ferrabyrne ltd

FERRAFLEX
FLEXIBLE COUPLINGS

A well-proven design with the benefit of extensive experience in a variety of applications

DESCRIPTION

Ferraflex flexible couplings are designed to transmit power between a prime mover and a driven machine.

Ferraflex couplings are designed around two flanged hub members, companion flanges, which are fitted to the shafts to be coupled and separated by a floating centre assembly containing four equispaced rubber bushes. Each rubber bush is alternately connected by bolts to one or other of the hub members.

The flexibility provided by Ferraflex couplings is the result of using specially developed highly resilient rubber bushes with reinforced cores. The shape of the rubber has been designed to give uniform stress and deflection throughout its area, thereby maximising the life of the coupling. The rubber blocks are pre- loaded to permit large deflections and can absorb controlled torsional vibration, as well as shock and uneven impulses.

They can be used with electric motors and internal combustion engines, in a wide range of applications including generators, pumps and fans.

Ferraflex couplings are designed for applications where the angular displacement does not exceed 5°.

For larger parallel misalignments, flexible shafts and close coupled assemblies can be supplied. In this instance the transverse frequency must be compatible with the operating speed. If the distance between the driving and driven unit's produce single shaft instability, a twin shaft assembly containing three couplings can be used.

Ferraflex couplings require minimal servicing and do not need to be lubricated or adjusted after fitting. They are unaffected by water, dust or normal atmospheric conditions.

COMMON PARAMETERS

The following parameters are common to most flexible coupling applications and are necessary to confirm the suitability or make a recommendation for a particular application:

- Description of driving machine (prime mover) i.e., diesel or petrol engine (including number of cylinders), electric motor
- Power output in kW or hp (normal and maximum)
- Speed in revolutions per minute
- Full description of driven machine
- Any space limitations in terms of dimensions i.e., overall length, diameter, shaft length
- Any other relevant details i.e., operating conditions (continuous or intermittent duty), fluctuating or reversing loads, flywheel characteristics, position of nearest bearings, etc
- An application drawing if available

Example:
The following example is a typical application of a Ferraflex Flexible Coupling and illustrates the method by which a coupling is selected.

A 30hp electric motor is to be coupled to a multi-cylinder air compressor. The diameter of the motor shaft is 48mm and compressor shaft 42mm. The speed of the motor is 1450rpm.

- Select the relevant Service factor from the table opposite
  Electric Motor Compressor 2.5
- Calculate the adjusted hp/100rpm

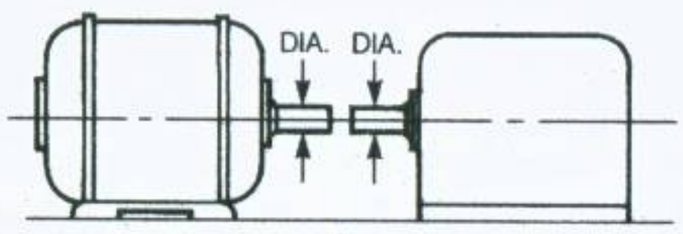
$$\text{hp/100rpm} = \frac{\text{Motor hp} \times \text{Service Factor} \times 100}{\text{Motor Speed}}$$

$$= \frac{30 \times 2.5 \times 100}{1450}$$

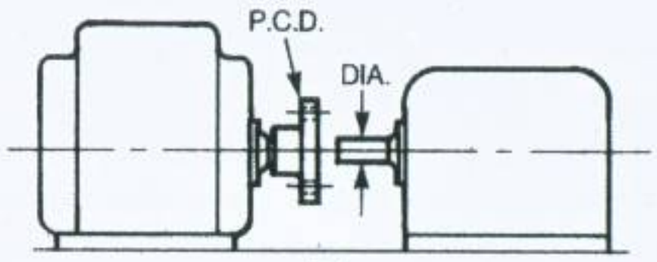
hp/100rpm = 5.2

- Select a suitable coupling which will bore to suit input/output shaft diameters of 48mm and 42mm, and will handle an effective hp/100rpm of 5.2

i.e. Ferraflex Coupling 70E
(Maximum recommended hp/100rpm - 5.4)



