ALTRA INDUSTRIAL MOTION

Huco Dynatork Flexible Couplings

Huco® Dynatork

An Altra Industrial Motion Company

Huco Dynatork 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.

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.

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.

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.

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Huco Dynatork

Huco Engineering Industries Ltd.
Merchant Drive, Hertford, SG13 7BL UK
Tel: +44 (0)1992 501900
Fax: +44 (0)1992 509890

440 North Fifth Avenue
Chambersburg, PA 17201 - USA
Tel: (888) 829 6637
Fax: (717) 264 6420

Web: www.huco.com
Email: sales@huco.com

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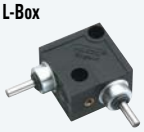
Product Overview

Stainless Steel Bellows type	Nickel Bellows type	Membrane type	Multi-Beam type	Single-Beam type
Flex B **Flex K**	**Flex Ni**	**Flex M** Single-stage Short two-stage Long two-stage	**Multi-Beam** 6-Beam Material Options: Aluminium Stainless Steel Acetal	**Single-Beam** Material Options: Aluminium Stainless Steel
General description				
Precision couplings with excellent kinematic properties. The 3 types offer differing combinations of stiffness, radial compensation and axial motion.	Precision couplings with excellent kinematic properties. The 3 types offer differing combinations of stiffness, radial compensation and axial motion.	Precision couplings with excellent kinematic properties. Dynamically balanced construction. Single-stage versions make up into 'whirl' free Cardans. The 2-stage versions offer short envelopes and low bearing loads respectively.	General purpose single piece couplings Single stage (3-beam) Two stage (6-beam) Material options for moisture and corrosion resistance.	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, 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 in standard form. Flex K up to 15000 rpm.	Up to 5000 rpm in standard form.	Up to 5000 rpm in standard form. Up to 30000 rpm in balanced form.	Up to 5000 rpm in standard form. Up to 30000 rpm in balanced form.	Up to 5000 rpm in standard form. Up to 30000 rpm in balanced form.
Peak torque largest size lbs.-in (Nm)				
4425 (500)	110.6 (12.5)	885 (100)	1239 (140)	266 (30)
Standard bores in. (mm)				
1/8"-2 1/2" (3 to 65)	1/8"-3/4" (3 to 20)	1/8"-1 1/4" (3 to 38)	1/8"-1 1/4" (1 to 38)	1/8"-3/4" (3 to 26)
Temperature range °F (°C)				
–40° to +250°F (–40° to +120°C)	–40° to +250°F (–40° to +120°C)	–40° to +250°F (–40° to +120°C)	–40° to +290°F (–40° to +140°)	–40° to +290°F (–40° to +140°)
Electrically isolating				
No, unless used with insulating bore adaptors	No, unless used with insulating bore adaptors	No, unless used with insulating bore adaptors	Aluminium, Stainless Steel: No; Acetal: Yes	Aluminium, Stainless Steel: No; Acetal: Yes
Connection				
Clamp, Set Screw or Spiggot	Clamp or Set Screw	Clamp or Set Screw	Clamp or set screw	Clamp or Set Screw
Page 9 - 15	**Page 16 - 17**	**Page 18 - 21**	**Page 29 - 38**	**Page 40 - 41**

Product Overview

Step-Beam type	Sliding Disc type	Universal / Lateral type	Double Loop type	Jaw Coupling	Universal Joints & Teleshafts	Friction Clutches	Bevel Gearboxes
Step-Beam Material Options: Nylon	**Oldham** Blind bored Thru' bored Thru' bored Material Options: Aluminium Stainless Steel Brass	**Uni-Lat** 	**Flex-P** 	**Flex-G** 	**Huco-Pol** Single joints Double joints Teleshafts 	**Vari-Tork, Polyclutch** Basic clutch Basic clutch + Oldham coupling 	**L-Box** 
General description							
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.	Unique, 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.	Exceptional flexibility in all three directions, radial, angular and axial.	High torque capacity and high speed are available from this naturally balanced coupling.	Light duty plastic universal joints and extensible drive shafts (teleshafts). Low mass, corrosion resistant, ideal where conventional steel joints would be under-utilized.	Small, user-adjustable torque limiters for concentric or in-line mounting. Operate by friction using interleaved clutch plates.	Small 90° drives encased in molded housings providing electrical isolation between shafts and mounting surface. The L-Box is rated for intermittent use.
Where to use							
Encoders, tachogenerators, small pumps, motors and drives.	Stepper drives for most applications including positioning slides, pumps, actuators, etc.	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.	Intermittent applications in business machines, instrumentation, lab equipment, analytical apparatus, etc., where steel joints would be under-utilized.	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.	L-box offers a compact means to route drives thru' 90°.
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.	Up to 1000 rpm.
Peak torque largest size lbs.-in (Nm)							
221 (25)	389 (44)	106 (12)	159 (18)	1177 (133)	95 (10.7)	531 (60)	6 (0.68)
Standard bores in. (mm)							
1/8"-1/2" (3 to 12.7)	1/8"-1" (2 to 30)	1/8"-3/4" (3 to 22)	1/8"-5/8" (3 to 16)	1/8"-5/8" (3 to 16)	1/8"-3/4" (3 to 20)	1/4"-1 1/4" (6 to 32)	5/32" (4)
Temperature range							
–20 to +300°F (–20 to +150°C)	–20 to +140°F (–20 to +60°)	–20 to +140°F (–20 to +60°)	–40 to +210°C (–40 to +100°)	–40 to +180°F (–40 to +80°)	–20 to +140°F (–20 to +60°)	–10 to +180°F (when operating) (–10 to +80°) (when operating)	–20 to +140°F (–20 to +60)
Electrically isolating							
Yes	Yes	Yes	Yes	Yes	Yes	No	*See General Description above*
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	N/A
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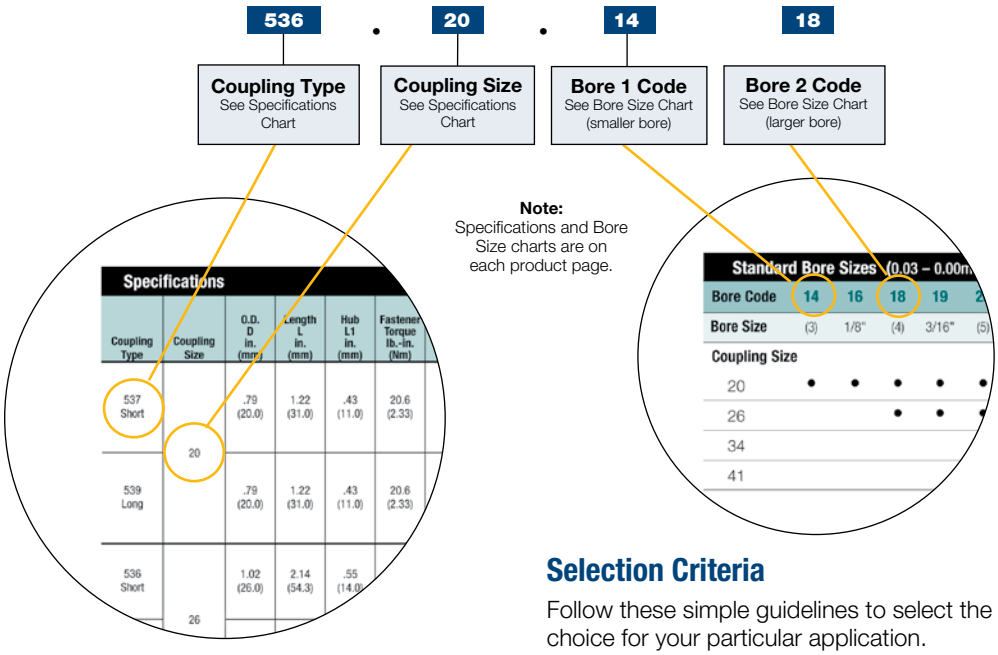
Selecting Flexible Couplings

