

In-Line Speed Reducers

Type R

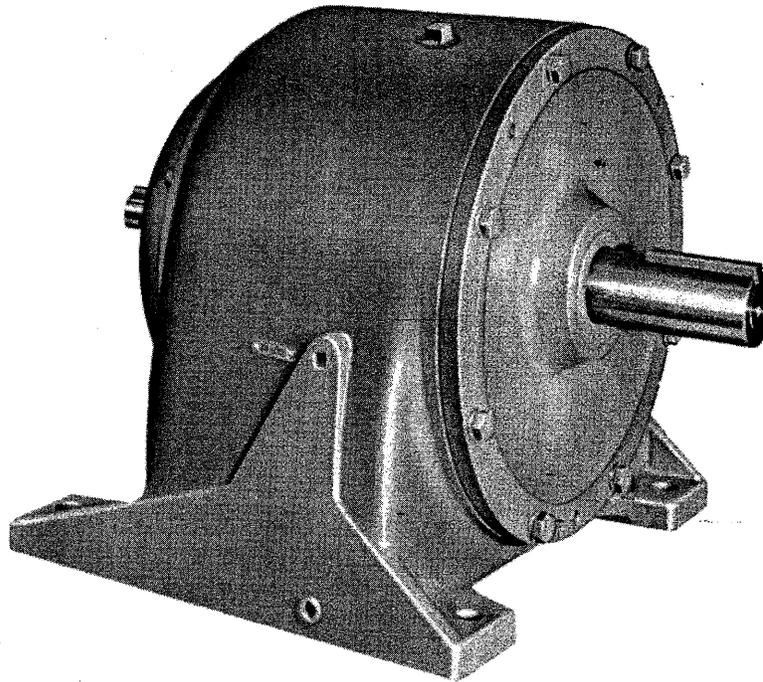
Moduline®

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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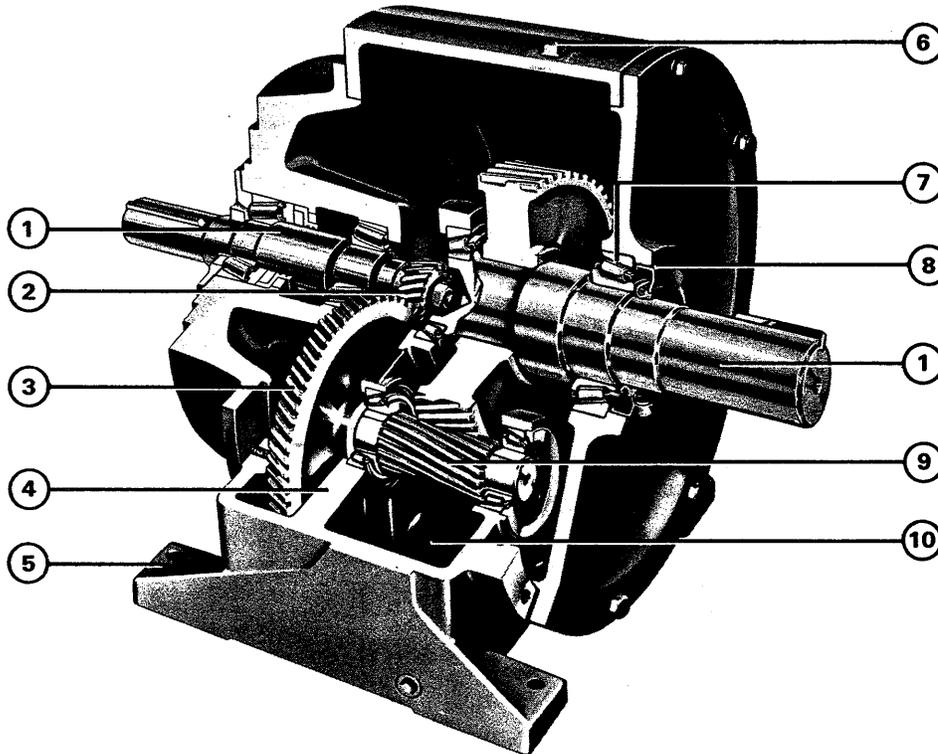
Effective: 1, August 1984

Supersedes: New

In-Line Speed Reducers

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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 hobs, 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 quadruple 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.

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1. REQUIRED APPLICATION INFORMATION

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

2. SELECTION PROCEDURE

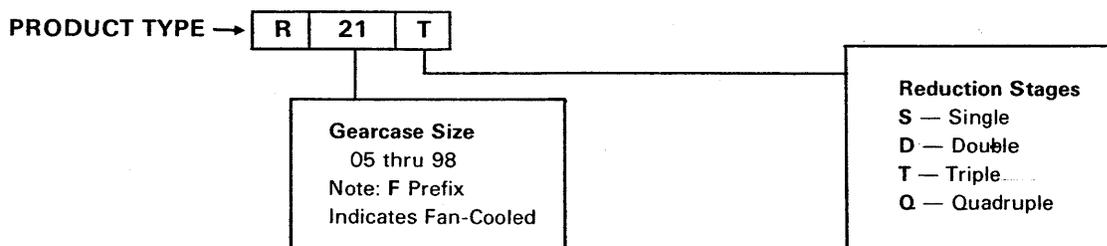
- Use rating and pricing Section 250, pages 4 thru 19. Find desired input speed in rating charts. Use either desired output speed or nominal gear ratio column. Read across page to either torque or horsepower rating which exceeds the equivalent horsepower or torque that is required. The top of the column shows the size and type of reducer to use, the line below the case designation indicates the list price of that unit.
- 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.

- 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:
 - Use a fan cooled unit designated with an F prefix (if available);
 - Use a larger standard unit with adequate thermal capacity; or
 - Contact the Nuttall office for price and availability of externally cooled units.
- Check overhung load and thrust load requirements (if any) against the ratings for the units listed in Section 257, pages 2, 3.
- 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

- Actual HP required 27
- AGMA Service Factor 1.75 (Sect. 257, pg. 4,5)
- Equivalent HP: $27 \times 1.75 = 47.25\text{HP}$
- Input 1750, output 420
- 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.
- 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

- 1750 base speed electric motor
- Required torque 20,000 inch pounds.
- AGMA service factor 1.25.
- Equivalent torque $20,000 \times 1.25 = 25,000$ inch pounds.
- See Section 250, page 5, 37 RPM line: selection is at 54T rated at 27,100 inch pounds.
- 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.

- | | |
|---|---|
| <ol style="list-style-type: none"> Quantity Prime mover, type, HP, speed Reducer size/type designation (R21T) Output RPM AGMA service class Mounting position Description of modifications | <ol style="list-style-type: none"> Overhung load and thrust requirements Pricing: <ol style="list-style-type: none"> List price of unit. Adders for modifications Multiplier Shipment required |
|---|---|

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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													

Effective: 1, August, 1984

Supersedes: New

Your Total Drive Source



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							MECH. HP TORQUE (1000 " #)	985.3	1.8
DISCOUNT N-3													

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

In-Line Speed Reducers

Type R

Moduline®

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 " #)												

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

DISCOUNT N-3



In-Line Speed Reducers

RATINGS/PRICING
1750 INPUT

Moduline®

Type R

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			804 164	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									MECH. HP TORQUE (1000 " #)	985.3	1.8	
				DISCOUNT N-3									

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

Effective: 1, August 1984

Supersedes: New

In-Line Speed Reducers

Type R

Moduline®

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 .9	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							

Effective: 1, August 1984

Supersedes: New

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

Effective: 1, August 1984

Supersedes: New

In-Line Speed Reducers

RATINGS/PRICING
1430 INPUT

Type R

Moduline®

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			190 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 " #)												