A



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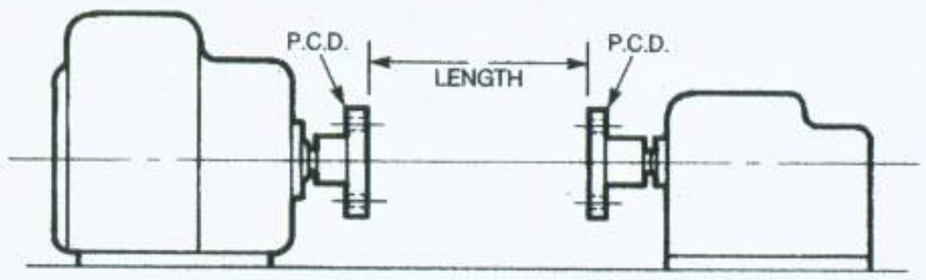

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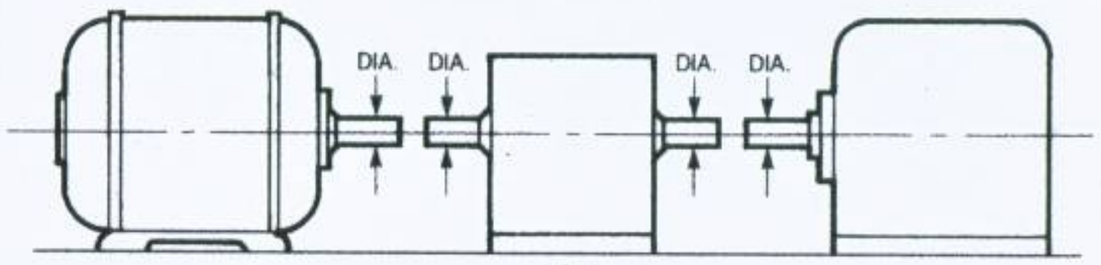


D

Some parameters are specific to a particular type of installation. Examples of four typical arrangements are detailed below:

Arrangement A
- Diameter of driving shaft
- Diameter of shaft on driven machine

Arrangement B
- Diameter of shaft on driven machine
- Details of flange or flywheel to which the coupling is to be connected on the driving machine i.e., pitch circle diameter, number and diameter of holes, spigot etc

Arrangement C
- Details of flange or flywheel to which the coupling is to be connected on the driving machine and the flange on the driven machine i.e., pitch circle diameter, number and diameter of holes, spigot, etc

Arrangement D
- Diameter of driving shaft
- Diameter of shaft on driven machine
- Description of intermittent machinery
- Other details of intermediate machinery i.e., if with reduction gear give ratio of speeds
- Diameter of input shaft
- Diameter of output shaft

SHAFTS AND KEYWAYS

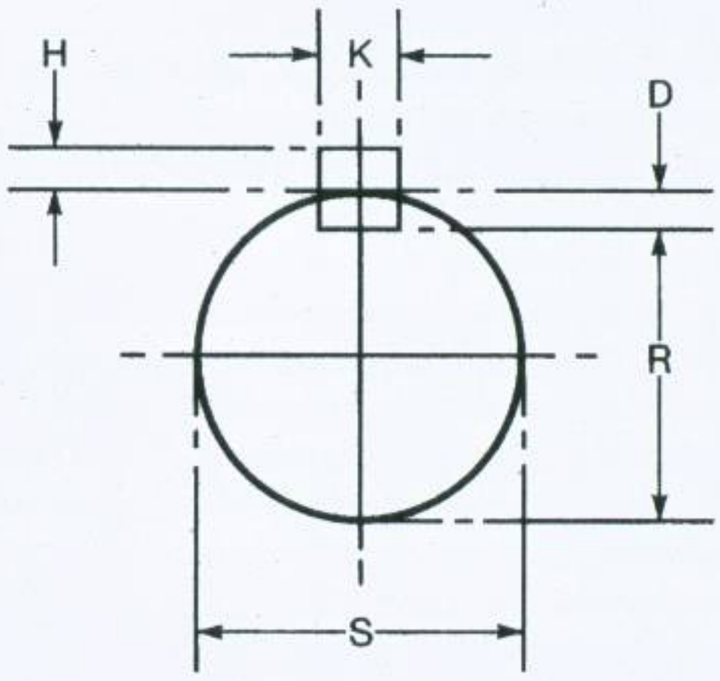
Each Ferraflex companion flange is designed to take a range of parallel shaft sizes, defined in terms of a minimum and maximum standard bore. It is important that the coupling selected is adequate to take the proposed shaft (see table for minimum/maximum dimensions) and where possible avoid boring hubs to their maximum by selecting a larger coupling. It is recommended that standard shafts and keys are selected based on BS4235 Part 1 for metric sizes and BS46 for imperial sizes, and where possible avoid oversize keyways. Other sizes and types of shafts and keys can be catered for, subject to special order conditions. Variations from these general rules are sometimes permitted provided the capacity of the coupling is well in excess of the power being transmitted.

