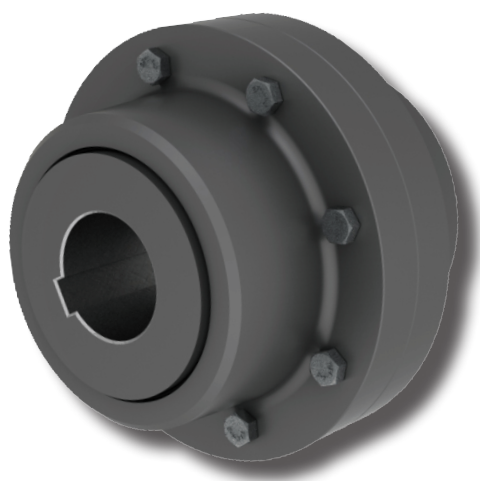
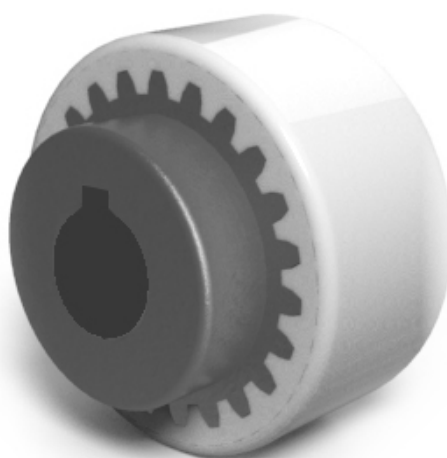


# benzlers

with you at every turn

## Series X - Flexible Couplings Installation & Maintenance



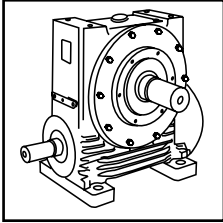
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with you at every turn

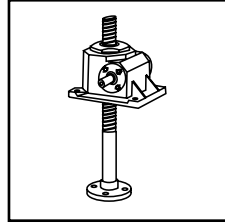
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# PRODUCTS IN THE RANGE

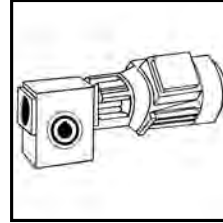
Serving an entire spectrum of mechanical drive applications from food, energy, mining and metal; to automotive, aerospace and marine propulsion, we are here to make a positive difference to the supply of drive solutions.



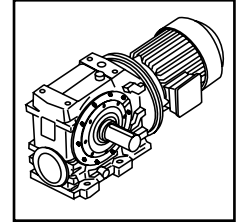
**Series A**  
Worm Gear units  
and geared motors  
in single & double  
reduction types



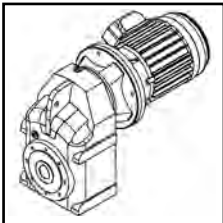
**Series BD**  
Screwjack worm  
gear unit



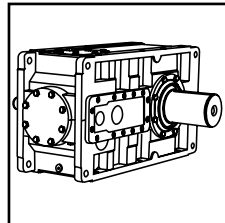
**Series BS**  
Worm gear unit



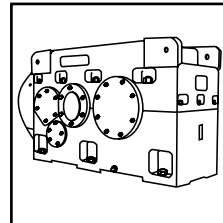
**Series C**  
Right angle drive  
helical worm geared  
motors & reducers



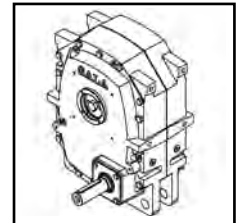
**Series F**  
Parallel shaft helical  
geared motors &  
reducers



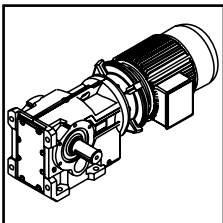
**Series G**  
Helical parallel shaft  
& bevel helical right  
angle drive gear  
units



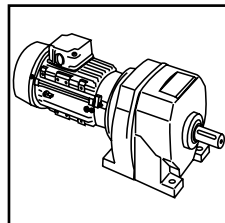
**Series H**  
Large helical parallel  
shaft & bevel helical  
right angle drive units



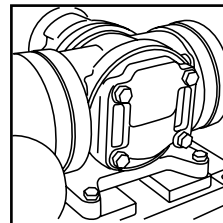
**Series J**  
Shaft mounted  
helical speed  
reducers



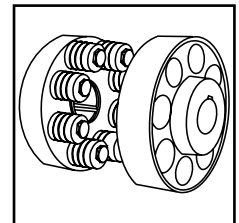
**Series K**  
Right angle helical  
bevel helical geared  
motors & reducers



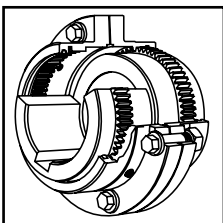
**Series M**  
In-line helical geared  
motors & reducers



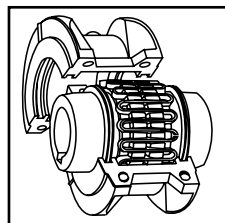
**Roloid Gear Pump**  
Lubrication and fluid  
transportation pump



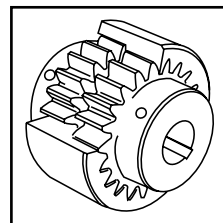
**Series X  
Cone Ring**  
Pin and bush  
elastomer coupling



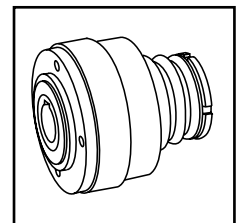
**Series X  
Gear**  
Torsionally rigid,  
high torque coupling



**Series X  
Grid**  
Double flexing steel  
grid coupling



**Series X  
Nylon**  
Gear coupling with  
nylon sleeve



**Series X  
Torque Limiter**  
Overload protection  
device



We offer a wide range of repair services and many years experience of repairing demanding and highly critical transmissions in numerous industries.

We can create custom engineered transmission solutions of any size and configuration.

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## General Information

### Declaration of Conformity

We hereby declare that our products have been designed in accordance with the following Directives and Standards:

The Machinery Directive 2006/42/EC

EN ISO 12100:2010 Safety of Machinery. General Principles for Design. Risk Assessment and Risk Reduction.

Conformity with other harmonised standards, tests, and specifications, (In as much as they apply to our products)

### Declaration of Incorporation According to Machinery Directive 2006/42/EC Annex IIB

This product must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of the machinery directive 2006/42/EC.

The equipment shall only be loaded within the framework of our recommendations, and installed and operated in accordance with our installation and maintenance instructions.

