	126.3	51.0	154.3	38.00	22.25	30.50	3.1	3.00	8.0	39.0	71.00	2.8	11.3	23.5	27.00	30,900
WTR40	130.1	53.0	158.1	40.00	23.25	32.00	3.1	3.00	8.0	40.8	73.00	2.8	11.5	22.6	28.55	36,600

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT RR①	KEY	RP	RX
WTR28	9.000	2.500 x 2.500 x 12.3	15.0	34.3	3.375	.875 x .875 x 4.5	6.5	87.1
WTR30	9.500	2.500 x 2.500 x 12.5	15.8	35.5	3.625	.875 x .875 x 5.0	7.0	94.6
WTR32	10.500	2.500 x 2.500 x 13.5	17.0	38.0	3.625	.875 x .875 x 5.0	7.0	96.7
WTR34	11.500	3.000 x 3.000 x 14.3	18.0	40.0	3.625	.875 x .875 x 5.0	7.0	106.3
WTR36	12.500	3.000 x 3.000 x 15.0	19.0	43.0	3.875	1.00 x 1.00 x 5.5	8.0	111.8
WTR38	13.250	3.500 x 3.500 x 16.0	20.0	45.0	3.875	1.00 x 1.00 x 5.5	8.0	115.3
WTR40	14.000	3.500 x 3.500 x 17.0	21.0	47.0	3.875	1.00 x 1.00 x 5.5	8.0	117.3

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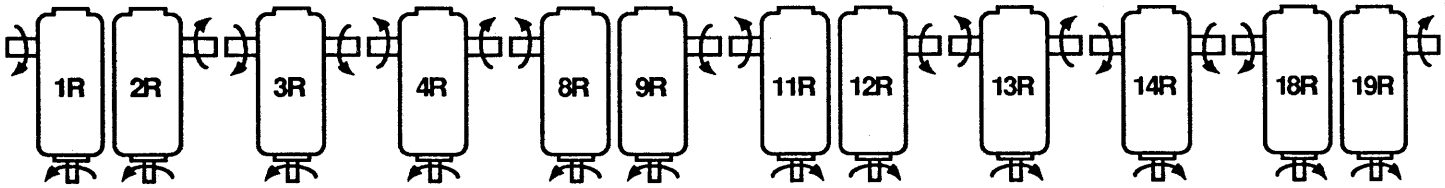
STANDARD ASSEMBLY POSITIONS



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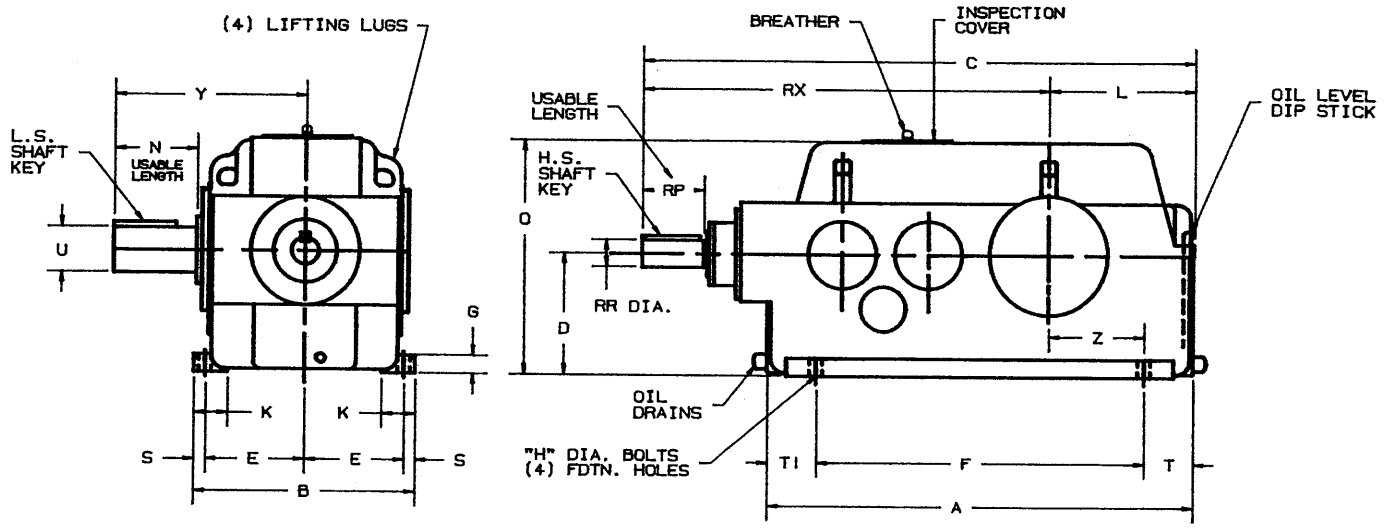
CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

Your Total Drive Source

Type TDS
Right Angle Shaft Speed Reducers
Quadruple Reduction-Steel Construction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

UNIT SIZE	A	B	C	D②	E	F	G	H	K	L	O	S	T	T1	Z	APPROX WT. LBS.
WQR7	27.0	15.3	35.6	8.25	6.75	20.00	1.1	0.75	3.7	9.1	15.8	0.9	3.0	4.0	6.00	900
WQR8	35.4	18.0	42.4	10.25	8.00	25.50	1.5	1.00	4.3	11.1	20.0	1.0	3.8	6.1	7.25	1,250
WQR9	35.4	18.0	45.4	10.25	8.00	25.50	1.5	1.00	4.3	11.1	20.0	1.0	3.8	6.1	7.25	1,500

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT RR①	KEY	RP	RX
WQR7	2.875	.750 x .750 x 4.0	5.0	11.3	1.125	.250 x .250 x 2.5	3.3	26.5
WQR8	3.375	.875 x .875 x 4.5	6.0	13.6	1.125	.250 x .250 x 2.5	3.3	31.3
WQR9	3.875	1.000 x 1.000 x 5.3	6.6	14.3	1.375	.312 x .312 x 2.5	3.5	34.3

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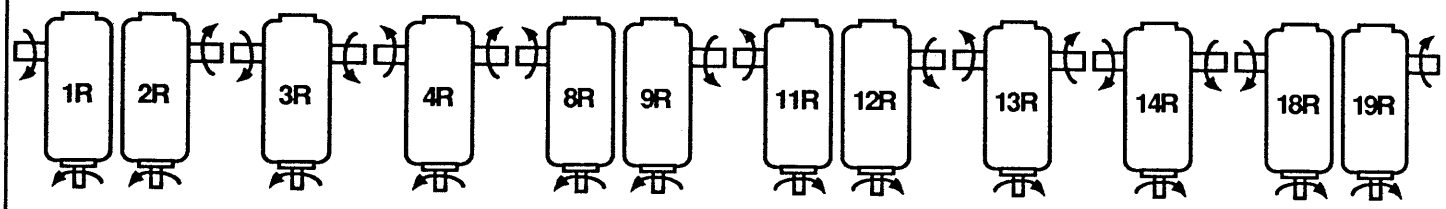
STANDARD ASSEMBLY POSITIONS



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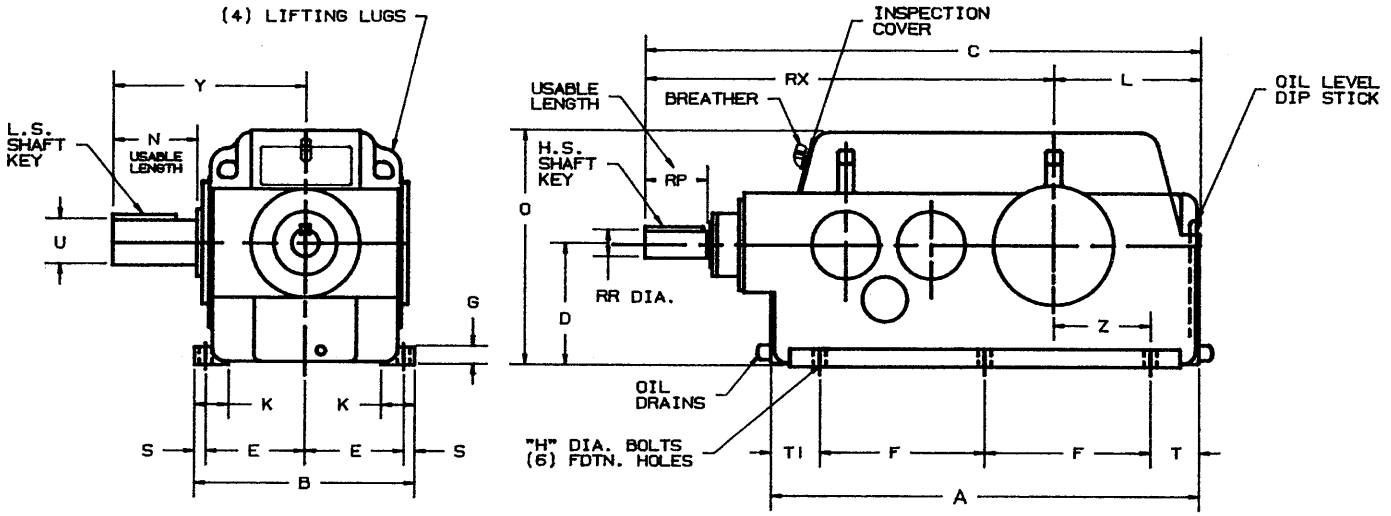
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

Type TDS
Right Angle Shaft Speed Reducers
Quadruple Reduction-Steel Construction



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

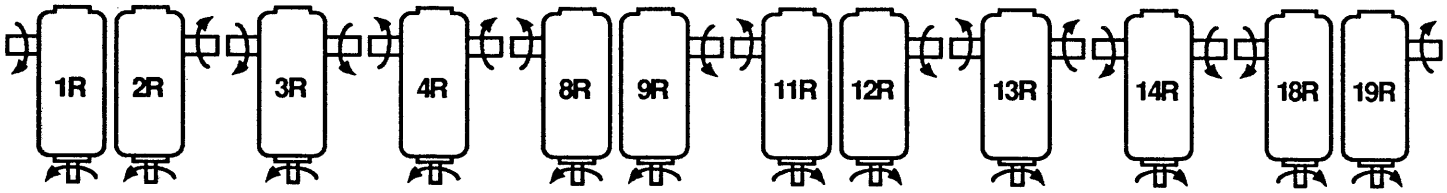
UNIT SIZE	A	B	C	D	②E	F	G	H	K	L	O	S	T	T1	Z	APPROX WT. LBS.
WQR11	42.3	25.0	53.5	11.50	11.25	14.75	1.8	1.00	5.8	14.0	23.0	1.3	5.0	7.8	8.88	2,400
WQR12	44.5	27.0	58.3	12.50	12.25	16.25	2.0	1.25	5.8	15.3	25.0	1.3	5.3	6.8	9.88	3,250
WQR13	49.5	28.0	64.1	13.50	12.75	18.25	2.0	1.25	5.9	16.2	27.0	1.3	5.4	7.6	10.70	3,850
WQR15	54.6	29.5	69.5	15.00	13.25	19.25	2.3	1.50	6.5	17.4	30.0	1.5	5.5	10.0	11.75	4,450
WQR16	58.8	33.0	75.1	16.50	14.75	21.88	2.5	1.50	7.3	19.6	33.0	1.8	5.9	9.1	13.62	6,000
WQR18	66.0	29.0	82.3	18.00	12.75	23.00	2.8	1.75	5.0	20.8	35.5	1.8	6.4	13.4	14.25	7,250
WQR20	70.5	31.0	87.3	20.00	13.75	25.50	3.0	1.75	5.8	23.1	39.5	1.8	7.1	12.2	15.88	7,700
WQR22	78.8	33.0	96.8	22.00	14.50	26.50	3.3	2.00	6.3	24.6	43.5	2.0	7.6	14.8	16.88	9,250
WQR25	84.0	35.0	103.2	25.00	15.25	30.50	3.5	2.25	7.0	27.1	49.5	2.3	8.3	18.2	18.75	11,050

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT RR①	KEY	RP	RX
WQR11	4.500	1.000 x 1.000 x 6.0	7.8	18.5	1.375	.312 x .312 x 2.5	3.5	39.5
WQR12	4.750	1.250 x 1.250 x 6.8	8.5	20.3	1.625	.375 x .375 x 2.8	3.8	43.0
WQR13	5.000	1.250 x 1.250 x 7.0	9.1	21.3	1.625	.375 x .375 x 2.8	4.0	47.9
WQR15	5.250	1.250 x 1.250 x 7.8	9.5	22.0	1.875	.500 x .500 x 3.0	4.0	52.1
WQR16	5.500	1.250 x 1.250 x 8.3	9.5	23.5	2.125	.500 x .500 x 3.0	4.0	55.5
WQR18	6.000	1.500 x 1.500 x 8.8	10.5	25.0	2.125	.500 x .500 x 3.5	4.5	61.5
WQR20	6.500	1.500 x 1.500 x 9.3	11.3	26.5	2.375	.625 x .625 x 3.8	4.8	64.2
WQR22	7.000	1.750 x 1.750 x 9.8	12.0	28.8	2.625	.625 x .625 x 4.0	5.3	72.2
WQR25	8.000	2.000 x 2.000 x10.8	13.5	30.8	2.875	.750 x .750 x 4.0	5.5	76.1

①**TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

②**THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

STANDARD ASSEMBLY POSITIONS



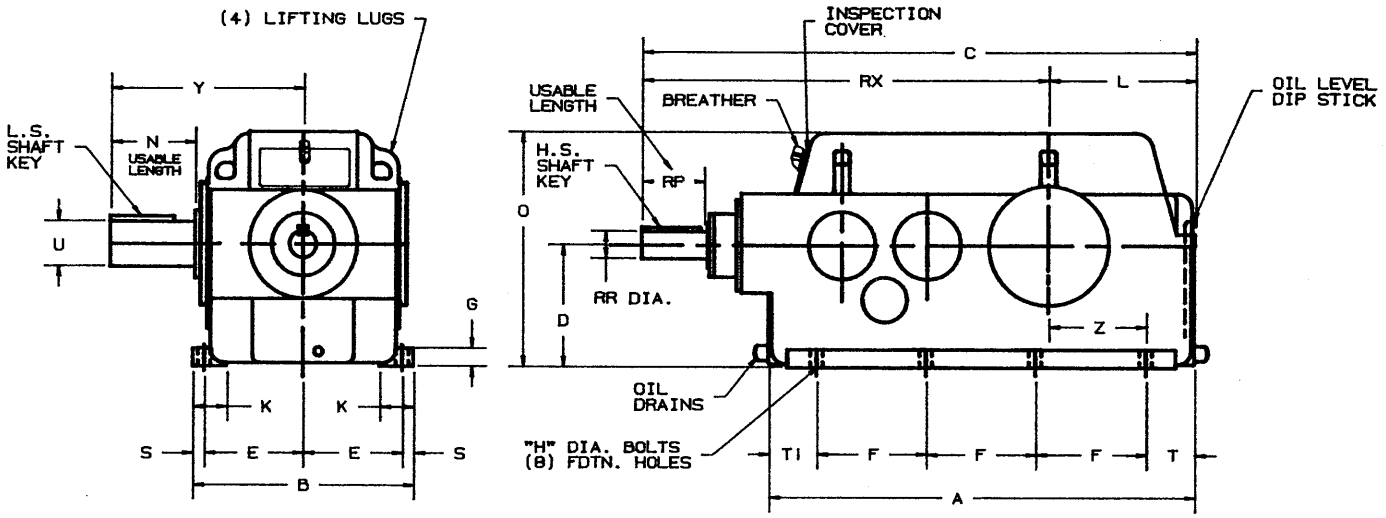
Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

Your Total Drive Source

Type TDS
Right Angle Shaft Speed Reducers
Quadruple Reduction-Steel Construction

WQR28 to WQR40



ALL UNITS FURNISHED WITH SINGLE END SHAFT EXTENSION UNLESS OTHERWISE SPECIFIED.