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

DISCOUNT N-3

Effective: 1, June 1986

Supersedes: 15, March 1985

Your Total Drive Source 

In-Line Speed Reducers

Module®

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	
		356 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	
		265 106	243 106			420 174	280 174			MECH. HP TORQUE (1000 " #)	9.30	155	
		212 108	212 108			360 177	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				205 182	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									MECH. HP TORQUE (1000 " #)	985.3	1.5	
				DISCOUNT N-3									

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

In-Line Speed Reducers

Type R

Moduline®

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								

Effective: 1, August 1984

Supersedes: New

Your Total Drive Source



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	Shaded boxes indicate a thermal limitation. Please see Thermal Ratings, Section 257 Page 6.					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			2.5 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

Effective: 1, August 1984

Supersedes: New

In-Line Speed Reducers

Type R

Moduline®

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 " #)												

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

DISCOUNT N-3

In-Line Speed Reducers

Type R

Moduline®

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
		287 108	214 106			405 184	220 164			MECH. HP TORQUE (1000 " #)	7.59	155
		212 108	212 108			338 137	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									MECH. HP TORQUE (1000 " #)	985.3	1.2
										DISCOUNT N-3		

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

In-Line Speed Reducers

Type R

Moduline®

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



In-Line Speed Reducers

Moduline®

Type R

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

Effective: 1, August 1984

Supersedes: New

In-Line Speed Reducers

Type R

Moduline®

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 58.6	157 58.5
140	6.20	MECH. HP TORQUE (1000 " #)	72.2 32.8			118 52.7	111 52.7			131 58.4		164 59.0	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 " #)											

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

DISCOUNT N-3

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									MECH. HP TORQUE (1000 " #)	985.3	.9
DISCOUNT N-3												

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

Effective: 1, August 1984

Supersedes: New

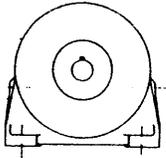
In-Line Speed Reducers

Moduline®

Type R

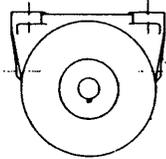
Mounting Positions (viewed from output end.)

Floor Mounted



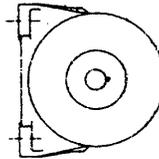
Standard Position F

Ceiling Mounted



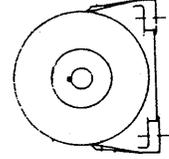
Standard Position C

Left Hand Wall Mounting



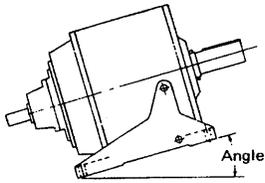
Standard Position W-L

Right Hand Wall Mounting



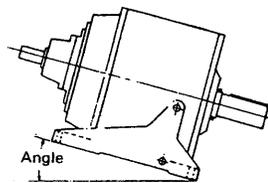
Standard Position W-R

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



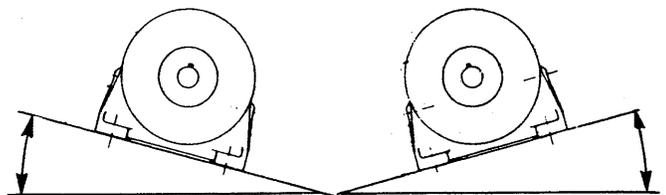
Position F-I

Output shaft up maximum 10 degrees



Position F-D

Output shaft down maximum 15 degrees



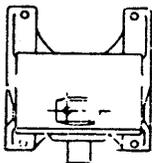
Position F-RR

Position F-RL

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

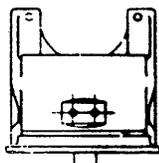
For units mounted as above, please contact Nuttall Gear.

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 •

Moduline®

In-Line Speed Reducers

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 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.										
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										

Effective: 1, March 1985

Supersedes: 1 October 1984

In-Line Speed Reducers

Type R

Moduline®

Gear Case Size	05	10	15/21	32	43	51/54	64	76	85/88	92	98	
<p>13. C—Flange Motor Adaptors are available to accommodate standard NEMA motor mounting, using standard motor flange and shaft dimensions. (includes standard coupling)</p> <p>Motor Frames</p> <p>56/140</p> <p>180</p> <p>210</p> <p>250</p> <p>280</p> <p>320</p> <p>360</p> <p>400</p> <p>440</p> <p>PLEASE REFER TO NUTTALL OFFICE FOR PRICE & AVAILABILITY</p>												
	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	
<p>15. Coupling Guards (High Speed End)</p> <p>A. For use with reducer and motor mounted on bedplate.</p> <p>B. For use with motor mounted on scoop.</p> <p>These coupling guards are designed to meet OSHA standards when used with MODULINE Reducers and Nuttall supplied couplings.</p>	300	300	300	300	320	320	320	360	360	360	360	
	100	100	115	140	155	175	175	190	220	220	240	
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	0.90

Effective: 1, March 1985

Supersedes: 15 July 1984

In-Line Speed Reducers

ENGINEERING DATA
OVERHUNG LOAD, THRUST RATINGS

Type R

Moduline®

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.



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 L_c and L_f 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

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

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

Input Shafts, Allowable Overhung Load Capacities

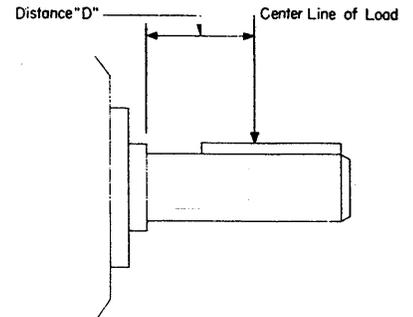
Input Rpm	Unit Size									
	5/10	15/21	32	43	51/54	64	76	85/88	92	98
Single and Double Reduction										
1750	150	200	250	350	500	575	650	650	700	750
1430	160	210	265	370	530	615	700	700	740	800
1170	170	230	290	400	570	655	740	740	800	860
870	185	250	320	430	620	710	800	800	870	930
720	195	260	340	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	200	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

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.

In-Line Speed Reducers Type R

Moduline®

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 1 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 $\pm 25\%$ of average transmitted torque.
- c. When unloaded, the torque variation at the gear mesh does not exceed $\pm 15\%$ 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 ex-

ceeds 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 1/2 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 1/2 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 1/2 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

In-Line Speed Reducers Type R

Moduline®

ENGINEERING DATA
SERVICE CLASSES

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

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

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 overheating. 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.

