Huco Flexible Couplings
Huco offers a wide variety of couplings for precision industrial and commercial applications worldwide.

Selecting the right shaft coupling can be the difference between a drive system that provides the required dynamic response and one that is catastrophic. The application constraints lead engineers towards products that have different levels of torsional stiffness, vibration dampening, backlash, and low bearing loads. Huco can respond quickly with a wide variety of couplings such as general purpose, beam style, and precision couplings suitable for highly reliable applications.

Beam Couplings

Step Beam, Single Beam, Three Beam, and Six Beam couplings are available for use in stepper and servo drives, encoders, tachometers, small pumps, motors and drives and light-duty power transmission applications.
**General Purpose Couplings**

Oldham couplings are designed for use in stepper drives and most applications including positioning slides, pumps, actuators, etc. Uni-Lat models are ideal for encoder, resolver, tachometers, potentiometer drives, as well as small positioning slides, dosing pumps, and general light drives. Flex P units can be utilized in light power drives, pumps and small generators.

**Precision Couplings**

Flex B Bellows, Flex K Large Bellows and Flex M Disc type couplings are ideal for use in high-end servo drives, pulse generators, scanners, X-Y positioning slides, high speed dynamometers, measuring instruments, robots, and machine tools.

**Friction Clutches**

Vari-Tork™ friction clutches allow slippage when the torque being transmitted reaches a pre-determined threshold. Used in all types of small drives to help protect personnel and equipment.
High-end servo drives, pulse generators, scanners, positioning slides, metering valves, etc.

Precision couplings with excellent kinematic properties. The 3 types offer differing combinations of stiffness, radial compensation and axial motion.

**Flex B**
- Stainless Steel Bellows type
- Membrane type
- Multi-Beam type
- Single-Beam type

**Flex Ni**
- Stainless Steel Bellows type
- Membrane type
- Multi-Beam type
- Single-Beam type

**Flex M**
- Membrane type
- Multi-Beam type
- Single-Beam type

**Flex K**
- Stainless Steel Bellows type
- Membrane type
- Multi-Beam type
- Single-Beam type

**General description**
- Precision couplings with excellent kinematic properties. The 3 types offer differing combinations of stiffness, radial compensation and axial motion.
- General purpose single piece couplings. Dynamically balanced construction. Single-stage versions make up into ‘whirl’ Free Carats. The 2-stage versions offer short envelopes and low bearing loads respectively.
- More flexible than Multi-Beam but less torsional rigidity.

**Where to use**
- High-end servo drives, pulse generators, scanners, positioning slides, metering valves, etc.
- High-end servo drives, pulse generators, scanners, positioning slides, high speed dynamometers, unsupported drive shafts, etc.
- Stepper and servo drives, encoders, general purpose light duty power transmission applications.
- Stepper drives, encoders, general purpose light duty power transmission applications.

**Speeds**
- Flex B up to 5000 rpm
- Flex K up to 15000 rpm
- Up to 5000 rpm
- Up to 5000 rpm
- Up to 5000 rpm

**Peak torque largest size Nm**
- 500
- 12.5
- 100
- 140
- 30

**Standard bores mm**
- 3 to 65
- 3 to 20
- 3 to 38
- 1 to 38
- 3 to 26

**Temperature range °C**
- –40° to +120°
- –40° to +120°
- –40° to +120°
- –40° to +120°
- –40° to +120°

**Electrically isolating**
- No
- No
- No
- Aluminium
- Stainless Steel
- Acetal
- Stainless Steel
- Acetal
- Yes
- No
- Yes

**Connection**
- Clamp, Set Screw
- Clamp or Set Screw
- Clamp or Set Screw
- Clamp or set screw
- Clamp or Set Screw

**Material Options**
- Stainless Steel
- Acetal
### Product Overview

<table>
<thead>
<tr>
<th>Step-Beam type</th>
<th>Sliding Disc type</th>
<th>Universal/Lateral type</th>
<th>Double Loop type</th>
<th>Jaw Coupling</th>
<th>Universal Joints &amp; Teleshafts</th>
<th>Friction Clutches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step-Beam</td>
<td>Oldham</td>
<td>Uni-Lat</td>
<td>Flex-P</td>
<td>Flex-G</td>
<td>Huco-Poly</td>
<td>Vari-Tork, Polyclutch</td>
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<tr>
<td></td>
<td>Blind bored</td>
<td></td>
<td></td>
<td></td>
<td>Single joints</td>
<td>Basic clutch</td>
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<tr>
<td></td>
<td>Thru’ bored</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Thru’ bored</td>
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</tr>
<tr>
<td></td>
<td>Material Options</td>
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<tr>
<td></td>
<td>Nylon</td>
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</tbody>
</table>

### General description
- **Step-Beam**
  - Unique coupling design gives excellent combination of radial flexibility with torsional stiffness.
  - General purpose, robust, easy to use 3-part couplings with replaceable wear elements.
  - Generous radial compensation and pull-apart re-engage facility for blind assemblies.
- **Oldham**
  - General purpose light duty couplings with generous angular and radial misalignment compensation.
  - Resist axial motion, can anchor unrestricted shafts and perform light push/pull duties.
- **Uni-Lat**
  - Exceptional flexibility in all three directions, radial, angular and axial.
  - High torque capacity and high speed are available from this naturally balanced coupling.
- **Flex-P**
  - Light power drives, pumps and small generators.
  - Light power drives where misalignment is small.
- **Flex-G**
  - Intermittent applications in business machines, instrumentation, lab equipment, analytical apparatus, etc., where steel joints would be under-utilised.
  - Light duty plastic universal joints and extensible drive shafts (teleshafts).
  - Small, user-adjustable torque limiters for concentric or in-line mounting.
  - Operate by friction using interleaved clutch plates.

### Where to use
- **Encoders, tachogenerators, small pumps, motors and drives.**
- **Encoder, resolver, tacho, potentiometer drives. Small positioning slides, dosing pumps, & light drives generally.**
- **Encoder, resolver, tacho, potentiometer drives. Small positioning slides, dosing pumps, & light drives generally.**
- **Light power drives, pumps and small generators.**
- **Light power drives where misalignment is small.**
- **Light power drives where misalignment is small.**
- **Light power drives where misalignment is small.**
- **Intermittent applications in business machines, instrumentation, lab equipment, analytical apparatus, etc., where steel joints would be under-utilised.**
- **Friction clutches interrupt rotation when the load being transmitted reaches a pre-determined threshold. Used in all kinds of small drives to help protect personnel and equipment.**

### Speeds
- **Up to 10000 rpm.**
- **Up to 3000 rpm.**
- **Up to 3000 rpm.**
- **Up to 3000 rpm.**
- **Up to 40,000 rpm.**
- **Up to 1000 rpm.**
- **Up to 1000 rpm slipping speed.**

### Peak torque largest size Nm
- 25
- 44
- 12
- 18
- 133
- 10.7
- 60

### Standard bores mm
- 3 to 12.7
- 2 to 30
- 3 to 22
- 3 to 16
- 3 to 16
- 3 to 20
- 6 to 32

### Temperature range
- -20 to +150°C
- -20 to +60°C
- -20 to +60°C
- -40 to +100°C
- -40 to +80°C
- -20 to +60°C
- -10 to +80°C (when operating)

### Electrically isolating
- Yes
- Yes
- Yes
- Yes
- Yes
- No

### Connection
- Clamp or Set Screw
- Clamp or Set Screw
- Clamp or Set Screw
- Set Screw
- Clamp or Set Screw
- Set Screw, Bonding, or Cross-Pinning
- Clamp or Set Screw
Selecting Flexible Couplings

Building an Ordering Part Number is fast and easy using the Specifications and Bore Size charts on each product page. Simply select the coupling type, coupling size and two bore sizes you require (always place smaller bore first). Always include (.) in Part Number.

Ordering Number System  Example: 536.20.1418

Selection Criteria

Follow these simple guidelines to select the optimal coupling choice for your particular application.

- Does the coupling provide adequate misalignment protection?
- Can it transmit the required torque?
- Can it sustain the required rotational speed?
- Will it fit in the available space envelope?
- Will it provide the torsional stiffness required for positional accuracy?
- Does it provide electrical isolation between the shafts?
- Will it provide the required life expectancy?
- Is axial motion or axial stiffness required?

Service Factors

- Torque capacity values shown in the coupling specification charts assume uniform load conditions at a constant speed with no misalignment or axial displacement. See page 48 to provide adequate service factors.
- The torque capacity of flexible couplings will reduce when acceleration is present (e.g.: stop/start or reverse conditions).
- The more severe the acceleration, the greater reduction in torque capacity.
- The more severe the misalignment, the greater reduction in torque capacity.
- Sliding couplings (Oldham and UniLat) are subject to a wear rate dependent on the number of cycles completed and environmental factors.
### Round & Keywayed Bore Details & Codes

<table>
<thead>
<tr>
<th>Metric mm</th>
<th>Inch fraction</th>
<th>Inch decimal</th>
<th>Round bore code</th>
<th>Metric keys key size</th>
<th>Inch keys key size</th>
<th>Keywayed bore code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.0394</td>
<td>08</td>
<td>–</td>
<td>–</td>
<td>–</td>
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<tr>
<td>1.5</td>
<td>0.0591</td>
<td>09</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
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<tr>
<td>1.588</td>
<td>1/16</td>
<td>0625</td>
<td>10</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>2</td>
<td>0.0787</td>
<td>11</td>
<td>–</td>
<td>–</td>
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<td>–</td>
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<td>2.286</td>
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<td>12</td>
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<td>2.382</td>
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<td>16</td>
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<td>3</td>
<td>0.1181</td>
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<td>–</td>
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<td>01250</td>
<td>16</td>
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</table>

*Not manufactured. Nearest alternative 4mm.*

### Round & Keywayed Bore Details & Codes Cont.

<table>
<thead>
<tr>
<th>Metric mm</th>
<th>Inch fraction</th>
<th>Inch decimal</th>
<th>Round bore code</th>
<th>Metric keys key size</th>
<th>Inch keys key size</th>
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<td>34.305</td>
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<td>P60</td>
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</tr>
<tr>
<td>38</td>
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<td>–</td>
<td>P61</td>
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<td>38.10</td>
<td>1-1/2</td>
<td>1.5000</td>
<td>62</td>
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<td></td>
</tr>
<tr>
<td>40</td>
<td>1.5748</td>
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<td>–</td>
<td>–</td>
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<td></td>
</tr>
<tr>
<td>41.28</td>
<td>1-5/8</td>
<td>1.6250</td>
<td>64</td>
<td>–</td>
<td>–</td>
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</tr>
<tr>
<td>42</td>
<td>1.6535</td>
<td>65</td>
<td>–</td>
<td>–</td>
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</tr>
<tr>
<td>44.45</td>
<td>1-3/4</td>
<td>1.7500</td>
<td>66</td>
<td>Specify on Order</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Specify on Order.*

### Specifying a Keywayed Bore

To specify a keywayed bore, prefix the 2-digit bore code number with a “P” for metric keyways or an “R” for an inch keyway.

**Examples:**

**Metric:** 538.34.P28

In this example both bores have a keyway.

**Inch:** 538.34.R36

In this example only the second bore will have a keyway.

Standard keyways are machined to two specifications:

- **Bore Codes prefixed with a “P”** denote a metric keyway conforming to ISO 773/774 (BS 4235 Pt. 1).
- **Bore Codes prefixed with a “R”** denote an inch keyway conforming to BS 46 Pt. 1.
Flexible Coupling Types

General instructions
1. Ensure that shafts are free of burrs, damage, or foreign matter, and can penetrate the bores.
2. Install the coupling by holding the shaft and the related hub, rotating it back and forth as you progress it along the shaft.
3. Do not apply any forces that cause extension, compression or lateral displacement of the coupling beyond its permissible offsets.