We hereby draw attention to the dangers of improper use of this equipment and particularly warns users against operating with inadequate guarding of rotating parts.

We will provide upon a reasoned request from national authorities, any relevant information on our products.

### Warranty Conditions

We warrant our products to be free of defects for a period of 12 months from the date the product is installed to a maximum of 18 months from the date shipment.

The warranty will only be valid if the product is loaded within the framework of our recommendations, and installed and operated in accordance with our installation and maintenance instructions.

The warranty is limited to the repair or replacement of the defective product or part which is returned to our factory after notification of failure.

We shall be liable only for the repair and replacement of the product and shall not be liable to any consequential damages resulting from a defective or nonconforming product.



## IMPORTANT

### Product Safety Information

**General** - The following information is important in ensuring safety. It **must** be brought to the attention of personnel involved in the selection of the equipment, those responsible for the design of the machinery in which it is to be incorporated and those involved in its installation, use and maintenance.

The equipment will operate safely provided it is selected, installed, used and maintained properly. As with any power transmission equipment **proper precautions must** be taken as indicated in the following paragraphs, to ensure safety.

**Potential Hazards** - these are **not** necessarily listed in any order of severity as the degree of danger varies in individual circumstances. It is important therefore that the list is studied in its entirety:-

- 1) Fire/Explosion
  - (a) Oil mists and vapours can be generated by machinery, it is therefore dangerous to use naked lights in the proximity of due to the risk of fire or explosion.
  - (b) In the event of fire or serious overheating (over 300 °C), certain materials (rubber, plastics, etc.) may decompose and produce fumes. Care should be taken to avoid exposure to the fumes, and the remains of burned or overheated plastic/rubber materials should be handled with rubber gloves.
- 2) Guards - Rotating shafts and couplings must be guarded to eliminate the possibility of physical contact or entanglement of clothing. It should be of rigid construction and firmly secured.
- 3) Noise - The machinery may produce noise levels which are damaging to the hearing with prolonged exposure. Ear defenders should be provided for personnel in these circumstances. Reference should be made to the Department of Employment Code of Practice for reducing exposure of employed persons to noise.
- 4) Lifting - On larger couplings tappings for eyebolts are provided, a suitable eyebolt must be fitted and used for lifting operations. Failure to use the lifting points provided may result in personal injury and/or damage to the product or surrounding equipment. Keep clear of raised equipment.
- 5) Lubricants and Lubrication
  - (a) Prolonged contact with lubricants can be detrimental to the skin. The manufacturer's instruction must be followed when handling lubricants.
  - (b) The lubrication status of the equipment must be checked before commissioning. Read and carry out all instructions on the lubricant in the installation and maintenance literature. Failure to do so could result in mechanical damage and in extreme cases risk of injury to personnel.
- 6) Electrical Equipment - Observe hazard warnings on electrical equipment and isolate power before working on the coupling or associated equipment, in order to prevent the machinery being started.
- 7) Installation, Maintenance and Storage
  - (a) In the event that equipment is to be held in storage, for a period exceeding 6 months, prior to installation or commissioning, application engineering must be consulted regarding special preservation requirements. Unless otherwise agreed, equipment must be stored in a building protected from extremes of temperature and humidity to prevent deterioration.
  - (b) Components may be supplied with preservative materials applied, in the form of a "waxed" tape over wrap or wax film preservative. Gloves should be worn when removing these materials. The former can be removed manually, the latter using white spirit as a solvent.
  - (c) Installation must be performed in accordance with the manufacturer's instructions and be undertaken by suitably qualified personnel.
  - (d) Before working on the coupling associated equipment, ensure that the load has been removed from the system to eliminate the possibility of any movement of the machinery and isolate power supply. Where necessary, provide mechanical means to ensure the machinery cannot move or rotate. Ensure removal of such devices after work is complete.
  - (e) Ensure the proper maintenance in operation. Use only the correct tools and approved spare parts for repair and maintenance. Consult the Maintenance Manual before dismantling or performing maintenance work.
- 8) Hot Surfaces and Lubricants
  - (a) During operation, the coupling and machinery may become sufficiently hot to cause skin burns. Care must be taken to avoid accidental contact.
  - (b) After extended running the lubricant may reach temperatures sufficient to cause burns. Allow equipment to cool before servicing or performing adjustments.
- 9) Selection and Design
  - (a) The equipment must be correctly selected to ensure that the complete machinery installation will perform satisfactorily, avoiding system critical speeds, system torsional vibration, etc.
  - (b) The equipment must not be operated in an environment or at speeds, powers, torques or with external loads beyond those for which it was designed.
  - (c) As improvements in design are being made continually the contents of this catalogue are not to be regarded as binding in detail, and drawings and capacities are subject to alterations without notice.

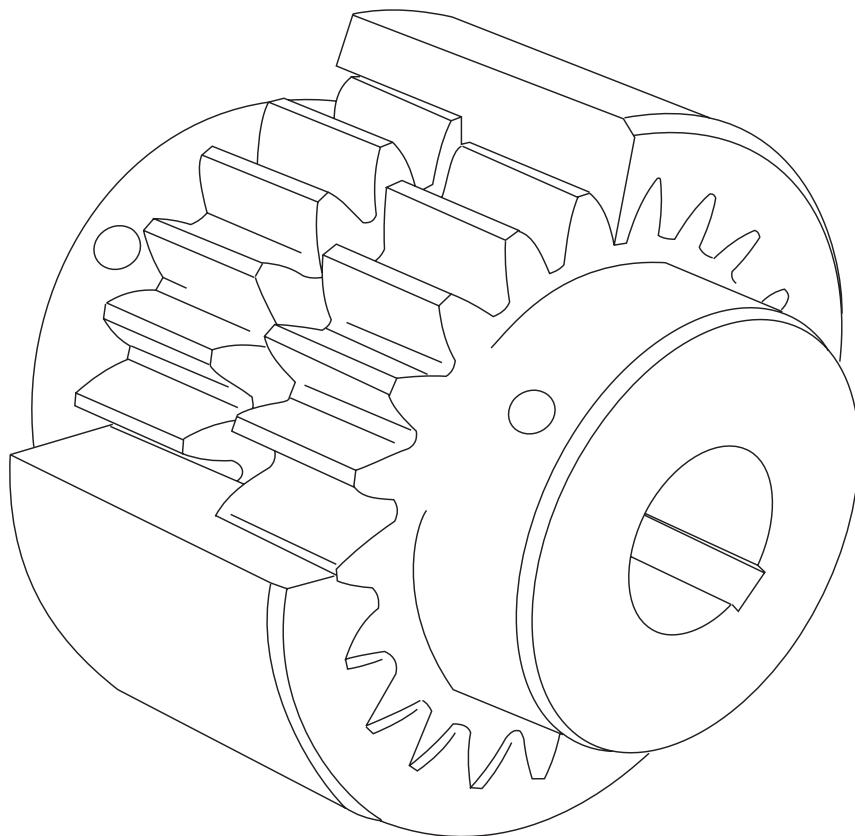
The above guidance is based on the current state of knowledge and our best assessment of the potential hazards in the operation of the couplings

Any further information or clarification required may be obtained by contacting our Application Engineers.