When couplings are required finish bored and keywayed, accurate measurements of the shaft and key, as indicated on the adjacent drawing, need to be submitted. Alternatively, Ferraflex couplings can be supplied with the flanges pilot bored to the minimum standard diameter, ready for the customer to finish bore and keyway.

SERVICE FACTORS

The safe capacity of a coupling can be established by taking the Service Factor for the application under consideration and making the following calculations:

Recommended Operating kW or hp =
Specified kW or hp
Service Factor

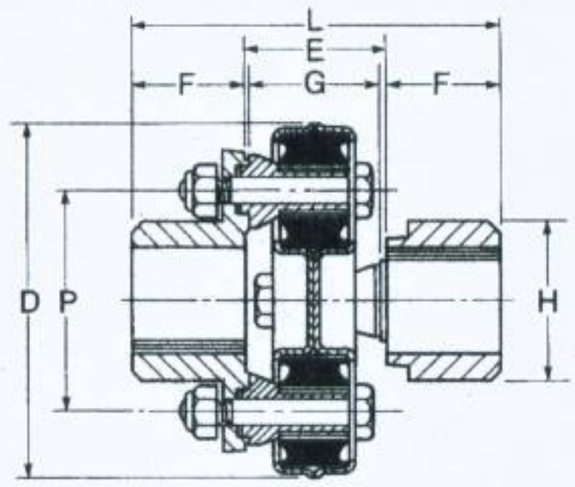


D – Depth in shaft
H – Height in hub
K – Width of keyway
R – Root depth of keyway
S – Shaft diameter

The table below gives an indication of Service Factors for various applications. For further details on selection please consult Ferrabyrne Technical Sales Department.

Type of Drive	Electric Motors	Internal Combustion Engines					
		Petrol 6 cyl & over	Petrol 2-5 cyl	Diesel 6 cyl & over	Diesel 3-5 cyl	Petrol single cyl	Diesel 1 & 2cyl
Generators (steady load)	1.0	2.0	2.5	3.0	3.5		4.0
Conveyors (steady load) Centrifugal Pumps	1.5	2.5	3.0	3.5	4.0		4.5
Conveyors (reversing) Fans and Blowers Medium Machine Tools Pumps (Duplex and Triplex) Textile Machinery	2.0	3.0	3.5	4.0	4.5		5.0
Compressors (Gas and Liquid) Pumps (Vacuum and Rotary)	2.5	3.5	4.0	4.5	5.0		5.5
Mine Fans and Heavy Blowers Hoists (Light) Heavy Machine Tools Rubber Mixers Welding Plant	3.0	4.0	4.5	5.0	5.5		6.0
Cranes (Slewing & Travelling) Pumps (Single Acting) Steel Rolling Mills Drop Hammers Crushers & Excavators	3.5	4.5	5.0	5.5	6.0		6.5
Cranes (Hoisting)	4.0	5.0	5.5	6.0	6.5		7.0