Normal installation

a) Position and secure the larger of the 2 shafts (if different) and progress the coupling onto it.

b) Progress the second shaft into the bore, taking care not to lever either shaft against the inner wall of the spacer.

c) Progress the coupling along the shafts to a position midway between the shaft terminations. Rotate the coupling to ensure it is not binding and is in its natural state, i.e., neither extended nor compressed.

d) Align the second shaft with the first using a straight edge and feeler gauges or a dial indicator.

e) Secure the second shaft and re-check alignment. Final alignment must be within the permissible offsets.

f) Secure one hub, tightening each screw alternately. Repeat for the second hub.

When to use single & two-stage couplings

Single-stage

Example 1. With partially supported (1 bearing) shafts.

Example 2. With unsupported intermediate shafts.

Single-stage couplings are radially supportive and function as supplementary bearings. They are used when the connected shaft lacks a full complement of bearings.

Two-stage

Two-stage couplings are radially compliant and are used when both shafts are fully supported by bearings.

Note: Bellows couplings do not provide the same level of radial support as Flex M when used with partially or wholly unsupported shafts. When essential for reasons of greater axial motion, use the 3-convolution type for these purposes.

CAUTION

These are precision high couplings that have a limited range of permissible flexure. They can be damaged through careless handling. Avoid gratuitous flexure in any direction.

No axial forces are permitted across the membranes when fitting Huco-Flex M couplings. Keyways with interference fits are not recommended.

Bellows couplings are more tolerant of axial motion, but flexure beyond the permissible limits should be avoided.
Installing Couplings

Sliding Disc type (Oldham)

Blind hub

- a) Slide hubs on to both shafts until fully seated and tighten screws.
- b) Position and secure R/H shaft.
- c) Seat disc fully on R/H hub.
- d) Place a gap gauge flat against the bottom of the exposed slot in the disc and push the L/H hub into full engagement by manipulating the L/H shaft.
- e) Align shafts within the permissible offsets and secure L/H shaft.
- f) Check alignment and correct if necessary.
- g) Remove gap gauge.

To fit a new disc, withdraw L/H shaft complete with hub and remove old disc. Repeat steps c) to g).

Gap gauges for all hub types

<table>
<thead>
<tr>
<th>Coupling size</th>
<th>Gap gauge</th>
</tr>
</thead>
<tbody>
<tr>
<td>06, 09 &amp; 13</td>
<td>0.05</td>
</tr>
<tr>
<td>19 &amp; 25</td>
<td>0.10</td>
</tr>
<tr>
<td>33 &amp; 41</td>
<td>0.15</td>
</tr>
<tr>
<td>50 &amp; 57</td>
<td>0.20</td>
</tr>
</tbody>
</table>

Clearances are set to allow for thermal shaft growth and / or end-float. Gaps may be increased, but total shaft movement should not exceed the values shown under Axial Compensation in the Performance Table.

Radial support

Shafts must be fully supported by 2 bearings and have minimal overhang. Oldham couplings cannot be used in pairs.

Thro’ hub

- a) Slide hubs on to both shafts.
- b) Align shafts to within the permissible offsets and position to leave minimum gap 2 between terminations. Secure both shafts, check alignment and correct if necessary.
- c) Position R/H hub with inboard face flush with shaft termination and tighten screws.
- d) Slide disc radially on to the tenons of the R/H hub. Ensure the disc is fully seated.
- e) Place a gap gauge flat against the bottom of the exposed slot in the disc and push the L/H hub into full engagement.
- f) Tighten fastening screws and remove gap gauge.

To fit a new disc, slacken the fastening screws on one hub and retract it along the shaft. Slide the old disc out radially and replace with the new. Repeat steps d) to f).

To retain shaft phasing, withdraw L/H shaft and repeat steps c) to g) as for Blind hub couplings.

Over-penetration of shafts can impair function of coupling with solid disc. Min shaft gap L2 must be observed. Specify thro’ bored disc for near-butted shafts.

<table>
<thead>
<tr>
<th>Coupling size</th>
<th>L2 min</th>
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</thead>
<tbody>
<tr>
<td>19</td>
<td>7.2</td>
</tr>
<tr>
<td>25</td>
<td>9.2</td>
</tr>
<tr>
<td>33</td>
<td>12.0</td>
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<tr>
<td>41</td>
<td>15.3</td>
</tr>
<tr>
<td>50</td>
<td>18.4</td>
</tr>
<tr>
<td>57</td>
<td>21.2</td>
</tr>
</tbody>
</table>

Clamp hubs

To improve clamp action, apply a little grease under the head of the clamp screw.

Note: It is important that installed couplings are not end-loaded. To help avoid this, thro’ bored hubs are recommended for shafts which have fixed axial locations such as face-mounted motors.
## Installing Couplings

### Beam Type

<table>
<thead>
<tr>
<th>Relief Under The Beams</th>
<th>Pilot Bores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most Multi-Beam couplings can be supplied with or without relief under the beams as shown in the diagrams below. When the drive or driven shafts extend under the beams relief is essential to ensure that the coupling remains flexible. Where non-relieved versions are used, shafts must not be allowed to penetrate under the beamed section of the coupling. Unless otherwise specified, relieved versions will be supplied.</td>
<td>Couplings can be supplied 'pilot bored' for opening out by the customer. Pilot bores are plain drilled holes, which are not produced with the same accuracy as finished machined bores. The largest bore provided in a pilot bored product is that needed to make the coupling flexible and this will always be larger than the minimum possible bore size 'B1' shown in the bore tables. For sizes 13 to 25, the pilot bore is also larger than the &quot;B2&quot; minimum shown in the bore tables. Further details are available on request.</td>
</tr>
</tbody>
</table>

### Non-Relieved

![Non-Relieved Beam Diagram](image1)

### Relieved

![Relieved Beam Diagram](image2)
High Performance Couplings

- Stainless Steel Bellows
- Nickel Bellows
- Flexible Membrane (Disc)

- Torsionally rigid design
- No moving parts
- All-metal construction
- Low inertia

The operating principles of Flex B, Flex K, Flex Ni and Flex M offer the highest performance available with flexible couplings. With excellent kinematic properties and torsional stiffness of a very high order, they are suitable for servo drives and satisfy the criteria for highly dynamic position and velocity control systems.

Bellows couplings have the greater torsional stiffness while Flex M have the more tolerant flexural system and feature dynamically balanced construction.
Stainless Steel Bellows Couplings

Set screw hubs

![Set screw hubs diagrams]

Clamp hubs

![Clamp hubs diagrams]

Comparative properties

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Short</th>
<th>Long</th>
<th>Stretched</th>
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</thead>
<tbody>
<tr>
<td>Peak Torque</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Torsional Stiffness</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Angular Compensation</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Axial Compensation</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Radial Compensation</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

The properties of the 3 types compared on a scale of 1 to 3. 3 = best.

Materials & Finishes

**Hubs**: Al. Alloy 2014T6 or 6026 LF and Clear anodised finish

**Bellows**: Spring quality stainless steel

**Joint assembly**: Copper C106, heat treated Zinc plate, clear passivate

**Fasteners**: Alloy steel, black oiled

Temperature Range

–40°C to +120°C
DIMENSIONS & ORDER CODES

Stainless Steel Bellows Couplings

PERFORMANCE

STANDARD BORES

Dimensions for which a bore adaptor is shown can be adapted to smaller shaft sizes. See page 48 for details of metal bore adaptors.
# Stainless Steel Bellows Couplings

## Dimensions & Order Codes

<table>
<thead>
<tr>
<th>Coupling Size</th>
<th>Set Screw Hubs</th>
<th>Clamp Hubs</th>
<th>ØD mm</th>
<th>L mm</th>
<th>L1 mm</th>
<th>ØB1, ØB2 Min mm</th>
<th>ØB1, ØB2 Max mm</th>
<th>Fasteners</th>
<th>Screw</th>
<th>Torque Nm</th>
<th>Wrench mm</th>
<th>Moment of inertia kgm² x10⁻³</th>
<th>Mass kgx10⁻³</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>550.10</td>
<td>554.10</td>
<td>10.0</td>
<td>23.0</td>
<td>6.0</td>
<td>4.0</td>
<td>1.5</td>
<td>M3</td>
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<td>5.3</td>
<td>17</td>
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<tr>
<td></td>
<td>550.16</td>
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<td>21.0</td>
<td>6.0</td>
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<td>7.6</td>
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<td></td>
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<td>-</td>
<td>15.5</td>
<td>23.0</td>
<td>8.0</td>
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<td>-</td>
<td>19.0</td>
<td>26.0</td>
<td>8.0</td>
<td>12.0</td>
<td>3</td>
<td>M4</td>
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<td>7.3</td>
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<td>555.20</td>
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<td>20.0</td>
<td>26.0</td>
<td>9.0</td>
<td>10.0</td>
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### Stainless Steel Bellows Couplings

**CLAMP HUBS**

#### DIMENSIONS & ORDER CODES

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<th>Clamp Hubs</th>
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<th>L mm</th>
<th>L1 mm</th>
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**PERFORMANCE**

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<th>Axial mm</th>
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### Notes:

1. Length of supported bore
2. Maximum recommended tightening torque
3. Values apply with Max. Bores
4. Peak Torque. Select a size where Peak Torque exceeds the application torque x service factor (see page 4)
5. Max. compensation values are mutually exclusive
6. Torsional stiffness values apply at peak torque with no misalignment
### Stainless Steel Bellows Couplings

**SPLIT CLAMP HUBS**

![Diagram of Split Clamp Hubs]

**DIMENSIONS & ORDER CODES**

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**PERFORMANCE**

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<th>Maximum recommended tightening torque</th>
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- Length of supported bore
- Maximum recommended tightening torque
- Values apply with Max. Bores
- Peak Torque. Select a size where Peak Torque exceeds the application torque x service factor (see page 4)
- Max. compensation values are mutually exclusive
- Torsional stiffness values apply at peak torque with no misalignment

### Materials & Finishes

**Hubs:** Al. Alloy  
**Bellows:** Spring quality stainless steel  
**Fasteners:** Alloy steel, black oiled

### Temperature Range

-30°C to +120°C
### Stainless Steel Bellows Couplings

**FLANGE MOUNTED**

#### Dimensions & Order Codes

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<th>L1 mm</th>
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1. Length of supported bore/thread depth
2. Values apply with Max. Bores
3. Peak Torque. Select a size where Peak Torque exceeds the application torque x service factor (see page 4)
4. Max. compensation values are mutually exclusive
5. Torsional stiffness values apply at peak torque with no misalignment

#### Materials & Finishes

**Flanges:** Steel

**Bellows:** Spring quality stainless steel

#### Temperature Range

-30°C to +120°C
The convolutions of Flex-Ni Couplings are formed by the electrolytic deposition of nickel. This produces stress-free convolutions with closely controlled wall thickness.

Nickel bellows couplings are characterised by their exceptional quality of rotational positional integrity. This is achieved through high torsional stiffness in a coupling that is still able to accommodate large amounts of lateral and angular misalignment due to low spring rates in these directions. These couplings are used primarily in instrumentation and similar sensitive applications.