**INSTALLATION & MAINTENANCE**

**NYLICON**

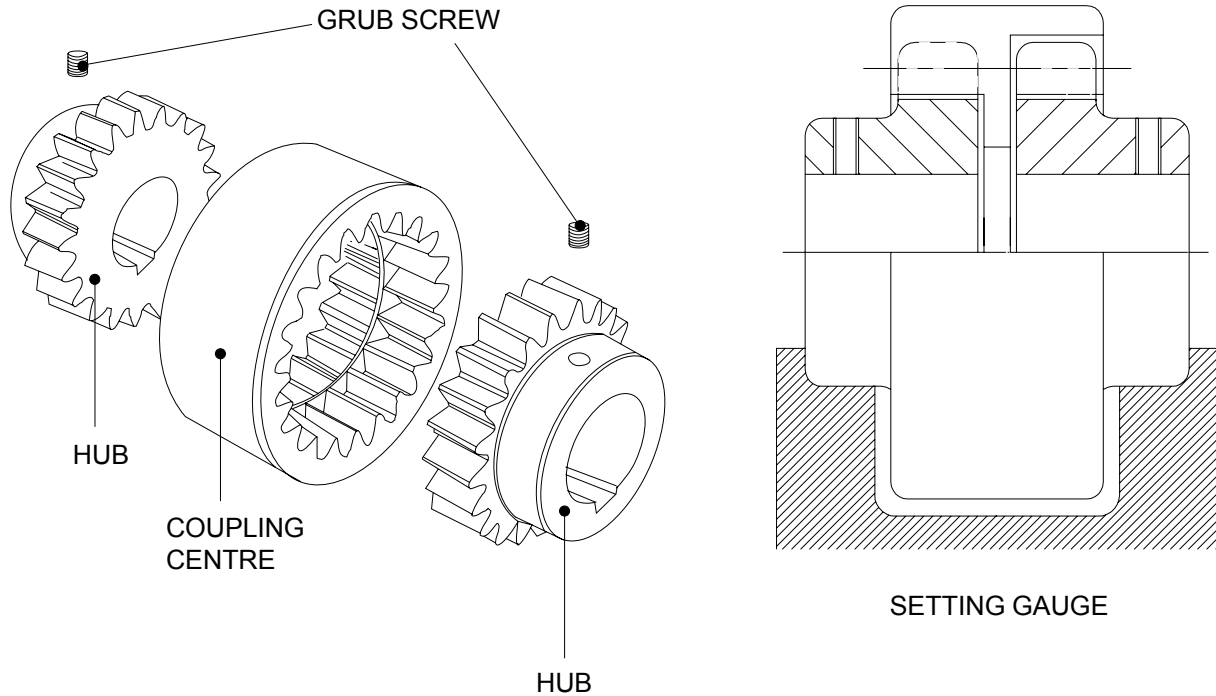
**GEAR COUPLING WITH NYLON SLEEVE**



# SERIES X

## NYLICON FLEXIBLE COUPLING

### NYLICON COUPLING



### INSTALLATION OF NYLICON GEAR TYPE FLEXIBLE COUPLINGS

Errors of alignment fall into categories of angularity and eccentricity, or a combination of both. While the NYLICON gear type flexible coupling compensates for a certain amount of misalignment, its life is greatly increased if any errors present are reduced as much as possible.

It is important, therefore to check the coupling for alignment with the setting gauge supplied before tightening the grub screws in the two hubs on their respective shafts.

The gauge should be placed on the coupling as shown above. Check for angular alignment using machined hub diameters. Adjust the hubs axially so that their outer faces correspond to the setting width on the gauge. The grub screws supplied can now be tightened to hold the coupling firmly.

Care should be taken in fitting the coupling to ensure that there is correct clearance for the central buffer ring and that the two shafts are in alignment within the limits as given in Table A1

There are no regular maintenance requirements for the Nylicon coupling range, They are maintenance free.

- Maximum allowable angular misalignment, + 1½° (¾° per gear mesh)
- Maximum allowable eccentricity is given in table A1

**Table A1 Allowable Alignment Errors**

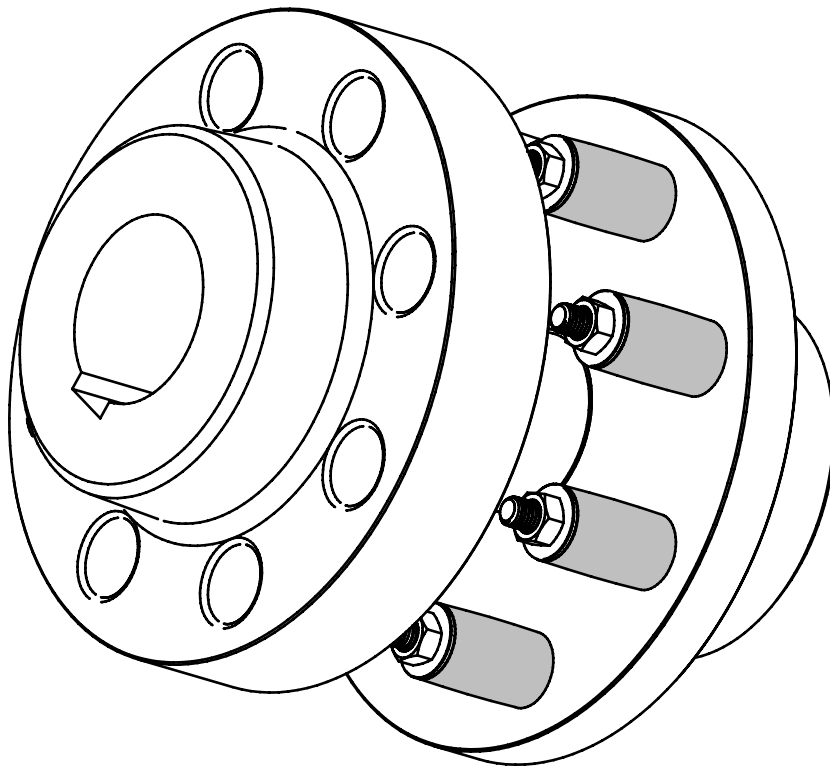
Size Of Coupling	Eccentricity Allowable (mm)	Equivalent Total Angular Misalignment
<b>X60001</b>	0.20	0.65°
<b>X60002</b>	0.20	0.41°
<b>X60003</b>	0.35	0.63°

The equivalent angular misalignment for the eccentricity should be added to the actual angular misalignment which should not exceed 1½°. Equivalent angular misalignment for lesser eccentricity should be obtained by proportioning.