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**



The following key factors should always be considered when specifying flexible shaft couplings:

- Torsional Stiffness
- Backlash
- Torque
- Life
- Shaft Attachment Type
- Misalignment Requirements

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 (eg: 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 dependant on the number of cycles completed and environmental factors.

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?
- Can it operate at the designated ambient temperature?
- 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?

Load					
	Steady State	Stop/Start	Reversing	Shock	Shock & Reversing
Huco Flex B	1.5	2.0	2.0	3.0	4.0
Huco Flex K	1.5	2.0	2.0	3.0	4.0
Huco Flex M	1.5	2.0	2.0	3.0	4.0
Huco Flex Ni	1.0	2.0	2.0	3.0	4.0
Huco Flex P	1.0	1.5	1.5	3.0	4.0
Huco Flex G	1.0	2.0	4.0	4.0	4.0
Huco MultiBeam	1.0	1.5	2.0	(Note 1)	(Note 1)
Huco S-Beam	1.0	1.5	2.0	(Note 1)	(Note 1)
Huco TorqLink	1.0	1.5	2.0	(Note 1)	(Note 1)
Duty (Hours/Day)					
	<1	1-2	3-5	6-12	>12
Huco Oldham	1.0	2.0	4.0	6.0	8.0
Huco Flex-B	1.0	1.5	2.0	3.0	4.0
Uni-Lat	1.0	1.5	2.0	3.0	4.0

* Note 1 - Not recommended in these conditions.

Round & Keywayed Bore Details & Codes

Metric mm	Inch fraction	Inch decimal	Round bore code	Metric keys key size w x h	Inch keys key size w x h	Keywayed bore code
1	–	0.0394	**08**	–	–	–
1.5	–	0.0591	**09**			
1.588	1/16	0.0625	**10**	–	–	–
2	–	0.0787	**11**	–	–	–
2.286	–	0.0900	**12**	–	–	–
2.382	3/32	0.0938	**13**	–	–	–
3	–	0.1181	**14**	–	–	–
3.048	–	0.1200	**15**	–	–	–
3.175	1/8	0.1250	**16**	–	–	–
*3.969	5/32	0.1563	**–**	–	–	–
4	–	0.1575	**18**	–	–	–
4.763	3/16	0.1875	**19**	–	–	–
5	–	0.1969	**20**	–	–	–
5.556	7/32	0.2188	**21**	–	–	–
6	–	0.2362	**22**	–	–	–
6.096	–	0.2400	**23**	–	–	–
6.350	1/4	0.2500	**24**	–	–	–
7	–	0.2756	**25**	2 x 2	–	P25
7.144	9/32	0.2813	**26**	–	–	–
7.938	5/16	0.3125	**27**	–	1/8 x 1/8	R27
8	–	0.3150	**28**	2 x 2	–	P28
8.731	11/32	0.3438	**29**	–	1/8 x 1/8	R29
9	–	0.3543	**30**	3 x 3	–	P30
9.525	3/8	0.3750	**31**	–	1/8 x 1/8	R31
10	–	0.3937	**32**	3 x 3	–	P32
11	–	0.4331	**33**	4 x 4	–	P33
11.113	7/16	0.4375	**34**	–	1/8 x 1/8	R34
12	–	0.4724	**35**	4 x 4	–	P35
12.700	1/2	0.5000	**36**	–	1/8 x 1/8	R36
13	–	0.5118	**37**	5 x 5	–	P37
14	–	0.5512	**38**	5 x 5	–	P38
14.288	9/16	0.5625	**39**	–	3/16 x 3/16	R39
15	–	0.5906	**40**	5 x 5	–	P40
15.875	5/8	0.6250	**41**	–	3/16 x 3/16	R41
16	–	0.6299	**42**	5 x 5	–	P42
17	–	0.6693	**43**	5 x 5	–	P43
17.463	11/16	0.6875	**44**	–	3/16 x 3/16	R44
18	–	0.7087	**45**	6 x 6	–	P45
19	–	0.7480	**46**	6 x 6	–	P46
19.050	3/4	0.7500	**47**	–	3/16 x 3/16	R47
20	–	0.7874	**48**	6 x 6	–	P48
22	–	0.8661	**49**	6 x 6	–	P49
22.225	7/8	0.8750	**50**	–	1/4 x 1/4	R50
24	–	0.9449	**51**	8 x 7	–	P51
25	–	0.9843	**52**	8 x 7	–	P52
25.400	1	1.0000	**53**	–	1/4 x 1/4	R53
28	–	1.1024	**54**	8 x 7	–	P54
28.575	1-1/8	1.1250	**55**	–	5/16 x 1/4	R55
30	–	1.1811	**56**	8 x 7	–	P56
31.750	1-1/4	1.2500	**57**	–	5/16 x 1/4	R57

* Not manufactured. Nearest alternative 4mm.