Materials & Finishes

**Hubs:** Aluminium Alloy  
**Bellows:** Electrodeposited nickel  
**Fasteners:** Alloy steel

**Temperature Range**  
-50°C to +120°C
## Nickel Bellows Couplings

### Dimensions & Order Codes

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<th>Clamp Hub</th>
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<th>O/A Length L mm</th>
<th>Max Shaft Depth L1 mm</th>
<th>Max Bores</th>
<th>Moment of Inertia kgm² x 10⁻³</th>
<th>Mass kg x 10⁻³</th>
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### Performance

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<th>Radial mm</th>
<th>Axial mm</th>
<th>Torsional (Nm/rad)</th>
<th>Angular (N/deg)</th>
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<td>20</td>
<td>(5/16&quot;)</td>
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S = Setscrew only

### Important

Load capacity depends on application conditions: [see page 4](#) for details.
Flexible Membrane Couplings - Rivetted Series

Materials & Finishes

Hubs & spacer: Al. Alloy 2014 T6 or 6026 LF
Clear anodised finish

Membranes: Spring quality stainless steel
Heat treated

Rivet assembly: Brass rivets flanked by formed steel washers
Steel, zinc plate & colour passivate

Fasteners: Alloy steel, black oiled

Temperature Range
-40°C to +120°C

Set screw hubs

Ref. 460 for use in pairs or with floating shafts
Ref. 464 for precisely aligned shafts
Ref. 468 for greater radial misalignment and lower bearing loads

Clamp hubs

Ref. 462 for use in pairs or with floating shafts
Ref. 466 for precisely aligned shafts
Ref. 470 for greater radial misalignment and lower bearing loads

Drive shafts

Unless specified otherwise, drive shafts are supplied with set screw hubs inboard.

Drive shafts are supplied to order.
Please specify:
- Coupling size
- Hub style and bore diameter at each end
- Keyway details
- Overall length L2
- Minimum torsional stiffness, if critical
- Quantity
### PERFORMANCE

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<th>ØL1 mm</th>
<th>ØB1, ØB2 max mm</th>
<th>ØB3 mm</th>
<th>Fasteners</th>
<th>Screw</th>
<th>Torque Nm</th>
<th>Wrench mm</th>
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<th>Mass kg x 10⁻³</th>
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### STANDARD bores

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<td>(1/8&quot;) 4 (3/16&quot;) 5 (1/4&quot;) 6 (3/8&quot;) 8 9 (3/8&quot;) 10 11 12 (1/2&quot;) 14 15 (5/8&quot;) 16</td>
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Diameters for which a bore adaptor is shown can be adapted to smaller shaft sizes. See page 58 for details of metal bore adaptors.

S = Plain bore only, types 462, 466 & 470, keyways not permissible sizes 19 & 26
Flexible Membrane Couplings - Bolted Series

Materials & Finishes

Hubs & spacer:  
- Al. Alloy 2014A T6 or 6063 LF  
- Clear anodised finish

Membranes:  
- Spring quality stainless steel  
- Heat treated

Bolt assembly:  
- Bolt, alloy steel, black oiled finish  
- Bush assembly, steel, zinc plate & black chromate  
- Safety washer, carbon steel, black/brown oiled finish

Fasteners:  
- Alloy steel, black oiled

Temperature Range

-40°C to +120°C

Set screw hubs

Clamp hubs

Drive shafts

Unless specified otherwise, drive shafts are supplied with set screw hubs inboard and/or bonded to link shaft.

Drive shafts are supplied to order.

Please specify: • Coupling size • Hub style and bore diameter at each end • Keyway details • Overall length L2 • Minimum torsional stiffness, if critical • Quantity
### Dimensions & Order Codes

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### Standard Bore Sizes

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<td>4.5 - 5</td>
<td>S - S -</td>
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<td>S - S -</td>
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<td>21 - 28</td>
<td>S - S -</td>
</tr>
<tr>
<td>76&lt;br&gt;1 - 7</td>
<td>S - S -</td>
</tr>
</tbody>
</table>

Note that the drawings on the facing page represent size 66 & 76 which employ 6-bolt membrane sizes 41 & 52 employ 4-bolts.

**IMPORTANT**

- Length of supported thro’ bore.
- Clearance bore thro’ spacer.
- Maximum recommended tightening torque.
- Values apply with max bores.
- Peak torque. Select a size where Peak Torque exceeds the application torque x service factor. 
(see page 4)
- Max. compensation values are mutually exclusive.
- Torsional stiffness values apply at 50% peak torquewith no misalignment, measured shaft-to-shaft with largest standard bores.
- Note that in some vendors’ catalogues the given torsional stiffness applies to the membrane stack only, giving rise to a greater value.
- Note that the drawings on the facing page represent Size 66 & 76 which employ 6-bolt membrane sizes 41 & 52 employ 4-bolts.

Diameters for which a bore adaptor is shown can be adapted to smaller shaft sizes.
See page 58 for details of metal bore adaptors.
S = Plain bore only, types 662, 666 & 670.
General Purpose Motion Control Couplings

- Sliding Disc (Oldham)
- Universal Lateral (Uni-Lat)

- Backlash-free up to 10° turns
- Can tolerate large misalignments
- Slight damping characteristics
- Flex-free mechanical action - non-progressive bearing loads
- Non-magnetic (with special screws)
- Electrically isolating
- Low inertia

Uni-Lats are widely used for pulse generator drives while Oldhams are very popular for stepper driven positioning stages.

A unique property of Uni-Lats is resistance to axial motion. This makes them suitable for light push/pull duties and for anchoring axially unrestricted shafts.

Oldhams are 3-part couplings consisting of 2 hubs + 1 torque disc. The hubs determine the method of installation and shaft attachment, the discs determine the quality of motion.

The 4 hub styles and 2 disc materials that comprise the range are fully interchangeable within each of the 9 sizes available. To take advantage of this flexibility, hubs and discs are specified and supplied separately.

The discs are the sacrificial elements and are replaceable at low cost in the event of wear or breakage.
**Lateral Offset Couplings**

**General Performance Criteria**

**Temperature Range**

–20°C to +60°C

**Maximum Rotational Speed**

3000 rev/min

- **Blind hubs**: Length of parallel bore ±0.2. Bores may terminate in 118° incl. angle or flat bottomed.
- **Thro’ hubs**: Max permissible hub penetration.

<table>
<thead>
<tr>
<th>Coupling size</th>
<th>Complete hub ref.</th>
<th>ØD</th>
<th>L</th>
</tr>
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<td>41</td>
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</table>

**Blank hubs**

User-adaptable for special needs, e.g. fitting within tubes. Blank hubs are supplied centred with no provision for fastening. External dimensions identical with blind hubs.

**Standard discs** (larger sizes are webbed)

- **Acetal**: High torsional stiffness, good bearing properties, long backlash-free life.
- **Nylon 11**: Resilient, isolates noise & vibration. Performance approximately 25% that of acetal disc.

**Thro’ bored discs**

Thro’ bored discs allow shafts to near-butt, standard thro’ hole diameter = ØD x 0.5. To order, add suffix ‘T’ to order code, e.g., **236.25T**

Other thro’ hole diameters are manufactured to order. Specify the disc ref. and thro’ hole diameter. This should equal the larger shaft diameter + 2 x max radial error.

Note that thro’ bored discs reduce torsional stiffness.
**Oldham**

**Brass / Aluminium Blind Hubs**

Controlled bore depth L1 provides a register when pre-assembling hubs to shafts.

**DIMENSIONS & ORDER CODES**

<table>
<thead>
<tr>
<th>Coupling Type and Size</th>
<th>Hub Ref</th>
<th>Set Screw Style</th>
<th>Clamp Style</th>
<th>ØD mm</th>
<th>L mm</th>
<th>L1 mm</th>
<th>L2 mm</th>
<th>ØB1 Max mm</th>
<th>ØB2 +0.03mm/-0mm (+0.0012/-0)</th>
<th>Mass kg x10^-3</th>
<th>Size</th>
<th>Torque Nm</th>
<th>Wrench mm</th>
<th>Acetal (black) Std</th>
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**PERFORMANCE (AT 20°C WITH STANDARD ACETAL DISC)**

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<th>Peak torque Nm</th>
<th>Max compensation @ 3000 rpm</th>
<th>Torsional</th>
<th>Static break torque Nm</th>
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<td>0.15</td>
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**STANDARD BORES FOR ALL TYPES**

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</table>

**IMPORTANT**

Load capacity depends on application conditions: see page 4 for details

**Materials & Finishes**

- Hubs sizes 06 to 13: Brass Cu Zn 21 Si 3P (Lead Free)
- Hubs sizes 19 to 41: Al Alloy 2014 T6 or 6026 LF

**Fasteners:**

- Alloy steel, black oiled
- Hub sizes 19 to 41: Irridite NCP finish
Aluminium Thro’ Hubs

DIMENSIONS & ORDER CODES

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<tr>
<th>Coupling Type and Size</th>
<th>Hub Ref</th>
<th>Dimensions</th>
<th>Fasteners</th>
<th>Disc Ref</th>
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**PERFORMANCE (AT 20°C WITH STANDARD ACETAL DISC)**

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<th>Coupling Size</th>
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<th>Max compensation @ 3000 rpm</th>
<th>Torsional</th>
<th>Static break torque Nm</th>
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<td>Angular deg</td>
<td>Radial mm</td>
<td>Axial ± mm</td>
<td>Rate deg / Nm</td>
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**STANDARD BORES® FOR ALL TYPES**

<table>
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<th>Coupling Size</th>
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<td>2 to 30</td>
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**Materials**

- **Finishes**: Al Alloy 2014A T6 or 6026 LF

**Fasteners**: Alloy steel, black oiled

**Hubs**: Clear anodised finish

**IMPORTANT**

- Load capacity depends on application conditions: **see page 4 for details**
Stainless Steel Thro' Hubs

DIMENSIONS & ORDER CODES

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<thead>
<tr>
<th>Size</th>
<th>Set Screw Style</th>
<th>Clamp Style</th>
<th>BD mm</th>
<th>L mm</th>
<th>L1 mm</th>
<th>L2 mm</th>
<th>ØB1 Max mm</th>
<th>Moment of Inertia kgm² x10⁻³</th>
<th>Mass kg x10⁻³</th>
<th>Size</th>
<th>Torque Nm</th>
<th>A/F mm</th>
<th>Acetal (black) Std.</th>
<th>Nylon 11 (Nylon)</th>
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PERFORMANCE (AT 20°C WITH STANDARD ACETAL DISC)

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<th>Peak torque Nm</th>
<th>Max compensation @ 3000 rpm</th>
<th>Torsional</th>
<th>Static break torque Nm</th>
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</thead>
<tbody>
<tr>
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<td>Angular deg</td>
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STANDARD BORES® FOR ALL TYPES

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<td>50</td>
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Materials Finishes

Hubs: Stainless Steel 303 S31 - Natural Finish

Fasteners: Stainless Steel

IMPORTANT

Load capacity depends on application conditions: see page 4 for details

DIMENSIONS & ORDER CODES

This holes allow disc replacement without disturbing shaft alignment

Set screw style

Clamp style

Ref. 850
Set screw style

Ref. 852
Clamp style
Universal / Lateral Offset Couplings

Materials & Finishes

| Hub sizes 18 & 27: | Brass Cu Zn 21 Si 3P (Lead Free) |
| Hub sizes 34, 41 & 70: | Al. Alloy 2014 T6 or 6026 LF Irridite NCP |
| Fasteners: | Alloy steel, black oiled |
| Clamp rings (sizes 18 & 27): | Al. Alloy 2014 T6 or 6026 LF Irridite NCP |
| Torque rings, all sizes: | Acetal (black) |

Temperature Range

-20°C to +60°C

Set screw hubs

- **Ref. 201** Small bores
- **Ref. 203** Large bores
- **Ref. 221** (not listed in main table). Combines large & small bores. See explanatory note on facing page

Clamp hubs

- **Ref. 205** Integral leaf clamp
- **Ref. 207** Collet hub & ring clamp
- **Typical**

Installation

- **right**
  - Up to 10° angular offset, depending on type
- **right**
  - Up to 1mm radial offset for extreme misalignments
- **wrong**
  - Standard Uni-Lats cannot be used in pairs. Special versions are available for use in this mode. Please enquire.
### Uni-Lat

#### Universal / Lateral Offset Couplings

### DIMENSIONS & ORDER CODES

**COUPLING REF.**

<table>
<thead>
<tr>
<th>Coupling Size</th>
<th>Set Screw Hubs</th>
<th>Clamp Hubs</th>
<th>ØD mm</th>
<th>L mm</th>
<th>ØL1 mm</th>
<th>ØL2 mm</th>
<th>ØB1, ØB2 (max) mm</th>
<th>Fasteners</th>
<th>Torque Nm</th>
<th>Wrench mm</th>
<th>Moment of inertia kgm² x 10⁻⁶</th>
<th>Mass kg x 10⁻³</th>
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**PERFORMANCE AT 20°C**

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<th>Max compensation @ 3000 rpm</th>
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<th>Axial</th>
<th>Static break torque Nm</th>
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**STANDARD BORES**

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</table>

**Corresponding bore adaptor**

| 253 | 254* |
| 255 | 257  |

*Note that adaptor 254 is dedicated to coupling ref. 201.27. Use adaptor 255 for all other 8mm diameters.*

**IMPORTANT**

- Load capacity depends on application conditions. See page 4 for details.
- By specifying ref. 221 (not listed in tables, see diagram previous page) you can combine the bores coded for ref. 201 with those coded for ref. 263, eg., 221.27.2432 specifies Size 27 with Ø6.35 x 10 bores.