**INSTALLATION & MAINTENANCE**

**ELFLEX COUPLINGS**

**FLEXIBLE PIN AND BUSH COUPLING**





### INSTALLATION PROCEDURE

#### 1.0 INSTALLATION OF THE HUBS

1.0.1 Inspect the coupling components and remove any protective coatings, ensure all coupling parts and mating shafts are clean and free of oil or grease.

1.0.2 Check the key fit in both shafts and hubs, and fit the keys into the shafts

1.0.3 Install each coupling half on its shaft, the half containing the rubber elements should be mounted on the driven shaft, the hubs should be positioned so that the coupling face is flush with the shaft end

Note! With press fits it is recommended to apply an appropriate lubricant to the hub bores and shafts, The hubs may be heated (max 120° C) to install more easily.

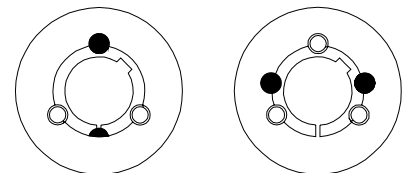
Ensure the hubs are square with the shafts and the keyways are in line before assembly.

1.0.4 Install the machinery to be connected and set the gap (F) between shafts (table 3).

1.0.5 Adjust for acceptable shaft alignment as per section 1.4.

Note! Use metal shim strips under machinery feet as packing to achieve adjustments.

#### 1.1 INSTALLATION AND REMOVAL OF HUBS WITH TAPER-LOCK BUSHES



##### TO INSTALL

1.1.1 Remove the protective coating from the bore and outside of bush, and bore of hub. After ensuring that the mating tapered surfaces are completely clean and free from oil or dirt, insert the bush in the hub so that the holes line up.

1.1.2 Sparingly oil the thread and point of grub screws, or thread and under head of capscrews. Place the screws loosely in the holes tapped in the hub, shown thus in the diagram

1.1.3 Clean the shaft. If a key is to be fitted place it in the shaft keyway before fitting the bush. It is essential that it is a parallel key and side fitting only, and has top clearance.

1.1.4 Fit the hub and bush to the shaft as one unit, and locate in position desired, remembering that the bush will nip the shaft first and then the hub will be slightly drawn on to the bush.

1.1.5 Using a hexagon wrench (Allen key) tighten the screws gradually and alternately until all are pulled up very tightly.

**Table B1 Taper Lock Bush Screw Tightening Torque**

COUPLING SIZE		ERC 03	EFC 04	EFC 05 EFC 06	EFC 07	EFC 08 EFC 09	EFC 10 EFC 11	EFC 12	EFC 13
SCREW DETAILS	QUANTITY	2	2	2	2	2	2	3	3
	SIZE BSW	1/4"	3/8"	3/8"	5/8"	7/16"	5/8"	1/2"	5/8"
TIGHTENING TORQUE (Nm)		5.6	20	20	30	50	90	115	170

1.2.6 Hammer against the large end of the bush using a block or sleeve to prevent damage. The screws will now turn a little more. Repeat this alternate hammering and screw tightening once or twice to achieve maximum grip on the shaft, particularly necessary if a key is not fitted.

1.2.7 After the drive has been running under load for a short time, stop and check tightness of screws. (See table 1 )

1.2.8 Fill the empty holes and screw heads with grease to exclude dirt.





### REMOVAL

1.1.9 Slacken all screws by several turns. Remove one (size 12 to 13, remove two) and insert it (them) into the jacking off holes shown thus ● in the diagram, after oiling thread and point of grub screws or thread and under head of cap screws.

1.1.10 Tighten the screw(s) until the bush is loosened in the hub and the assembly is free on the shaft.

1.1.11 Remove the assembly from the shaft.

## 2.0 SHAFT ALIGNMENT

Check shaft alignment as follows:-

Errors of alignment fall into categories of angularity (see figure 1) and eccentricity (See figure 2), or a combination of both.

Errors of angularity should be checked for and corrected before errors of eccentricity.

### 2.1 ERRORS OF ANGULARITY

The angularity errors can be checked by keeping both shafts stationary and taking measurements with a block gauge and feelers at the four points 1, 2, 3 and 4 as shown in figure 3 (Fig 3a method for standard couplings, and 3b and 3c are methods for the brake drum type coupling). The difference between the readings 1 and 3 will give the error of alignment in the vertical plane over a length equal to the diameter of the coupling flanges. Similarly the difference between the readings 2 and 4 gives the amount of sideways adjustment necessary to correct any errors of alignment in the horizontal plane.

A simpler method of checking angularity is by marking adjacent points on both coupling hubs and rotating both hubs together keeping the marks in line, by taking gap measurements each quarter revolution the errors of angularity in the vertical and horizontal planes can be found.

The allowable difference in gap for angular misalignment is given in table B2.

### 2.2 ERRORS OF ECCENTRICITY

Measurements are taken in a radial direction and the most convenient and accurate means of doing this is to use a dial indicator suitably clamped to one half coupling, and bearing onto the hub or flange of the other, as shown in figure 4 (See Fig 4a for Standard Coupling, and 4b for the Brake Drum Coupling).

Care must be taken to ensure the support for the dial indicator is sufficiently rigid to prevent the weight of the indicator from causing deflection and, in consequence, inaccurate readings.

Extra care should be taken where the shafts are supported by taper roller bearings to ensure that alignment is checked with shafts in mid-point position and a final check is made with the unit at operating temperature.

The allowable parallel offset is given in table B2.