Round & Keywayed Bore Details & Codes Cont.

Metric mm	Inch fraction	Inch decimal	Round bore code	Metric keys key size w x h	Inch keys key size w x h	Keywayed bore code
32	–	1.2598	**58**	10 x 8	–	P58
34.925	1-3/8	1.3750	**59**	–	3/8 x 1/4	R59
35	–	1.3780	**60**	10 x 8	–	P60
38	–	1.4961	**61**	10 x 8	–	P61
38.10	1-1/2	1.5000	**62**	Specify on Order		
40	–	1.5748	**63**			
41.28	1-5/8	1.6250	**64**	Specify on Order		
42	–	1.6535	**65**			
44.45	1-3/4	1.7500	**66**			
45	–	1.7717	**67**	Specify on Order		
47.63	1-7/8	1.8750	**68**			
48	–	1.8898	**69**			
50	–	1.9685	**70**	Specify on Order		
50.80	2	2.0000	**71**			
53.98	2-1/8	2.1250	**72**			
55	–	2.1654	**73**	Specify on Order		
57.15	2-1/4	2.2500	**74**			
60	–	2.3622	**75**			
60.33	2-3/8	2.3750	**76**	Specify on Order		
63.50	2-1/2	2.5000	**77**			
65	–	2.5591	**78**			
73.03	2-7/8	2.8750	**79**	Specify on Order		
75	–	2.9528	**80**			

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.**P**28**P**28

In this example both bores have a keyway.

Inch: 538.34.24**R**36

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.

Installing Couplings

Flexible Coupling Types

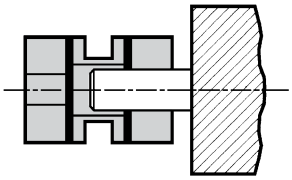
General instructions

1. Ensure that shafts are free of burrs, damage, or foreign matter, and can penetrate the bores.

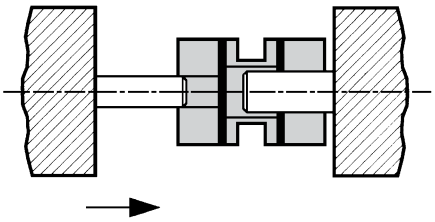
2. Install the coupling by holding the shaft and the related hub, rotating it back and forth as you progress it along the shaft.

3. Do not apply any forces that cause extension, compression or lateral displacement of the coupling beyond its permissible offsets.

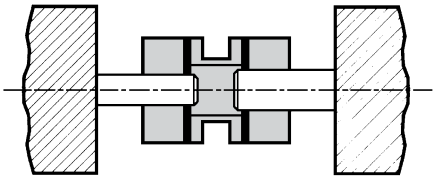
Normal installation



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, ie., neither extended nor compressed.

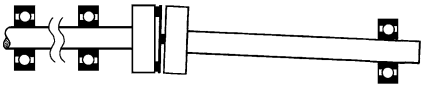
d) Align the second shaft with the first using a straight edge and feeler gauges or a dial indicator.

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

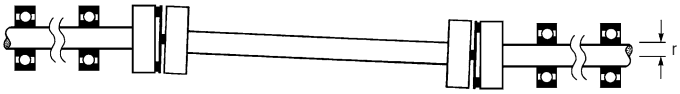
f) Secure one hub, tightening each screw alternately. Repeat for the second hub.

When to use single & two-stage couplings

Single-stage



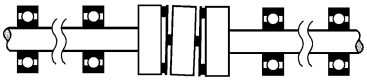
Example 1. With partially supported (1 bearing) shafts.



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.

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.

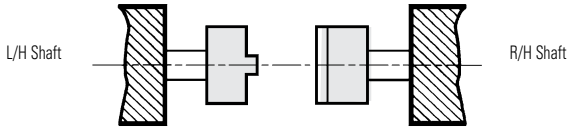
No axial forces are permitted across the membranes when fitting Huco-Flex M couplings. Keyways with interference fits are not recommended.

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

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.

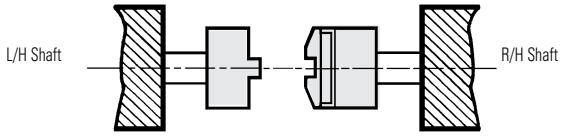
Sliding Disc type (Oldham)

Blind hub

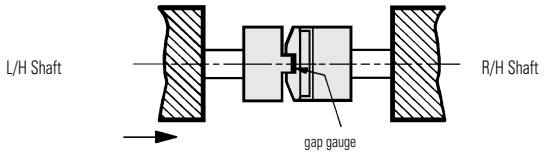


a) Slide hubs on to both shafts until fully seated and tighten screws.

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

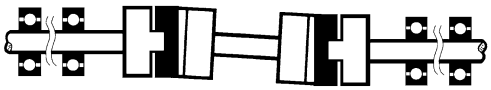
Coupling size		Gap gauge
	06, 09 & 13	0.002 (0.05)
	19 & 25	0.004 (0.10)
	33 & 41	0.006 (0.15)
	50 & 57	0.008 (0.20)

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

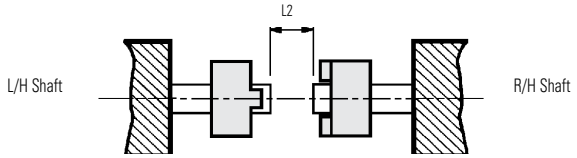
Shafts must be fully supported by 2 bearings and have minimal overhang. Oldham couplings cannot be used in pairs.

right



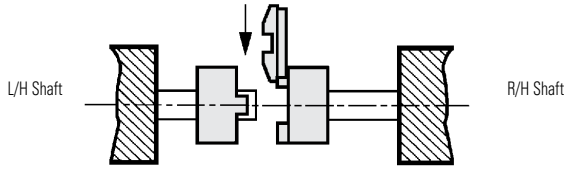
wrong

Thro' hub



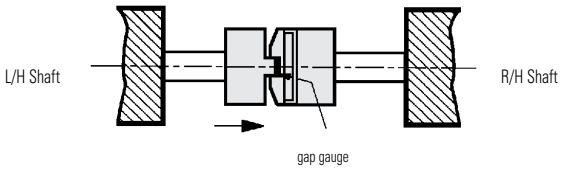
a) Slide hubs on to both shafts.