**Coupling ref. 221**

Length of supported thro’ bore. Shafts must not penetrate beyond L1 when in operation.
- Nominal distance between shafts inserted to L1.
- Maximum recommended tightening torque.
- Values apply with max bores.
- Peak torque. Select a size where Peak Torque exceeds the application torque x service factor. (See page 4)
- Couplings can provide up to 1mm radial and 10° angular compensation (5° for ref. 207) when required. Observe given values for maximum backlash-free life. Electrical isolation between shafts > 3kV for all models when offset ≤5°.
- Values apply at 50% peak torque with no misalignment, measured shaft-to-shaft with largest standard bores.

† Ref. 207 only. Insert both bore codes in place of ‡.
Beam Couplings

- Multi-Beam
- Single-Beam
- Step-Beam

- Torsionally rigid design
- Zero backlash
- No moving parts
- Single beam simple coupling compatible with industry standard types
- 3-Beam single stage for increased torsional stiffness
- 6-Beam two stage for torsional stiffness and increased radial compliance
- Step Beam for low inertia, electrical isolation, low cost

Beam couplings will readily accommodate any combination of axial motion, angular and parallel misalignment.

The 3 start helical-cut design provides higher torque capability and reduced wind-up compared with single beam versions.

Multi-Beam is available in three standard materials: stainless steel, aluminium and acetal, for shaft diameters from 1mm to 38mm.
## Stainless Steel Multi-Helix Flexible 3 Beam Couplings

### Set Screw Hubs

![Set Screw Hub Diagram](image)

**Materials & Finishes**
- **Couplings:** Stainless Steel 303 S31
- **Fasteners:** Stainless Steel

### Clamp Hubs

![Clamp Hub Diagram](image)

**Temperature Range**
- –40°C to +140°C

### 3-BEAM COUPLINGS: DIMENSIONS & ORDER CODES

<table>
<thead>
<tr>
<th>Coupling Type &amp; Size</th>
<th>Set Screw Style</th>
<th>Clamp Type</th>
<th>ØD mm</th>
<th>L mm</th>
<th>Ø B2 mm</th>
<th>Ø B1 mm</th>
<th>L1 mm</th>
<th>Bore Diameters</th>
<th>Mass kgx10⁻³</th>
<th>Fasteners</th>
<th>Angular Offset Deg.</th>
<th>Parallel Offset mm</th>
<th>Torsional Stiffness Nm/rad</th>
<th>Peak Torque Nm</th>
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- Length of supported bore.
- **Peak torque**. Select a size where Peak Torque exceeds the application torque x service factor. *(see page 4)*
- Max. compensation values are mutually exclusive.

### BORE SIZES 3-BEAM COUPLINGS

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- B1 only
- B1 & B2

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P-7293-HD-A4 2/20
Stainless Steel Multi-Helix Flexible 6 Beam Couplings Non-Relieved

Set Screw Hubs

Clamp Hubs

Materials & Finishes

Couplings: Stainless Steel 303 S31
Fasteners: Stainless Steel

Temperature Range

–40°C to +140°C

6-BEAM COUplings: Dimensions & Order Codes

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<th>Set Screw Style</th>
<th>Clamp Type</th>
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<th>L mm</th>
<th>L1 mm</th>
<th>Bore Diameters</th>
<th>Mass kgx10-3</th>
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<th>Parallel Offset mm</th>
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Max. compensation values are mutually exclusive.

Length of supported bore.

Peak torque Select a size where Peak Torque exceeds the application torque x service factor. (see page 4)

S = Setscrew only

BORE SIZES 6-BEAM COUplings, NON-RELIEVED

1. Length of supported bore.
2. Max. compensation values are mutually exclusive.
3. Peak torque Select a size where Peak Torque exceeds the application torque x service factor. (see page 4)
4. S = Setscrew only
Stainless Steel Multi-Helix Flexible 6 Beam Couplings

6-BEAM COUPLINGS: DIMENSIONS & ORDER CODES

<table>
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<tr>
<th>Coupling Type &amp; Size</th>
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<th>Clamp Type</th>
<th>ØD mm</th>
<th>L mm</th>
<th>L1 mm</th>
<th>Bore Diameters</th>
<th>Mass kgx10-3</th>
<th>Fasteners</th>
<th>Angular Offset Deg.</th>
<th>Parallel Offset mm</th>
<th>Torsional Stiffness Nm/rad</th>
<th>Peak Torque Nm</th>
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<td>Wrench mm</td>
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Length of supported bore. Peak torque: Select a size where Peak Torque exceeds the application torque x service factor. (see page 4) Max. compensation values are mutually exclusive. Torsional Stiffness values based on maximum bores, for smaller bore combinations the values are nearer the non-relieved type.

BORING SIZES 6-BEAM COUPLINGS, RELIEVED

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S = Setscrew only

Temperature Range
–40°C to +140°C

Materials & Finishes
Couplings: Stainless Steel 303
Fasteners: Stainless Steel

www.huco.com
### 3-BEAM COUPLINGS: DIMENSIONS & ORDER CODES

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<th>L mm</th>
<th>L1 mm</th>
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<th>Fasteners</th>
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<th>Cap Screw</th>
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<th>Wrench mm</th>
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<th>Parallel Offset mm</th>
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- **Length of supported bore.**
- **Peak torque**: Select a size where Peak Torque exceeds the application torque x service factor. [see page 4](#)
- **Max. compensation values are mutually exclusive.**

### BORE SIZES 3-BEAM COUPLINGS

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- **B1 only**
- **B1 & B2**

---

**Multi-Beam**

**Aluminium Multi-Helix Flexible 3 Beam Couplings**

**Set Screw Hubs**

**Clamp Hubs**

**Materials & Finishes**

- **Couplings**: Aluminium L168 or better
- **Fasteners**: Alloy steel, black oiled

**Temperature Range**

\(-40°C\) to \(+120°C\)
### Multi-Beam

**Aluminium Multi-Helix Flexible 6 Beam Couplings Non-Relieved**

**Set Screw Hubs**

**Clamp Hubs**

**Materials & Finishes**
- Couplings: Aluminium L168 or better
- Fasteners: Alloy steel, black oiled

**Temperature Range**
- –40°C to +120°C

### 6-BEAM COUPLINGS: DIMENSIONS & ORDER CODES

<table>
<thead>
<tr>
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<th>Clamp Hub Type</th>
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<th>L mm</th>
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**Bore Sizes 6-BEAM COUPLINGS, NON-RELIEVED**

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| Bore ref. | 11 | 14 | 16 | 18 | 19 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 35 | 36 | 38 | 41 | 42 | 45 | 46 | 47 | 48 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 |
|-----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|    |
| ØB1 only  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| ØB1 & ØB2 |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |

**Bore ref.**
- ØB1 only
- ØB1 & ØB2

**Length of supported bore.**

**Peak torque**: Select a size where Peak Torque exceeds the application torque x service factor. (see page 4)

**Max. compensation values are mutually exclusive.**

S = Setscrew only

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P-7293-HD-A4 2/20
## 6-BEAM COUPLINGS: DIMENSIONS & ORDER CODES

<table>
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<tr>
<th>Coupling Type &amp; Size</th>
<th>Set Screw Style</th>
<th>Clamp Type</th>
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<th>Mass kgx10-3</th>
<th>Fasteners</th>
<th>Angular Offset Deg.</th>
<th>Parallel Offset mm</th>
<th>Torsional Stiffness Nm/rad</th>
<th>Peak Torque Nm</th>
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**Bore Sizes 6-Beam Couplings, Relieved**

- **Length of supported bore.**
- **Peak torque:** Select a size where Peak Torque exceeds the application torque x service factor. (see page 4)
- **Max. compensation values are mutually exclusive.**
- **Torsional Stiffness values based on maximum bores, for smaller bore combinations the values are nearer the non-relieved type.**
Multi-Beam

Acetal Multi-Helix Flexible 3 Beam Couplings

Set Screw Hubs

Clamp Hubs

Materials & Finishes

Couplings: Acetal (natural)
Fasteners: Stainless Steel

Temperature Range
–20°C to +60°C

3-BEAM COUPLINGS: DIMENSIONS & ORDER CODES

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ØD: Diameter of bore hole
L: Length of bore hole
L1: Length of bore hole

ØB1, ØB2: Bore diameters
Min B1, Min B2, Max B1 & B2: Minimum and maximum bore diameters
Min B1 & B2: Minimum and maximum bore diameters

Mass kgx10-3: Mass of the coupling

Fasteners: Set Screw, Cap Screw
Angular Offset Deg.: Angular offset in degrees
Parallel Offset mm: Parallel offset in millimeters
Torsional Stiffness Nm/rad: Torsional stiffness in newton meters per radian
Peak Torque Nm: Peak torque in newton meters

Notes:

• Length of supported bore.

• Peak torque: Select a size where Peak Torque exceeds the application torque x service factor. (see page 4)

• Max. compensation values are mutually exclusive.

BORE SIZES 3-BEAM COUPLINGS

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<tr>
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<td>8 (1/8&quot;) 11 14 16 18 20 22 24 28 31 32 35</td>
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B1 only

B1 & B2
Set Screw Hubs

Materials & Finishes
- Couplings: Acetal (natural)
- Fasteners: Stainless Steel

Temperature Range
-20°C to +60°C

Clamp Hubs

6-BEAM COUPLINGS: DIMENSIONS & ORDER CODES

<table>
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<th>Coupling Style</th>
<th>Clamp Type</th>
<th>ØD (mm)</th>
<th>L (mm)</th>
<th>ØB1, ØB2</th>
<th>Bore Diameters (ØB1, ØB2)</th>
<th>Mass (kg x 10^-3)</th>
<th>Fasteners</th>
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- Length of supported bore.

- Peak torque. Select a size where Peak Torque exceeds the application torque x service factor. [see page 4]

- Max. compensation values are mutually exclusive. Torsional Stiffness values based on maximum bores, for smaller bore combinations the values are nearer the non-relieved type.