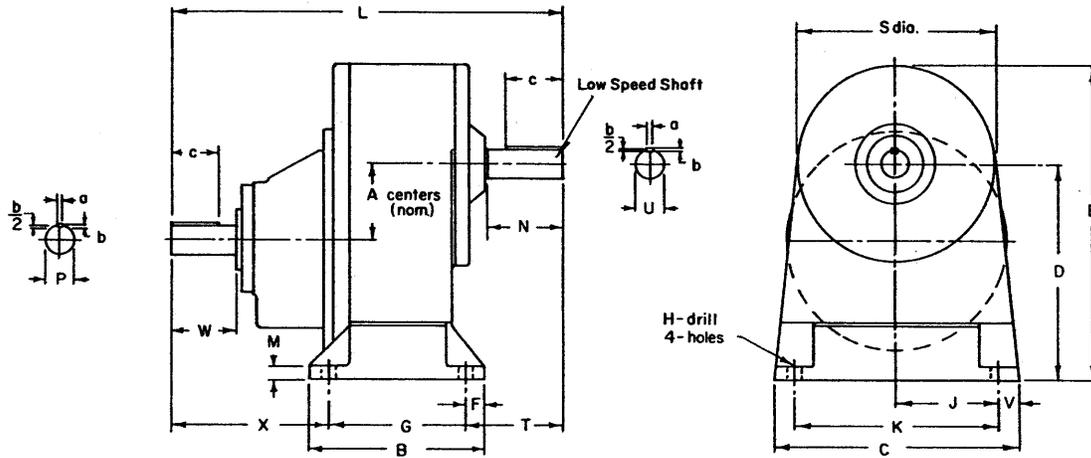
Input Speed	Nominal Gear Ratio	Nominal Output Speed	CASE SIZE AND TYPE															
			54D	64D	76S	76D	F76D	85D	F85D	88D	F88D	92D	F92D	98D	F98D			
1750	1.225	1430																
	1.500	1165																
	1.837	950																
	4.134	420																
	5.06	350	65			87	170			125	240							
	6.20	280	65	76		87	170			125	240							
	7.59	230	66	76		90	174	125	250	127	250			180	300			
	9.30	190	66	77		92	⓪	⓪	⓪	128	253	150	282	180	300			
	11.39	155		77		100	⓪	⓪	⓪	128	⓪	150	284	182	300			
	13.95	125				100	⓪	⓪	⓪	130	⓪	151	286	184	300			
	17.09	100					⓪	⓪	⓪	132	⓪	152	⓪	186	300			
	20.93	84								135		153	⓪	188	⓪			
	25.63	68										155	⓪	188	⓪			
1430	1.225	1170																
	1.500	950																
	4.134	350																
	5.06	280	66			89	139			127	203							
	6.20	230	66	76		92	141	128	205	128	205							
	7.59	190	67	77		100	145	130	208	130	208	150	240	180	280			
	9.30	155		77		100	145	132	⓪	132	211	151	242	181	280			
	11.39	125				101	⓪	⓪	⓪	133	⓪	152	243	183	280			
	13.95	100				104	⓪	⓪	⓪	135	⓪	154	⓪	185	280			
	17.09	84										156	⓪	186	280			
	20.93	68											⓪	188	⓪			
															190	⓪		
	1170	1.225	950															
4.134		280																
5.06		230	67			100	125			128	180							
6.20		190	67	77		100	127	130	182	130	182	152	212	184	220			
7.59		155		78		101	129	132	184	132	184	153	214	186	220			
9.30		125				104	⓪	⓪	⓪	134	188	155	⓪	190	220			
11.39		100								136	⓪	156	⓪	194	220			
870	4.134	210	68			100	109			129	155							
	5.06	175				102	110			131	157							
	6.20	140		78		106	111			133	159	154	⓪	184	200			
	7.59	115								135	⓪	155	⓪	186	200			
	9.30	95										156	⓪	190	200			
	11.39	77											⓪	194	200			

⓪ 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.

In-Line Speed Reducers

Moduline®

Type R



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

Unit Size	U ^①	Key			A	B	C	D ^②	E	F	G	H	J	K	L	M	N
		a	b	c													
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	P ^①	Key			S	T	V	W	X	Approx. Wt. Lbs
		a	b	c						
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.			
Motor Rpm				Item No.			
Output Rpm		Service Factor		Service Hp		Gear Ratio	
Application				Signed			
				Date			

Effective: 1, August 1984

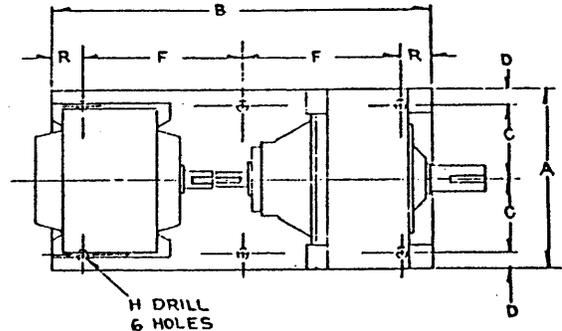
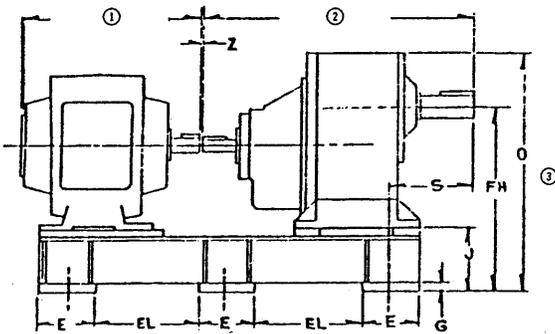
Supersedes: New

In-Line Speed Reducers

Type R

Moduline®

DIMENSIONS
BEDPLATES



NOTES:

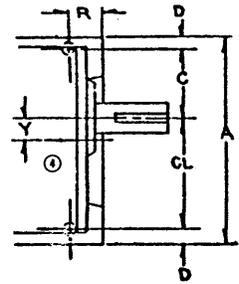
- ① = See motor dimension sheet
- ② = See speed reducer dimension sheet
- ③ = This dimension will never be exceeded. When exact dimension is required, shims up to .125 inches may be necessary.

Single Reduction

UNIT SIZE	A	B	C	D	E	EL	F	FH③	G	H	J	O MAX③	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	O MAX③	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:

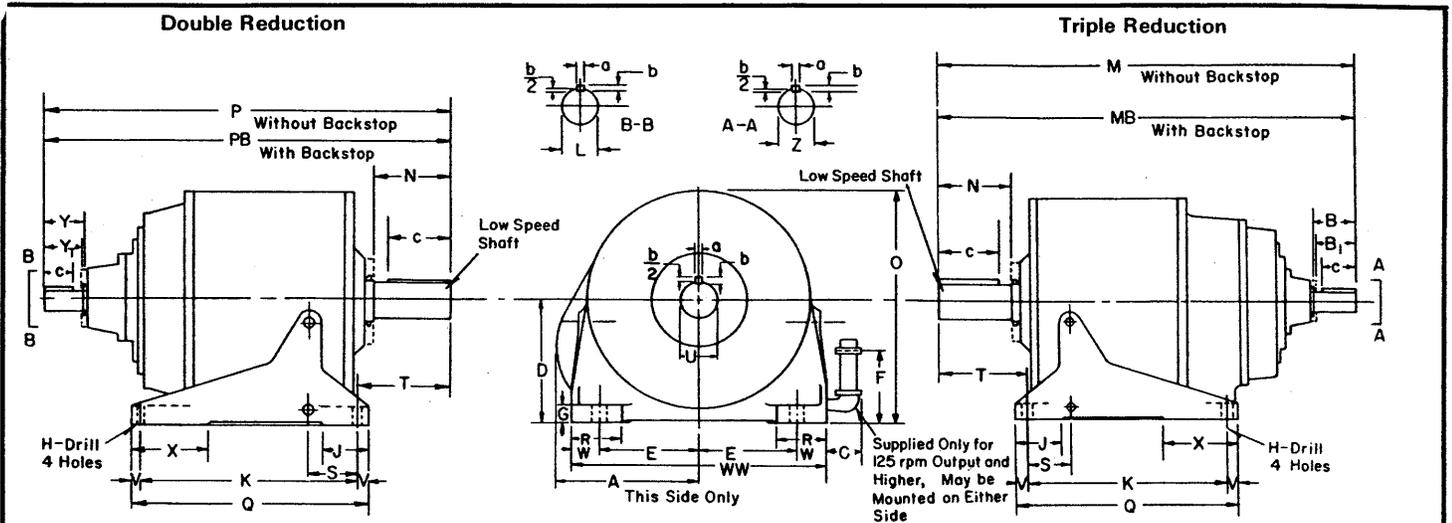
Purchaser		Purch. Order No.			Item No.		Dated	
No. Req'd.		Unit Size		Assembly Fig.		Motor Bed		H.S. Shaft Rpm
Motor Make		Hp	Frame No.		Furnish by		Mtd. by	L.S. Shaft Rpm
Coupling, Pinion, Sprocket Pulley				Furnish by		Mtd. by		Ratio
G.O.		Size H.S. Cplg.		Mtd. by		Service Rating Hp		Catalog Rating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



In-Line Speed Reducers

Moduline®

Type R



Dimensions, Inches Not to be used for construction purposes unless dimensions are approved
 Dimensions Common to Double and Triple Reduction Units

Unit Size	U ^①	Key			A	C	D ^②	E	F	G	H	J	K	N	O	Q	R	S	T	V	W	WW	X
		a	b	c																			
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	L ^①	Key			Y	Y ₁	PB	P	Approx. Wt. Lbs.
		a	b	c					
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	1.875 ^③	.50 ^③	.50 ^③	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

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 Y₁ and B₁ and add .50 inch to dimensions M, MB, P, PB and T (All units except size 64).