**NOTE !** The alignment should be re-checked after running the machine until it has attained its normal working temperature, any discrepancies should be rectified



Figure 1

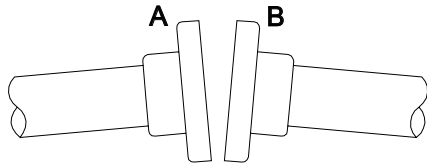


Figure 2

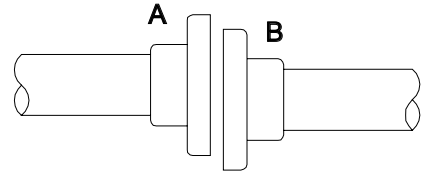
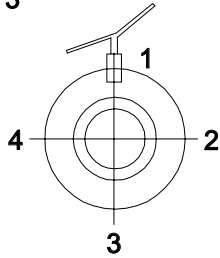
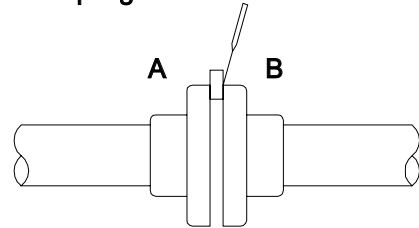


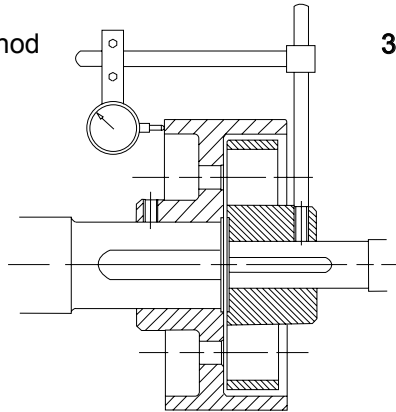
Figure 3



3a) Standard Coupling



3b) Clock Gauge Method for Brake Drum Coupling



3c) Gauge Method for Brake Drum Coupling

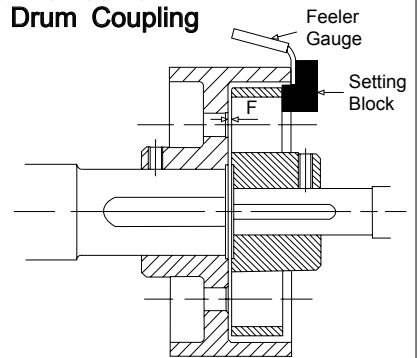
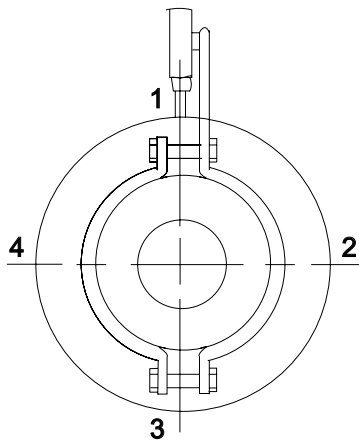
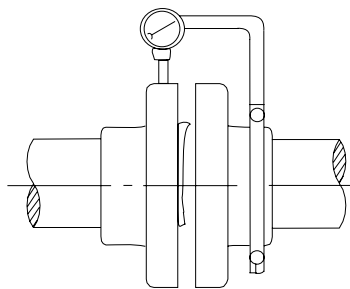


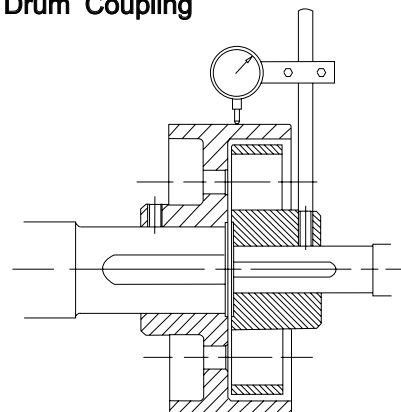
Figure 4

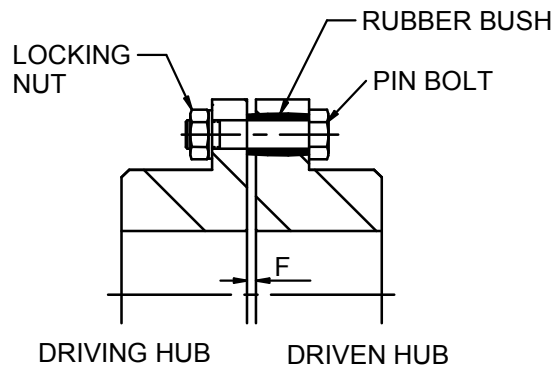


4a) Standard Coupling



4b) Brake Drum Coupling





**Table B2 Allowable Gap and Error**

COUPLING SIZE	GAP F	ANGULARITY		ECCENTRICITY	
		mm	Degrees	mm	mm
EFC 01 to 07	3	0.20	1.0°	0.03	0.15
EFC 08 to 12	5	0.35	1.0°	0.04	0.20
EFC 13 to 17	6	0.55	1.0°	0.05	0.25
FC 630 to 900	12	1.0	1.0°	0.05	0.25
FC 1000 to 1250	14	1.5	1.0°	0.05	0.25
FC 1400 to 1600	14	2.0	1.0°	0.05	0.25

Note! The recommended misalignments given in the above table allow for further misalignment during operation that can be caused by thermal expansion or distortion of the machine or foundation

### 3.0 PIN AND BUSH INSTALLATION

3.1 Ensure that all parts are clean and free from grit.

3.2 Apply silicon grease to rubber bush outer diameters.

Recommended greases are

- (i) Shell Silicone Grease
- (ii) Dow Corning
- (iii) Rocol MX66 Silicone Grease.

3.3 Align the driving and driven half coupling pin holes and insert the pin/bush assemblies and torque tighten to the nuts to the tightening torque given in table B3.

**Table B3 Pin Bolt Tightening Torque**

Coupling Size	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17
Number / Size	4 x M6	4 x M8	5 x M8	6 x M10	8 x M10	6 x M12	8 x M12	6 x M16	8 x M16	10 x M16	8 x M20	10 x M20	8 x M24	10 x M24	12 x M24	8 x M36	10 x M36
Tightening Torque (Nm)	10	25	25	45	45	80	80	190	190	190	350	350	610	610	610	2150	2150

## **4.0 MAINTENANCE**

### **4.1 RUBBER BUSH INSPECTION**

Check the condition of the rubber bushes periodically (every 6 months) for wear. If the outside diameter of the bushes is worn down more than 5% compared to the pin bore diameter, then the pin and bush assemblies should be changed.