BORE SIZES 6-BEAM COUPLINGS, NON-RELIEVED

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Bore ref. 11 14 16 18 19 20 22 24 28 31 32 35 36 38 41 42

- ØB1 only

- ØB1 & ØB2

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Multi-Beam

Acetal Multi-Helix Flexible 6 Beam Couplings

Set Screw Hubs

Clamp Hubs

Materials & Finishes

Couplings: Acetal (natural)
Fasteners: Stainless Steel

Temperature Range

–20°C to +60°C

6-BEAM COUPLINGS: DIMENSIONS & ORDER CODES

<table>
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<th>Clamp Type</th>
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</table>

Length of supported bore.

Peak torque. Select a size where Peak Torque exceeds the application torque x service factor. (see page 4)

Max. compensation values are mutually exclusive.

BORE SIZES 6-BEAM COUPLINGS, RELIEVED

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Bore ref. 11 14 16 18 19 32 35 38 39

□ B1 only □ B1 & B2
Step Beam Couplings - Nylon

Materials & Finishes
- **Couplings**: Nylon type engineering polymer
- **Fasteners**: Stainless Steel

Temperature Range
-20°C to +150°C

**Set Screw Hubs**

**Clamp Hubs**

**Dimensions & Order Codes**

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**Performance**

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**Available Bores**

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S-Beam

Single Helix Beam Couplings - Stainless Steel

Set Screw Hubs

Clamp Hubs

DIMENSIONS & ORDER CODES

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PERFORMANCE

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<th>Nominal stiffness at std. bore size</th>
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<td>30</td>
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Materials & Finishes

Couplings: Stainless Steel 303 S31
Fasteners: Stainless Steel

Temperature Range

-40°C to +140°C

AVAILABLE BORES

<table>
<thead>
<tr>
<th>Size</th>
<th>ØB1, ØB2 +0.03mm/-0mm (+0.0012/−0)</th>
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Bore Ref: 14 16 18 19 20 22 24 27 28 30 31 32 35 36 38 40 41 42 47 48 52 53
### Performance

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</table>

### Materials & Finishes
- Couplings: Aluminium L 168 or better
- Fasteners: Alloy steel, black oiled

### Temperature Range
- 
-40°C to +120°C
Drive Couplings

- Flexible Double Loop
- Flexible Jaw (Spider)

General purpose couplings for light power drives.
**Flex-G**

**Flexible Jaw Coupling**

Huco Flexible Jaw Couplings utilise the flexibility and resilience of a polyurethane element between aluminium hubs. This combination allows high torque to be transmitted with little or no backlash, even where there is significant angular and/or parallel misalignment.

- Zero / Low backlash
- Rated up to 17Nm Torque
- Choice of 3 polyurethane elements

---

**Set Screw Hubs**

**Thro’ Clamp Hubs**

User-adaptable for special needs e.g. fitting within tubes. Blank hubs are supplied centred with no provision for fastening. External dimensions identical with blind hubs. Except size 40 which has 6.35mm pilot hole.

---

**Pilot Hubs**

Polyurethane elements are available with three hardness levels; hard, standard and soft which exhibit different operating characteristics. Other features of polyurethane are:

- Resistance to oils, grease and many solvents
- Good atmospheric and chemical resistance
- Excellent shock and vibration damping
## Dimensions & Order Codes

<table>
<thead>
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<th>Coupling Size</th>
<th>Set Screw Style</th>
<th>Clamping Style</th>
<th>Pilot Hub</th>
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<th>L mm</th>
<th>L1 mm</th>
<th>L2 mm</th>
<th>ØB1 max mm</th>
<th>ØB2 max mm</th>
<th>Fasteners</th>
<th>Screw</th>
<th>Torque Nm</th>
<th>Wrench mm</th>
<th>Moment of inertia kgm² x 10⁻⁸</th>
<th>Mass kg x 10⁻³</th>
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### Performance (at 20°C)

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<th>Torsional Stiffness Nm/rad</th>
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### Standard Bores

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<tr>
<td>20</td>
</tr>
<tr>
<td>30</td>
</tr>
<tr>
<td>40</td>
</tr>
</tbody>
</table>

### Materials & Finishes

- **Hub sizes 14 - 30:** Al. Alloy 2024
- **Hub size 40:** Cast Aluminium LM9
- **Membranes:** Polyurethane
- **Fastener:** Alloy steel, black oiled

### Temperature Range

-40°C to +80°C

For short durations up to 100°C

Note: Larger sizes available. Please ask for details.
# Flex-P

## Double Loop Flexible Coupling

### Dimensions & Order Codes

<table>
<thead>
<tr>
<th>Size</th>
<th>Steel screws</th>
<th>Stainless steel screws</th>
<th>Dimensions</th>
<th>Fasteners</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Order Code</td>
<td></td>
<td>Max Diameter mm</td>
<td>Length L +/- 1.0 mm</td>
</tr>
<tr>
<td>10</td>
<td>047.10</td>
<td>-</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>049.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>047.20</td>
<td>-</td>
<td>48</td>
<td>48</td>
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<tr>
<td></td>
<td>-</td>
<td>049.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>047.30</td>
<td>-</td>
<td>54</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>049.30</td>
<td></td>
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<tr>
<td>40</td>
<td>047.40</td>
<td>-</td>
<td>56</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>049.40</td>
<td></td>
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</tbody>
</table>

### Performance

<table>
<thead>
<tr>
<th>Size</th>
<th>Max Torque 1 Nm</th>
<th>Max Torque 2 Nm</th>
<th>max misalignment/displacement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Angular deg</td>
<td>Radial mm</td>
<td>Axial +/- mm</td>
</tr>
<tr>
<td>10</td>
<td>0.5</td>
<td>0.8</td>
<td>10</td>
</tr>
<tr>
<td>20</td>
<td>1.8</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>30</td>
<td>5</td>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>40</td>
<td>10</td>
<td>18</td>
<td>15</td>
</tr>
</tbody>
</table>

Torque 1 = torque at maximum displacement

Torque 2 = torque at 1 deg. angular, 2mm axial and 0.5mm radial displacement

### Materials & Finishes

- **Hubs:** Stainless Steel 304 [1.4301] natural finish
- **Flexing Element:** Hytrel
- **Fastener:**
  - 047 Type: Alloy steel, black oiled
  - 049 Type: Stainless steel

### Temperature Range

-40°C to +100°C

### Maximum Rotational Speed

3000 rev/min

### Standard Bores

<table>
<thead>
<tr>
<th>Size</th>
<th>0B1, 0B2 +0.05mm/-0.0mm (+0.002/-0)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ØB1, ØB2 +0.05mm/-0.0mm (+0.002/-0)</td>
</tr>
<tr>
<td>10</td>
<td>3 (1/8&quot;) 4 (3/16&quot;) 5 (1/4&quot;) 6 (5/16&quot;)</td>
</tr>
<tr>
<td>20</td>
<td>8 (3/8&quot;) 10 (1/2&quot;) 12 (5/8&quot;)</td>
</tr>
<tr>
<td>30</td>
<td>14 (1&quot;) 15 (1&quot;)</td>
</tr>
<tr>
<td>40</td>
<td>16 (1&quot;) 18 (1.5&quot;)</td>
</tr>
</tbody>
</table>

*B = Plain bore only, keyway not permissible size 10

*S = Plain bore only, keyway not permissible size 10

* Couplings with dissimilar bores are non-standard
Plastic Universal Joints and Teleshafts

- Backlash-free up to 10⁴ turns
- Low mass
- Low inertia
- Corrosion resistant
- Electrically isolating
- No maintenance

Huco-Pol is a range of light duty, backlash-free universal joints and teleshafts manufactured of acetal and non-ferrous metals.

They are suitable for intermittent applications where low mass, corrosion resistance and electrical isolation are desirable.

Huco-Pol joints and teleshafts have only a fraction of the torque capability of steel joints and are not intended to substitute for these in the normal way.

Huco-Pols are used in business machines, food processing plants, laboratory equipment and electro-medical apparatus among others.

Alternative polymers are available for high temperature operation.
SINGLE JOINTS - DIMENSIONS & ORDER CODES

<table>
<thead>
<tr>
<th>Size</th>
<th>Order Code</th>
<th>OD mm</th>
<th>L mm</th>
<th>L1 mm</th>
<th>L2 mm</th>
<th>L3 mm</th>
<th>B1, B2 Max mm</th>
<th>Moment of inertia kgm² x 10⁻⁸</th>
<th>Mass kg x 10⁻³</th>
<th>Fasteners</th>
</tr>
</thead>
<tbody>
<tr>
<td>06</td>
<td>103.06</td>
<td>7.1</td>
<td>27.2</td>
<td>-</td>
<td>9.3</td>
<td>8.6</td>
<td>3.18</td>
<td>1.1</td>
<td>3.1</td>
<td>M3</td>
</tr>
<tr>
<td>09</td>
<td>103.09</td>
<td>11.1</td>
<td>37.6</td>
<td>-</td>
<td>13.1</td>
<td>11.4</td>
<td>5.0</td>
<td>13.5</td>
<td>9.3</td>
<td>M3</td>
</tr>
<tr>
<td>13</td>
<td>103.13</td>
<td>14.3</td>
<td>46.2</td>
<td>-</td>
<td>15.7</td>
<td>14.8</td>
<td>6.35</td>
<td>44.6</td>
<td>17.7</td>
<td>M3</td>
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<td>16</td>
<td>103.16</td>
<td>17.5</td>
<td>67.6</td>
<td>-</td>
<td>22.3</td>
<td>23.0</td>
<td>10.0</td>
<td>136</td>
<td>35</td>
<td>M4</td>
</tr>
<tr>
<td>20</td>
<td>105.20</td>
<td>23.0</td>
<td>62.0</td>
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<td>28.0</td>
<td>12.7</td>
<td>147</td>
<td>25.7</td>
<td>-</td>
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<td>25</td>
<td>105.25</td>
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<td>10.0</td>
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<td>34.0</td>
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<td>463</td>
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<td>32</td>
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<td>86.0</td>
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<td>44.0</td>
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<td>1399</td>
<td>103</td>
<td>-</td>
</tr>
</tbody>
</table>

FOR STANDARD BORES SEE FACING PAGE

SINGLE JOINTS - PERFORMANCE at 20°C

<table>
<thead>
<tr>
<th>Size</th>
<th>Peak Torque Nm</th>
<th>Static Break Torque Nm</th>
<th>Torsional Rate deg/Nm</th>
<th>Torsional Stiffness Nm/Rad</th>
<th>Max angular compensation @ 1000 rev/min</th>
<th>Max axial loading N</th>
</tr>
</thead>
<tbody>
<tr>
<td>06</td>
<td>0.11</td>
<td>0.45</td>
<td>19.7</td>
<td>2.9</td>
<td>45</td>
<td>18</td>
</tr>
<tr>
<td>09</td>
<td>0.38</td>
<td>1.9</td>
<td>6.8</td>
<td>8.4</td>
<td>45</td>
<td>38</td>
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<tr>
<td>13</td>
<td>0.95</td>
<td>4.5</td>
<td>3.2</td>
<td>18</td>
<td>45</td>
<td>67</td>
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<td>16</td>
<td>1.5</td>
<td>6.8</td>
<td>1.7</td>
<td>34</td>
<td>45</td>
<td>98</td>
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<td>20</td>
<td>2.8</td>
<td>17</td>
<td>0.94</td>
<td>61</td>
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<td>25</td>
<td>5.6</td>
<td>34</td>
<td>0.51</td>
<td>112</td>
<td>40</td>
<td>222</td>
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<td>32</td>
<td>10.7</td>
<td>72</td>
<td>0.25</td>
<td>229</td>
<td>40</td>
<td>334</td>
</tr>
</tbody>
</table>