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.

Coupling size	19	25	33	41	50	57
L2 min	0.28 (7.2)	0.36 (9.2)	0.47 (12.0)	0.60 (15.3)	0.72 (18.4)	0.83 (21.2)

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

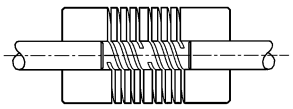
Relief Under The Beams

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.

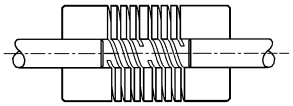
Pilot Bores

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 'B2' minimum shown in the bore tables. Further details are available on request.

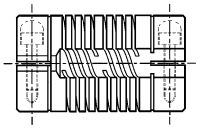
Non-Relieved



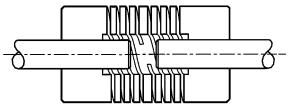
√



X



Relieved



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.

Flexible Membrane Couplings - Rivetted Series

Materials & Finishes

Hubs & spacer: Al. Alloy 2014 T6 or 2011T8
Clear anodised finish

Membranes: Spring quality stainless steel
Heat treated

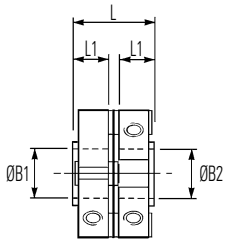
Rivet assembly: Brass rivets flanked by formed steel washers
Steel, zinc plate & colour passivate

Fasteners: Alloy steel, black oiled

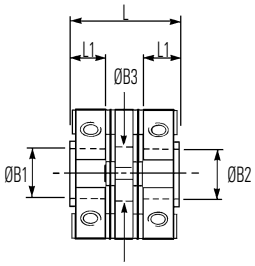
Temperature Range

-40ºF to + 248ºF (-40°C to +120°C)

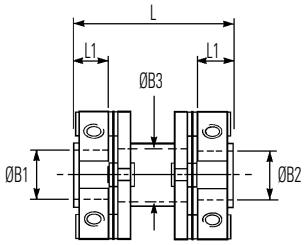
Set screw hubs



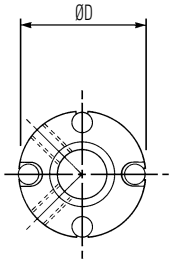
Ref. 460
for use in pairs or with floating shafts



Ref. 464
for precisely aligned shafts

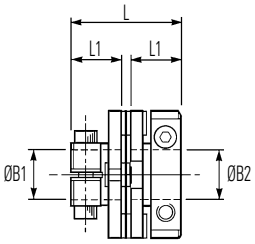


Ref. 468
for greater radial misalignment and lower bearing loads

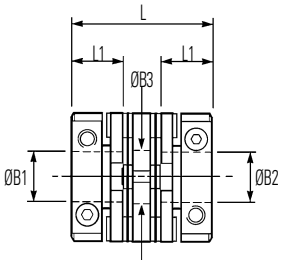


Typical

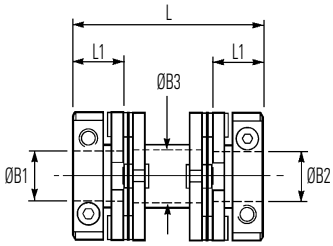
Clamp hubs



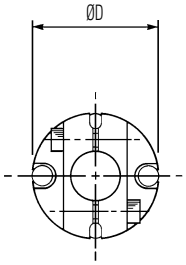
Ref. 462
for use in pairs or with floating shafts



Ref. 466
for precisely aligned shafts



Ref. 470
for greater radial misalignment and lower bearing loads



Typical

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

Flexible Membrane Couplings - Rivetted Series

DIMENSIONS & ORDER CODES

Coupling Size	Set Screw Hubs	Clamp Hubs	ØD in. (mm)	L in. (mm)	① L1 in. (mm)	ØB1, ØB2 max in. (mm)	② ØB3 in. (mm)	Fasteners Screw	Fasteners ③ Torque lb-in. (Nm)	Fasteners Wrench in. (mm)	④ Moment of inertia kgm2 x 10–8	④ Mass kg x 10–3
	COUPLING REF											
19	460.19	–	0.76 (19.2)	0.51 (13.0)	0.22 (5.6)	.25 (6.35)	N/A	M3	8.32 (0.94)	0.06 (1.5)	30	7
	464.19	–		0.77 (19.6)			0.29 (7.3)				50	10
	468.19	–		1.07 (27.3)							60	12
	–	462.19		0.80 (20.2)	0.36 (9.2)		N/A	M2.5	11.6 (1.32)	0.08 (2)	40	9
	–	466.19		1.06 (26.8)			0.29 (7.3)				60	13
	–	470.19		1.36 (34.5)							60	14
26	460.26	–	1.00 (25.6)	0.62 (15.8)	0.27 (6.9)	0.39 (10)	N/A	M4	20.0 (2.27)	0.08 (2)	120	15
	464.26	–		0.88 (22.4)			0.43 (11.0)				160	18
	468.26	–		1.19 (30.1)							200	23
	–	462.26		0.86 (21.8)	0.40 (10.0)		N/A	M2.5	11.6 (1.32)	0.08 (2)	130	16
	–	466.26		1.12 (28.4)			0.43 (11.0)				160	20
	–	470.26		1.42 (36.1)							210	25
33	460.33	–	1.32 (33.5)	0.89 (22.5)	0.40 (10.0)	0.50 (12.7)	N/A	M5	40.8 (4.62)	0.10 (2.5)	560	37
	464.33	–		1.26 (32.1)			0.56 (14.1)				800	52
	468.33	–		1.69 (42.8)							830	55
	–	462.33		1.20 (30.5)	0.55 (14.0)		N/A	M3	21.5 (2.43)	0.10 (2.5)	520	37
	–	466.33		1.58 (40.1)			0.56 (14.1)				730	51
	–	470.33		2.00 (50.8)							760	55
41	460.41	–	1.63 (41.5)	1.10 (27.1)	0.47 (12.0)	0.63 (16)	N/A	M6	67.4 (7.61)	0.12 (3)	1540	69
	464.41	–		1.52 (38.5)			0.69 (17.5)				2250	97
	468.41	–		1.97 (50.1)							2450	107
	–	462.41		1.46 (37.1)	0.67 (17.0		N/A	M4	50.1 (5.66)	0.12 (3)	1530	72
	–	466.41		1.91 (48.5)			0.69 (17.5)				2220	100
	–	470.41		2.40 (60.1)							2370	109

IMPORTANT

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

① Length of supported thro' bore.