Triple Reduction Units

Unit Size	Z ^①	Key			B	B ₁	MB	M	Approx. Wt. Lbs.
		a	b	c					
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

Reproduced from Drawing 823-D-019

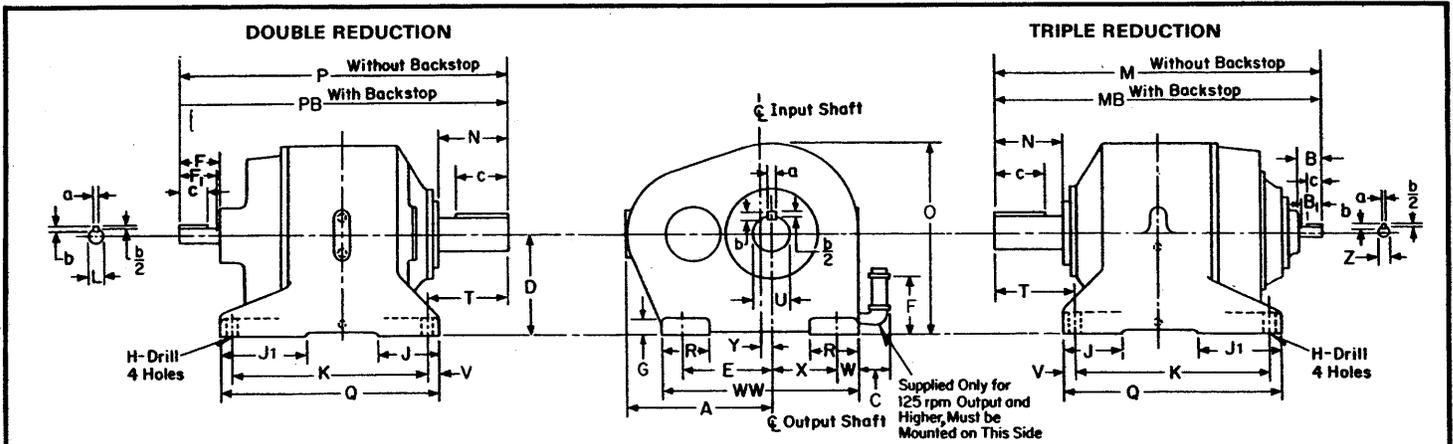
PRELIMINARY CERTIFIED PRINT FOR:

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, 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	C	D②	E	F max.	G	H	J	J1	K	N	O	Q	R	T	V	W	WW	X	Y
		a	b	c																				
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			F	F ₁	PB	P	Approx. Wt. Lbs.
		a	b	c					
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			B	B ₁	MB	M	Approx. Wt. Lbs.
		a	b	c					
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 F₁ and B₁, and add .50 inch to dimensions M, MB, P, PB and T.

Reproduced from Drawing 842-D-238.

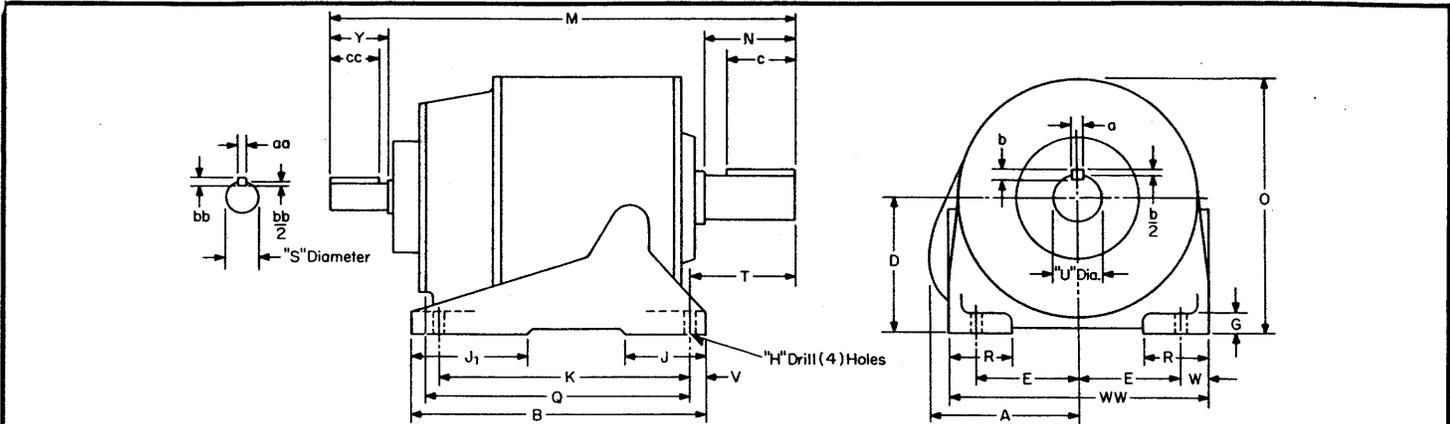
PRELIMINARY CERTIFIED PRINT FOR:

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

In-Line Speed Reducers

Moduline®

Type R



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

Unit Size	U ^①	Key (Low Speed)			A	B	D ^②	E	G	H	J	J ₁	K	M	N
		a	b	c											
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)			T	V	W	WW	Y	Approx. Wt. Lbs.
					aa	bb	cc						
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

Unit Size	A	B	C ^③	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

③ Tolerance = +.000 to -.125.

PRELIMINARY CERTIFIED PRINT FOR:

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

Effective: 1, October 1984

Supersedes: 1, August 1984

DIMENSIONS

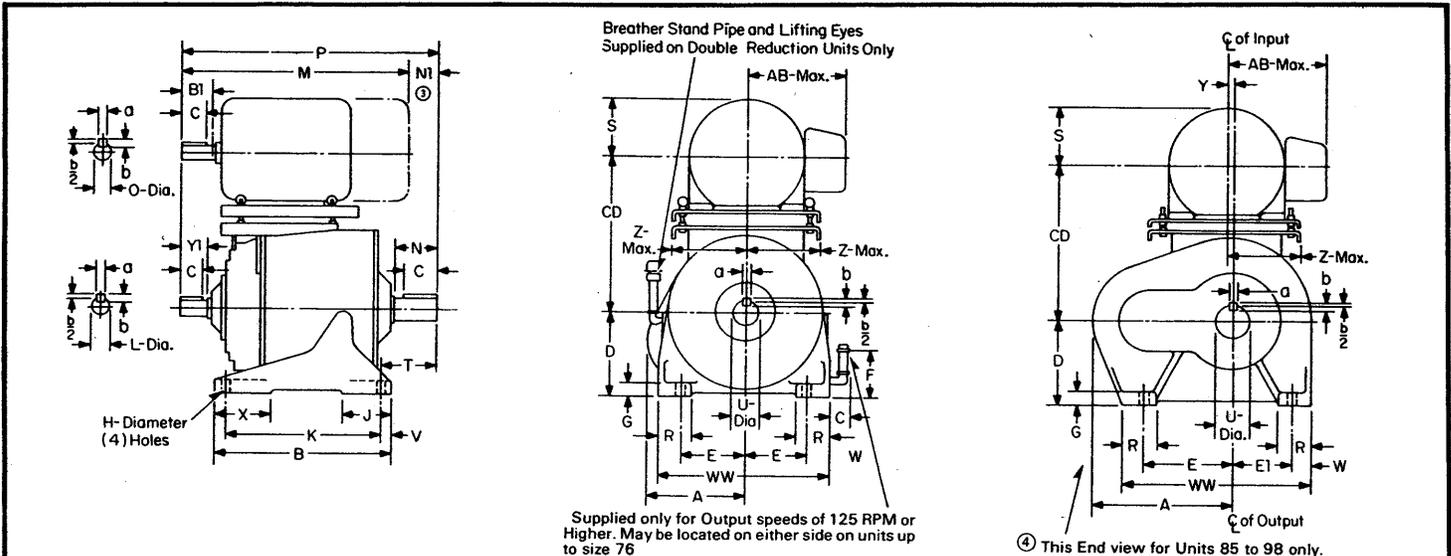
PIGGYBACK MOTOR MOUNT

SIZES 64 THRU 98

In-Line Speed Reducers

Type R

Moduline®



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	B	C	D②	E	EI	F	G	H	J	K	N	R	T	V	W	WW	X	Y	Z
		a	b	c																				
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			YI	P	Approx. Wt. Lbs.
		a	b	c			
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			YI	P	Approx. Wt. Lbs.
		a	b	c			
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

Motor Frame	O①	Key			BI	Drip-proof			TEFC, Expl. Proof				
		a	b	c		AB	S	M	Wt.	AB	S	M	Wt.
182T	1.125	.25	.25	1.75	2.50	7.4	4.7	12.8	70	8.4	4.8	14.4	85
184T	1.125	.25	.25	1.75	2.50	7.4	4.7	13.8	80	8.4	4.8	15.4	100
213T	1.375	.31	.31	2.38	3.12	8.4	5.5	15.8	115	10.3	5.6	17.7	145
215T	1.375	.31	.31	2.38	3.12	8.4	5.5	17.3	140	10.3	5.6	19.2	175
254T	1.625	.38	.38	2.88	3.75	10.3	6.6	20.5	200	12.4	6.6	23.0	230
256T	1.625	.38	.38	2.88	3.75	10.3	6.6	22.3	240	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
364T	1.875	.50	.50	2.00	3.50	17.9	9.3	26.6	672	18.8	9.6	30.5	835
365T	1.875	.50	.50	2.00	3.50	17.9	9.3	27.6	716	18.8	9.6	31.5	920
404T	2.125	.50	.50	2.75	4.00	18.9	10.6	29.6	960	20.5	10.8	33.6	1145
405T	2.125	.50	.50	2.75	4.00	18.9	10.6	31.1	1010	20.5	10.8	35.1	1260
444T	2.375	.62	.62	3.00	4.50	21.4	11.8	34.1	1388	26.3	12.1	38.4	1515

CD Dimensions

	64		76		85/88		92		98	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
64	19.4	15.9	...	...	...	...	...	...	...	...
76	19.4	15.9	...	...	...	...	...	...	...	...
85/88	20.1	16.6	...	...	...	...	...	...	...	...
92	20.1	16.6	...	...	...	...	...	...	...	...
98	21.6	18.1	24.9	20.9	25.4	19.2	...	...	...	...
92	21.6	18.1	24.9	20.9	25.4	19.2	...	...	...	...
98	22.4	18.9	25.6	21.6	26.1	21.9	27.9	23.4	29.9	25.4
92	22.4	18.9	25.6	21.6	26.1	21.9	27.9	23.4	29.9	25.4
98	23.4	19.9	26.6	22.6	27.1	22.9	28.9	24.4	30.9	26.4
92	23.4	19.9	26.6	22.6	27.1	22.9	28.9	24.4	30.9	26.4
98	24.4	20.9	27.6	23.6	28.1	23.9	29.9	25.4	31.9	27.4
92	24.4	20.9	27.6	23.6	28.1	23.9	29.9	25.4	31.9	27.4
98	...	...	27.6	23.6	28.1	23.9	29.9	25.4	31.9	27.4
92	...	...	27.6	23.6	28.1	23.9	29.9	25.4	31.9	27.4
98	...	...	...	...	29.1	24.9	30.9	26.4	32.9	28.4
92	...	...	...	...	29.1	24.9	30.9	26.4	32.9	28.4
98	...	...	...	...	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:

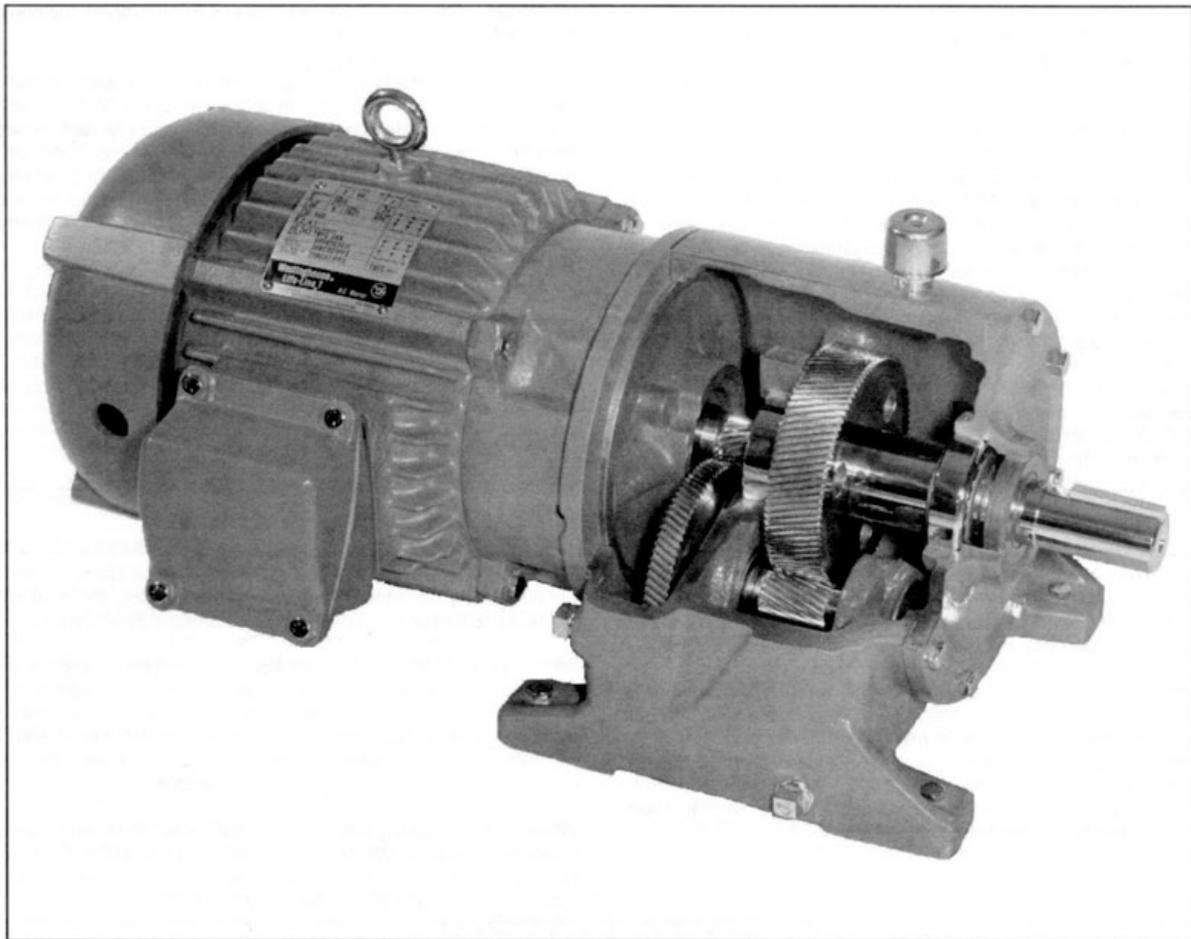
Customer		Customer Order	
G.O.	Cat. No.	Item No.	
Motor Rpm	Output Rpm	Service Factor	Service Hp
Application	Signed	Gear Ratio	Date

NUTTALL GEAR™

A REGAL REXNORD BRAND

Moduline Concentric Shaft Speed Reducers

- Installation
- Lubrication
- Maintenance
- Operation
- Replacement Parts



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Niagara Falls, NY 14302

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Toll Free: 800.432.0121
Fax: 716.298.4101
Web: www.nuttallgear.com
email: info@nutallgear.com

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 or 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 its 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 grout 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.