Materials & Finishes

Bodies: Acetal

Cross-pieces: 103, 111 = Brass Cu Zn 21 Si 3P (Lead Free)
105 = CZ122

Bore Inserts: 103, 111 = Brass Cu Zn 21 Si 3P (Lead Free)
105 = Al. Alloy 2014A T6 or 6026 LF

Fasteners: Alloy steel, black oiled

Operating Temperature Range

-20°C to +60°C

Maximum Rotational Speed

1000 rev/min
### DOUBLE JOINTS - DIMENSIONS & ORDER CODES

<table>
<thead>
<tr>
<th>Size</th>
<th>Order Code</th>
<th>Dimensions</th>
<th>Fasteners</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>OD mm</td>
<td>L mm</td>
</tr>
<tr>
<td>06</td>
<td>111.06</td>
<td>7.1</td>
<td>35.3</td>
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<td>09</td>
<td>111.09</td>
<td>11.1</td>
<td>50.6</td>
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<td>13</td>
<td>111.13</td>
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<td>16</td>
<td>111.16</td>
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<td>89.6</td>
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</table>

### DOUBLE JOINTS - PERFORMANCE at 20°C

<table>
<thead>
<tr>
<th>Size</th>
<th>Peak Torque Nm</th>
<th>Static Break Torque Nm</th>
<th>Torsional Rate deg/Nm</th>
<th>Torsional Stiffness Nm/Rad</th>
<th>Max angular compensation @ 1000 rev/min</th>
<th>Max radial compensation mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>06</td>
<td>0.08</td>
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<td>4.5</td>
<td>12.6</td>
<td>90</td>
<td>15.5</td>
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### STANDARD BORES

<table>
<thead>
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<th>4 (3/16&quot;)</th>
<th>5 (1/4&quot;)</th>
<th>6 (3/8&quot;)</th>
<th>8 (1/2&quot;)</th>
<th>10 (5/8&quot;)</th>
<th>12 (1&quot;)</th>
<th>14 (5/8&quot;)</th>
<th>16</th>
<th>18</th>
<th>19 (3/4&quot;)</th>
<th>20</th>
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</thead>
<tbody>
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<td>●</td>
<td>●</td>
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<td>●</td>
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<td>●</td>
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<tr>
<td>Bore Ref</td>
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<td>18</td>
<td>19</td>
<td>20</td>
<td>22</td>
<td>24</td>
<td>28</td>
<td>31</td>
<td>32</td>
<td>35</td>
<td>36</td>
</tr>
</tbody>
</table>
Plastic Universal Joints

Constant velocity

The velocity ratio of single universal joints is not constant when the working angle is greater than zero. Their geometry gives rise to sinusoidal fluctuations at the output that increase with the working angle and which vary between:

\[ \omega \cos \beta \text{ and } \omega \sec \beta \]

where \( \omega \) = angular velocity
and \( \beta \) = operating angle

For example, when the operating angle is 5°, the maximum error is ±0.4%; at 7° it is ±0.8%, and at 10° it is ±1.5%. A motor shaft turning at a constant 1000 rpm, driving through a single universal joint set at an operating angle of 9°, produces an output that fluctuates between 996 rpm and 1004 rpm twice each revolution.

The fluctuations are cancelled out when using a double joint or two single joints connected back to back.

ADJUSTED TORQUE

Peak torque values apply when the working angle is zero. Adjusted torque takes account of dynamic loading at the bearings. To find adjusted torque, determine application speed, torque and operating angle,

Then:

a) multiply speed x working angle
b) subtract the result from 10000
c) divide the answer into 10000
d) apply the result to the application torque.

eg. speed = 400 rpm
application torque = 0.1Nm
working angle = 20°

Accordingly:

a) \( 400 \times 20° = 8000 \)
b) \( 10000 - 8000 = 2000 \)
c) \( 10000 / 2000 = 5 \)
d) \( 5 \times 0.1Nm = 0.5Nm \)

Select a joint where Peak Torque exceeds 0.5Nm, ie., size 13 or larger.

Note: To remain within the capacity of the joint, the result of speed x working angle must be less than 10000.
**Plastic Universal Joints Brass Cross Pieces and Tubes**

Teleshafts are delivered with nose bush welded here.

Nose bush optional. Bond in place after cutting tube to length.

**DIMENSIONS & ORDER CODES**

<table>
<thead>
<tr>
<th>Teleshaft size</th>
<th>Teleshaft options</th>
<th>ØD mm</th>
<th>L mm ±1.0 min</th>
<th>L mm max</th>
<th>Stroke mm</th>
<th>L2 mm</th>
<th>ØB1, ØB2 max</th>
<th>Mass kg x 10^-3</th>
<th>Corresponding joints. For dimensions see</th>
</tr>
</thead>
<tbody>
<tr>
<td>09</td>
<td>Standard tubes self-colour brass</td>
<td>128.09.240</td>
<td>11.1</td>
<td>240</td>
<td>389</td>
<td>149</td>
<td>13.1</td>
<td>5</td>
<td>36</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>128.13.300</td>
<td>14.3</td>
<td>300</td>
<td>494</td>
<td>184</td>
<td>15.7</td>
<td>6.35</td>
<td>58</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td>128.16.450</td>
<td>17.5</td>
<td>450</td>
<td>730</td>
<td>280</td>
<td>22.3</td>
<td>10</td>
<td>168</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>130.20.464</td>
<td>20.5</td>
<td>500</td>
<td>784</td>
<td>284</td>
<td>20.0</td>
<td>14</td>
<td>457</td>
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<tr>
<td>25</td>
<td></td>
<td>130.25.500</td>
<td>23.5</td>
<td>564</td>
<td>899</td>
<td>304</td>
<td>21.0</td>
<td>20</td>
<td>827</td>
</tr>
<tr>
<td>32</td>
<td></td>
<td>130.32.564</td>
<td>26.5</td>
<td>644</td>
<td>899</td>
<td>304</td>
<td>21.0</td>
<td>20</td>
<td>827</td>
</tr>
</tbody>
</table>

- A range of standard telescopes is available which can be shortened to achieve an infinite number of length/stroke requirements. The lengths L min shown in the table above are the longest of the standard range in each size. Specific lengths are produced by cutting an equal amount from both ends of the nearest standard size. See next page for recommended procedure.
- Custom Teleshaft assemblies can be factory made subject to minimum order quantities.
- *The nose bush eliminates any torsional free play that may be apparent in the tubes due to working clearances.
- Full details of the standard range and product order codes are available on request. Please ask for a Huco Teleshaft data sheet.

**STANDARD BORES**

<table>
<thead>
<tr>
<th>Teleshaft size</th>
<th>ØB1, ØB2 +0.03mm/-0mm (+0.0012/-0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8”</td>
<td>4</td>
</tr>
<tr>
<td>09</td>
<td>128.09.240</td>
</tr>
<tr>
<td>13</td>
<td>128.13.300</td>
</tr>
<tr>
<td>16</td>
<td>128.16.450</td>
</tr>
<tr>
<td>20</td>
<td>130.20.464</td>
</tr>
<tr>
<td>25</td>
<td>130.25.500</td>
</tr>
<tr>
<td>32</td>
<td>130.32.564</td>
</tr>
</tbody>
</table>

Diameters for which a bore adaptor is shown can be adapted to smaller shaft sizes. See page 59 for details.
**Huco Teleshafts**

**Plastic Universal Joints Brass Cross Pieces and Tubes**

Extensible drive shafts (teleshafts), are useful when the distance between actuator and load varies during operation, or needs to accommodate component variances, or when a quick disconnect facility is needed in the drive line.

Huco teleshafts are in keeping with the light duty capabilities of plastics universal joints and employ precision drawn square brass tubes as the telescoping medium. These can easily be cut by the user to provide an extensible drive shaft with customised dimensions.

There are 2 ways to arrive at a customised teleshaft: empirically (shown below), or with tables that provide all necessary data on stroke and tube lengths for teleshafts with and without nose bushes up to 500mm retracted length.

**Empirical method** (based on the retracted length).

<table>
<thead>
<tr>
<th>Size</th>
<th>L3</th>
<th>L8</th>
</tr>
</thead>
<tbody>
<tr>
<td>09</td>
<td>8.6</td>
<td>3.2</td>
</tr>
<tr>
<td>13</td>
<td>10.4</td>
<td>4.3</td>
</tr>
<tr>
<td>16</td>
<td>15.2</td>
<td>6.1</td>
</tr>
<tr>
<td>20</td>
<td>17.0</td>
<td>8.2</td>
</tr>
<tr>
<td>25</td>
<td>20.0</td>
<td>10.3</td>
</tr>
<tr>
<td>32</td>
<td>21.0</td>
<td>18.0</td>
</tr>
</tbody>
</table>

- Disengage the teleshaft, remove the nose bush parked on the inner tube and keep it in case you need to use it later. Then lay the 2 halves of the teleshaft side by side.
- Slide one half alongside the other so that overall length \( L_{\text{min}} \) matches the intended length of the teleshaft when fully retracted. With a felt tip pen, draw a line across the outer tube at the point where this is level with the inboard end of the universal joint.
- If you are sure that the teleshaft will satisfactorily extend the required amount, cut the tube at the line.
- Mark the inner tube in the same way, then add an amount equivalent to dimension \( L_3 \) for your teleshaft size and draw a second line. Cut the tube at this second line.
- Now re-engage the tubes, taking care to orientate them correctly so that the inboard forks of the joints are in the same plane, and retract the teleshaft. The overall length should be as intended, and both tubes should bottom out simultaneously.
- If required, the nose bush can now be fitted by bonding it to the outer tube with an instant adhesive. (Factory fitted bushes are retained by a barbing technique). The bush will add an amount equivalent to dimension \( L_8 \) to the retracted length. Cutting this amount from the outer tube will reinstate the intended retracted length.
- The purpose of the nose bush is to eliminate any torsional free play that may be apparent in the tubes due to working clearances.

**How to order customised teleshafts**

Please specify your teleshaft by completing the questionnaire.

![Teleshaft dimensions](image)

Teleshaft size

<table>
<thead>
<tr>
<th>Teleshaft ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>09</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bore diameter End A</th>
</tr>
</thead>
<tbody>
<tr>
<td>.....................</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Bore diameter End B</th>
</tr>
</thead>
<tbody>
<tr>
<td>.....................</td>
</tr>
</tbody>
</table>

Fitted nose bush (end B only)

<table>
<thead>
<tr>
<th>Speed of rotation</th>
</tr>
</thead>
<tbody>
<tr>
<td>rpm</td>
</tr>
</tbody>
</table>

Please specify:

- \( L_{\text{min}} \) .................. and/or
- \( L_{\text{max}} \) .................. and/or
- \( S \) ..................

If more than one parameter is specified, which one is critical? ..................

Please quote .................. pcs

Projected annual qts .................. pcs
Adjustable Friction Clutches

Huco Vari-Tork are rotary friction devices with adjustable drag or slip torque. Controlled slip takes place between the hub and housing whenever the load exceeds the set torque.

- Three sizes - up to 3Nm torque capacity
- 4 interface styles
- Set screw or clamp connection
- Compact proportions
- Use as a torque limiter, tensioning, or overrun device

The construction is simple and robust and comprises a series of steel clutch plates engaging a hub and a series of friction rings engaging a housing. Pressure is brought to bear on the plates and friction rings by an adjuster acting through a spring and pressure plate. The load can be connected to either the steel inner hub or the aluminium alloy housing.

As a torque limiter, Vari-Tork interrupts continuity between power source and load when this reaches a pre-determined level.