DIMENSIONS - INCHES

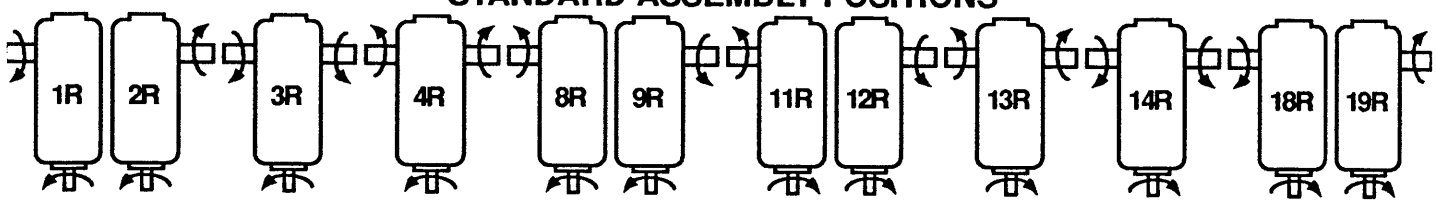
UNIT SIZE	A	B	C	D	②E	F	G	H	K	L	O	S	T	T1	Z	APPROX WT. LBS.
WQR28	95.3	40.5	117.8	28.00	17.75	23.50	3.5	2.25	7.5	30.6	55.5	2.5	8.8	16.5	21.75	12,800
WQR30	103.0	42.8	127.5	30.00	18.62	24.50	3.6	2.50	8.1	32.9	59.0	2.8	9.8	19.8	23.00	15,800
WQR32	106.2	45.0	130.7	32.00	19.75	25.75	3.1	2.50	8.3	34.3	63.0	2.8	11.7	17.3	23.25	19,600
WQR34	117.8	47.5	142.3	34.00	20.75	27.00	3.1	2.75	9.0	36.0	67.0	3.0	12.3	24.5	23.50	22,850
WQR36	121.3	49.0	149.3	36.00	21.50	29.50	3.1	2.75	9.0	37.5	71.0	3.0	12.8	20.0	24.50	26,950
WQR38	126.3	50.5	154.3	38.00	22.25	30.50	3.1	3.00	9.8	39.0	75.0	3.3	12.8	22.0	26.00	31,350
WQR40	130.1	53.0	158.1	40.00	23.25	32.00	3.1	3.00	9.8	40.8	79.0	3.3	12.8	21.4	27.75	37,100

UNIT SIZE	LOW SPEED SHAFT U①	KEY	N	Y	HIGH SPEED SHAFT RR①	KEY	RP	RX
WQR28	9.000	2.500 x 2.500 x 12.3	15.0	34.3	3.375	.875 x .875 x 4.5	6.5	87.1
WQR30	9.500	2.500 x 2.500 x 12.5	15.8	35.5	3.625	.875 x .875 x 5.0	7.0	94.6
WQR32	10.50	2.500 x 2.500 x 13.5	17.0	38.3	3.625	.875 x .875 x 5.0	7.0	96.5
WQR34	11.50	3.000 x 3.000 x 14.3	18.0	40.3	3.625	.875 x .875 x 5.0	7.0	106.3
WQR36	12.50	3.000 x 3.000 x 15.0	19.0	43.0	3.875	1.000 x 1.000 x 5.5	8.0	111.8
WQR38	13.25	3.500 x 3.500 x 16.0	20.0	45.0	3.875	1.000 x 1.000 x 5.0	8.0	115.3
WQR40	14.00	3.500 x 3.500 x 17.0	21.0	47.0	3.875	1.000 x 1.000 x 5.5	8.0	117.3

①**TOLERANCE** = +.0000, - .0005 for diameters up to and including 2 inches; +.000, - .001 for dimensions above 2 inches.

②**THIS DIMENSION** will never be exceeded. When exact dimension is required, shims up to 1/16 inch may be necessary.

STANDARD ASSEMBLY POSITIONS



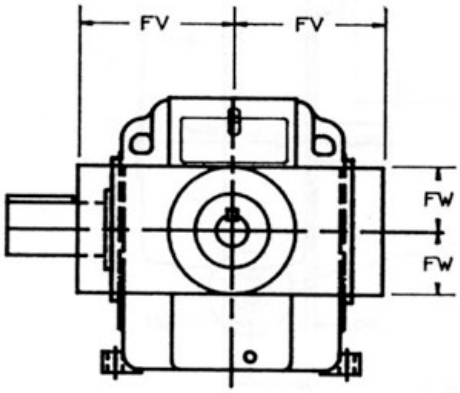
Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

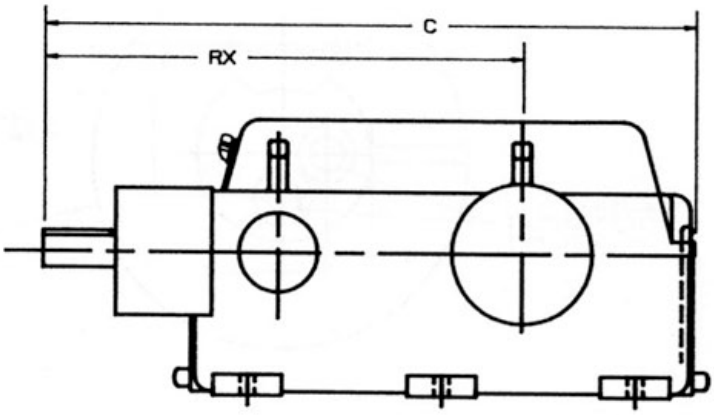
CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

Type TDS
Right Angle Shaft Speed Reducers

NOTES

Type TDS
Right Angle Shaft Speed Reducers
Fan Cooled





① H.S. SHAFT length is longer than standard on fan cooled units to accomodate the fan and maintain usable shaft length.

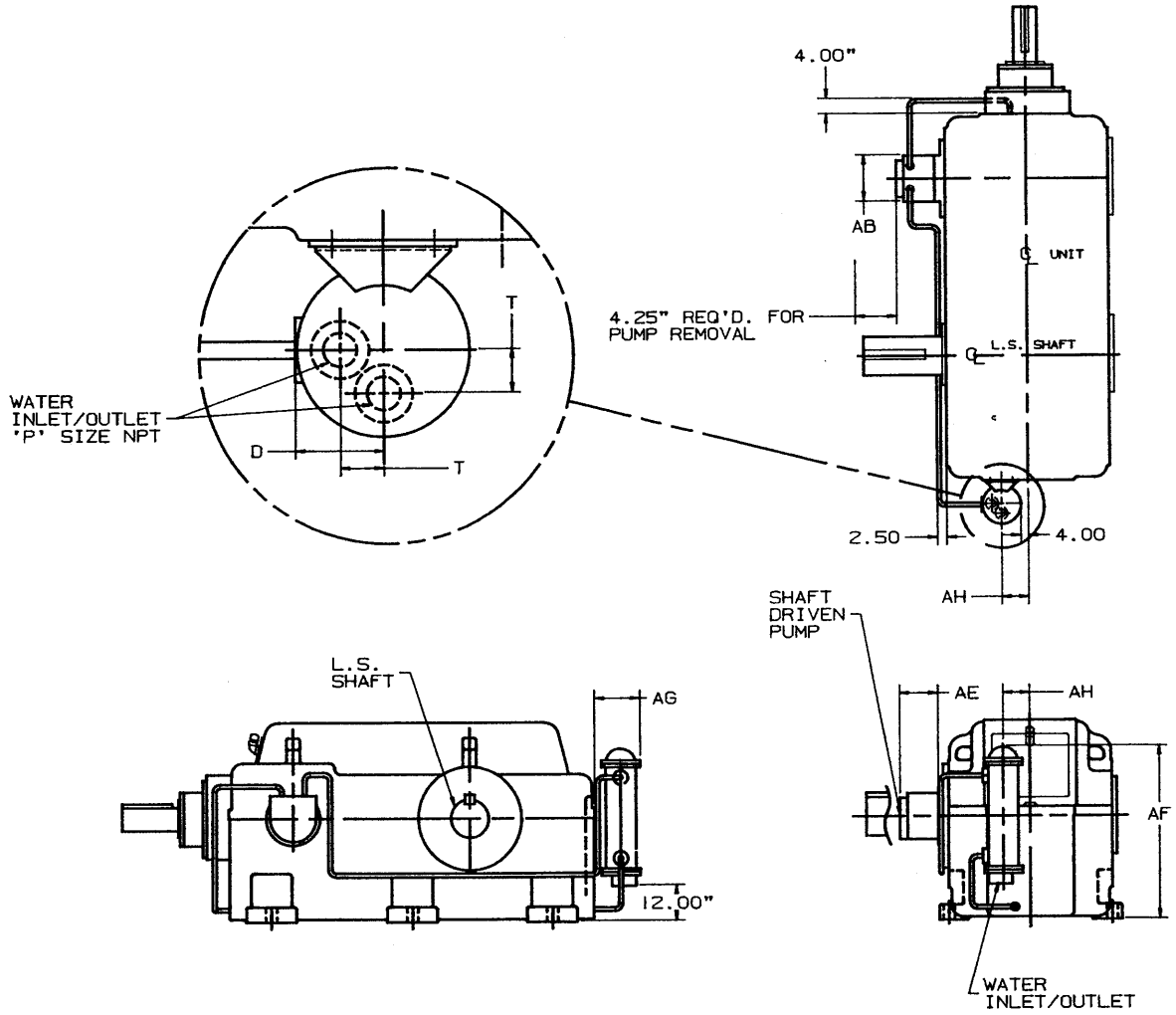
DOUBLE AND TRIPLE REDUCTION

UNIT SIZE	FV	FW	DOUBLE C	DOUBLE RX ①	TRIPLE C	TRIPLE RX ①
7	6.5	5.0	36.8	24.7	38.8	29.6
8	7.5	7.0	45.8	34.7	46.3	35.2
9	7.5	7.0	47.3	36.2	49.3	38.2
11	10.5	7.0	55.0	41.0	57.3	43.3
12	11.5	8.0	59.5	44.3	62.8	47.5
13	11.9	8.0	64.8	48.6	68.8	52.6
15	12.3	8.0	71.3	53.9	74.0	56.6
16	13.8	9.5	76.5	56.9	80.5	60.9
18	14.0	9.5	83.5	62.8	87.5	66.8
20	15.0	9.5	88.5	65.4	92.5	69.4
22	16.3	11.0	98.5	73.9	102.5	77.9
25	16.8	11.0	104.5	77.4	109.0	81.9
28	18.8	12.0	120.0	89.4	123.8	93.1
30	19.4	12.0	127.3	94.4	133.8	100.9
32	21.0	14.0	131.2	97.0	137.7	103.5
34	22.0	14.0	144.8	108.8	149.3	113.3
36	23.0	16.0	149.3	111.8	157.3	119.8
38	24.0	16.0	154.3	115.3	162.3	123.3
40	25.3	16.0	158.1	117.4	166.1	125.4

Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

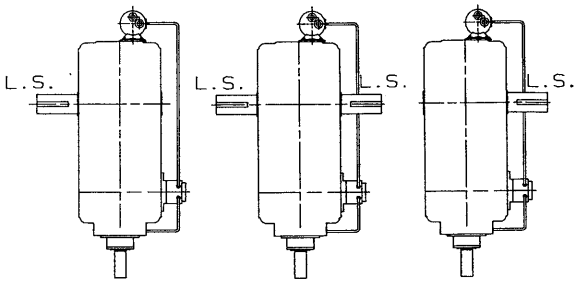
Type TDS
Right Angle Shaft Speed Reducers
Water Cooled Units



DIMENSIONS IN INCHES

UNIT SIZE	AB	AE	AF	AG	AH	D	T	P
1	5.2	2.8	39.2	5.6	6.3	2.31	1.00	0.75
2	5.2	2.8	29.2	5.6	6.3	2.31	1.00	0.75
3	6.6	3.4	39.9	7.1	7.0	3.13	1.25	0.75
4	6.6	3.4	39.2	5.6	6.3	2.31	1.00	0.75
5	6.5	4.1	52.8	8.0	7.4	3.44	1.69	1.00
6	6.5	4.1	40.8	8.0	7.4	3.44	1.69	1.00