② Clearance bore thro' spacer.

③ Maximum recommended tightening torque.

④ Values apply with max bores.

⑤ **Peak torque**. Select a size where Peak Torque exceeds the application torque x service factor. (***see page 4***)

⑥ Max. compensation values are mutually exclusive.

⑦ Torsional stiffness values apply at 50% peak torque with 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.

PERFORMANCE

Coupling Size	Ref.	⑤ Peak torque lb-in. (Nm)	⑦ Max compensation Angular deg	Max compensation Radial in. (mm)	Max compensation Axial in. (±mm)	⑦ Flexural stiffness Torsional Nm / rad	Flexural stiffness Angular N / deg	Flexural stiffness Radial N / mm	Flexural stiffness Axial N / mm
19	460 & 462	7.97 (0.9)	2	0 (0)	.004 (0.1)	220	0.4	–	< 7
	464 & 466		4	.001 (0.2)	.001 (0.2)	150	0.25	14	
	468 & 470		4	.016 (0.4)	.001 (0.2)	145	0.3	4	
26	460 & 462	20.4 (2.3)	2	0 (0)	.004 (0.1)	585	0.75	–	< 7
	464 & 466		4	.001 (0.2)	.001 (0.2)	385	0.5	37	
	468 & 470		4	.016 (0.4)	.001 (0.2)	400	0.4	7	
33	460 & 462	49.6 (5.6)	1.5	0 (0)	.004 (0.1)	1560	2	–	< 8
	464 & 466		3	.001 (0.2)	.004 (0.1)	935	1	48	
	468 & 470		3	.016 (0.4)	.001 (0.2)	980	1.2	13	
41	460 & 462	100 (11.3)	1	0 (0)	.004 (0.1)	2710	4	–	< 8
	464 & 466		2	.001 (0.2)	.001 (0.2)	1980	2	100	
	468 & 470		2	.016 (0.4)	.001 (0.2)	2020	2	25	

STANDARD BORES

Sizes indicated in parenthesis are metric (mm).

Coupling Size	ØB1, ØB2 +0.0012/ -0 (+0.03mm/-0mm) (3)	1/8"	(4)	3/16"	(5)	(6)	1/4"	(8)	(9)	3/8"	(10)	(11)	(12)	1/2"	(14)	(15)	5/8"	(16)
19	•	•	•	•	•	•	•											
26			•	•	•	•	•	•	•	•	•							
33						•	•	•	•	•	•	•	•	•				
41							•	•	•	•	•	•	•	•	•	•	•	•
Bore ref.	14	16	18	19	20	22	24	28	30	31	32	33	35	36	38	40	41	42
Corresponding bore adaptor					251		253	255			257			259				260

Diameters for which a bore adaptor is shown can be adapted to smaller shaft sizes. See page 58 for details of metallic and electrically insulating adaptors.

Flexible Membrane Couplings - Bolted Series

Materials & Finishes

Hubs & spacer: Al. Alloy 2014A T6
Clear anodised finish

Membranes: Spring quality stainless steel
Heat treated

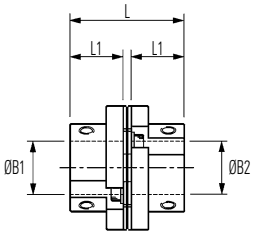
Bolt assembly: Bolt, alloy steel, black oiled finish
Bush assembly, steel, zinc plate & black chromate
Safety washer, carbon steel, black/brown oiled finish

Fasteners: Alloy steel, black oiled

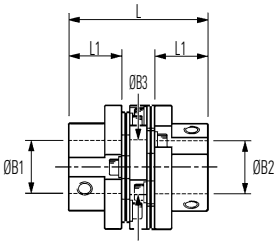
Temperature Range

-40ºF to + 248ºF (-40°C to +120°C)

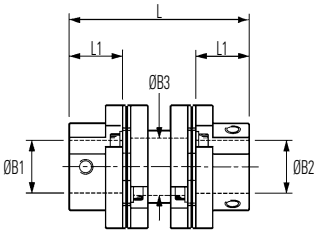
Set screw hubs



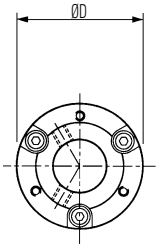
Ref. 660
for use in pairs or with floating shafts



Ref. 664
for precisely aligned shafts

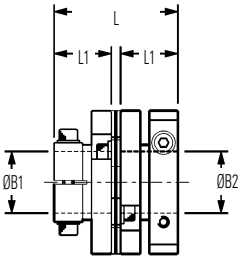


Ref. 668
for greater radial misalignment and lower bearing loads

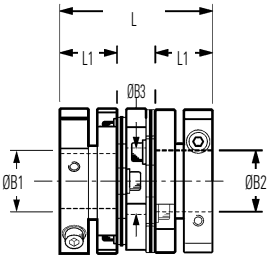


Typical

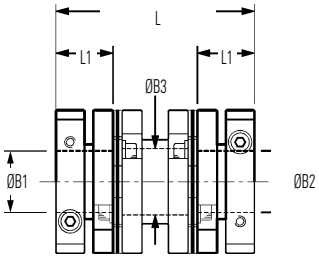
Clamp hubs



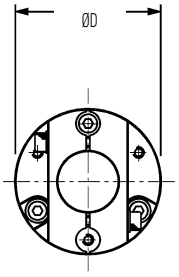
Ref. 662
for use in pairs or with floating shafts



Ref. 666
for precisely aligned shafts



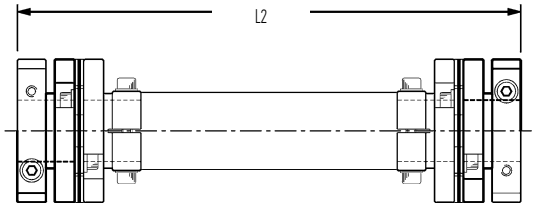
Ref. 670
for greater radial misalignment and lower bearing loads