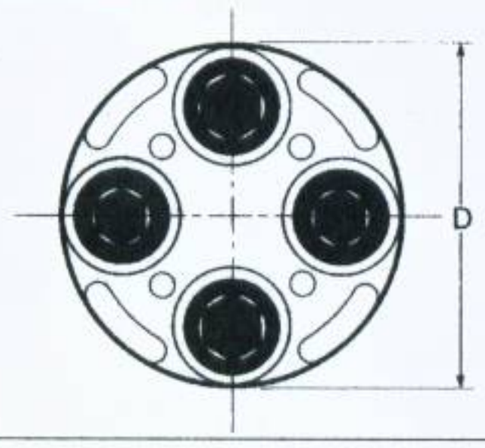
UNIVERSAL COUPLINGS

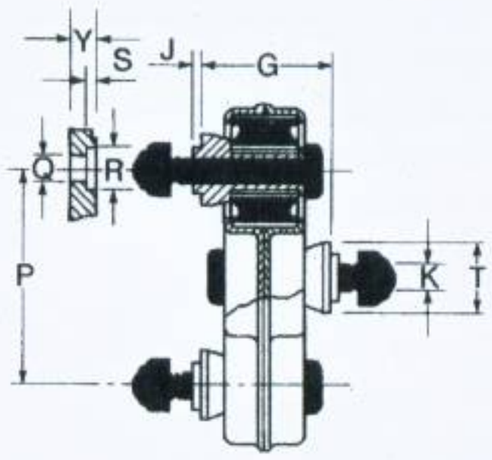


Part No.	*Power/100rpm kw	hp	Bore Min/Max	Dimensions mm D	E	F	G	H	L	P	Max.Torque Nm	lbfft
25C	0.186	0.25	9.5/15.9	63.5	19.0	19.0	19.0	27.0	57.2	41.3	17.80	13.13
30C	0.283	0.38	9.5/22.2	77.0	25.4	22.2	25.4	34.9	69.9	49.2	27.10	19.96
35E	0.448	0.60	11.1/23.8	88.9	31.8	23.8	28.6	38.1	79.4	57.2	42.70	31.51
40E	0.724	0.97	12.7/28.6	102.4	44.5	30.2	41.3	44.5	104.8	65.1	69.10	50.95
50E	1.171	1.57	15.9/38.1	127.8	47.6	36.5	44.5	57.2	120.7	81.0	112.0	82.48
60E	2.35	3.15	19.0/47.6	152.4	60.3	49.2	57.2	69.9	158.8	96.8	223.0	164.4
70E	4.03	5.40	25.4/57.1	177.8	61.9	58.7	58.7	81.0	179.4	109.5	385.0	283.5
80E	5.52	7.40	25.4/63.5	203.2	71.4	68.3	68.3	95.3	208.0	125.4	527.0	389
90E	7.46	10.0	25.4/69.9	228.6	79.4	84.1	76.2	104.8	247.7	141.3	712.0	525
100E	10.3	3.8	31.8/79.4	254.0	85.7	96.8	79.4	15.9	279.4	157.2	983.0	725
120E	14.9	20.0	44.5/88.9	304.8	98.4	111.1	92.1	113.4	320.7	187.3	1424.0	1050

* NOTE - Before selection, correct the actual power rating, using the Service Factor