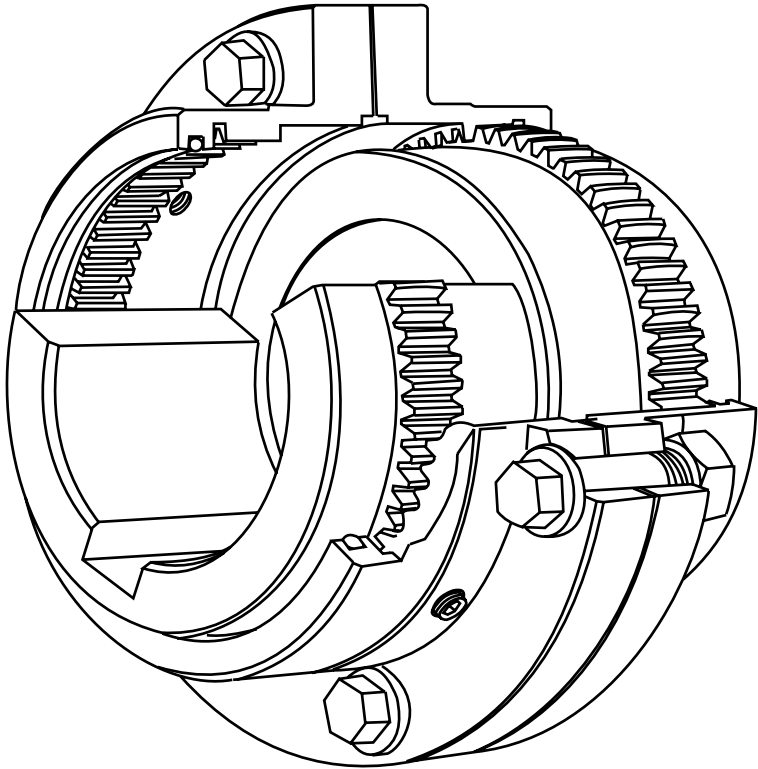
### **4.2 ALIGNMENT CHECK**

With the pins removed an alignment check in accordance with Section 2.0 should be carried out.

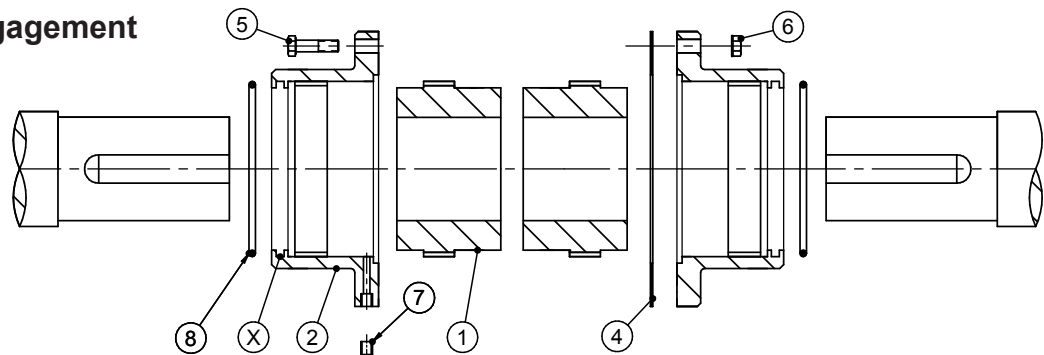
### **4.3 REPLACEMENT OF THE BUSHES**

New pin and bush assemblies shall be fitted back into the coupling as detailed in section 3.0

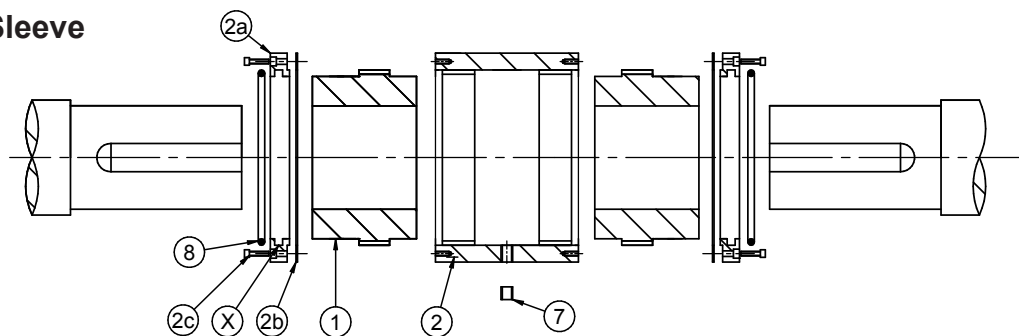
**INSTALLATION & MAINTENANCE**  
**ELIGN COUPLINGS**  
**GEAR TYPE COUPLINGS**



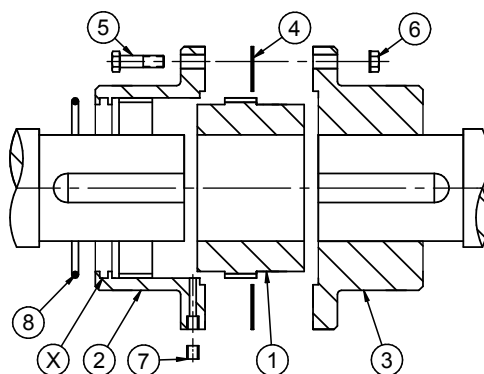
### Type ED Double Engagement



### Type ES Continuous Sleeve



### Type ER Single Engagement



## 1.0 HUB ASSEMBLY

1.1 Inspect the coupling components and remove any protective coatings. Ensure all coupling parts and mating shafts are clean and free of oil or grease.

1.2 Check that the keys fit correctly into both shafts and hubs (1) or (3)  
Coat each key with a grease resisting sealing compound (to prevent leakage of grease through the keyway) and fit the keys into the shafts

1.3 Apply a light coat of grease to the O-rings (8) and insert O-rings into grooves (X) in sleeves (2) on ES type couplings insert the O-rings into end caps (2a)

1.4 Place sleeves (2) over shaft ends, on ES type couplings place the end cap (2a) and gasket (2b)  
- Care should be taken not to damage O-rings (8).

1.5 The hubs (1) can now be assembled onto the shafts (10) either way around dependant on the coupling type.(See page 5 to determine correct orientation)

Assemble the coupling hubs (1) or (3) so that the end face is flush with the end of the shaft (10),

Note! With press fits it is recommended to apply an appropriate lubricant to the hub bores and shafts, The hubs may be heated (max 120° C) to install more easily.

Ensure the hubs are square with the shafts and the keyways are in line before assembly.

### 1.0 HUB ASSEMBLY - cont..

1.6 Coat the hub (1) & sleeve (2) gearing with coupling grease (see appendix ??) and place the sleeve over the hub

1.7 Install the machinery to be connected and set the gap (F) between shafts.

Note! The gap can vary dependant on coupling size and type. See the table 3 or an approved drawing for the correct gap, - if in doubt please contact our engineers.