Typical

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

Flexible Membrane Couplings - Bolted Series

DIMENSIONS & ORDER CODES

Coupling Size	Set Screw Hubs	Clamp Hubs	ØD in. (mm)	L in. (mm)	L1 ① in. (mm)	ØB1, ØB2 max in. (mm)	② ØB3 in. (mm)	Fasteners Screw	③ Torque lb.-in. (Nm)	Wrench in. (mm)	④ Moment of inertia kgm2 x 10–8	④ Mass kg x 10–3
	COUPLING REF											
41	660.41	–	1.63 (41.5)	1.45 (36.9)	0.67 (17.1)	0.63 (16)	N/A	M6	67.3 (7.60)	0.12 (3)	1160	63
	664.41	–		1.89 (47.9)			0.66 (16.8)				1680	90
	668.41	–		2.35 (59.7)			0.69 (17.5)				1790	101
	–	662.41		1.45 (36.9)			N/A	M4	50.1 (5.66)	0.12 (3)	1400	74
	–	666.41		1.89 (47.9)			0.66 (16.8)				2010	101
	–	670.41		2.35 (59.7)			0.69 (17.5)				2250	112
52	660.52	–	2.05 (52.0)	1.74 (44.2)	0.79 (20.0)	0.79 (20)	N/A	M6	0.86 (7.60)	0.12 (3)	3740	124
	664.52	–		2.17 (55.0)			0.87 (22.0)				5490	168
	668.52	–		2.85 (72.4)							6840	208
	–	662.52		1.97 (50.0)	0.90 (22.9)		N/A	M5	101 (11.4)	0.16 (4)	5660	164
	–	666.52		2.39 (60.8)			0.87 (22.0)				7470	208
	–	670.52		3.07 (78.1)							8870	247
66	660.66	–	2.60 (66.0)	2.38 (60.4)	1.10 (28.0)	1.10 (28)	N/A	M8	162 (18.3)	0.16 (4)	13370	272
	664.66	–		2.90 (73.6)			1.13 (28.7)				18040	360
	668.66	–		3.73 (94.7)			1.19 (30.2)				23400	447
	–	662.66		2.22 (56.4)	1.02 (26.0)		N/A	M5	101 (11.4)	0.16 (4)	14200	269
	–	666.66		2.74 (69.6)			1.13 (28.7)				19300	357
	–	670.66		3.57 (90.7)			1.19 (30.2)				24320	444
76	–	662.76	2.99 (76.0)	3.20 (81.2)	1.50 (38.0)	1.50 (38)	N/A	M8	354 (40.0)	0.24 (6)	45658	529
	–	670.76		4.98 (126.4)			1.54 (39)				69823	804

IMPORTANT

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

① Length of supported thro' bore.

② Clearance bore thro' spacer.

③ Maximum recommended tightening torque.

④ Values apply with max bores.

⑤ **Peak torque**. Select a size where Peak Torque exceeds the application torque x service factor. (***see page 4***)

⑥ Max. compensation values are mutually exclusive.

⑦ Torsional stiffness values apply at 50% peak torque with 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

PERFORMANCE

Coupling Size	Ref.	⑤ Peak torque lb.-in. (Nm)	⑥ Max compensation Angular deg	Radial in. (mm)	Axial in. (± mm)	⑦ Flexural stiffness Torsional Nm / rad x 103	Angular N / deg	Radial N / mm	Axial N / mm
41	660 & 662	0.44 (11.3)	1	0 (0)	.004 (0.1)	4.0	3.7	–	< 8
	664 & 666		2	.001 (0.2)	.001 (0.2)	2.8	1.6	97	
	668 & 670		2	.016 (0.4)	.001 (0.2)	2.6	1.6	23	
52	660 & 662	1.18 (30)	1	0 (0)	.004 (0.1)	7.5	10.0	–	< 9
	664 & 666		2	.001 (0.2)	.001 (0.2)	4.8	5.0	313	
	668 & 670		2	.016 (0.4)	.001 (0.2)	4.8	5.0	57	
66	660 & 662	2.36 (60)	1	0 (0)	.004 (0.1)	19.0	84.0	–	< 9
	664 & 666		2	.001 (0.2)	.001 (0.2)	12.0	23.0	379	
	668 & 670		2	.016 (0.4)	.001 (0.2)	12.0	23.0	93	
76	662	3.94 (100)	0.5	0 (0)	.004 (0.1)	45.7	-	178	< 9
	670		1	.016 (0.4)	.001 (0.2)	31	134	110	

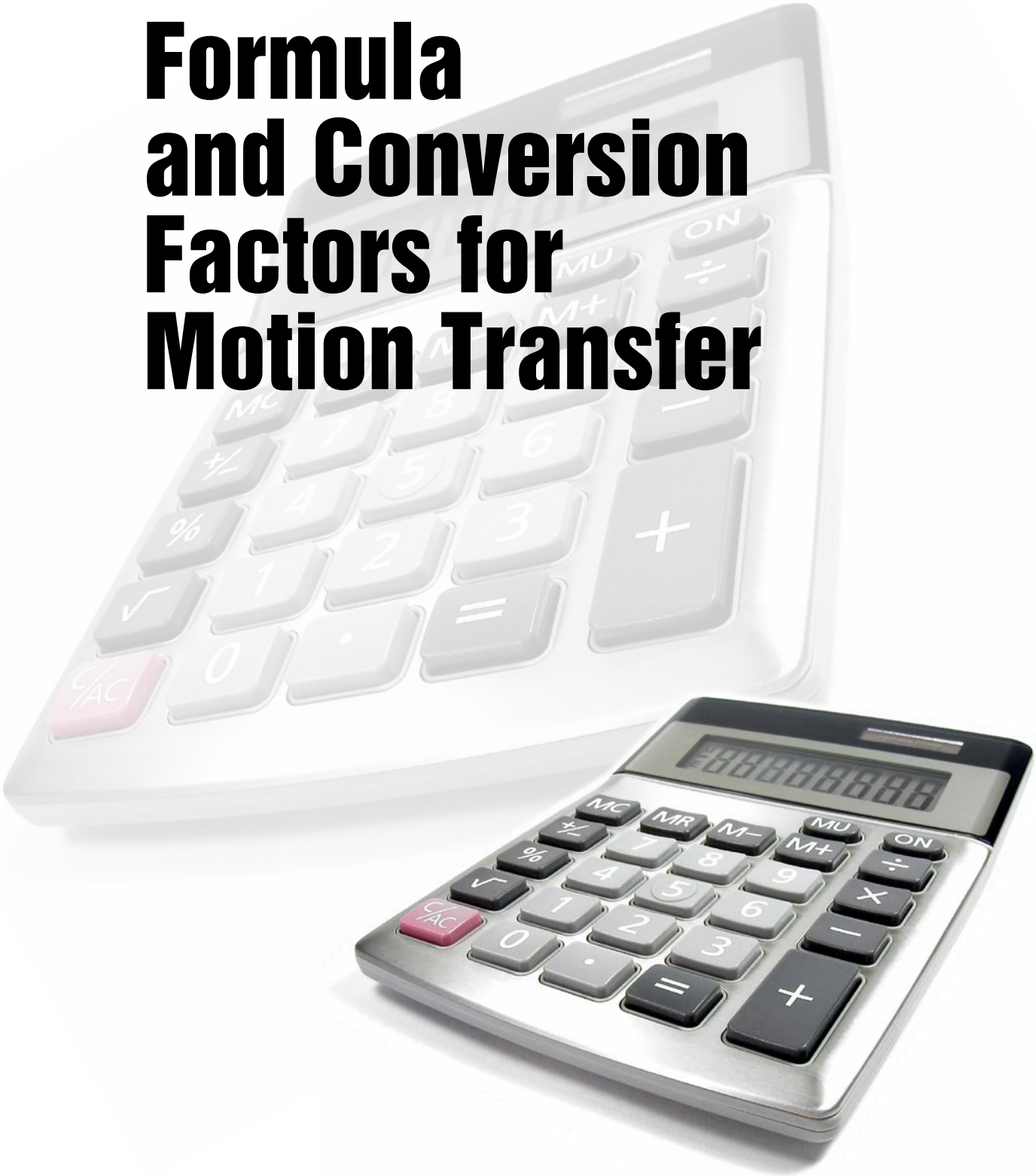
STANDARD BORES[8]