STANDARD ASSEMBLY POSITIONS



1 RPW	3 RPW	2 RPW
8 RPW	4 RPW	9 RPW
11 RPW	13 RPW	12 RPW
18 RPW	14 RPW	19 RPW

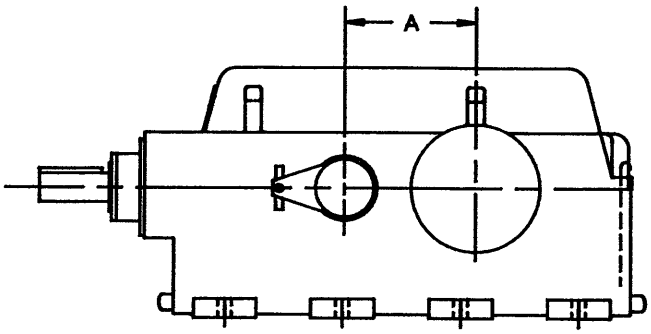
See Unit Dimension Page for Relative Shaft Rotations

Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

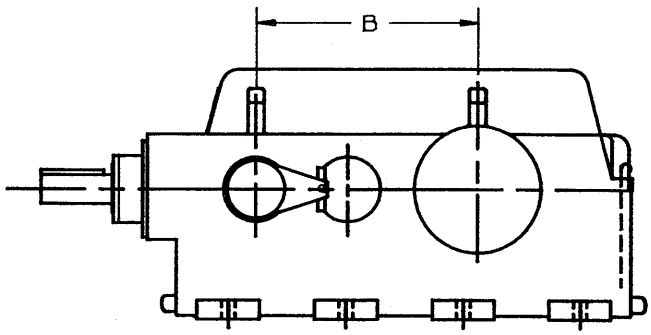
CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

Your Total Drive Source

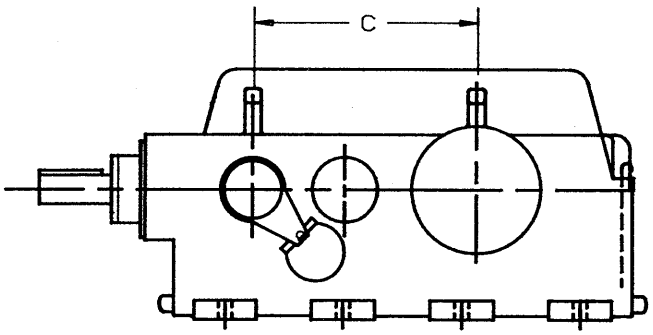
Type TDS
Right Angle Shaft Speed Reducers
Backstops



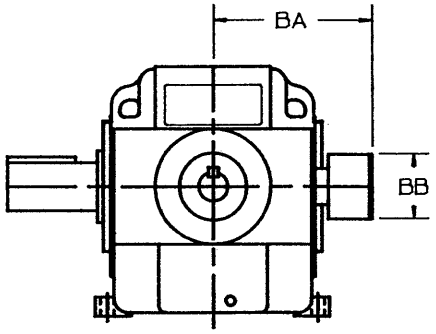
DOUBLE REDUCTION



TRIPLE REDUCTION



QUADRUPLE REDUCTION



ALL UNITS

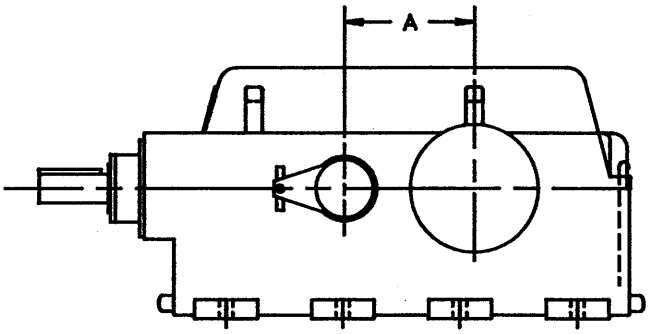
	BACKSTOP MODEL NUMBER						
	B20	B50	B80	B110	B120	B130	B150
TORQUE (x1000 IN. LBS.)	3.6	12.0	26.4	48.0	81.6	138	216
MAXIMUM RPM	2900	2650	2300	2000	1800	1400	1300
BB DIMENSION	3.5	4.3	5.4	7.2	8.8	10.0	12.0

UNIT	A	B	C	BA DIMENSIONS				
7	7.50	13.50	13.50	12.3	14.0			
8	8.55	14.55	14.55	13.3	15.0			
9	9.50	17.00	17.00	13.3	15.0			
11	11.14	19.67	19.67	16.8	18.5	18.8		
12	12.32	21.82	21.82	17.8	19.5	19.8		
13	13.47	24.61	24.61	18.2	19.9	20.2		
15	15.02	27.34	27.34	18.6	20.3	20.6		
16	16.58	28.90	28.90	20.1	21.8	22.1	24.3	26.3
18	18.13	33.16	33.16	20.3	22.0	22.3	24.5	26.5

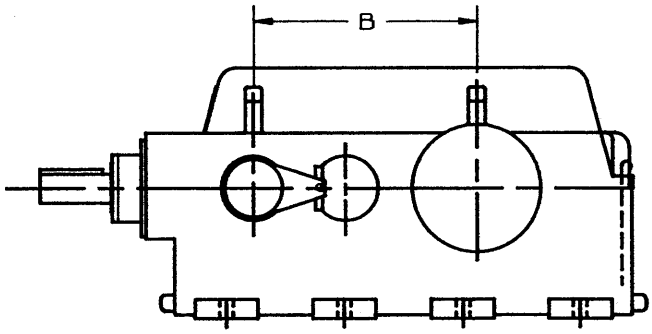
Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:		ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑	CERTIFIED ❑	BY:		DATE:	

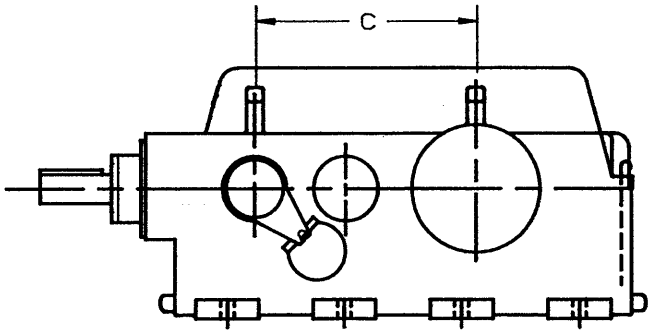
Type TDS
Right Angle Shaft Speed Reducers
Backstops



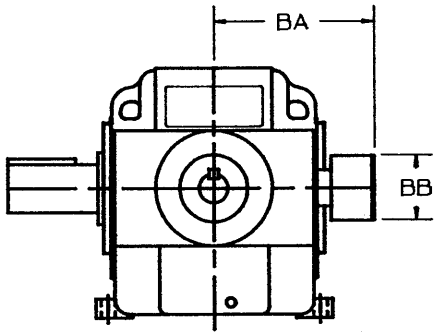
DOUBLE REDUCTION



TRIPLE REDUCTION



QUADRUPLE REDUCTION



ALL UNITS

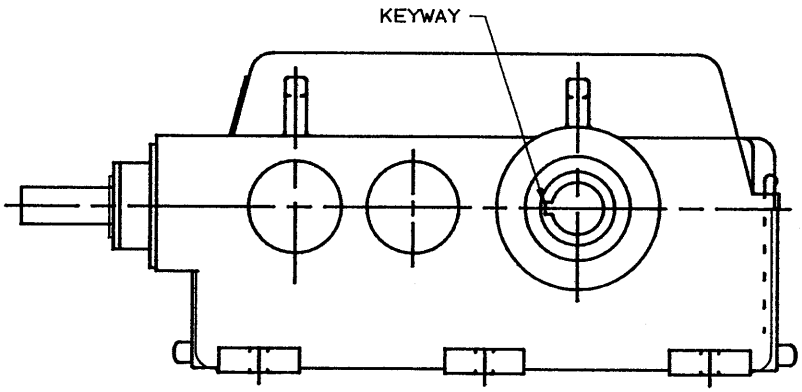
				BACKSTOP MODEL NUMBER						
				B20	B50	B80	B110	B120	B130	B150
TORQUE (x1000 IN. LBS.)				3.6	12.0	26.4	48.0	81.6	138	216
MAXIMUM RPM				2950	2650	2300	2000	1800	1400	1300
BB DIMENSION				3.5	4.3	5.4	7.2	8.8	10.0	12.0
UNIT	A	B	C	BA DIMENSIONS						
20	20.21	35.23	35.23	21.3	23.0	23.3	25.5	27.5		
22	21.76	37.89	37.89	22.6	24.3	24.6	26.8	28.8	29.3	
25	24.87	43.00	43.00	23.1	24.8	25.1	27.3	29.3	29.8	30.6
28	27.98	48.18	48.18	24.8	26.5	26.8	29.0	31.0	31.5	32.3
30	30.05	50.25	50.25	25.6	27.3	27.6	29.8	31.8	32.3	33.1
32	32.12	53.88	53.88	26.8	28.5	28.8	31.0	33.0	33.5	34.3
34	34.19	59.06	59.06	27.8	29.5	29.8	32.0	34.0	34.5	35.3
36	36.00	61.13	61.13	28.8	30.5	30.8	33.0	35.0	35.5	36.3
38	38.00	62.87	62.87	29.8	31.5	31.8	34.0	36.0	36.5	37.3
40	40.00	64.87	64.87	30.8	32.5	32.8	35.0	37.0	37.5	38.3

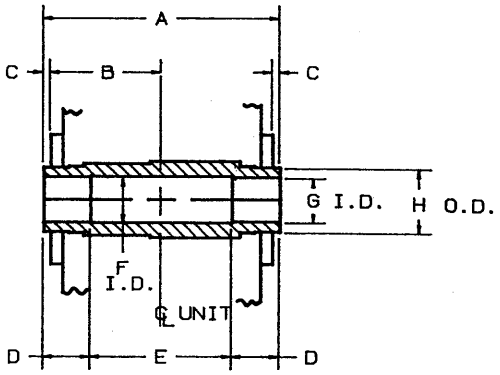
Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

Your Total Drive Source

Type TDS
Right Angle Shaft Speed Reducers
Hollow Shaft Construction





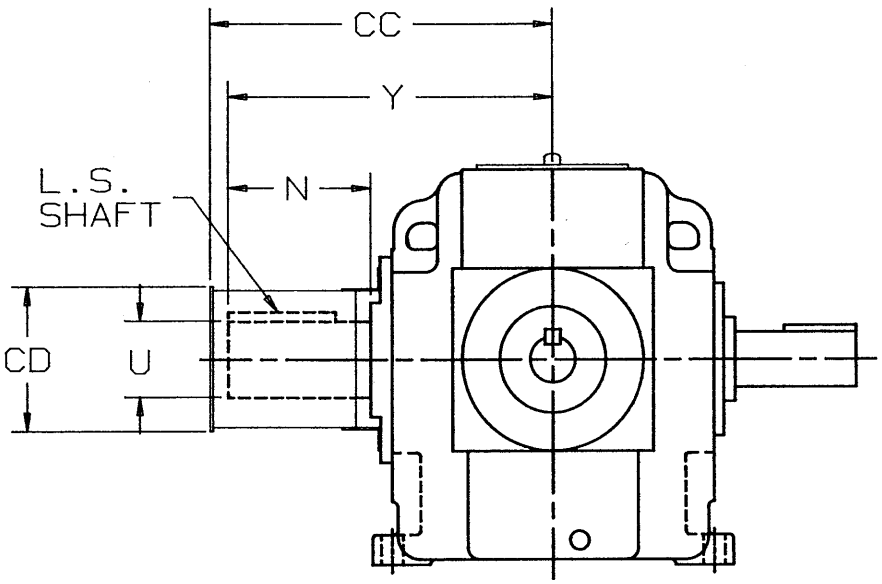
UNIT SIZE ①	A	B	C	D	E	F	G	H	KEYS ②
7	13.1	6.3	.25	3.3	6.50	3.125	2.875	4.250	.750 x .750 x 3.1
8	15.7	7.6	.25	3.9	7.90	3.625	3.375	5.000	.875 x .875 x 3.7
9	15.9	7.7	.25	4.0	7.90	4.125	3.875	5.750	1.000 x 1.000 x 3.8
11	21.9	10.7	.25	5.5	10.90	4.750	4.500	6.750	1.000 x 1.000 x 5.3
12	24.1	11.8	.25	6.0	12.10	5.000	4.750	7.000	1.250 x 1.250 x 5.8
13	24.9	12.2	.25	6.2	12.50	5.250	5.000	7.500	1.250 x 1.250 x 6.0
15	25.5	12.5	.25	6.4	12.70	5.500	5.250	8.000	1.250 x 1.250 x 6.2
16	29.0	14.0	.50	7.3	14.40	5.750	5.500	8.250	1.250 x 1.250 x 7.1
18	30.0	14.5	.50	7.5	15.00	6.250	6.000	9.000	1.500 x 1.500 x 7.3
20	31.4	15.2	.50	7.9	15.60	6.750	6.500	9.750	1.500 x 1.500 x 7.7
22	34.6	16.8	.50	8.6	17.40	7.250	7.000	10.500	1.750 x 1.750 x 8.4
25	35.6	17.3	.50	8.9	17.80	8.250	8.000	12.000	2.000 x 2.000 x 8.7
28	40.6	19.3	1.00	10.1	20.40	9.250	9.000	13.500	2.500 x 2.500 x 9.9
30	41.4	19.7	1.00	10.3	20.80	9.750	9.500	14.000	2.500 x 2.500 x 10.1
32	44.6	21.3	1.00	11.1	22.40	10.750	10.500	16.000	2.500 x 2.500 x 10.9
34	46.6	22.3	1.00	11.6	23.40	11.750	11.500	17.000	3.000 x 3.000 x 11.4
36	50.0	24.0	1.00	12.5	23.00	12.750	12.500	18.750	3.000 x 3.000 x 12.3
38	52.0	25.0	1.00	13.0	25.24	13.500	13.250	20.000	3.500 x 3.500 x 12.8
40	54.0	26.0	1.00	13.5	25.74	14.250	14.000	21.000	3.500 x 3.500 x 13.3

① Above dimensions for multiple reduction units only. For single reduction, please contact Nuttall Gear
② 2 Keys Supplied

Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

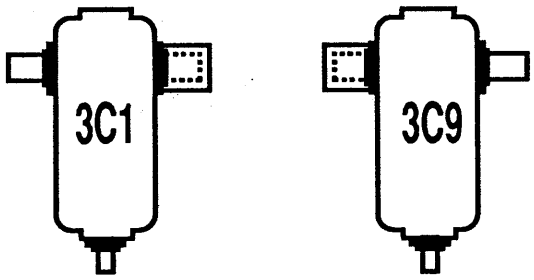
Type TDS
Right Angle Shaft Speed Reducers
Shaft Covers



UNIT SIZE ①	CC	CD
7	11.5	5.12
8	13.9	6.62
9	14.5	6.62
11	18.8	7.12
12	21.5	8.62
13	21.6	8.62
15	23.3	8.62
16	23.8	10.62
18	26.9	10.62
20	28.4	12.12
22	30.5	12.12
25	32.8	12.62
28	35.0	14.62
30	36.0	11.12
32	38.5	12.12
34	40.5	12.12
36	43.5	13.12
38	45.5	14.12
40	47.5	15.12

① *NOTE: For Dimensions U, N, Y, see appropriate unit drawing.*

STANDARD ASSEMBLY POSITIONS



Not to be used for construction unless both appropriate unit and supplemental dimensions are CERTIFIED.