As a tensioning device, Vari-Tork typically maintains tension in a filament or tape winding operation by exerting drag on the feed spool.

As an overrun device, Vari-Tork absorbs residual inertia of a motor when the load is braked or reaches a terminal stop.
Varitork

Adjustable Friction Clutches

Size 16 Set Screw Shaft Fixing

Size 25 Set Screw Shaft Fixing

Size 25 Clamp Shaft Fixing

Size 48 Set Screw Shaft Fixing

Materials & Finishes

- Housing, adjuster ring, adaptors: Al. Alloy 2014 T6 or 6026 LF
- Hub: Steel, heat treated
- Clutch plates: Size 25 Steel, heat treated
- Size 48 Brass
- Bearings: Sintered bronze
- Fasteners: Alloy steel, black oiled
## Adjustable Friction Clutches

### Performance Data

<table>
<thead>
<tr>
<th>Size</th>
<th>Size 16</th>
<th>Size 25</th>
<th>Size 48</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Power dissipation at 20°C</td>
<td>0.5 watt</td>
<td>7 watts</td>
</tr>
<tr>
<td></td>
<td>Backlash</td>
<td>0° max</td>
<td>2° max</td>
</tr>
<tr>
<td></td>
<td>Max surface temperature</td>
<td>80°C</td>
<td>80°C</td>
</tr>
<tr>
<td></td>
<td>Max speed continuous slip</td>
<td>1000 rpm</td>
<td>1000 rpm</td>
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</table>

### Standard Bores

<table>
<thead>
<tr>
<th>Size 16</th>
<th>ØB1, ØB2 +0.03mm/-0mm (+0.0012/-0)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4</td>
</tr>
<tr>
<td>At B1 end</td>
<td>•</td>
</tr>
<tr>
<td>At B2 end</td>
<td>•</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size 25</th>
<th>ØB1, ØB2 +0.03mm/-0mm (+0.0012/-0)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4</td>
</tr>
<tr>
<td>At B1 end</td>
<td>•</td>
</tr>
<tr>
<td>At B2 end</td>
<td>•</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size 48</th>
<th>ØB1, ØB2 +0.03mm/-0mm (+0.0012/-0)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4</td>
</tr>
<tr>
<td>At B1 end</td>
<td>•</td>
</tr>
<tr>
<td>At B2 end</td>
<td>•</td>
</tr>
</tbody>
</table>

Diameters for which a bore adaptor is shown can be adapted to smaller shaft sizes. See page 58 for details.
Varitork

Adjustable Friction Clutches

How to install Vari-Tork

BASIC CLUTCH – REFS. 271, 279, 401 & 409
Controlled slip occurs between pulley and shaft.

Motor, gearbox, or other externally supported shafts can pass thru hollow hub. Please ensure for clutch/pulley assemblies.

BASIC CLUTCH + SLEEVE ADAPTOR – REFS. 273, 281, 403 & 411
Controlled slip occurs between LH & RH shafts. Clutch orientation not important, supported shaft may be entered either end.

Motor, gearbox, or other externally supported shafts can be attached after fitting a suitable stub shaft. Side loads must be minimal. Avoid connecting both ends of this clutch to externally supported shafts.

BASIC CLUTCH + FLEXIBLE COUPLING - REFS. 267, 269, 277, 285, 397, 399, 407 & 415
Controlled slip occurs between LH & RH shafts.

Motor, gearbox, or other externally supported shafts

Vari-Tork characteristics

The characteristics of dry plate clutches favour those applications which can tolerate relatively imprecise drag torques. Three tendencies should be noted:

BREAKAWAY TORQUE
After a period during which no slipping has taken place, the breakaway torque can be up to $2\frac{1}{2}$ times the set value.

TORQUE DECAY
There is an inverse relationship between clutch temperature and slipping torque. The slipping torque reduces from the set value as the power being dissipated causes the clutch temperature to rise. When slipping continuously, torque settles at approximately 70% of the value set on a new clutch and at approximately 80% of the value set on a used clutch. This characteristic is not speed-dependent.

SPEED RELATED TORQUE FLUCTUATIONS
Variations in slipping speed cause a momentary increase in the prevailing output torque. The clutches behave more consistently at high speed/low torque than at low speed/high torque. High speed in this instance starts at approximately 500 rpm.

Where applications call for sustained slipping, the housing temperature should be maintained below 80°C. Clutches mounted concentrically within pulleys, gear wheels, etc. will be more effective at dissipating heat generated during slipping.

CALCULATING FOR POWER DISSIPATION
Given the slipping speed in rpm and the drag torque in Nm, the following equation can be used for calculating the power dissipation in watts (W).

$$ W = \frac{Nm \cdot rpm}{9.55} $$

Locking ring

In some circumstances it is possible for the adjuster ring to unscrew during operation. The adjuster ring can be secured by fitting locking ring ref. 294.25.

Removing the adjuster ring

1) If this should be necessary, be sure to replace the pressure plate first, then the spring washers. Ensure that the topmost friction ring is fully engaged with the splines. A disengaged friction ring will cause the clutch to malfunction.

2) To remove the adjuster ring, first remove the clamp. With set screw hubs the adjuster ring cannot be removed if the set screws protrude above the hub diameter. Flattening or dimpling of shafts is recommended and may be necessary with shafts larger than Ø6.35 to avoid the screws fouling the adjuster ring.

Waved washers

Two waved washers are fitted to these clutches. In some instances, better torque control may result from removing one of them, particularly when working in the lower torque ranges.
Bore Adaptors

Bore adaptors offer a convenient way of adapting a coupling to a variety of shaft diameters, typically at the R & D stage. A range of motor options, for example, can be accommodated with one coupling and a selection of Huco-Loks.

When fitted to set screw hubs, adaptors prevent the screws from scoring the shafts and permit repeated re-positioning and easy removal of the coupling.

The adaptors feature a feathered head which sits in the chamfer at the bore entry and prevents over-insertion.
Huco-Lok

Metal (non insulating) bore adaptors

For optimum fastening, install HUCO-LOK bore adaptors as shown.

'S' represents screws in set screw hub.

'T' represents tangential screw in clamp hub.

'F' shows recommended orientation of flatted shaft in set screw hub.

Note that both traction and concentricity may be affected when using an adaptor. For best results shafts with h6 tolerance or better, are recommended. Undersized shafts become progressively less effective. For similar reasons, flatted shafts with more than 1/4 of their diameter removed are not recommended.

<table>
<thead>
<tr>
<th>Cat ref.</th>
<th>251</th>
<th>253</th>
<th>254</th>
<th>255</th>
<th>257</th>
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</thead>
<tbody>
<tr>
<td>ØD mm</td>
<td>5</td>
<td>6.35</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>12.7</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>L mm</td>
<td>4.3</td>
<td>6.6</td>
<td>5.8</td>
<td>8.1</td>
<td>8.1</td>
<td>10.7</td>
<td>13.2</td>
<td>20</td>
</tr>
<tr>
<td>To fit bores coded</td>
<td>20</td>
<td>24</td>
<td>28</td>
<td>28</td>
<td>32</td>
<td>36</td>
<td>42</td>
<td>48</td>
</tr>
</tbody>
</table>

| ØB | 251.11 | 253.11 |
| (2) | 251.14 | 253.14 | 254.14 | 255.14 |
| (3) | 251.15 | 253.15 | 254.15 | 255.15 |
| .120" | 251.16 | 253.16 | 254.16 | 255.16 |
| 1/8" | 251.18 | 253.18 | 254.18 | 255.18 |
| 3/16" | 253.19 | 254.19 | 255.19 |
| (5) | 253.20 | 254.20 | 255.20 |
| (6) | 254.22 | 255.22 | 257.22 |
| 1/4" | 257.24 | 259.24 | 260.24 |
| (7) | 257.25 | 259.25 | 260.25 |
| (8) | 257.28 | 259.28 | 260.28 | 261.28 |
| (9) | 259.30 | 260.30 | 261.30 |
| (10) | 259.32 | 260.32 | 261.32 |
| (11) | 260.33 | 261.33 |
| (12) | 260.35 | 261.35 |
| (13) | 260.38 | 261.38 |
| (14) | 260.40 |
| (15) | 261.42 |
| (16) | 261.45 |
| (18) | 261.48 |

<table>
<thead>
<tr>
<th>Material</th>
<th>Brass</th>
<th>Aluminium alloy</th>
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</thead>
</table>

Cat ref. | 251 | 253 | 254 | 255 | 257 | 259 | 260 | 261 |
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<tbody>
<tr>
<td>ØD mm</td>
<td>5</td>
<td>6.35</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>12.7</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>L mm</td>
<td>4.3</td>
<td>6.6</td>
<td>5.8</td>
<td>8.1</td>
<td>8.1</td>
<td>10.7</td>
<td>13.2</td>
<td>20</td>
</tr>
<tr>
<td>To fit bores coded</td>
<td>20</td>
<td>24</td>
<td>28</td>
<td>28</td>
<td>32</td>
<td>36</td>
<td>42</td>
<td>48</td>
</tr>
</tbody>
</table>

| ØB | 251.11 | 253.11 |
| (2) | 251.14 | 253.14 | 254.14 | 255.14 |
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| .120" | 251.16 | 253.16 | 254.16 | 255.16 |
| 1/8" | 251.18 | 253.18 | 254.18 | 255.18 |
| 3/16" | 253.19 | 254.19 | 255.19 |
| (5) | 253.20 | 254.20 | 255.20 |
| (6) | 254.22 | 255.22 | 257.22 |
| 1/4" | 257.24 | 259.24 | 260.24 |
| (7) | 257.25 | 259.25 | 260.25 |
| (8) | 257.28 | 259.28 | 260.28 | 261.28 |
| (9) | 259.30 | 260.30 | 261.30 |
| (10) | 259.32 | 260.32 | 261.32 |
| (11) | 260.33 | 261.33 |
| (12) | 260.35 | 261.35 |
| (13) | 260.38 | 261.38 |
| (14) | 260.40 |
| (15) | 261.42 |
| (16) | 261.45 |
| (18) | 261.48 |

<table>
<thead>
<tr>
<th>Material</th>
<th>Brass</th>
<th>Aluminium alloy</th>
</tr>
</thead>
</table>
Formulae and Conversion Factors for Motion Transfer
SI BASE UNITS

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<thead>
<tr>
<th>Quantity</th>
<th>Unit Symbol</th>
<th>Name</th>
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<tbody>
<tr>
<td>length</td>
<td>m</td>
<td>metre</td>
</tr>
<tr>
<td>mass</td>
<td>kg</td>
<td>kilogram</td>
</tr>
<tr>
<td>time</td>
<td>s</td>
<td>second</td>
</tr>
<tr>
<td>electric current</td>
<td>A</td>
<td>ampere</td>
</tr>
<tr>
<td>Thermodynamic</td>
<td>K</td>
<td>kelvin</td>
</tr>
<tr>
<td>luminous intensity</td>
<td>cd</td>
<td>candela</td>
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</table>