Sizes indicated in parenthesis are metric (mm).

Coupling Size	ØB1, ØB2 +0.0012/ -0 (+0.03mm/-0mm)																			
	1/4"	(8)	(9)	3/8"	(10)	(11)	(12)	1/2"	(14)	(15)	5/8"	(16)	(18)	(19)	3/4"	(20)	(24)	(25)	1"	(28)
41	•	•	•	•	•	•	•	•	•	•	•	•								
52		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•				
66							•	•	•	•	•	•	•	•	•	•	•	•	•	•
76	MANUFACTURED TO ORDER ONLY. PLEASE ENQUIRE																			
Bore ref.	24	28	30	31	32	33	35	36	38	40	41	42	45	46	47	48	51	52	53	54
Corresponding bore adaptor	253	255			257			259				260				261			262	263

Diameters for which a bore adaptor is shown can be adapted to smaller shaft sizes.
See *page 58* for details of metallic and electrically insulating adaptors.

Formula and Conversion Factors for Motion Transfer



Formula and Conversion Factors

SI BASE UNITS

Quantity	Unit Symbol	Name
length	m	meter
mass	kg	kilogram
time	s	second
electric current	A	ampere
Thermodynamic temperature	K	kelvin
luminous intensity	cd	candela

LETTER SYMBOLS & SI UNITS IN POWER TRANSMISSION ENGINEERING

Symbol	Quantity	SI Unit Symbol	Name
Mechanics			
E	modulus of elasticity (Young's modulus)	Pa	pascal
F	force	N	Newton
G (W)	weight	N	Newton
J	moment of inertia	kgm2	kilogram meter squared
M (T)	torque	Nm	Newton meter
m	mass	kg	kilogram
P	power	W	watt
p	pressure	Pa	pascal
ρ	density (mas density)	kg/m^3	-
σ	stress	Pa	pascal
W (E)	work (energy)	J	joule
η	efficiency	1	-
μ	coefficient of friction	1	-

FORMULAE

International System(SI) | Imperial System (FPS)

POWER

Lifting motion

$$P = \frac{m \cdot g \cdot v}{\eta \cdot 1000}$$

Linear motion

$$P = \frac{F_r \cdot v}{1000}$$

$$F_r = \mu \cdot m \cdot g$$

Rotary motion

$$P = \frac{M \cdot n}{9550}$$

P - Power in kW
F_r - Frictional resistance in N
m - Mass in kg
g - Acceleration of free fall (9.81) in m/s_2
v - Velocity in m/s
η - Efficiency in decimals
μ - Coefficient of friction
M - Torque in Nm
n - Rotational speed in 1/min or r/min

Lifting motion

$$P = \frac{W \cdot v}{\eta \cdot 33000}$$

Linear motion

$$P = \frac{F_r \cdot v}{33000}$$

$$F_r = \mu \cdot W$$

Rotary motion

$$P = \frac{M \cdot n}{5250}$$

P - Power in hp
F_r - Frictional resistance in lbf
W - Weight in lb
v - Velocity in ft/min
η - Efficiency in decimals
μ - Coefficient of friction
M - Torque in lbf . ft
n - Rotational speed in rpm

International System(SI) | Imperial System (FPS)

TORQUE

$$M - F \cdot r$$

$$P = \frac{9550 \cdot P}{n}$$

M - Torque in Nm
F - Force in N
r - Radius of lever in m
P - Power in kW
n - Rotational speed in 1/min or r/min

$$M - F \cdot r$$

$$P = \frac{5250 \cdot P}{n}$$

M - Torque in lbf . ft
F - Force in lbf
r - Radius of lever in ft
P - Power in hp
n - Rotational speed in rpm

WORK

$$W - F \cdot s = m \cdot g \cdot s$$

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

W - Work (energy) in Nm = Ws = J
F - Force in N
s - Length of path in m
m - Mass in kg
g - Acceleration of free fall (9.81) in m/s2
J - Moment of inertia in kgm_2
n - Rotational speed in 1/min or r/min

$$W - F \cdot s$$

$$W = \frac{WK^2 \cdot n^2}{5880}$$

W - Work (energy) in lb . ft
F - Force in lbf
s - Length of path in ft
m - Mass in kg
g - Acceleration of free fall (9.81) in m/s2
WK_2- Flywheel effect lb . ft_2
n - Rotational speed in rpm