CUSTOMER ORDER:	ITEM NO.:	S.O. NO.:	UNIT SIZE:	ASSEMBLY:
PRELIMINARY ❑ CERTIFIED ❑	BY:		DATE:	

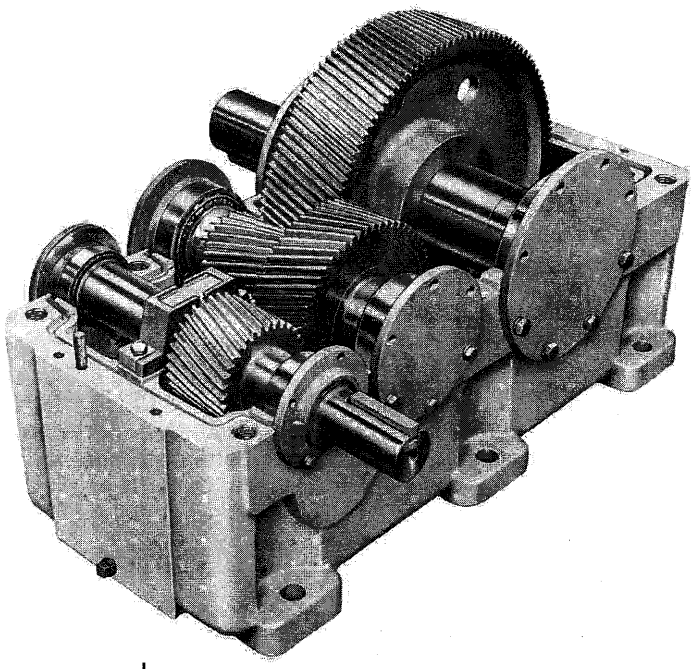
Your Total Drive Source

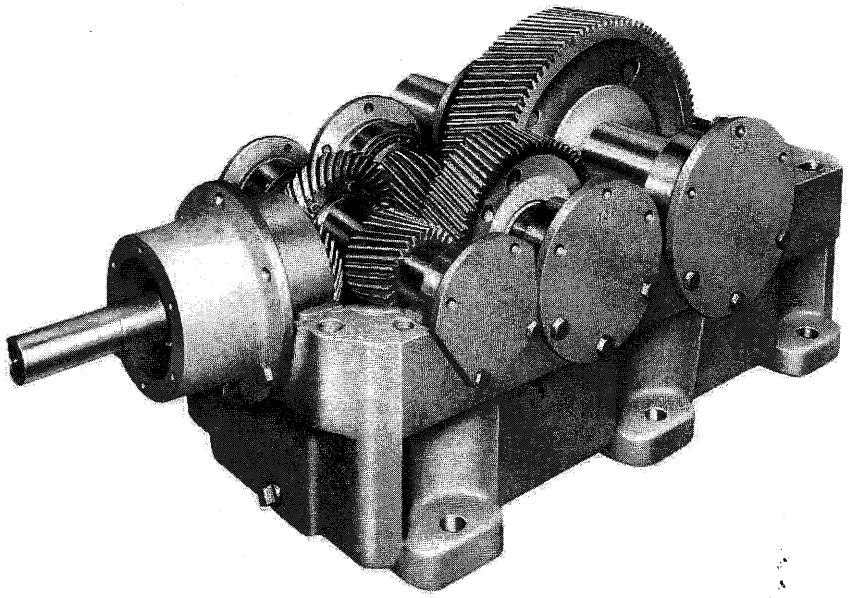
NUTTALL GEAR™

A REGAL REXNORD BRAND

Type TDS
Helical & Helical / Bevel
Speed Reducers

- Installation
- Lubrication
- Maintenance
- Operation
- Replacement Parts





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WARRANTY

CAUTION: Service and repair under warranty must be performed only by a Nuttall authorized service shop, otherwise the warranty will become void.

Nuttall Gear warrants that the product furnished will be free of defects in material an workmanship for a period not to exceed one year from installation or eighteen months from shipment to the purchaser, whichever is soonest. Upon prompt notification and written substantiation that the equipment has been stored, installed, operated and maintained in accordance with Nuttall recommendations and standard industry practices, Nuttall will correct non-conformity by repair or replacement, at its option, F.O.B. factory.

The warranties set forth in this provision are exclusive and in lieu of all other warranties whether statutory, express or implied (including all warranties of merchantability and fitness for particular purpose and all warranties arising from course of dealing or usage of trade), except of title and against patent infringement. The remedies provided above shall constitute complete fulfillment of all the liabilities of Nuttall whether the claims of the purchaser are based in contract, in tort (including negligence), or otherwise with respect to, or arising out of, the product furnished hereunder.

The system of connected rotating parts—PRIME MOVER AND ACCESSORIES, GEAR UNIT, AND DRIVEN EQUIPMENT—must be compatible; free from critical speeds, torsional or other types of vibration, within the operating range, regardless of the source of such vibration, and/or it's inducement. Nuttall Gear Corporation's responsibility is limited to providing a gear unit within normal commercial levels of vibration generation. Nuttall Gear Corporation is not responsible for the unsatisfactory operation or failure of the drive system, resulting from the incompatibility of rotating components, nor the analysis required. The system responsibility remains with the purchaser, system builder or designer, unless Nuttall Gear Corporation has agreed to perform such analysis, and the nature of such vibrations is fully defined.

Those units supplied with motor/gear couplings mounted must be final aligned by the installer, Nuttall Gear verifies that the motor and gear can be aligned; however, Nuttall Gear does not do final alignment, because of changes that occur during shipment handling as well as foundation variances.

The user is responsible for furnishing and installing any guards or other safety equipment needed to protect operating personnel, even though such safety equipment may not have been furnished by the seller with the equipment purchased.

Nuttall, its contractors and suppliers of any tier, shall not be liable in contract, in tort (including negligence), or otherwise for damage or loss of other property or equipment, loss of profits or revenue, loss of use of equipment or power system, cost of capital, cost of purchased or replacement power or temporary equipment (including additional expenses incurred in using existing facilities), claims of customers of the purchaser, or for any special; indirect, incidental, or consequential damages whatsoever.

The remedies of the purchaser set forth herein are exclusive and the liability of Nuttall with respect to any contract, or anything done in connection therewith, such as the performance or breach thereof, or from the manufacture, sale, delivery, resale, or use of any equipment covered by or furnished under the contract, whether in contract, in tort (including negligence) or otherwise, shall not exceed the price of the equipment or part on which such liability is claimed.

In no event shall Nuttall be responsible for providing working access to the defect, including the removal, disassembly, replacement or reinstallation of any equipment, materials or structure to the extent necessary to permit Nuttall to perform its warranty obligations, or transportation costs to and from Nuttall factory or repair facility. The conditions of any tests shall be mutually agreed upon and Nuttall shall be notified of, and may be present at, all tests that may be made.

INTRODUCTION

The following instructions apply to all Nuttall Gear Parallel Shaft and Right Angle Shaft reducers. If a unit is furnished with special features, refer to the supplemental instructions shipped with the unit or contact Nuttall Gear. This manual is meant to be used in conjunction with the outline and/or assembly drawing(s) for a particular gearbox. Where a conflict exists between this manual and supplied drawings, the drawings take precedence.

The gear drive is rated according to the latest standard of the American Gear Manufacturers Association, and was selected to suit the load conditions for the service ratings on the nameplate. Proper performance depends on adherence to these operational ratings. Operate this unit only at the ratings shown on the nameplate. Before changing any of these operational ratings, contact your Nuttall Gear representative for factory approval.

To protect warranty, installation and maintenance services must only be performed by trained personnel after reading the instructions. Particular attention must be paid to all nameplates and warning tags.

All warning labels and instructions for installing and operating electrical equipment must be carefully read and followed. All electrical connections must be installed only by qualified personnel in strict accordance with the national electric code and local requirements. Compliance with all codes, laws and safety ordinances is the sole responsibility of the user.

When communicating with your Nuttall Gear sales representative, make reference to the Nuttall nameplate shop order number, the type and rating of the gear drive, serial number, and any other information useful in identifying the gear drive.

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RECEIVING & HANDLING

Immediately upon receipt examine the unit for damage. Notify the carrier and your Nuttall Gear sales representative immediately if there is any evidence of shipping damage. Responsibility for reimbursement for losses or damage in shipment remain solely with the transportation company.

Operating instructions for accessories mounted on the gear unit assembly are normally attached to the unit. Save all hardware, accessories, wiring diagrams, and instruction information included with the unit.

CAUTION:

- Never use shaft extensions for pushing, pulling, or supporting the weight of the unit.
- Never drag the gear unit. Machined mounting surfaces will be marred and overstressing of the housing may occur.
- Never attempt to lift the entire unit by using the motor lifting lugs or eyebolt holes.
- When lifting, use slings to distribute the load evenly and to keep the unit from tilting. Spreader bars may be required to avoid stress on any piping and accessories mounted on the unit.
- Never use piping for lifting or climbing.
- If the unit is to be stored, refer to the storage instructions in this manual.

STORAGE

General

All internal and unpainted external surfaces of gear drives have been treated at the factory, prior to shipment, with a rust preventative. The protective life of this rust preventative will vary with temperature fluctuations, atmospheric moisture content, degree of exposure to the elements during storage, and degree of contact with other objects. Inspect all machined surfaces and spray or add rust inhibitor to exposed metal surfaces that may have had the protective coating removed in shipping and handling. To assure that the gear drive will operate satisfactorily at start-up, certain precautions must be taken by the customer upon receipt. The expected length of storage and the storage atmosphere dictated the maintenance schedule to be followed. Units must always be stored in their operating position and free of loads or weights on output and input shafts. These instructions apply to the reducer only. If a motor is included in our drive package, motor operating maintenance and storage instructions are included with drawing transmittals and are also attached to the unit. These instructions must be carefully read and followed.

Short Term Storage (Indoor)

If the gear drives are to be stored for a period of 30 days or less, the following should be observed: Store in a clean, dry location with factory packaging intact, and with as nearly a constant temperature as possible. Elevate a minimum of six inches above the floor level. Avoid areas that are subject to extremes in temperature, vibrations, and humidity.

Long Term Storage (Indoor)

If units are to be stored for a period longer than 30 days, the following should be observed: Store in a clean dry location with the unit elevated a minimum of six inches above the floor level. Avoid areas that are subject to extremes in temperature, vibrations, and humidity.

Use one of the following recommendations:

1. **For all horizontal and vertically mounted units:**
   Remove breather and replace with pipe plug. Fill gear drive to the recommended oil level with Shell VSI grade 68 oil or equal, heated between 110-120°F. **Do Not Overfill**. Immediately close openings to maintain vapors in the housing. **(Special Note for units with labyrinth seals**. Prior to filling the unit with heated oil, pack entire seal area with grease to form a vapor barrier. Seal with tape.) Rotate the high speed shaft slowly by hand, a minimum of eighty revolutions, at least once every four weeks. Inspect unit periodically and spray or add rust inhibitor suitable for anticipated storage conditions, as required. Drain and replace with the recommended oil type prior to start-up.
2. **For all horizontal and vertically mounted units:**
   Remove breather and replace with pipe plug. A vapor-phase rust inhibitor such as Daubert Chemical, Nox-Rust Motorstor VCI-10, or equal, may be added to the recommended oil type in the amount of 2% of the total sump capacity. Fill the unit to the recommended oil level. **Do Not Overfill. (Special note for units with labyrinth seals:** Prior to filling the unit with oil, pack the entire seal area with grease to form a vapor barrier. Seal with tape.) Rotate the high speed shaft slowly by hand, a minimum of eighty revolutions, at least once every four weeks. Inspect unit periodically and spray or add rust inhibitor suitable for anticipated storage conditions, as required. The unit may run without changing this oil mixture.
3. **For horizontally mounted units only (Do not use when labyrinth seals are used):**
   Fill unit completely to the top of the housing with the recommended oil type for operation of the unit. Eliminate any air pockets. Rotate the high speed shaft slowly by hand a minimum of eighty revolutions, at least once every four weeks. Inspect unit periodically and spray or add rust inhibitor suitable for anticipated storage conditions, as required. Before start-up, lower the oil level to the correct operational level.

Outdoor Storage

Note: OUTDOOR STORAGE IS NOT RECOMMENDED. When storage in a warehouse or enclosed building is not possible, however, the following should be observed:

1. Bring unit to an area in which the ambient temperature is greater than 50°F and allow to stand for a minimum of 24 hours.
2. Remove breather and replace with pipe plug. Seal the unit completely by sealing all air vents with pressure sensitive tape. Pack grease around the shafts near the contact seals and tape. Pack grease into the seal retainers and wrap tape against the seals.
3. Fill gear unit to half the recommended oil level with Shell VSI grade 68 oil or equal, heated between 110-120°F. Immediately close openings to maintain vapors in the housing.
4. Coat the entire exterior with a rust preventative.
5. Seal the unit in a moisture proof container with an adequate supply of desiccant inside to avoid moisture build-up. Unit must be elevated a minimum of six inches above the ground.
6. The high speed shaft should be rotated slowly by hand, eighty revolutions, at least once every four weeks.
7. Repeat operations 1,2,3, and 4 every six months. The Shell VSI Grade 68 Oil may be drained, reheated and reused.
8. Do not store the unit in direct sunlight.