Bolt Size (UNC)	Torque (Ft. Lbs.)		Bolt Size (UNC)	Torque (Ft. Lbs.)	
	Metal To Metal	Metal To Concrete		Metal To Metal	Metal To Concrete
1/4	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
1/2	69	54	1-3/4	1,975	1,558
5/8	137	108	2	3,083	2,147
3/4	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 to 242	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.

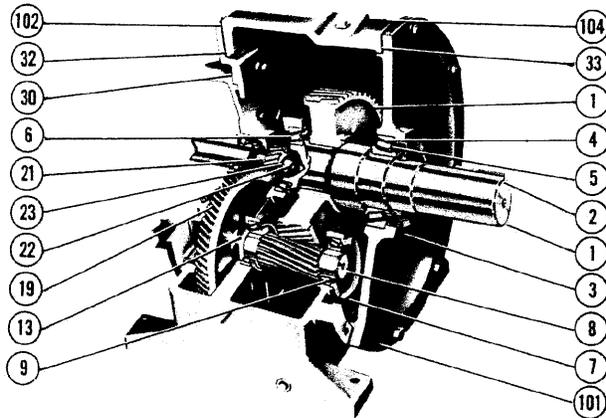
Noisy Unit

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 by coupled apparatus. A new gear unit may be initially noisy and then quiet down after a reasonable period of service; normal wear 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.

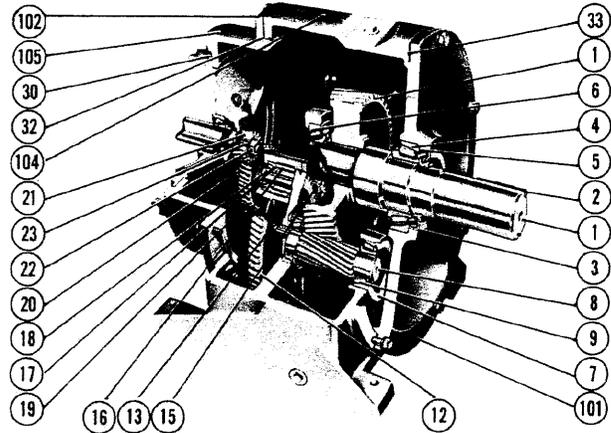
Problem	Potential Causes
Excessive operating temperature	1, 2, 3, 4, 5, 6, 7, 9, 12, 18, 21, 22, 23
Oil leakage	1, 2, 3, 4, 5, 7, 9, 12, 13, 18, 19, 20, 22, 23
Gear wear	1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 20, 22, 23
Bearing failure	1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 15, 16,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

Integral Gearmotors (Type G)

Double Reduction
Sizes 05D thru 98D



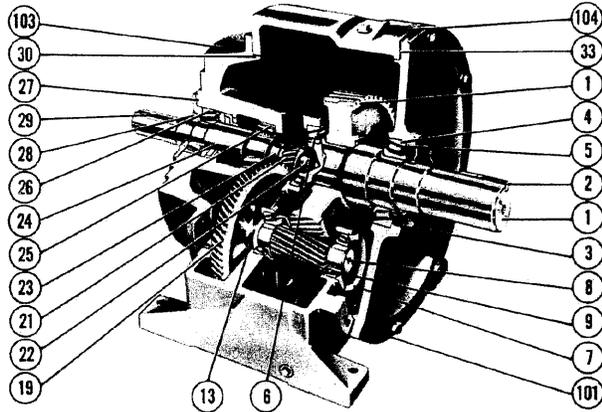
Triple Reduction
Sizes 21T thru 98T



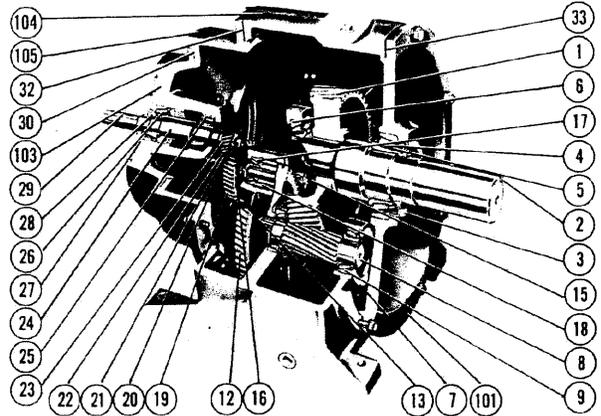
Part No.	Part Description	Part No.	Part Description
A. LOW SPEED COMPONENTS - Consists of:		A. LOW SPEED COMPONENTS - Consists of:	
1	Low Speed Gear Set - Includes: ① ②	1	Low Speed Gear Set - Includes: ① ②
1	L.S. Gear and Shaft Assembly	1	L.S. Gear and Shaft Assembly
2	L.S. Shaft Key	2	L.S. Shaft Key
8	L.S. Pinion Shaft	8	L.S. Pinion Shaft
Low Speed Bearing Set - Includes: ① ②		Low Speed Bearing Set - Includes: ① ②	
4	L.S. Shaft Outer Bearing	4	L.S. Shaft Outer Bearing
5	L.S. Shaft Bearing Shims	5	L.S. Shaft Bearing Shims
6	L.S. Shaft Inner Bearing	6	L.S. Shaft Inner Bearing
7	L.S. Pinion Shaft Bearing Retainer	7	L.S. Pinion Shaft Bearing Retainer
9	L.S. Pinion Shaft Bearings ① ②	9	L.S. Pinion Shaft Bearings ① ②
13	L.S. Pinion Shaft Locking Device.....	13	L.S. Pinion Shaft Locking Device.....
C. HIGH SPEED COMPONENTS - Consists of:		B. INTERMEDIATE COMPONENTS - Consist of:	
19	High Speed Gear Set - includes ① ②	12	Intermediate Gear Set - includes ① ②
21	H.S. Gear	15	Intermediate Gear
21	H.S. Pinion	15	Intermediate Pinion Shaft
22	H.S. Pinion Shaft Nut.....	Intermediate Bearing Set - Includes ① ②	
23	H.S. Pinion Shaft Spacer.....	17	Intermediate Bearings
D. OIL SEALS and GASKETS - Includes ① ②		18	Intermediate Shims
3	L.S. Shaft Oil Seal	16	Intermediate Pinion Shaft Spacer.....
30	Motor Flange Gasket	20	Intermediate Pinion Shaft Locking Device
32	Adapter Gasket	C. HIGH SPEED COMPONENTS - Consists of:	
33	L.S. Cover Gasket	19	High Speed Gear Set - Includes ① ②
E. HOUSING PARTS		19	H.S. Gear
101	Low Speed Cover.....	21	H.S. Pinion
102	Adapter (if required).....	22	H.S. Pinion Shaft Nut.....
104	Gear Housing.....	23	H.S. Pinion Shaft Spacer.....
① Available only in sets.		D. OIL SEALS and GASKETS - includes ① ②	
② Order as Redi-Pak		3	L.S. Shaft Oil Seal
Order Information		30	Motor Flange Gasket
When ordering renewal parts read the following from the nameplate:		32	Adapter Gasket
1. Style Number		33	L.S. Cover Gasket
2. Motor Frame (if needed)		E. HOUSING PARTS	
3. Gear Box Size and Reduction		101	Low Speed Cover.....
Plus: Order by part number and description		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**