CENTRE ASSEMBLIES



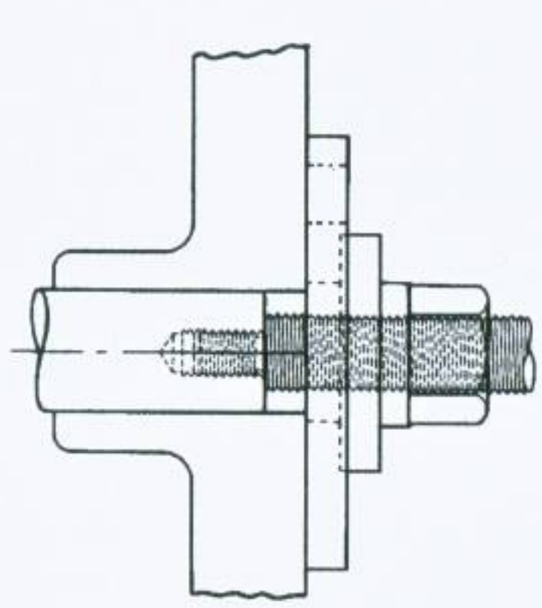


Part No	*Power/100rpm kw	hp	Dimensions mm D	G	J	K	P	Q	R	S	T	Y	Max.Torque Nm	lbf.ft	**Nut/ Bolt Sets Mild Steel
FC2425	0.186	0.25	63.5	19.0	1.6	6.4	41.3	6.4	8.61/8.64	2.4	14.3	4.8	17.80	13.13	NB2
FC2430	0.283	0.38	77.0	25.4	1.6	6.4	49.2	6.4	8.61/8.64	2.4	14.3	5.6	27.10	19.96	NB3
FC2435	0.448	0.60	88.9	28.6	2.4	7.9	57.1	7.9	11.11/11.14	3.2	15.9	6.4	42.70	31.51	NB9
FC2440	0.724	0.97	102.4	41.3	4.0	9.5	65.1	9.9	15.88/15.91	4.8	22.2	9.5	9.10	50.95	NB14
FC2450	1.171	1.57	127.8	44.5	3.2	11.1	81.0	11.5	19.05/19.08	4.8	25.4	9.5	112.0	82.48	NB26
FC2460	2.35	3.15	152.4	57.2	4.0	12.7	96.8	13.1	19.05/19.08	6.4	31.8	12.7	223.0	164.4	NB34
FC2470	4.03	5.40	177.8	58.7	4.0	14.3	109.5	14.7	22.23/22.26	6.4	38.1	15.9	385.0	283.5	NB61
FC2480	5.52	7.40	203.2	68.3	4.0	14.3	125.4	14.7	22.23/22.26	7.9	41.3	15.9	527.0	389	NB64
FC2490	7.46	10.0	228.6	76.2	4.8	15.9	141.3	16.3	28.58/28.61	7.9	50.8	19.0	712.0	525	NB81
FC24100	10.3	13.8	254.0	79.4	4.8	19.0	157.2	19.4	31.75/31.78	7.9	57.2	23.8	983.0	725	NB99
FC24120	14.9	20.0	304.8	92.1	6.4	25.4	187.3	26.2	38.10/38.13	9.5	57.2	31.8	1424.0	1050	NB116

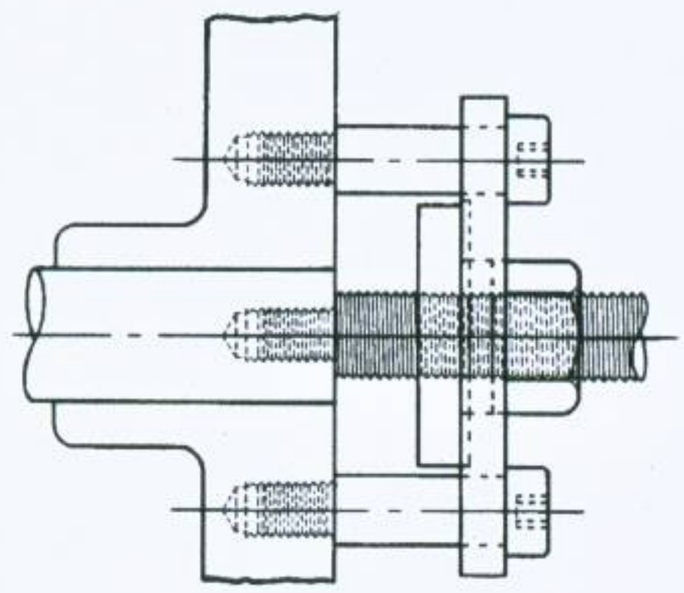
NOTE - Before selection correct the actual power rating, using the Service Factor ** Nuts and bolts - supplied separately in sets of 4