INSTALLATION

The continuous efficient operation of a gear unit depends chiefly on four factors:

1. Proper type of foundation and correct mounting.
2. Correct alignment with the driven equipment.
3. Correct lubrication.
4. Full consideration of both preventative and operating maintenance.

CAUTION: Operate the gear unit only within the ratings shown on the nameplate. Review the application to confirm the unit will not be operated in conditions exceeding the nameplate rating. Selection and installation of guard, warning signs, or any provisions required to meet national and local safety codes are the responsibility of the user.

Environmental Considerations

Units should not be installed in locations of unusually high or low temperatures. Adequate air flow is required for proper heat dissipation from the unit. Ambient temperatures must not exceed 100°F, unless supplemental means of cooling are supplied. Environmental conditions, including exposure to direct sunlight, high humidity, dust or chemicals suspended in the air are worthy of special consideration. Gear drives exposed to the direct rays of the sun will run hotter than a gear drive in an identical application which is sheltered. Gear drives exposed to these and other adverse conditions should be referred to Nuttall Gear for special evaluation and recommendation.

Foundation

A foundation or mounting, which provides rigidity and prevents weaving or flexing with resultant misalignment of the shafts, is essential to the successful operation of a gear unit. A concrete foundation should be used whenever possible and should be carefully prepared to conform with data regarding bolt spacing and physical measurements contained in the Dimension Leaflet supplied prior to delivery of the equipment. Grout steel mounting pads into the concrete base. Mount the unit on these steel pads. Do not gout the unit directly into the concrete base. Mount the unit on these steel pads. Do not grout the unit directly into the concrete foundation. When the units are installed on structural foundation pads a supporting base plate of steel should be provided to obtain proper rigidity. These plates or pads should be of a thickness equal to or greater than the diameter of the hold down bolts.

Foundation Bolt Torque Recommendations

Gear units must be securely bolted to their foundations with the specified bolt size. Bolts are to be SAE Grade 5 or equivalent fasteners. **Do not lubricate fasteners**. Tighten bolts per the torques listed below.

	Torque (Ft. Lbs.)			Torque (Ft. Lbs.)	
Bolt Size (UNC)	Metal To Metal	Metal To Concrete	Bolt Size (UNC)	Metal To Metal	Metal To Concrete
¾	245	191	1-3/4	1,975	1,558
7/8	380	313	2	3,083	2,147
1	567	467	2-1/4	4,333	3,417
1-1/8	742	584	2-1/2	6,000	4,667
1-1/4	1,050	834	2-3/4	8,167	6,417
1-3/8	1,375	1,084	3	10,417	8,250
1-1/2	1,842	1,458			

Bedplates

Bedplates are provided as common mounting surfaces which will support several components when mounted on a proper foundation. Bedplates are also designed to facilitate alignment of those components. Because of the disparity of component sizes, bedplates are not designed to be self-supporting structures under all conditions. They are not designed to provide a platform for lifting and transporting with all of the components mounted, unless the assemblies are properly supported and balanced with appropriate material handling fixtures. There will be occasions when it will be necessary to remove some components for transport, and subsequently, reassemble the drive train in its final location. Nuttall Gear supplies the components on the bedplate assemblies rough aligned to the coupling manufacturer's specifications. However, due to possible shifting in transit or handling and the possible variances in foundation surfaces, the final alignment is the responsibility of the installer. To align a bedplate supplied unit, the output shaft of the reducer should be aligned with the driven shaft by moving and shimming the bedplate assembly—not by moving the reducer on the bedplate. Insure that all bedplate mounting points are properly shimmed for proper support to provide a solid level surface. Failure to do so may create a twist in the bedplate and could make final alignment of the drive components difficult. After aligning the reducer output shaft and shimming between the bedplate and the foundation, the mounting bolts or lugs should be tightened and the bedplate firmly locked and grouted in place. Final alignment of the other bedplated components must now be completed.

Alignment

Gear units are designed with a tolerance of +0 and −1/16 in. between the shaft center and the base, therefore, shimming may be required. Flat shims of various thicknesses, slotted to slide around the foundation bolts, should be used. All feet must be solidly supported before the mounting bolts are tightened. After alignment has been secured through shimming, the equipment should be bolted down and alignment rechecked. Heat up couplings, sprockets or pinions and shrink them onto shaft extensions when required, avoiding contact with the shaft seal. Do not heat parts above manufacturers recommended limits, or 300°F, whichever is lower. **To avoid severe damage to bearing and gears the above must not be hammered on to shaft extensions**. When the prime-mover is connected to the gear unit or the gear unit is connected to the driven equipment by means of a coupling, correct alignment cannot be overemphasized. This becomes of greater importance as speeds are increased or the drive is subjected to variations in load conditions. Misalignment, either parallel or angular, is one of the most frequent causes of bearing or shaft failures, noisy operation, or excessive operating temperatures due to the extra load imposed. A straight edge laid across the coupling member at the machined diameter provided for alignment purposes shows correct parallel alignment when the straight edge rests on both coupling members for their full length. Check this at four positions-90 degrees apart. The use of feeler gauges between coupling member faces is a common method of checking for correct angular alignment. Check at four positions-90 degrees apart. A more accurate alignment check is obtained by the use of dial indicators. This is done by clamping the indicator on one coupling member with the indicator stem resting on the other coupling member, then rotating the member holding the clamped indicator. To minimize overhung loads, pulleys and sprockets should be mounted as close to the gear case as possible. Tighten hardware for pulleys and sprockets in accordance with the manufacturers recommendations. **Do not** over tighten belts or chains. Reducer bearing life may be significantly reduced if belts and chains are too tight. Install pulleys and sprockets on driver/driven equipment so that they run true. Guards should be mounted over couplings, pulleys, and sprockets after final alignment is completed.

LUBRICATION

Warning: Gear units are shipped from the factory without oil. Fill unit to the proper level before operating.
Lubrication oil for use with gear units must be high quality, straight mineral petroleum oils. They must be non-corrosive to gears or bearings, neutral in reaction, free from grit or abrasives, and have good defoaming and oxidation resisting properties. Refer to AGMA 9005 for more detailed information on lubricant property requirements. Performance and life of the gear unit are dependent upon the use of the proper lubricants maintaining the correct oil level, and regular oil changes, including draining the unit at regular intervals, and flushing it, before refilling. For applications where loads, speeds, or temperatures are abnormal, Nuttall should be contacted for specific recommendations.

Oil Sump Temperature
Gear drives operating in the ambient temperature range described in the table below generally produce oil sump temperatures of not more than 180°F. This sump temperature is considered maximum because lubricants begin to lose their lubrication properties as temperatures exceed 180°F. These lubrication recommendations exclude applications such as those gear drives installed in the food and drug industry where a possibility exists for incidental contact between the lubricant and the product being processed.

Lubricant Recommendations

Ambient Temperature Range*:			
-40°F to 0°F (-40°C to -20°C)	-20°F to +25°F (-30°C to -5°C)	15°F to 60°F (-10°C to +15°C)	50°F to 125°F (10°C to 50°C)
Contact factory	Use ISO VG 68 – 100 (AGMA 2 – 3)	Use ISO VG 100 – 150 (AGMA 3 – 4)	Use ISO VG 150 – 220 (AGMA 4 – 5)

*The ambient temperature range is defined as the air temperature in the immediate vicinity of the gear drive.

Lubricant Viscosity Ranges (for rust and oxidation inhibited gear oils)

ISO Viscosity Grade	AGMA Lubricant No.	CST Viscosity (mm^2/s) at 40°C	SSU Viscosity at 100°F
VG 68	2	61.2 to 74.8	284 to 347
VG 100	3	90 to 110	417 to 510
VG 150	4	135 to 165	626 to 765
VG 220	5	198 to242	918 to 1122

Lubricant Brand Name Cross Reference

ISO Grade	VG 68 (AGMA 2)	VG 100 (AGMA 3)	VG 150 (AGMA 4)	VG 220 (AGMA 5)
Texaco Regal	68	100	150	220
Exxon Teresstic	68	100	150	220
Keystone KLC	20	30	40	--
Nevastone	--	--	--	90
Shell Turbo Oil	68	100	150	220
Gulf Harmony Oil	68	100	150	220
Sun Oil Sunvis	931	951	975	999
Mobil DTE	Heavy Medium	Heavy	Extra Heavy	BB

Note: All oils listed are non-EP. EP gear lubricants in the corresponding viscosity grade may be used where the user believes he has continuous sustained heavy duty loading on his gear units. Consult a lube oil specialist. EP lubricants must not be used in backstops.

Oil Changes
Proper lubrication maintenance is vital to gear drive performance throughout its design life. After the first 500 hours or four weeks of operation, whichever occurs first, the gear drive should be thoroughly drained, flushed, and refilled with the proper lubricant. Under normal operating conditions, the lubricant should be changed every 2500 hours or six months, whichever occurs first. This change frequency can be extended if analysis of oil samples indicates very limited degradation or contamination.

Cleaning and Flushing
Ideally, the lubricant should be drained while the gear drive is at operating temperature. The gear drive should be cleaned with a flushing oil. Used lubricant and flushing oil should be completely removed for the system to avoid contaminating the new oil. The use of a solvent should be avoided unless the gear drive contains deposits of oxidized or contaminated lubricant which cannot be removed with a flushing oil. When persistent deposits necessitate the use of a solvent, a flushing oil should then be used to remove all traces of solvent for the system. The interior surfaces should be inspected where possible, and all traces of foreign material removed. The new charge of lubricant should be added and circulated to coat all internal parts.

Oil Filling Instructions
Drain all oil from the unit, pumps, external piping, and cooler, prior to adding new oil. Oil is added through the inspection cover on most units manufactured prior to 1995. The inspection cover must be removed to add oil. Care should be taken to seal the inspection cover when it is replaced. Most units manufactured after 1995, have provisions on the inspection cover for filling the unit, without the need to remove the inspection cover, through a large removal pipe plug. Make sure all external piping, coolers, and pumps are fill prior to confirming the final oil level. Fill the unit to the proper oil level as follows.

- Units with dip sticks: fill to marks scribed on the dip stick
- Units with stand pipes: fill to the top edge of the standpipe.
- Units with vertical sight gauge: fill to the oil level indicated next to the glass sight gauge
- Units with round sight gauge: fill to the center of the round sight gauge

CAUTION: Never attempt to add or replace oil while the unit is running, unless a vertical sight glass is in use, and the running oil level has been established and marked on the sight glass. Do not fill beyond the indicated oil level. Excess lubrication increases the churning effect and may result in overheating and subsequent thinning of the oil and possible damage to the rotating components.

Cold Temperature Conditions
Lubrication, either by splash or pump, shall be given special attention if the gear drive is to be started or operated at temperatures below which the oil can be effectively splashed or pumped. Preheating the oil may be necessary under these low ambient temperature conditions. Nuttall should be informed when gear drives are to operate outside the individual temperature ranges listed below. Gear drives operating in cold areas must be provided with oil that circulates freely and does not cause high starting torques. An acceptable low temperature gear oil in addition to meeting AGMA specifications, must have a pour point at least 5°C (10°F) below the minimum expected ambient temperature and a

viscosity which is low enough to allow the oil to flow freely at the start up temperature but high enough to carry the load at the operating temperature. When the lubricant selected does not provide proper lubrication for the expected ambient temperature range, the gear drive should be equipped with a sump heater to bring the oil up to a temperature at which it will circulate freely for starting. The heater watt-density should be selected to avoid excessive localized heating which could result in rapid degradation of the lubricant.

Abnormal Operating Conditions
A rise and fall in temperature may produce condensation. Dust, dirt, chemical particles, or chemical fumes may also react with the lubricant resulting in the formation of sludge. Sustained sump temperatures in excess of 180°F may result in accelerated degradation of the lubricant and excessive gear wear. When operating under these conditions the lubricant should be analyzed more frequently and changed when required.

Grease Lubrication of Seals and Bearings
On units supplied with special seals for hazardous dust conditions, fittings are provided for flushing away contaminated grease from seals. Grease should be applied at regular lubrication change periods or more frequently depending upon severity of dust. On vertical units and units mounted on an incline, fittings are provided for grease lubrication of the input shaft outboard bearing. To lubricate, remove drain pipe plug on input bracket and add grease (with hand operated gun) to fitting on end cap until clean grease starts to flow from drain hole. Replace drain plug. A good grade of #2 bearing grease should be used for these applications and applied at regular lubrication change periods. On units supplied with internal backstops, fittings are provided for the input shaft outboard bearing and backstop. To lubricate, remove drain pipe plug on input bracket only and add grease (with hand operated gun) to fitting on end cap until clean grease starts to flow from drain hole on input bracket. Replace drain plug on input bracket. Remove drain pipe plug on end cap, and grease until grease starts to flow from drain hole on end cap. Replace drain plug. Socony Mobilux #2, Texaco Unitemp #2 or an equivalent grease should be used for these applications and applied at regular lubrication change periods. **WARNING: Do not use lubricants of the EP type or those containing slippery additive such as Molybdenum disulphide and graphite, in a backstop.**

START-UP

Pre-start For Units in Storage
1. Replace breather if removed during storage period.
2. Remove all tape applied in storage preparation.
3. Drain all oils applied during storage; Shell VSI Grade 68 is soluble in recommended lubricating oils. Unit does not require flushing.
4. Thoroughly inspect unit, sump, and all accessories for damage.
5. Follow additional start-up steps as outlined in this manual.

Start-up
Warning: Nuttall Gear units are shipped without oil. Prior to start-up, the unit must be filled with the proper amount of oil, selected in accordance with the operating conditions.
1. Add the correct amount of oil to the gear unit. Fill to the indicated oil level (see oil filling instructions) when unit is at a standstill. Operate unit until oil fills all lines. Stop the unit and recheck oil level and add oil as required.
2. Check that all electrical connections are made and in working order; and that all accessories are properly mounted.
3. Check all external mounting bolts, screws, etc. to make sure they have not loosened in transit or handling.
4. Check that all couplings, sprockets, pulleys, etc. are properly aligned, lubricated, mounted and keyed on shaft extensions.
5. Check that inspection cover is securely tightened and install guards for rotating equipment.
6. For units equipped with oil heaters in cold ambient temperature operation, turn the heater on and allow oil temperature to rise at least to 40°F before start-up.
7. Turn the shafts by hand to confirm there are no obstructions to rotation.
8. To avoid damage to the motor used with reducer having a built in backstop, break the high speed coupling connection, turn input shaft by hand to check proper rotation. Operate motor to check shaft rotation reversing leads if necessary to secure proper rotation. Reconnect coupling. Reducers with piggyback motors should be started very carefully with the output shaft coupling disconnected. If output shaft does not rotate, reverse motor direction and test. Reconnect the coupling.
9. Start unit under as light a load as possible. If rotation of the unit is limited to one direction only, a tag on the housing indicates direction of rotation. Make certain that direction of shaft rotation is as shown on tag.
10. The machinery should be checked frequently for unusual sounds, oil leaks, excessive vibration and excessive heat. If an operating problem develops, shut down immediately and correct the problem before restarting. The operating temperature of the unit housing should normally not exceed 180°F.