1.8 Adjust machinery for acceptable shaft alignment as per section 2.0.

Note! Use metal shim strips under machinery feet as packing to achieve adjustments.

1.9 Slide sleeve over the hub into position to engage the gear teeth. On all ES type couplings fit the gaskets (2b) and covers (2a) to the sleeve (2) and secure with screws (2C) - see table 2 for tightening torques - take care not to damage the seal rings

### 2.0 SHAFT ALIGNMENT

Check shaft alignment as follows:-

Errors of alignment fall into categories of angularity (see figure 1) and eccentricity (See figure 2), or a combination of both.

Errors of angularity should be checked for and corrected before errors of eccentricity.

For ERR Fully Rigid Couplings refer to Section 6.0

#### 2.1 ERRORS OF ANGULARITY

The angularity errors can be checked by keeping both shafts stationary and taking measurements with a block gauge and feelers at the four points 1, 2, 3 and 4 as shown in figure 1

The difference between the readings 1 and 3 will give the error of alignment in the vertical plane over a length equal to the diameter of the coupling flanges.

Similarly the difference between the readings 2 and 4 gives the amount of sideways adjustment necessary to correct any errors of alignment in the horizontal plane.

A simpler method of checking angularity is by marking adjacent points on both coupling hubs and rotating both hubs together keeping the marks in line, by taking gap measurements each quarter revolution the errors of angularity in the vertical and horizontal planes can be found.

The allowable difference in gap (Y-X) for angular misalignment is given in table C1.

#### 2.2 ERRORS OF ECCENTRICITY

Measurements are taken in a radial direction and the most convenient and accurate means of doing this is to use a dial indicator suitably clamped to one half coupling, and bearing onto the hub (or flange) of the other as shown in figure 2

Care must be taken to ensure the support for the dial indicator is sufficiently rigid to prevent the weight of the indicator from causing deflection and, in consequence, inaccurate readings.

Extra care should be taken where the shafts are supported by taper roller bearings to ensure that alignment is checked with shafts in mid-point position and a final check is made with the unit at operating temperature.

The allowable parallel offset is given in table C1.

**NOTE !** The alignment should be re-checked after running the machine until it has attained its normal working temperature

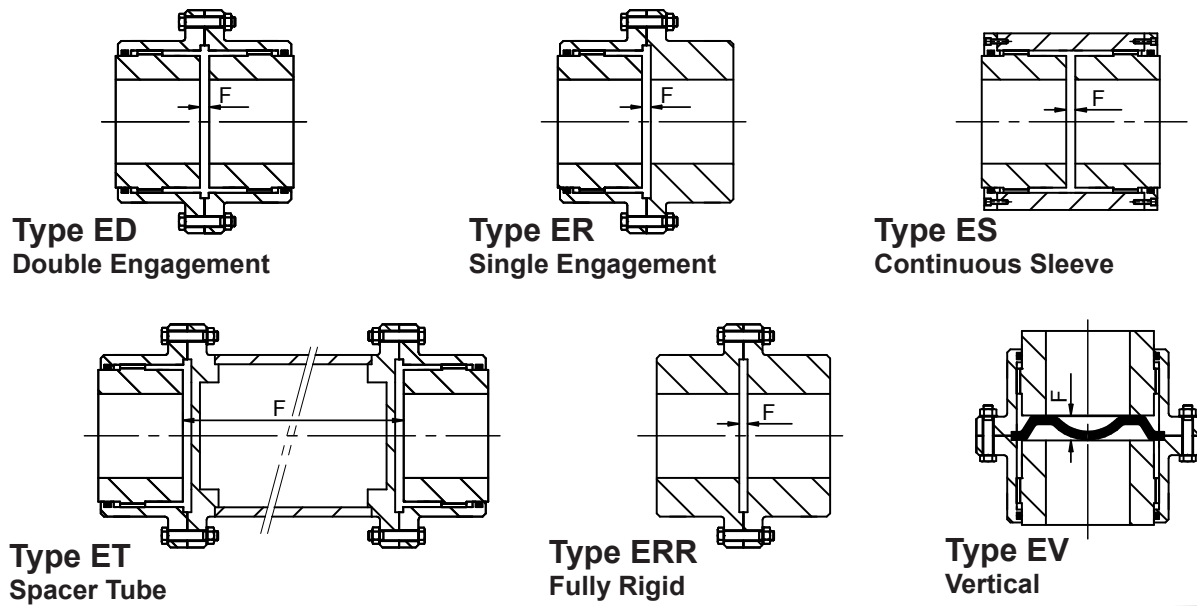
### 3.0 SLEEVE CONNECTION

3.1 Draw the sleeves (2) together and place the flange gasket (4) between the sleeves, align the bolt holes and insert the bolts (5) and nuts (6) tighten uniformly to the correct torque. (See Table C2)

3.2 Tighten the bolts uniformly. See table 2 for correct tightening torque (Nm). Make sure that sleeve can slide freely above hubs by axially displacing it to a value equal to the shaft gap (F) (See table C3)

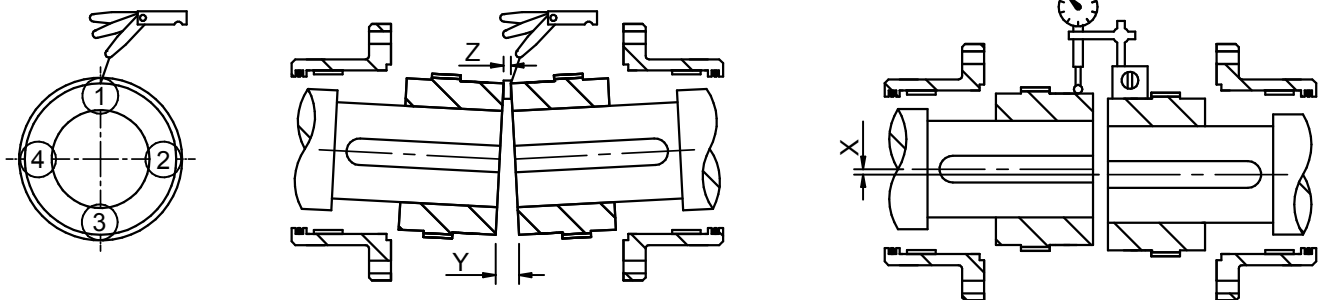
# SERIES X

## ELIGN GEAR COUPLING



**Fig 1 Errors of Angularity**

**Fig 2 Errors of Eccentricity**



**Table C1 Allowable Misalignment Errors**

Size	0 - 250 rpm		250 - 500 rpm		500 - 1000 rpm		1000 - 2000 rpm		2000 - 4000 rpm	
	X max	Y-Z	X max	Y-Z	X max	Y-Z	X max	Y-Z	X max	Y-Z
<b>130 - 1000</b>	0.25	0.25	0.25	0.25	0.25	0.25	0.15	0.20	0.08	0.10
<b>1600 - 6200</b>	0.50	0.60	0.50	0.60	0.25	0.35	0.15	0.20	0.08	0.10
<b>8400 - 11500</b>	0.90	1.00	0.50	0.75	0.25	0.35	0.15	0.20	-	-