LETTER SYMBOLS & SI UNITS IN POWER TRANSMISSION ENGINEERING

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Quantity</th>
<th>SI Unit Symbol</th>
<th>Name</th>
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<tbody>
<tr>
<td>E</td>
<td>modulus of elasticity (Young’s modulus)</td>
<td>Pa</td>
<td>Pascal</td>
</tr>
<tr>
<td>F</td>
<td>force</td>
<td>N</td>
<td>Newton</td>
</tr>
<tr>
<td>G (W)</td>
<td>weight</td>
<td>N</td>
<td>Newton</td>
</tr>
<tr>
<td>J</td>
<td>moment of inertia</td>
<td>kgm²</td>
<td>Kilogram – metre squared</td>
</tr>
<tr>
<td>M (T)</td>
<td>torque</td>
<td>Nm</td>
<td>Newton metre</td>
</tr>
<tr>
<td>m</td>
<td>mass</td>
<td>kg</td>
<td>Kilogram</td>
</tr>
<tr>
<td>P</td>
<td>power</td>
<td>W</td>
<td>Watt</td>
</tr>
<tr>
<td>p</td>
<td>pressure</td>
<td>Pa</td>
<td>Pascal</td>
</tr>
<tr>
<td>ρ</td>
<td>density (mass density)</td>
<td>kg/m³</td>
<td>Kilogram/metre cubed</td>
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<tr>
<td>σ</td>
<td>stress</td>
<td>Pa</td>
<td>Pascal</td>
</tr>
<tr>
<td>W (E)</td>
<td>work (energy)</td>
<td>J</td>
<td>Joule</td>
</tr>
<tr>
<td>η</td>
<td>efficiency</td>
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</tr>
<tr>
<td>μ</td>
<td>coefficient of friction</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

FORMLAE

POWER

Lifting motion

\[ P = \frac{W \cdot v}{\eta \cdot 33000} \]

Linear motion

\[ P = \frac{F \cdot v}{1000} \]

\[ F = \mu \cdot m \cdot g \]

Rotary motion

\[ P = \frac{M \cdot n}{9550} \]

\[ P = \text{Power in kW} \]

\[ F_r = \text{Frictional resistance in lb} \]

\[ m = \text{Mass in kg} \]

\[ g = \text{Acceleration of free fall (9.81) in m/s}^2 \]

\[ v = \text{Velocity in m/s} \]

\[ \eta = \text{Efficiency in decimals} \]

\[ \mu = \text{Coefficient of friction} \]

\[ M = \text{Torque in Nm} \]

\[ n = \text{Rotational speed in 1/min or r/min} \]

Lifting motion

\[ P = \frac{W \cdot v}{\eta \cdot 33000} \]

Linear motion

\[ P = \frac{F \cdot v}{1000} \]

\[ F = \mu \cdot m \cdot g \]

Rotary motion

\[ P = \frac{M \cdot n}{9550} \]

\[ P = \text{Power in kW} \]

\[ F_r = \text{Frictional resistance in lb} \]

\[ m = \text{Mass in kg} \]

\[ g = \text{Acceleration of free fall (9.81) in m/s}^2 \]

\[ v = \text{Velocity in ft/min} \]

\[ \eta = \text{Efficiency in decimals} \]

\[ \mu = \text{Coefficient of friction} \]

\[ M = \text{Torque in lb} \cdot \text{ft} \]

\[ n = \text{Rotational speed in 1/min or r/min} \]

TORQUE

\[ M = \frac{F \cdot r}{9550} \]

\[ M = \text{Torque in Nm} \]

\[ F = \text{Force in N} \]

\[ r = \text{Radius of lever in m} \]

\[ P = \text{Power in kW} \]

\[ n = \text{Rotational speed in 1/min or r/min} \]

\[ P = \frac{5250 \cdot P}{n} \]

\[ P = \text{Torque in lbf} \cdot \text{ft} \]

\[ F = \text{Force in lbf} \]

\[ r = \text{Radius of lever in ft} \]

\[ P = \text{Power in hp} \]

\[ n = \text{Rotational speed in rpm} \]

WORK

\[ W = \frac{j \cdot n^2}{182.5} \]

\[ W = \text{Work (energy) in Nm} = Ws = J \]

\[ W = \frac{j \cdot n}{182.5} \]

\[ W = \text{Work (energy) in lb} \cdot \text{ft} \]

\[ F = \text{Force in lbf} \]

\[ s = \text{Length of path in ft} \]

\[ m = \text{Mass in kg} \]

\[ g = \text{Acceleration of free fall (9.81) in m/s}^2 \]

\[ J = \text{Moment of inertia in kgm}^2 \]

\[ n = \text{Rotational speed in 1/min or r/min} \]

\[ W = \frac{WK^2 \cdot n^2}{388} \]

\[ W = \text{Work (energy) in lb} \cdot \text{ft} \]

\[ F = \text{Force in lbf} \]

\[ s = \text{Length of path in ft} \]

\[ m = \text{Mass in kg} \]

\[ g = \text{Acceleration of free fall (9.81) in m/s}^2 \]

\[ WK = \text{Flywheel effect lb} \cdot \text{ft} \]

\[ n = \text{Rotational speed in rpm} \]

ACCELERATION OR BRAKING TIME

\[ ta = \frac{j \cdot n}{2.56 \cdot 10^6} \]

\[ ta = \text{Acceleration or braking time in s} \]

\[ J = \text{Moment of inertia in kgm}^2 \]

\[ n = \text{Rotational speed in 1/min or r/min} \]

\[ M_{a*} = \text{Acceleration or braking torque in Nm} \]

\[ ta = \frac{WK^2 \cdot n}{388 \cdot 10^6} \]

\[ ta = \text{Acceleration or braking time in s} \]

\[ WK = \text{Flywheel effect in kgm}^2 \]

\[ n = \text{Rotational speed in rpm} \]

\[ M_{a*} = \text{Acceleration or braking torque in lb} \cdot \text{ft} \]

MOMENT OF INERTIA

Solid Cylinder

\[ J = \frac{1}{2} \cdot m \cdot r^{2} \]

\[ = \frac{1}{32} \cdot 1000 \cdot \pi \cdot r^2 \cdot d_w^2 \]

\[ = 98 \cdot \pi \cdot d_w^2 \cdot d_v^2 \]

Hollow Cylinder

\[ J = \frac{1}{2} \cdot (d_w^2 + d_v^2) \]

\[ = \frac{1}{32} \cdot 1000 \cdot \pi \cdot (d_w^2 - d_v^2) \]

\[ = 98 \cdot \pi \cdot (d_w^2 - d_v^2) \]

\[ \text{torsional stiffness and resonant frequency} \]

\[ C_T \leq \frac{(F_p \times 2 \times a^2)}{(\frac{1}{J_m} \cdot a)} \]

\[ FR \leq \frac{1}{2\pi} \times \sqrt{(\frac{1}{J_m} \cdot a) \times C_T} \]

Where

\[ C_T = \text{torsional stiffness (Nm/rev)} \]

\[ J_m = \text{motor inertia (kgm}^2) \]

\[ a = \text{resonant frequency (Hz)} \]

L = \text{load inertia (kgm}^2)
### FORCE

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>kp</th>
<th>p</th>
<th>tonf (UK)</th>
<th>lbf</th>
<th>oz</th>
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</thead>
<tbody>
<tr>
<td>1N</td>
<td>1</td>
<td>0.102</td>
<td>102</td>
<td>100.4 × 10^2</td>
<td>0.2248</td>
<td>3.597</td>
</tr>
<tr>
<td>1kp</td>
<td>9.807</td>
<td>1</td>
<td>1000</td>
<td>0.984 × 10^4</td>
<td>2.205</td>
<td>35.27</td>
</tr>
<tr>
<td>1p</td>
<td>9.81 × 10^1</td>
<td>1 × 10^4</td>
<td>1</td>
<td>0.984 × 10^4</td>
<td>2.2 × 10^4</td>
<td>35.3 × 10^4</td>
</tr>
<tr>
<td>1tonf (UK)</td>
<td>9984</td>
<td>1016</td>
<td>1.02 × 10^6</td>
<td>1</td>
<td>2240</td>
<td>35.8 × 10^6</td>
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<tr>
<td>1lbf</td>
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<td>0.4536</td>
<td>453.6</td>
<td>0.5 × 10^6</td>
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<td>16</td>
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<td>1ozf</td>
<td>-</td>
<td>28.4 × 10^3</td>
<td>28.35</td>
<td>27.9 × 10^4</td>
<td>62.5 × 10^4</td>
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### VELOCITY

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<tr>
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<th>m/min</th>
<th>m/s</th>
<th>mile/h</th>
<th>ft/min</th>
<th>ft/s</th>
<th>in/s</th>
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<td>1km/h</td>
<td>1</td>
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<td>m/min</td>
<td>0.06</td>
<td>1</td>
<td>16.7 × 10^-1</td>
<td>37.3 × 10^-1</td>
<td>3.281</td>
<td>54.7 × 10^-3</td>
<td>0.656</td>
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<td>1m/s</td>
<td>3.6</td>
<td>60</td>
<td>1</td>
<td>2.237</td>
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<td>3.281</td>
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<td>1mile/h</td>
<td>1.609</td>
<td>26.82</td>
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<td>88</td>
<td>1.467</td>
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<td>1ft/min</td>
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<td>5.08 × 10^-1</td>
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### TORQUE

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<th>Nm</th>
<th>Ncm</th>
<th>kgfm</th>
<th>lbf.ft</th>
<th>lbf.in</th>
<th>ozf.in</th>
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<td>0.10197</td>
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### POWER

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<th>PS</th>
<th>hp</th>
<th>kgfm/s</th>
<th>ft.lbf/s</th>
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<td>ft.lbf/s</td>
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<td>1.84 × 10^-1</td>
<td>1.82 × 10^-1</td>
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### MOMENT OF INERTIA AND OTHER FLYWHEEL EFFECTS

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<tr>
<th></th>
<th>kgm² (mr²)</th>
<th>kgfm² (GD²)</th>
<th>lbf.ft (WK)²</th>
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<th>ft lbf s²</th>
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<tr>
<td>1kgfm² (GD²)</td>
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<td>0.25</td>
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<td>76.94</td>
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### LENGTH

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<th>yds</th>
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<td>0.00109</td>
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<td>1mile</td>
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<td>63.346.45</td>
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<td>1</td>
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</tr>
</tbody>
</table>
The Brands of Altra Motion

**Couplings**
- Ameridrives
  - www.ameridrives.com
- Bibby Turboflex
  - www.bibbyturboflex.com
- Guardian Couplings
  - www.guardiancouplings.com
- Huco
  - www.huco.com
- Laminflex Couplings
  - www.laminflexcouplings.com
- Stromag
  - www.stromag.com
- TB Wood’s
  - www.tbwoods.com

**Linear Systems**
- Thomson
  - www.thomsonlinear.com

**Geared Cam Limit Switches**
- Stromag
  - www.stromag.com

**Engineered Bearing Assemblies**
- Killian
  - www.killianbearings.com

**Electric Clutches & Brakes**
- Matrix
  - www.matrix-international.com
- Stromag
  - www.stromag.com
- Warner Electric
  - www.warnerelectric.com

**Belted Drives**
- TB Wood’s
  - www.tbwoods.com

**Heavy Duty Clutches & Brakes**
- Twiflex
  - www.twiflex.com
- Stromag
  - www.stromag.com
- Svendborg Brakes
  - www.svendborg-brakes.com
- Wichita Clutch
  - www.wichitachutch.com

**Gearing & Specialty Components**
- Bauer Gear Motor
  - www.bauergears.com
- Boston Gear
  - www.bostongear.com
- Delevan
  - www.delevan.com
- Delroyd Worm Gear
  - www.delroyd.com
- Nuttall Gear
  - www.nuttallgear.com

**Engine Braking Systems**
- Jacobs Vehicle Systems
  - www.jacobsvehiclesystems.com

**Precision Motors & Automation**
- Kollmorgen
  - www.kollmorgen.com

**Minature Motors**
- Portescap
  - www.portescap.com

**Overrunning Clutches**
- Formsprag Clutch
  - www.formsprag.com
- Marland Clutch
  - www.marland.com
- Stieber
  - www.stieberclutch.com

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