TROUBLE SHOOTING

Operating Temperature
These gear drives are designed for a 100°F rise in temperature over the ambient temperature, but not to exceed 180°F. If the unit is operated in the sun at ambient temperatures exceeding a "hot" running unit, takes periodic measurements over a twenty-four hour period.

Noisy Unit
By nature, all gear units produce some kind of noise in operation, either a low pitch rumble or a high whine from the high speed mesh. Learn to distinguish between normal gear noise and symptomatic noises that could mean lack of oil, bearing trouble, or misalignment. Remember that sound is often amplified by the type of mounting or can be induced y coupled apparatus. A new gear unit may be initially noisy and then quiet down after a reasonable period of service; normal were has taken place, and teeth have established a well defined run-in-pattern. Other subtle changes can take place resulting in smoother, quieter operation. Always record changes in noise patterns of levels, as well as temperature changes.

Problem	Potential Causes
Excessive operating temperature	1, 2, 3, 4, 5, 6, 7, 9, 12, 18, 21, 22, 23
Oil leakage	1, 2, 3, 4, 5, 7, 9, 12, 13, 18, 19, 20, 22, 23
Gear wear	1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12,13, 14, 15, 16, 18, 20, 22, 23
Bearing failure	1, 2, 3, 4, 6, 7, 9, 10, 11, 12,13, 15, 16, 17, 18, 19, 20
Shaft failure	1, 6, 7, 8, 9, 10, 11, 12, 15, 16, 20, 21, 23
Excessive noise	1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12,13, 15, 16, 17, 21, 22, 23

Potential Cause	Action
1. Unit overload	Reduce the loading.
2. Incorrect Oil Level	Verify that the oil level is correct. Too little or too much oil can cause high temperature.
3. Wrong Oil Grade	Use only the AGMA grade oil as specified for the unit size and ambient temperature.
4. Contaminated oil	If oil is oxidized, dirty, or has high sludge content, change the oil.
5. Clogged breather	Clean breather regularly.
6. Improper bearing Adjustment	Too few or too many shims cause incorrect bearing clearance. Contact the factory for correct end play, checking technique, and tolerance. Shafts should turn freely when disconnected from the load.
7. Improper coupling alignment	Disconnect couplings, check spacing between shafts, and check alignment. Realign as required.
8. Incorrect coupling	Rigid couplings can cause shaft failure. Replace with a coupling that provides flexibility and lateral play.
9. Excessive operating speed	Reduce the speed.
10. Torsional or lateral vibrations	Vibration can occur through a particular speed range known as the critical speed. Contact the factory for specific recommendations.
11. Extreme repetitive shocks	Apply couplings capable of absorbing shocks.
12. Improper lubrication of bearings	Verify that all bearings are receiving adequate amounts of lubricating oil, or grease.
13. Improper storage or prolonged shutdown	Destructive rusting of bearings and gears will be caused by storage or prolonged shutdown in moist ambient temperatures. If rust is found, unit must be disassembled, inspected and repaired.
14. Excessive backlash	Contact factory.
15. Misalignment of gears	Contact pattern to be a minimum of 75% of face.
16. Housing twisted or distorted	Verify proper shimming or stiffness of the foundation.
17. Gear tooth wear	Contact factory.
18. Open drains	Tighten drain plugs.
19. Worn oil seals	Check oil seals and replace if worn.
20. Loosely bolted covers	Check all bolted joints and tighten if necessary.
21. Motor related	Verify actual operating conditions are consistent with motor nameplate.
22. Excessive ambient temperature	Shield unit from direct sunlight, and maintain proper air flow around the gear unit.
23. Excessive overhung load	Move the pulley or sprocket closer to the housing. Check for excessive tension in belts or chains.

RENEWAL PARTS

This parts list provides information organized by unit. A cut-a-way view of the gear unit is shown with the parts individually identified by item number and description. Refer to the assembly drawings provided with your gear unit for more detailed information, including part numbers.

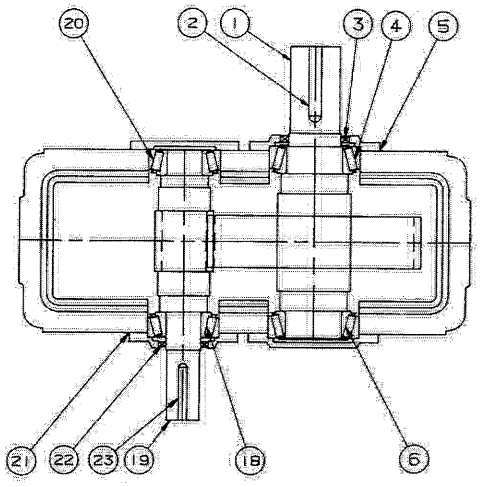
Instructions

In order to obtain renewal parts for your gear unit:

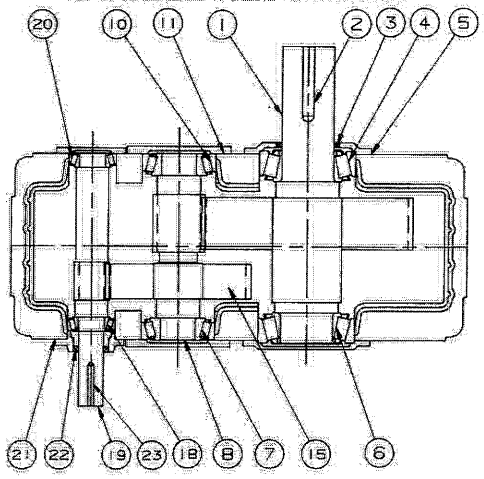
1. Determine Type of Gear Unit (Parallel Shaft or Right Angle) and number of reductions (Single, Double, Triple, Quadruple).
2. Record all of the information off of the gear unit nameplate (refer to the illustration at the right).
3. Refer to the correct illustrations and/or assembly drawing for the description and part number of the required parts.
4. To order parts, contact your nearest Nuttall Gear Sales Office with the information you have assembled.

Parts Identification Parallel Shaft Reducers

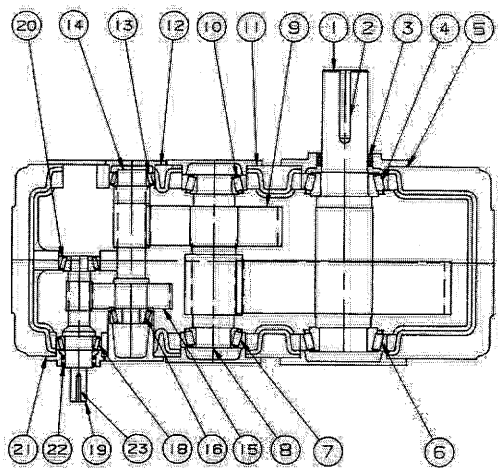
SINGLE REDUCTION



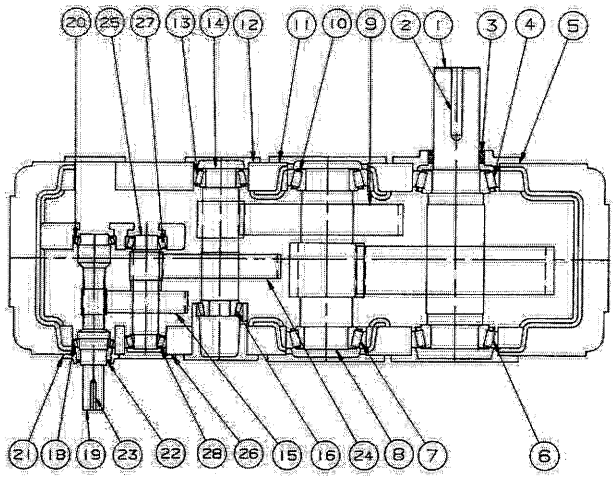
DOUBLE REDUCTION



TRIPLE REDUCTION



QUADRUPLE REDUCTION

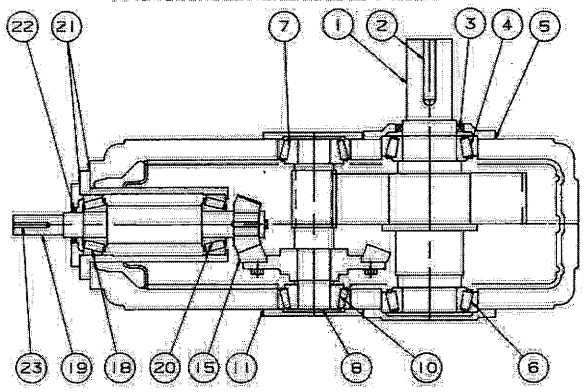


No.	Description
	A. LOW SPEED COMPONENTS
	Low Speed Gear Set Includes:
1	L.S. Gear and Shaft Assembly (Incl. No. 2)
2	L.S. Key
8	L.S. Pinion Shaft
	Low Speed Bearing Set Includes
4	L.S. Shaft Bearing (outer)
5	L.S. Shaft Bearing Shims
6	L.S. Shaft Bearing (inner)
	Low Speed Pinion Shaft Bearing Set Includes:
7	L.S. Pinion Shaft Bearing
10	L.S. Pinion Shaft Bearing
11	L.S. Pinion Shaft Bearing Shims
	B. INTERMEDIATE SPEED COMPONENTS
	B1. (TRIPLE AND QUADRUPLE)
	Intermediate Gear Set Includes:
9	Intermediate Gear
14	Intermediate Pinion Shaft
	Intermediate Bearing Set Includes:
12	Intermediate Pinion Shaft Bearing Shims
13	Intermediate Pinion Shaft Bearing
16	Intermediate Pinion Shaft Bearing

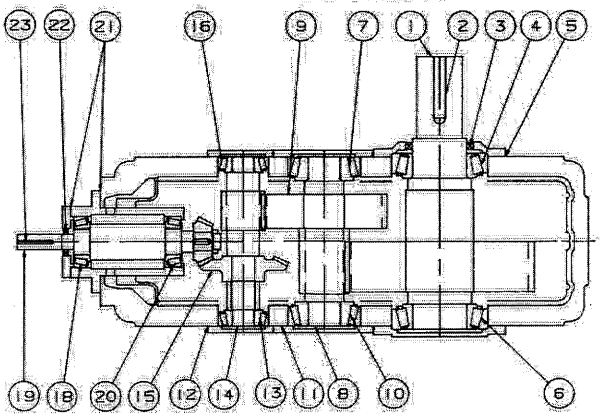
No.	Description
	B2. (QUADRUPLE ONLY)
	Intermediate Gear Set Includes:
24	Intermediate Gear
25	Intermediate Pinion Shaft
	Intermediate Bearing Set Includes:
26	Intermediate Pinion Shaft Bearing Shims
27	Intermediate Pinion Shaft Bearing
28	Intermediate Pinion Shaft Bearing
	C. HIGH SPEED COMPONENTS
	High Speed Gear Set Includes:
15	H.S. Gear
19	H.S. Pinion Shaft
23	H.S. Pinion Shaft Key
	High Speed Pinion Shaft Bearing Set Includes:
18	H.S. Pinion Shaft Bearing (outer)
20	H.S. Pinion Shaft Bearing (inner)
21	H.S. Pinion Shaft Bearing Shims
	D. OIL SEALS Include:
3	L.S. Shaft Oil Seal
22	H.S. Shaft Oil Seal

Parts Identification For Right Angle Shaft Reducers

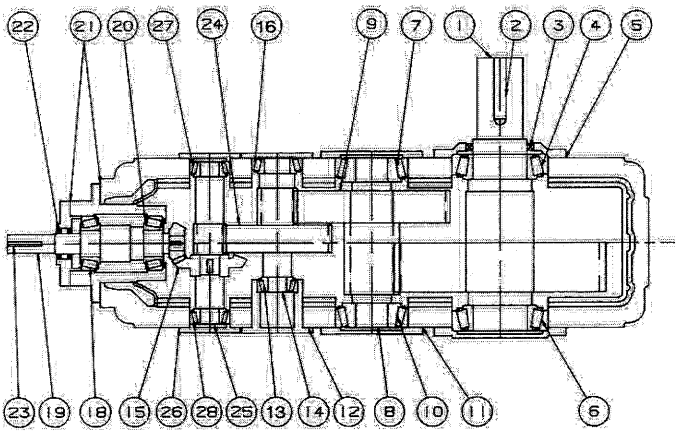
DOUBLE REDUCTION



TRIPLE REDUCTION



QUADRUPLE REDUCTION



Item No.	Part Description
	A. LOW SPEED COMPONENTS
	Low Speed Gear Set Includes:
1	L.S. Gear and Shaft Assembly (Incl. No. 2)
2	L.S. Key
8	L.S. Pinion Shaft
	Low Speed Bearing Set Includes
4	L.S. Shaft Bearing (outer)
5	L.S. Shaft Bearing Shims
6	L.S. Shaft Bearing (inner)
	Low Speed Pinion Shaft Bearing Set Includes:
7	L.S. Pinion Shaft Bearing
10	L.S. Pinion Shaft Bearing
11	L.S. Pinion Shaft Bearing Shims
	B. INTERMEDIATE SPEED COMPONENTS
	B1. (TRIPLE AND QUADRUPLE)
	Intermediate Gear Set Includes:
9	Intermediate Gear
14	Intermediate Pinion Shaft
	Intermediate Bearing Set Includes:
12	Intermediate Pinion Shaft Bearing Shims
13	Intermediate Pinion Shaft Bearing
16	Intermediate Pinion Shaft Bearing
	B2. (QUADRUPLE ONLY)
	Intermediate Gear Set Includes:
24	Intermediate Gear
25	Intermediate Pinion Shaft
	Intermediate Bearing Set Includes:
26	Intermediate Pinion Shaft Bearing Shims
27	Intermediate Pinion Shaft Bearing
28	Intermediate Pinion Shaft Bearing
	C. HIGH SPEED COMPONENTS
	High Speed Gear Set Includes:
15	H.S. Gear Set (Spiral-Bevel)
19	H.S. Shaft (Not Including Gear)
23	H.S. Shaft Key
	High Speed Pinion Shaft Bearing Set Includes:
18	H.S. Pinion Shaft Bearing (outer)
20	H.S. Pinion Shaft Bearing (inner)
21	H.S. Pinion Shaft Bearing Shims
	D. OIL SEALS Include:
3	L.S. Shaft Oil Seal
22	H.S. Shaft Oil Seal

ASSEMBLY & DISASSEMBLY

The following instructions apply to standard TDS parallel shaft units only. For right angle units see supplemental instructions on page 14.