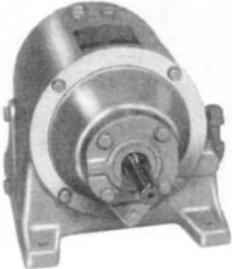
**Triple Reduction
Sizes 15T thru 98T**



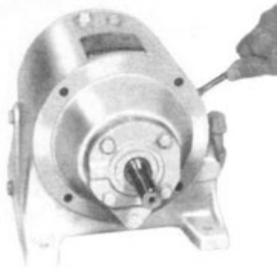
Part No.	Part Description	Part No.	Part Description
A. LOW SPEED COMPONENTS - Consists of:		A. LOW SPEED COMPONENTS - Consists of:	
	Low Speed Gear Set - Includes: ② ③		Low Speed Gear Set - Includes: ② ③
1	L.S. Gear and Shaft Assembly	1	L.S. Gear and Shaft Assembly
2	L.S. Shaft Key	2	L.S. Shaft Key
8	L.S. Pinion Shaft	8	L.S. Pinion Shaft
	Low Speed Bearing Set - Includes: ② ③		Low Speed Bearing Set - Includes: ② ③
4	L.S. Shaft Outer Bearing	4	L.S. Shaft Outer Bearing
5	L.S. Shaft Bearing Shims	5	L.S. Shaft Bearing Shims
6	L.S. Shaft Inner Bearing	6	L.S. Shaft Inner Bearing
7	L.S. Pinion Shaft Bearing Retainer	7	L.S. Pinion Shaft Bearing Retainer
9	L.S. Pinion Shaft Bearings ② ③	9	L.S. Pinion Shaft Bearings ② ③
13	L.S. Pinion Shaft Locking Device.....	13	L.S. Pinion Shaft Locking Device.....
C. HIGH SPEED COMPONENTS - Consists of:		B. INTERMEDIATE COMPONENTS - Consists of:	
	High Speed Gear Set - includes ② ③		Intermediate Gear Set - includes ② ③
19	H.S. Gear	12	Intermediate Gear
21	H.S. Pinion	15	Intermediate Pinion Shaft
22	H.S. Pinion Shaft Nut.....		Intermediate Bearing Set - Includes ② ③
23	H.S. Pinion Shaft Spacer.....	17	Intermediate Bearings
24	H.S. Shaft.....	18	Intermediate Shims
29	H.S. Shaft Key.....	16	Intermediate Pinion Shaft Spacer.....
	High Speed Bearing Set - includes: ② ③	20	Intermediate Pinion Shaft Locking Device
25	H.S. Shaft Inner Bearing		C. HIGH SPEED COMPONENTS - Consists of:
26	H.S. Shaft Outer Bearing		High Speed Gear Set - Includes ② ③
27	H.S. Shaft Shims	19	H.S. Gear
	D. OIL SEALS and GASKETS - Includes ② ③ ..	21	H.S. Pinion
3	L.S. Shaft Oil Seal	22	H.S. Pinion Shaft Nut.....
28	H.S. Shaft Oil Seal	23	H.S. Pinion Shaft Spacer.....
30	H.S. Bracket Gasket	24	H.S. Shaft.....
33	L.S. Cover Gasket	29	H.S. Shaft Key.....
	E. HOUSING PARTS		High Speed Bearing Set - includes: ② ③
101	Low Speed Cover.....	25	H.S. Shaft Inner Bearing
103	High Speed Bracket.....	26	H.S. Shaft Outer Bearing
104	Gear Housing.....	27	H.S. Shaft Shims
②	Available only in sets.		D. OIL SEALS and GASKETS - includes ② ③
③	Order as Redi-Pak	3	L.S. Shaft Oil Seal
	Ordering Information	28	H.S. Shaft Oil Seal
	When ordering renewal parts read the following from the nameplate:	30	H.S. Bracket Gasket
	1. Style Number	32	Triple Reduction Housing Gasket
	2. Gear Box Size and Reduction	33	L.S. Cover Gasket
	Plus: Order by part number and description		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.



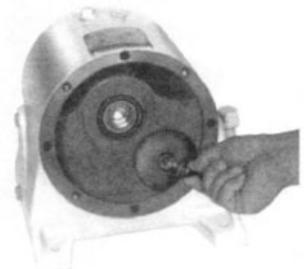
1. Begin disassembly at the input shaft end by removing the hex head bolts that secure the input bracket.



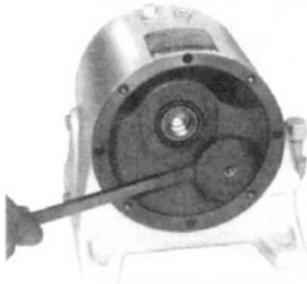
2. Pry the input bracket off using a screw driver at the inset between the bracket and housing.



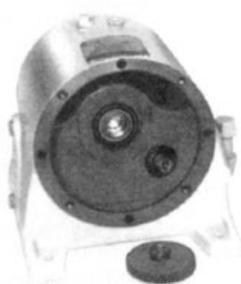
3. Remove the input bracket revealing the high speed gear. If gasket is damaged, remove and clean surfaces.



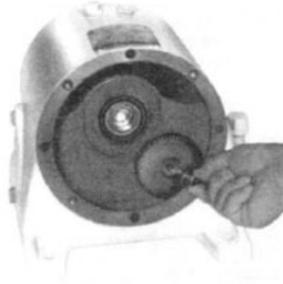
4. Lock the low speed shaft from rotating using a spanner wrench. Remove the hex bolt and washers that secure the high speed gear.



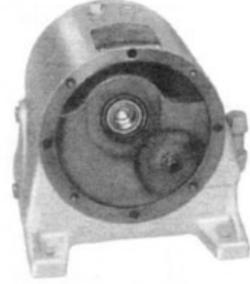
5. Pry the high speed gear off the splined shaft using a pry-bar.



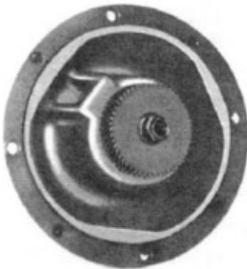
6. The new high speed gear and spacer are now ready to be placed on the splined shaft.



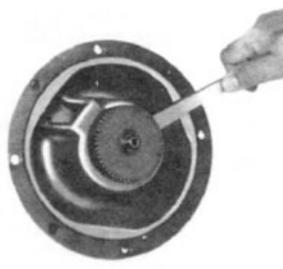
7. Place the original spacer and the new high speed gear on the splined shaft and secure with the hex bolt and its washers.



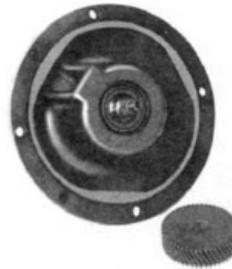
8. Shown here is the completed assembly with the new high speed gear.



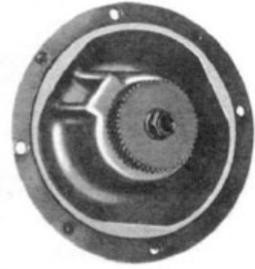
9. The next step is to change the high speed pinion. Lock the high speed shaft from rotating using a spanner wrench. Remove the hex head nut that secures the high speed pinion.