ALIGNMENT

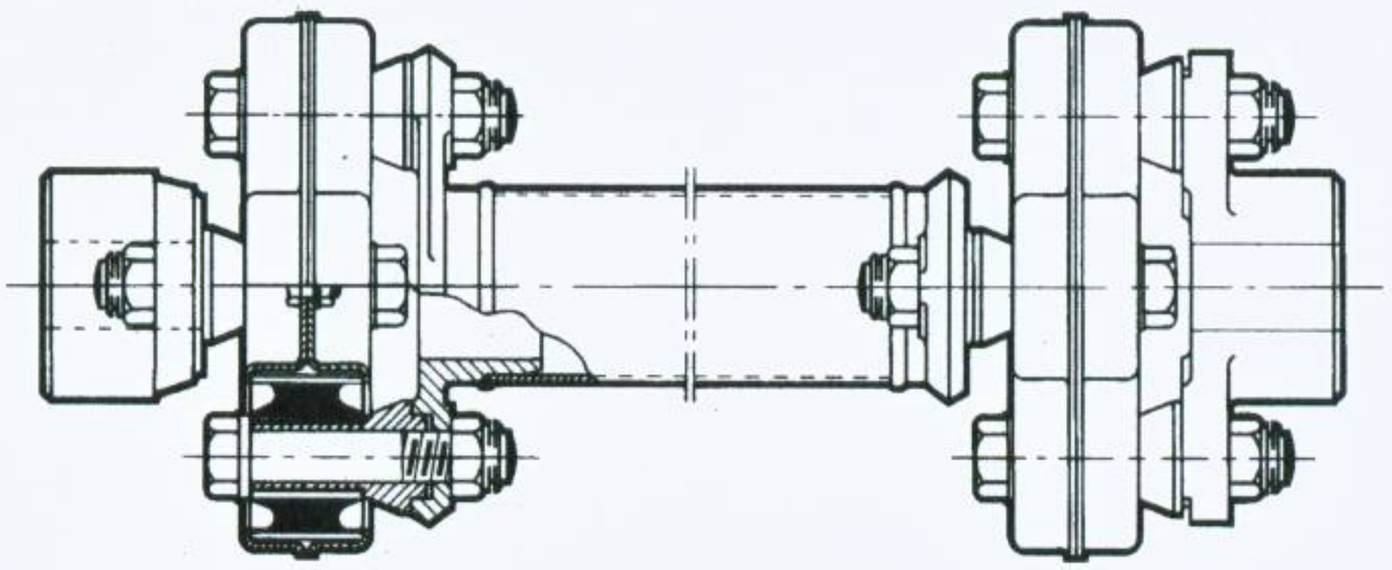
Every effort should be made to obtain and maintain good alignment between the shafts of connected machines. This will result in better running performance and lower maintenance costs. Where the nature of the application is such that the connected machines will be constantly subject to abnormal misalignment, either fixed or varying, two couplings connected by an intermediate shaft generally provide the best arrangement.



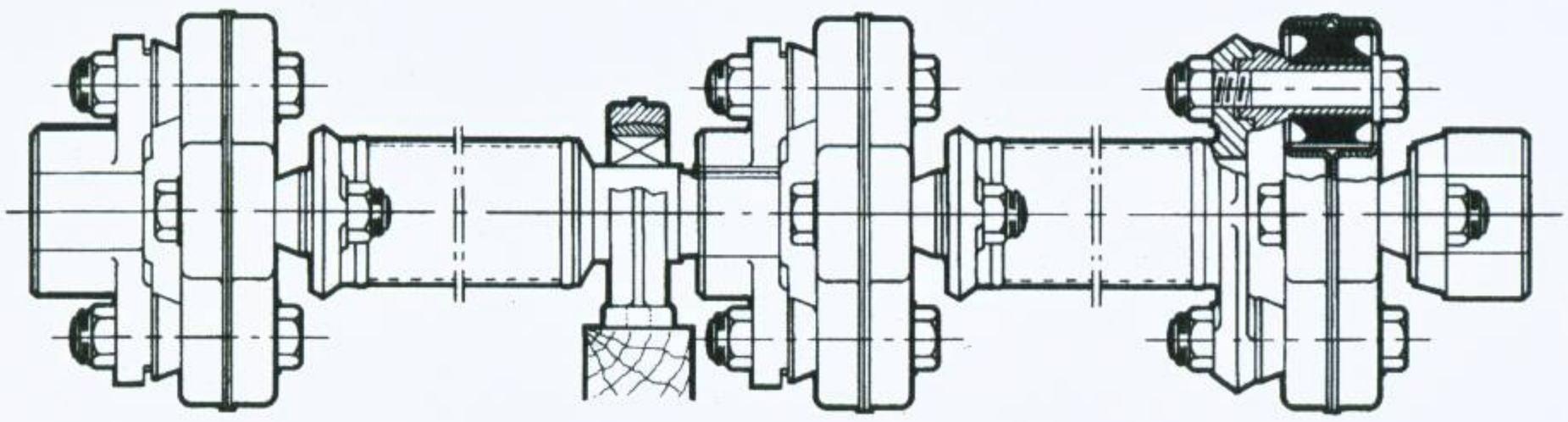
Fitting a hub to a shaft



Withdrawing a hub from a shaft



Single Shaft Assembly



Twin Shaft Assembly

SAFETY PRECAUTIONS

To meet the requirements of various Safety Regulations, rotating parts of machinery must be adequately guarded against accidents. Information on the guarding of couplings is given in British Standard 1649.

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