Speed Or Ratio Change
When either speed or ratio is required to be changed, Nuttall Gear should be consulted for rating data and/or design considerations, and a new nameplate.

Required Equipment
In addition to standard mechanic's tools, the following equipment is required: hoist, sling, bearing/wheel puller, torque wrench, feeler gauges and dial indicator(s).

General Instructions
Clean external surfaces of reducer before removing cover to prevent dirt and debris from falling into the unit. Record mounting dimensions and location of accessories for reference when reassembling. To remove reducer from it operating area, disconnect all connected equipment and lift reducer from its foundation by means of the lifting lugs. Before removing oil seals from end caps, record location of seal lips for use as a reference when replacing seals.

Cover Removal
1. Drain oil and remove the dipstick.
2. Remove housing cover fasteners and all fasteners **ABOVE** housing split that hold end covers to housing cover. Loosen fasteners below housing split three or four turns. **DO NOT** remove these for they hold outer bearing races in position.
3. Tighten nuts on dowel pins and lift out all dowels. Dowel pins are located at each end of gear unit above the split line.
4. Attach hoist to cover and lift **STRAIGHT UP. TAKE CARE NOT BUMP OR DAMAGE GEAR TEETH.**

Removal Of Gear And Shaft Assemblies
1. Complete the following procedure for each shaft assembly. Start with the high speed shaft and work through to the low speed shaft.
   a. Place sling around shaft assembly and take up the slack just enough to take the weight off the bearings.
   b. Remove balance of fasteners, end covers, and outer bearing races.
   c. Lift shaft assembly straight up out of base. **DO NOT DAMAGE GEAR TEETH.**
2. **EXCEPTIONS TO STEP 1 ABOVE**
   a. The intermediate pinion shaft/gear assembly, item 14, is the last to be removed from a triple or quadruple reduction unit.
   b. After attaching sling, remove fasteners, end cover, bearing cartridge and one outer bearing race. The other outer bearing race will come out with the cartridge. Carefully move assembly into pinion side of bearing bore, then lift out at an angle.
   c. When disassembling a quadruple reduction parallel shaft gear unit, the high speed pinion shaft must be removed before removing the top half of the housing. Remove oil dam from upper pedestal bearing bore. Remove high speed end cap from housing and slide high speed pinion shaft out through bearing bore.

Preparation
1. Housing cover and base: Remove sealing compound from housing split line. Clean oil troughs, oil passages and oil sump with a suitable solvent.
2. Endcaps and bearing cartridges: Remove sealing compound from all end caps and bearing cartridges. Remove oil seals from end caps. Clean parts with a suitable solvent.
3. Oil seals: Refer to general instructions above before removing and installing oil seals.

CAUTION: New seals will leak if seal lips are cut or if a seal's rubbing surface on the shaft has been altered. Protect seal lips at all times. Clean the shaft, but do not use any abrasive material on rubbing surface polished by the seal.

4. Bearings: Bearing re-use is not recommended, however, if bearings are to be reused, wash in clean kerosene or suitable solvent and then dry. Do not spin bearings for they may score due to lack of lubricant. Inspect bearings carefully and replace those that are worn or questionable. Use a bearing puller or press to remove bearings. Apply force to the inner race only, not the bearing cage.
5. Gears, pinions and shafts: Whenever possible, it is recommended that gears and pinions always be replaced as a set. It is also recommended that gear and shaft or gear and pinion assemblies be replaced as factory supplied assemblies.
6. Check to insure that all parts are cleaned and all preservatives have been removed from gears and bearings.

Reducer Assembly
1. Bearings: To install bearings, heat in an oil bath or oven to a maximum of 300°F and slide or press on to shaft tight against shaft shoulder. When heating bearings, do not apply flame directly to bearings or rest bearings on bottom of heated container. Check bearing inner race for position against shaft shoulders with feeler gauge after bearings have cooled. When installing outer bearing race into a bearing cartridge, check with feeler gauge for position of race against cartridge shoulder.
2. Coat bearings with a light coating of grease and install gears, pinions, and shafts into lower housing in reverse order of removal, along with their respective end caps or cartridges and a new shim pack for each shaft. Do not tighten fasteners at this time unless a cartridge is used. If a bearing cartridge is used, seal with RTV sealer when installing. **NOTE: Whenever possible, place all shim packs on the same side of the gear unit. However, do not place shims under a bearing cartridge.**
3. Use a thin wire to hold upper portion of shims to their respective end covers to avoid damage to them when installing cover.
4. Place a 3/32"—1/8" bead of RTV sealer on split of lower housing. Do not deposit excessive quantities near bearings.
5. Carefully lower cover on to the base using caution not to bump gear teeth.
6. Position cover properly and drive in dowel pins.
7. Remove wire from shims, install remaining split line fasteners and tighten to torques specified on page 22.

Bearing End Play
Nuttall gear must be contacted for bearing end play tolerances for units manufactured prior to 1997. Units manufactured after 1997 normally have a nameplate mounted on the unit listing all end play tolerances. If operation conditions vary from the unit nameplate, for instance, speed, horsepower, etc., contact Nuttall Gear for revised end play tolerances.
CAUTION: Extreme accuracy must be maintained when setting end play. If end play is set too tight, premature bearing failure can result. If end play is set too loose, end loading of the gear teeth will result and cause premature gear failure. Bearing outer races must be kept tight up against their respective end caps when adjusting end play.

Bearing End Play Adjustment
1. Tip gear unit on its side keeping the machined surface level to the floor, with shim side up. Loosen fasteners on upper end cap approximately 1/8" and loosen lower end cap until it drops approximately 1/8". DO NOT REMOVE OR LOWER A BEARING CARTRIDGE. Tap on shaft so the lower outer bearing race will drop against the lower end cap. THIS STEP IS NOT NECESSARY WHEN LOWER CAP IS A BEARING CARTRIDGE. If shaft will not drop, cover fasteners must be

loosened on either side of bearing which will then allow the shaft to drop against the end cap. With the weight of the shaft resting on the end cap, draw the end cap up evenly per the bolt-tightening sketch on page 12. This will ensure that the outer bearing race is in contact with the lower end cap. If cover fasteners were loosened, retighten lower fasteners at this time.

2. Using the threaded hole in the lower end cap and a hydraulic jack, raise shafts until upper end cap moves up approximately 1/8". Tighten upper end cap fasteners evenly per the bolt-tightening sketch on page 12 with jack pressure still applied. This will ensure that the upper bearing race is in contact with the upper end cap. If cover fasteners were loosened, retighten upper fasteners at this time. Release jack pressure after fasteners are tightened.
3. Rotate shaft back and forth and tap down to properly position bearing rollers. Place dial indicator on top of shaft or through the threaded hole in upper end cap and raise shaft with a hydraulic jack until housing just begins to lift.
4. Record end play and release jack pressure. Rotate shaft back and forth until indicator returns to zero at the SAME POINT the reading was taken. Repeat step 3 until readings repeat at least three times.
5. Adjust shim pack to obtain required end play (remove shims to decrease end play and add shims to increase end play) and repeat steps 3 and 4 for verification,
6. Repeat steps 1 thru 5 for remaining shafts that extend the full width of the gear box.
7. On short shafts such as high speed shafts which extend only to the center pedestal, tip gear unit on its side with short shaft up. Tap shaft down to seat lower outer bearing race against the shoulder. Loosen end cap fasteners and place a clam onto the shaft. Use a crane or hoist and lift shaft upward to raise upper outer bearing race. If shaft will not raise, cover fasteners must be loosened. Follow steps 3 thru 5 to adjust end play except use a hoist or crane when lifting shaft.
8. Remove all end caps and shims (do not remove bearing cartridges). Use caution not to alter shim pack at this time. Apply 3/32" to 1/8" bead of RTV to all end caps and reinstall with appropriate shim pack.
   IMPORTANT: During assembly, position all end caps with the end cap oil slots in line and below the oil troughs in the lower housing to permit proper circulation of lubricant.

Oil Seal Installation

1. Coat outer diameter of seal with Permatex and seal lips with grease prior to assembly into unit.
   CAUTION: Protect seal lips from sharp edges of keyway by wrapping a thin, strong paper around the shaft and coating it with grease before sliding seal into position. Do not expand the diameter of the seal lips more than 1/32".
2. When double seals are used, they must be installed into the end cap prior to installing the end cap onto the gear unit. Pack the area between the two seals with grease.

Reducer Installation

1. Reinstall all exterior accessories.
2. Reinstall reducer.
3. Fill reducer with oil to the indicated oil level.

SUPPLEMENTAL INSTRUCTIONS FOR RIGHT ANGLE DRIVES

Disassembly Of Right Angle Gear Units

1. Remove the cartridge mounting bolts from the cartridge flange above split line.
2. Loosen, but do not remove, the cartridge mounting bolts from the cartridge flange below the split line. Back these bolts out 1/8 to 1/4 inch.
3. Using the two threaded holes in the cartridge flange, jack the cartridge away from the gear housing to permit removal of the upper housing.
4. To remove the upper housing, follow the disassembly instructions for standard TDS units.
5. After the upper housing has been removed, the remaining cartridge mounting bolts may be removed and the cartridge removed from the gear unit.
6. To remove the remaining shafts follow the disassembly instructions for standard TDS gear units.

NOTE: The right angle cartridge must be assembled, bearing end play set, and the correct positioning of the high speed pinion must be completed before the reducer can be assembled.

Cartridge Assembly

1. Install inner bearing races as described under "Reducer Assembly".
2. Place right angle cartridge on a suitable bench in a vertical position.
3. Press lower outer bearing race into the right angle cartridge. Check with feeler gauge for position of race against cartridge shoulder.
4. Lightly coat bearings with grease and install high speed shaft into cartridge.
5. Press upper outer bearing race into the cartridge. Do not bottom the race against bearing rollers.
6. Install the high speed end cap and a full shim pack and tighten bolts evenly to draw the bearing race into the cartridge and still remain in full contact with the end cap.
7. When a third bearing is required, turn the cartridge over and mount this bearing before adjusting the end play.
8. To adjust end play, use a dial indicator as described in 3, 4 and 5 under "Bearing End Play Adjustment" except a hydraulic jack is not needed to lift the shaft.

Bevel Pinion Assembly

1. Record the mounting dimension (M.D.) and backlash which is stamped on the bevel pinion.
2. Refer to figure 1 and measure the "A" dimension of the gear case (+/- .002"). This is the dimension from the machined end of the gear case to the centerline of the bearing bore.
3. If it is a small pinion as shown in figure 2, measure the "B" dimension between the right angle flange and the high speed shaft shoulder. If it is a larger bevel pinions as shown in figure 3, measure the "B" dimension between the right angle cartridge and the bevel pinion hub shoulder.
4. Subtract the "B" dimension from the "A" dimension to obtain the "T" dimension. The "T" dimension is the distance from the bearing centerline to the high speed shaft shoulder or the pinion hub shoulder, whichever applies.
5. Using the formula S=MD-T, determine the required value of shims to be placed between the right angle cartridge and the gear case as shown in figure 4. "S" equals the correct amount of shims required. When installing the right angle cartridge into the gear case using the previously determined shims, the bevel pinion will be in the correct mounting position.
6. The bevel pinion may now be shrunk onto the high speed shaft, using caution not to heat the pinion above 275 degrees F.

Bevel Gear Assembly And Backlash Adjustment

Proper end play setting of the bevel gear shaft bearings must be completed before the right angle cartridge is installed and the backlash set.

1. The end play on this shaft can be set with the upper housing removed. Install the bevel gear shaft into the lower housing placing a full shim-pack on the side of the gear unit that the bevel gear is mounted on. To adjust end play, mount a dial indicator and record axial movement of the shaft. Care should be exercised be exercised that the outer bearing races are tightly seated against the bearing caps. To reduce end play, remove shims, and to increase end play, add shims.
2. After the bevel gear shaft end play has been set, install the assembled right angle cartridge and the correct shims into the lower housing. When installing the right angle cartridge into the lower housing, match marks on the bevel gear and bevel

pinion must be lined up. Backlash must now be adjusted as follows:

a. To adjust backlash, shim (on the bevel gear shaft) must be moved from one side of the gear case to the other until proper backlash is achieved.
b. When shims are added to one side, the shaft must be tapped in that direction to move the bearing race up against the end cap.

NOTE: Once end play has been established, moving shims from one side to another will not alter the end play as long as the combined size of the shim pack remains the same.

3. After backlash has been set, install the remaining parallel shafts, and upper housing (right angle cartridge must be backed out far enough to permit installation of the upper housing). Seal the housing split and the right angle cartridge flange with RTV sealer. When drawing the cartridge into final position after the upper housing has been installed, check that the match marks on the bevel gear set are still aligned.

Follow the assembly instructions for standard TDS gear units to assemble and adjust the remaining shafts.