ACCELERATION OR BRAKING TIME

$$ta = \frac{j \cdot n}{9.55\ M_a}$$

ta - Acceleration or braking time in s
J - Moment of inertia in kgm_2
n - Rotational speed in 1/min or r/min
M_a- Acceleration or braking torque in Nm

$$ta = \frac{WK^2 \cdot n}{308\ M_a}$$

ta - Acceleration or braking time in s
WK_2- Flywheel effect in kgm_2
n - Rotational speed in rpm
M_a- Acceleration or braking torque in lb . ft

MOMENT OF INERTIA

Solid Cylinder

$$J = \frac{1}{2} \cdot m \cdot r^2_{ext}$$

$$= \frac{1}{32} \cdot 1000 \cdot \pi \cdot \rho \cdot l \cdot d^4_{ext}$$

$$= 98\ \rho \cdot l \cdot d^4_{ext}$$

Hollow Cylinder

$$J = \frac{1}{2} \cdot m \cdot (r^2_{ext} + r^2_{int})$$

$$= \frac{1}{32} \cdot 1000 \cdot \pi \cdot \rho \cdot l\ (d^4_{ext} - d^4_{int})$$

$$= 98 \cdot \rho \cdot l\ (d^4_{ext} - d^4_{int})$$

Solid Cylinder

$$WK_2 = \frac{1}{2} \cdot W \cdot r^2_{ext}$$

$$= \frac{\pi}{32} \cdot \rho \cdot l \cdot d^4_{ext}$$

$$= 0.1\ \rho \cdot l \cdot d^4_{ext}$$

Hollow Cylinder

$$WK_2 = \frac{1}{2} \cdot W \cdot (r^2_{ext} + r^2_{int})$$

$$= \frac{\pi}{32} \cdot \rho \cdot l\ (d^4_{ext} - d^4_{int})$$

$$= 0.1 \cdot \rho \cdot l\ (d^4_{ext} - d^4_{int})$$

torsional stiffness and resonant frequency

$$C_T \le \frac{(F_R \times 2\pi)^2}{\left(\frac{1}{J_M} + \frac{1}{J_L}\right)}$$

$$FR \le \frac{1}{2\pi} \times \sqrt{\left(\frac{1}{J_M} + \frac{1}{J_L}\right) \times C_T}$$

Where
C_T = *torsional stiffness (Nm/rad);*
J_M = *motor inertia (kgm^2)*
F_R = *resonant frequency (Hz)*
J_L = *load inertia (kgm^2)*

FORCE

		N	kp	p	tonf (UK)	lbf	ozf
1N	=	1	0.1020	102.0	100.4×10^{-6}	0.2248	3.597
1kp	=	9.807	1	1000	0.984×10^{-3}	2.205	35.27
1p	=	9.81×10^{-3}	1×10^{-3}	1	0.984×10^{-6}	2.2×10^{-3}	35.3×10^{-3}
1tonf (UK)	=	9964	1016	1.02×10^{6}	1	2240	35.8×10^{3}
1lbf	=	4.448	0.4536	453.6	0.5×10^{-6}	1	16
1ozf	=	-	28.4×10^{-3}	28.35	27.9×10^{-6}	62.5×10^{-3}	1

VELOCITY

		km/h	m/min	m/s	mile/h	ft/min	ft/s	in/s
1km/h	=	1	16.667	0.2778	0.6214	54.68	0.9113	10.936
m/min	=	0.06	1	16.7×10^{-3}	37.3×10^{-3}	3.281	54.7×10^{-3}	0.656
1m/s	=	3.6	60	1	2.237	196.85	3.281	39.37
1mile/h	=	1.609	26.82	0.4470	1	88	1.467	17.6
1ft/min	=	18.3×10^{-3}	0.3048	5.08×10^{-3}	11.4×10^{-3}	1	16.7×10^{-3}	0.2
1ft/s	=	1.097	18.288	0.3048	0.6818	60	1	12
1in/s	=	91×10^{-3}	1.524	25.4×10^{-3}	56.8×10^{-3}	5	83.3×10^{-3}	1

TORQUE

		Nm	Ncm	kgfm	lbf.ft	lbf.in	ozf.in
1Nm	=	1	100	0.10197	0.73756	8.8507	141.61
Ncm	=	0.01	1	1.02×10^{-3}	7.376×10^{-3}	88.5×10^{-3}	1.4161
1kgfm	=	9.8067	980.67	1	7.233	86.796	1389
1lbf.ft	=	1.356	135.6	0.1383	1	12	192
1lbf.in	=	0.1129	11.29	11.5×10^{-3}	83.3×10^{-3}	1	16
1ozf.in	=	7.062×10^{-3}	0.7062	0.72×10^{-3}	5.21×10^{-3}	62.5×10^{-3}	1

POWER

		kW	PS	hp	kgfm/s	ft.lbf/s
1kW	=	1	1.360	1.341	102.0	737.6
1PS	=	0.7355	1	0.9863	75	542.5
1hp	=	0.7457	1.014	1	76.04	550
1kgfm/s	=	9.81×10^{-3}	13.33×10^{-3}	13.15×10^{-3}	1	7.233
1ft.lbf/s	=	1.36×10^{-3}	1.84×10^{-3}	1.82×10^{-3}	0.1383	1

MOMENT OF INERTIA AND OTHER FLYWHEEL EFFECTS

		kgm^2 (mr^2)	$kgfm^2$ (GD^2)	$lb.ft^2$(WK^2)	$kpms^2$	ft lbf s^2
1kgm^2 (mr^2)	=	1	4	23.73	0.102	0.7376
1$kgfm^2$ (GD^2)	=	0.25	1	5.933	25×10^{-3}	0.1844
1$lb.ft^2$(WK^2)	=	42.1×10^{-3}	0.1686	1	4.30×10^{-3}	31.1×10^{-3}
1$kpms^2$	=	9.807	39.23	232.7	1	7.233
1ft lbf s^2	=	1.356	5.423	32.17	0.1383	1

LENGTH

	mm	m	in	ft	yds	km	miles
1mm	1	0.001	0.3937	0.0033	0.00109	-	-
1m	1000	1	39.370	3.2808	1.0936	0.001	0.0006215
1in	25.4	0.0254	1	0.0833	0.0277	0.0000254	0.0000158
1ft	304.8	0.3048	12	1	0.3333	0.000304	0.0001894
1yd	914.4	0.9144	36	3	1	0.000914	0.000568
1km	-	1000	39,370.07	3,280.83	1,093.613	1	0.6215
1mile	-	1,609	63,346.45	5,278.87	1,759.623	1.609	1