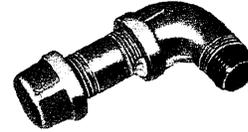
10. Pry the high speed pinion off the splined shaft using a pry-bar.



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.



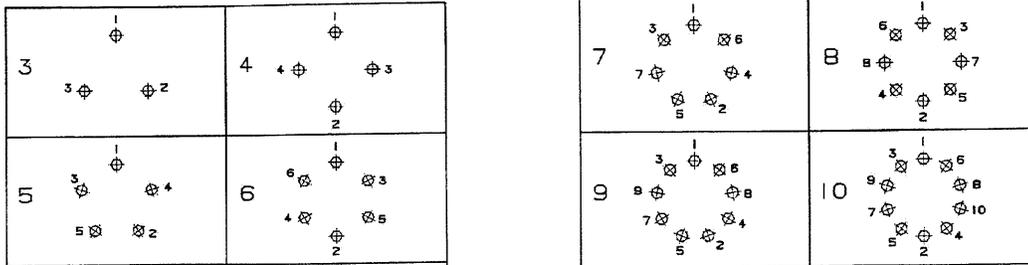
13. Reassemble the input bracket to the housing and line up mounting holes. Be sure lube opening is in proper position (180° from application floor).

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

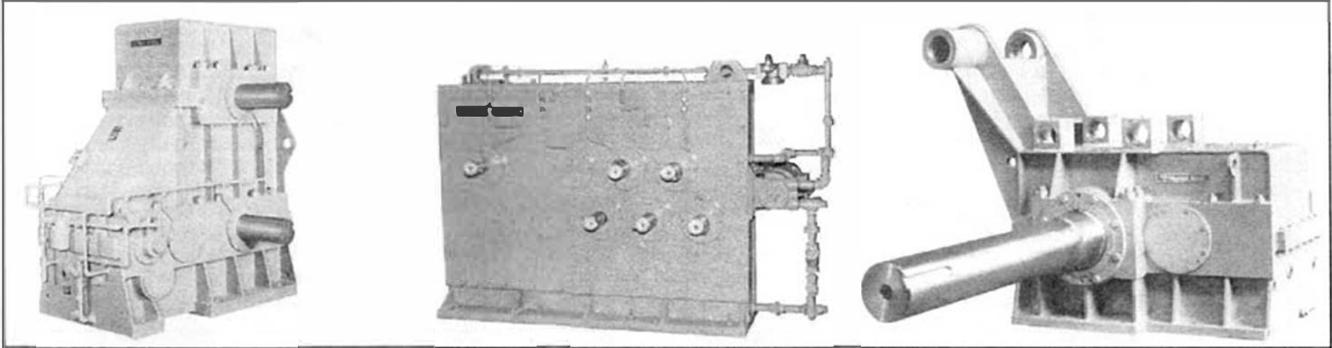
The following torque values are to be used for end covers, seal cages, shaft guards, inspection covers, and housing split line bolts, unless otherwise specified on the drawing or assembly instructions. Torque values for lubricated fasteners are to be used when fasteners are coated with thread locking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

Diameter UNC	Dry Fastener (foot-lbs)		Lubricated Fastener (foot-lbs)	
	Min.	Max.	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

WEIGHT

Approximate Unit Weight in Pounds

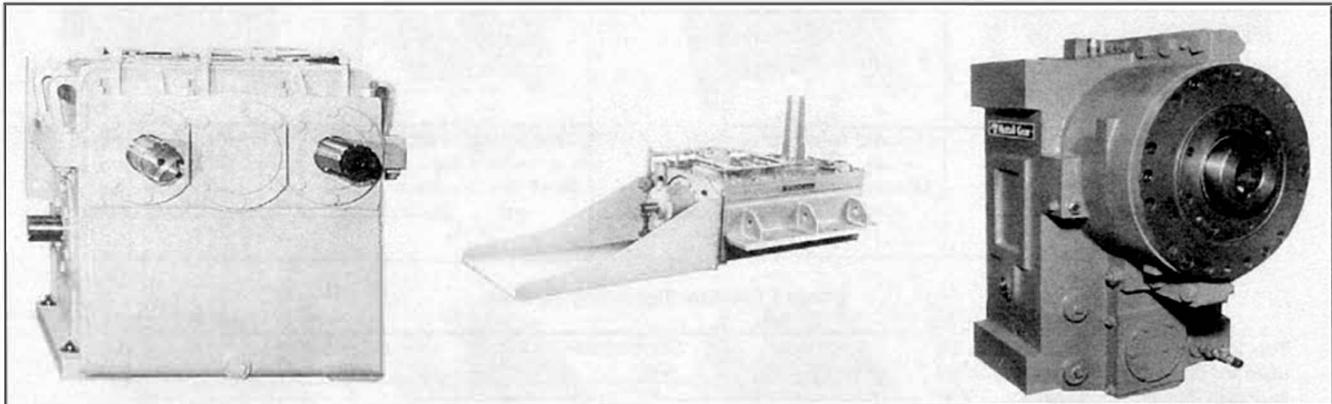
Unit Size	(reducer only, no motor, motor support or accessories)			
	Single	Double	Triple	Quad
5 / 10	70	77	--	--
15 / 21	110	130	140	--
32	180	165	190	210
43	200	270	290	300
51 / 54	350	490	500	570
64	--	550	620	700
76	350	770	800	825
85 / 88	--	1,237	1,340	1,435
92	--	1,300	1,450	1,570
98	--	2,350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

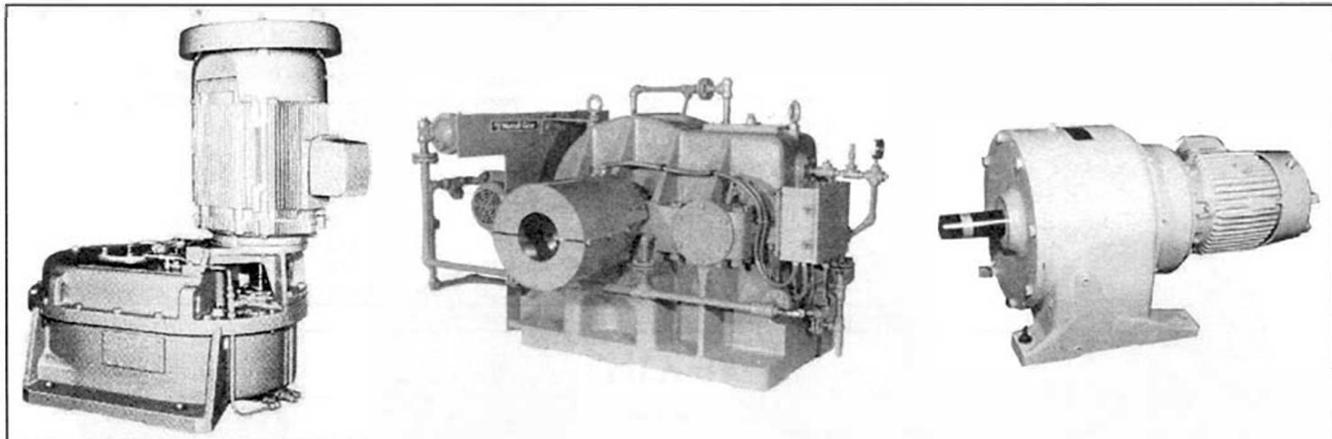
Reel Units are available in single and multiple speed designs, in ratings up to 14000 HP and output speeds down to 2.4 RPM and in ratios up to 357:1.



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™
A REGAL REXNORD BRAND