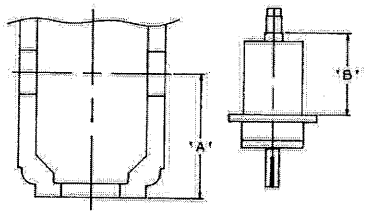


Figure 1


Figure 2


Figure 3

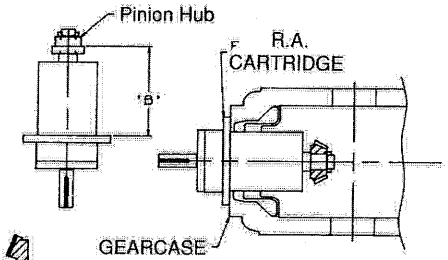
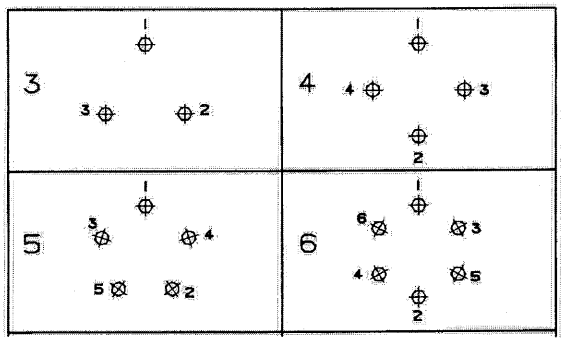
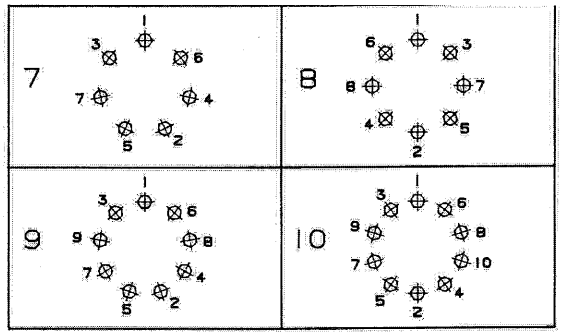


Figure 4

FASTENERS

Fastener Tightening Sequence





Grade 5 Fastener Tightening Torques

The following torque values are to be used for end covers, seal cages, shaft guards, inspection covers, and housing split line bolts, unless otherwise specified on the drawing or assembly instructions. Torque values for lubricated fasteners are to be used when fasteners are coated with thread locking compounds.

Diameter UNC	Dry Fastener (foot-lbs) Min.	Max.	Lubricated Fastener (foot-lbs) Min.	Max.
1/4	7	8	4	5
5/16	14	17	8	10
3/8	25	31	15	19
7/16	40	49	24	30
1/2	60	75	36	45
9/16	87	109	52	65
5/8	120	150	72	90
3/4	213	266	128	160
7/8	344	430	206	258
1	515	644	309	386
1-1/8	635	794	381	476
1-1/4	896	1,120	538	672
1-3/8	1,175	1,469	705	881
1-1/2	1,560	1,949	936	1,170
1-3/4	1,829	2,286	1,097	1,372
2	2,750	3,438	1,650	2,063
2-1/4	4,022	5,027	2,413	3,016
2-1/2	5,500	6,875	3,300	4,125
2-3/4	7,457	9,321	4,474	5,592

OIL CAPACITY

Approximate Oil Capacity in U.S. Gallons for Standard Floor Mounted Horizontal Units.

Unit Size	Single Reduction All Ratios	Double Reduction 21:1 Ratio	Double Reduction 6:1 Ratio	Triple Reduction All Ratios	Quad Reduction All Ratios
7	1.9	5.3	3.9	4.1	5.3
8	4.0	9.5	7.1	7.3	9.5
9	2.9	8.7	5.8	6.1	8.7
11	3.3	20	14	14	20
12	3.7	24	16	17	24
13	6.4	29	19	20	29
15	5.6	38	27	28	38
16	11	52	36	38	52
18	8	64	46	48	64
20	10	87	63	66	87
22	15	107	82	84	107
25	19	144	105	109	144
28	25	201	141	146	201
30	33	251	184	189	251
32	-	212	157	164	212
34	-	223	165	172	223
36	-	260	180	191	260
38	-	317	228	240	317
40	-	410	310	324	410

NOTE: For single and double reduction units the approximate oil capacity is normally inversely proportional to the gear ratio, but may vary in individual situations. All values are approximate. Refer to the drawings supplied with the gear unit for a more precise estimate. Always fill the unit to the level marked on the gear unit itself. Do not overfill.

WEIGHT

Approximate Unit Weight in Pounds

	Parallel Shaft				Right Angle		
Unit Size	Single	Double	Triple	Quad	Double	Triple	Quad
7	500	550	600	650	600	650	700
8	750	900	950	1,000	950	1,000	1,050
9	850	1,000	1,100	1,200	1,100	1,200	1,300
11	1,400	1,750	1,850	1,950	1,850	1,950	2,050
12	1,900	2,450	2,550	2,650	2,550	2,650	2,750
13	2,750	2,900	3,050	3,200	3,050	3,200	3,350
15	2,750	3,450	3,550	3,700	3,550	3,700	3,850
16	4,850	4,850	5,000	5,150	5,000	5,150	5,300
18	4,650	5,650	5,850	5,050	5,850	6,050	6,250
20	4,900	5,900	6,1,00	6,300	6,100	6,300	6,500
22	5,500	7,000	7,250	7,500	7,250	7,500	7,750
25	5,950	8,450	8,750	9,050	8,750	9,050	9,350
28	9,400	9,900	10,250	10,600	10,250	10,600	10,950
30	11,300	12,800	13,150	13,500	13,150	13,500	13,850
32	-	18,400	18,850	19,200	18,850	19,200	19,600
34	-	21,650	22,050	22,450	22,050	22,450	22,850
36	-	25,600	26,050	26,500	26,050	26,500	26,950
38	-	30,000	30,450	30,900	30,450	30,900	31,350
40	-	35,600	36,100	36,600	36,100	36,600	37,100

NOTES

SERVICE DIVISION

YOUR TOTAL DRIVE SOURCE

Your business depends upon the continued operation of your rotating machinery. The quality of service you receive in maintaining your gear drives combined with a quality product, will determine the degree of success you achieve. Nuttall Gear specializes in providing you with both. The Service Division of Nuttall Gear has comprehensive services designed to keep your rotating machinery in operation. Whether you need a unit repaired or rebuilt, ratio changed or unit upgraded, training, preventive maintenance, or drive train analyzed, Nuttall Gear can offer you the solution for any manufacturer's gear drive. Our extensive experience in gear drive applications, combined with the total manufacturing and design capabilities of Nuttall Gear enable us to provide you with a single, comprehensive source for improving your productivity.

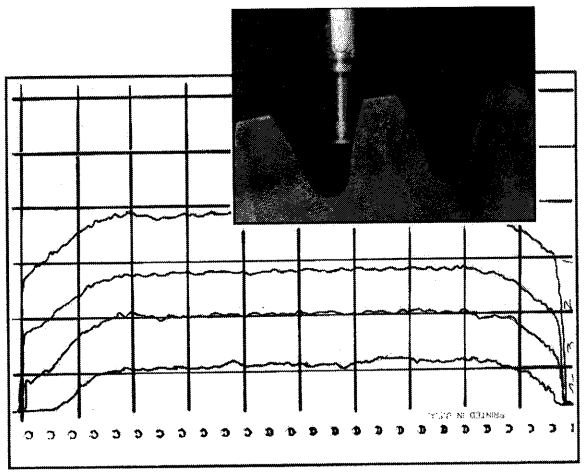
Nuttall Gear is your TOTAL DRIVE SOURCE for equipment and services. TDS is more than a catchy phrase. It means a commitment to quality and excellence in everything we do. In addition to our extensive service capabilities, we specialize in providing complete mechanical and electrical packaged component assemblies. We can also custom design and manufacture units to your unique requirements, utilizing our extensive expertise in designing gear drives for a wide variety of applications.

OUR SERVICE DIVISION CAPABILITIES INCLUDE...

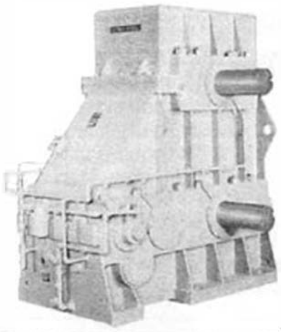
- **Repair and Rebuild (of almost any manufacturer's unit)**
  - Gear Refinishing
  - Shaft Repair
  - Rebabbitting Sleeve Bearings
  - Cast Iron and Welded Housing Repair
  - Complete Nondestructive Testing
  - Complete Unit Assembly and Testing
- **Redesign and Rerate**
  - Ratio Change
  - Increased Mechanical and Thermal Ratings
  - Complete Redesign
- **Field Service**
  - Installation
  - On-Site Rebuild
  - Trouble Shooting
  - Mechanical Alignment
- **System Analysis**
  - Vibration and Sound
  - Torsional System Study
  - Lubrication
  - Metallurgical
- **On-Site Seminars**
  - Preventive Maintenance
  - Assembly and Rebuild

QUALITY ASSURANCE

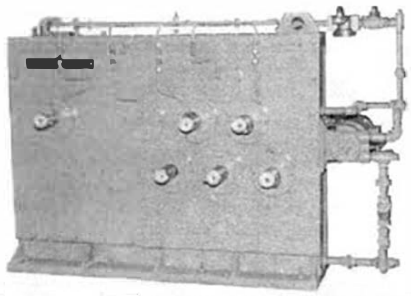
From inspection and teardown to reassembly and complete unit testing, each step is planned and executed within the requirements of our Quality Assurance Program. Our program was designed to meet the strict requirements of the Nuclear Industry, as well as the world recognized standards established by ISO 9001-2000. Documented traceability for materials, processes, and testing is part of the Quality Assurance Program that applies to all service work.



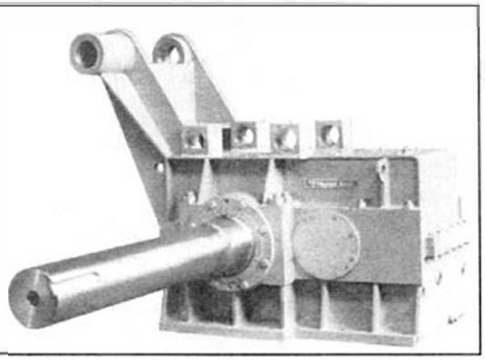
Total Commitment To Your Needs Drives Us....
Our Commitment Keeps You Driving.



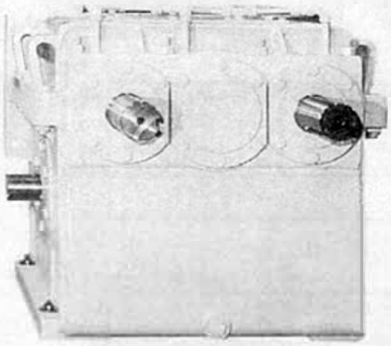
Combination Reducer/ Pinion Stands are available in ratings up to 14000 HP and output speeds down to 1.7 RPM and in ratios up to 357:1.

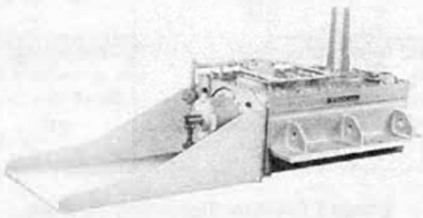


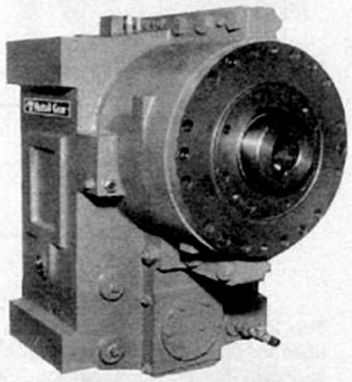
Combination Reducer Levelers & Flatteners are available in ratings up to 300 HP and output speeds down to 2.4 RPM and in ratios up to 357:1.



Reel Units are available in single and multiple speed designs, in ratings up to 14000 HP and output speeds down to 2.4 RPM and in ratios up to 357:1.



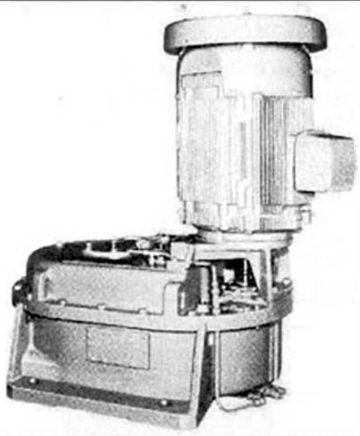


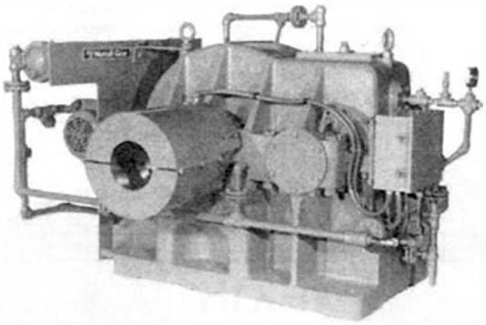


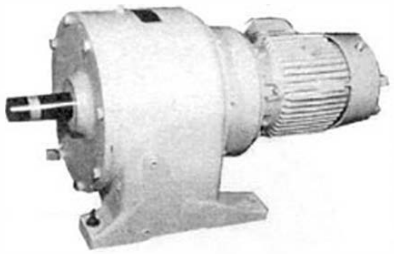
Custom Engineered Drives are available in ratings up to 6,000,000 inch pounds of torque, designed for specific customer and/or application requirements.

Type DRV, TRV, QRV Right Angle Vertical Reducers are available in ratings up to 9000 HP and output speeds down to 2.4 RPM and in ratios up to 238:1.

DHE, DVE Extruder Drives are available in horizontal and vertical mountings, in ratings up to 3000 HP and output speeds down to 55 RPM and in ratios up to 21:1.







Veri-Dri, Vertical Reducers are available in ratings up to 14000 HP and output speeds down to 1.7 RPM and in ratios up to 357:1.

Type SU Speed Increasers and SD Speed Reducers are available in ratings up to 15000 HP and output speeds up to 15000 RPM and in ratios up to 9:1.

Type R, G, & U Concentric Shaft Reducers and Integral and Scoop Mount Gearmotors are available in ratings up to 200 HP and output speeds down to 1.5 RPM and in ratios up to 985:1.

NUTTALL GEAR™

A REGAL REXNORD BRAND

MEMBER OF AGMA

N70105; 5/06

Nuttall Gear Facilities

North America

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Worm Gear and
Helical Speed Reducers

Scan to see all the brands of Regal Rexnord

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