**Table C2 Tightening Torques**

Type / Size	Flange Bolts		Cover Bolts		Filling Plugs	
	ED, ER, EV, ERR, ET		ES		ED, ES, ER, EV, ET	
	Tightening Torque (Nm)	Socket Size (mm)	Tightening Torque (Nm)	Socket Size (mm)	Plug Size	Key size
<b>130</b>	34	10	-	-	1/8" BSP	5
<b>280</b>	66	12				
<b>500</b>	112	14				
<b>1000</b>	277	19				
<b>1600</b>	277	19	9.1	4		
<b>2200</b>	537	24	9.1	4		
<b>3200</b>	537	24	9.1	4		
<b>4500</b>	537	24	15.7	5		
<b>6200</b>	537	24	15.7	5		
<b>8400</b>	537	24	38	6	3/8" BSP	8
<b>11500</b>	795	30	38	6		



**Table C3 Gap Between Shafts**

Type / Size	Gap F (mm)					ET
	ED	ES	ER	EV	ERR	
130	3	-	5	8	7	As specified on the Assembly Drawing
280	3	-	5	5	7	
500	3	-	5	13	7	
1000	5	-	6	11	7	
1600	5	5	6	12.5	7	
2200	6	6	6.5	14	7	
3200	6	6	6.5	15	7	
4500	8	8	8	17	8	
6200	8	8	8	20	8	
8400	8	8	8	27	8	
11500	8	8	10	34	12	

## 4.0 LUBRICATION

4.1 Remove the lube plugs - for Type ED it is remove the plugs from one sleeve only

4.2 Horizontal Couplings Types ED, ES, ER, & ET

Rotate the shafts to set the position of the lube holes so that the filling hole is uppermost and the level hole is in the horizontal position.

Vertical Couplings Type EV rotate the shafts so that uppermost filling hole is accessible

4.3 Horizontal Couplings Fill with a suitable EP coupling grease (NLGI grade 1) until it escapes through the horizontal position. For the types ET repeat this operation for the second sleeve.

see Table C4 for grease quantity , see Table C5 for recommended grease's

Vertical Couplings Fill both sleeves with correct quantity of grease.

4.4 Re-install the filling plugs and tighten securely.

**Table C4 Lubricant Quantity**

Type / Size	Quantity (grams)					
	ED	ES	ER	EV	ERR	ET
130	100	-	50	2 x 50	-	2 x 50
280	150	-	75	2 x 75	-	2 x 75
500	270	-	135	2 x 135	-	2 x 135
1000	430	-	215	2 x 215	-	2 x 215
1600	740	740	370	2 x 370	-	2 x 370
2200	1070	1070	535	2 x 535	-	2 x 535
3200	1630	1630	815	2 x 815	-	2 x 815
4500	2000	2000	1000	2 x 1000	-	2 x 1000
6200	3100	3100	1550	2 x 1550	-	2 x 1550
8400	4130	4130	2065	2 x 2065	-	2 x 2065
11500	4970	4970	2485	2 x 2485	-	2 x 2485

**Table C5 Recommended Lubricants**

Supplier	Lubricant Type
BP	Energrease LS-EP1
Caltex	Coupling Grease
Castrol	Spheerol EPL 1
Fuchs	Renolit EP 1
Kluber	Kluberplex GE11-680
Mobil	Mobilux EP 111
Shell	Alvania EP 1
Texaco	Coupling Grease

### 5.0 INSPECTION MAINTENANCE

#### 5.1 INSPECTION

Regular audio and visual inspection is recommended to check for unusual noise and vibration levels, and loss of lubricant.

#### 5.2 ROUTINE MAINTENANCE

Every 3000 operating hours or every year (whichever occurs soonest)

Check the axial movement of the sleeves, ensure they can slide freely and be displaced by the shaft gap F - see Table C3

Monitor the grease level / quantity - top up as necessary

#### 5.3 SCHEDULED MAINTENANCE

Every 8000 operating hours or every 2 years (whichever occurs soonest)

Remove flange fastenings to dismantle the coupling sleeves, slide the sleeves out of mesh

Clean out all the grease and inspect the gear teeth and seals for damage - replace if necessary

Check that the shaft alignment is within acceptable limits in accordance with Clause 2.0

Replace gasket(s) and re-connect the coupling sleeves in accordance with Clause 3.0

Refill with correct quantity and type of lubricant in accordance with Clause 4.0

### 6.0 FULLY RIGID COUPLINGS (Type ERR)

#### 6.1 SHAFT ALIGNMENT

Align the shafts as described in Section 2 to achieve as near perfect alignment as possible within the limits shown in Table C6



#### 6.2 WARNING

When lining up shafts fitted with rigid couplings it is important that no attempt is made to force the coupling hub flanges together by tightening up the coupling bolts, as this will induce undue stresses in the shafts, coupling and supporting bearings,

This malpractice is revealed by the springing apart of the coupling faces as the bolts are slackened off.

**Table C6 Allowable Misalignment Errors for Fully Rigid Couplings**

Size	Eccentricity	Angularity	Note! D is the outside diameter of the coupling flange
	X max	Y-Z	
All Sizes	0.05mm	0.0005 D	

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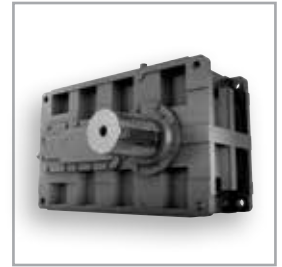
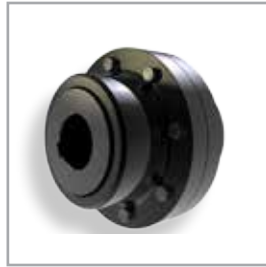
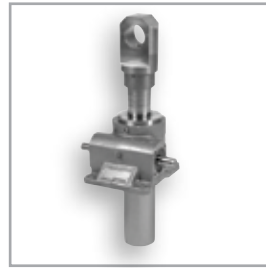
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