

# PENCOflex



ATEX



## 1-ASSEMBLY

- During the final boring of couplings supplied with a pre-bore, make sure that the plate to be machined is centered correctly on its larger diameter.  
In this way, the bore will be absolutely concentric, a primordial condition for fault-free alignment. Indeed, the premature wear of the elastic packing can result from incorrect bore concentricity.
- For couplings starting from size 510, it is essential to avoid that the shaft end coincides with the hole provided in the hub (see figure 1). In this case, use a hub without a hole.
- It is not advisable to assemble the plates on the shafts by driving them with hammer blows so as to avoid damage to the bearings supporting the shafts to be connected. Assembly will be carried out preferably with a threaded rod fitted with a nut and washer. Simply screw this rod into the tapped hole of the shaft. A ball stop will greatly simplify the task (see fig.2).
- To facilitate the assembly of large size couplings, the prior heating of the plates is advisable. However, avoid exceeding a temperature of 100°C and first remove the rubber collets.

## 2-ALIGNMENT

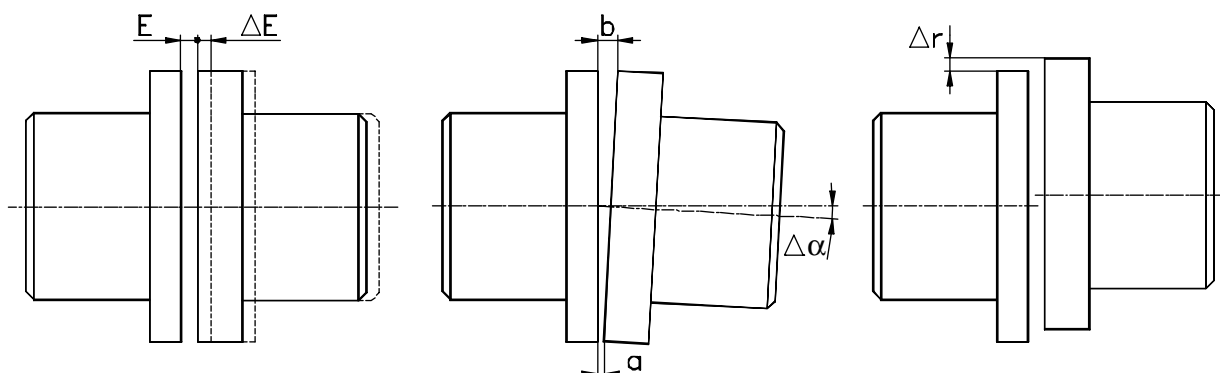
Correct alignment presupposes that the shafts to be connected:

- a) Are parallel (see fig.3A);
- b) Are not offset radially with respect to one another (see fig.3B).

When inspection using a thickness gauge shows that the clearance between the plates is equal all over (see at bottom of fig.4) the shaft axes are parallel.

When a rule placed on the outer cylinder of the plates touches them simultaneously at any point (see the upper part of fig.4), there is no misalignment.

It is important to note that the alignment of the shafts to be connected must be as accurate as possible. Indeed although the PENCOFLEX coupling is capable of neutralizing the alignment defects, it is still true that a misalignment that is relatively too large can cause premature wear of the rubber collets.



Size	145	155	175	200	235	245	280	315	355	385
EΔE PN & PB PD	3.5±1.5	3.5±1.5 3.5 <sup>+1.5</sup>			4±2 4 <sup>+1.5</sup>				5.5±2.5	
Δα (b-a)	0.3				0.45				0.6	
Δr	0.2				0.25				0.3	

Size	460	510	575	670	725	850	990	1060	1220	1420
EΔE PN & PB PD	5.5±2.5	7±3		8.5±3.5		10.5±4.5				
Δα (b-a)	0.6	0.9		1.2		2.2				
Δr	0.3	0.4		0.5		0.75				

In practice, measure each misalignment value, report this value with respect to the maximum indicated value.

The sum of these ratios shall not exceed 1.

$$dr/\Delta r + d\alpha/\Delta\alpha < 1$$

With:

dr: value of measured radial misalignment

Δr: value of maximum radial misalignment (e.g. 0.25 mm for PN280)

dα: value of maximum measured radial alignment

Δα: value of maximum angular misalignment (e.g. (b-a)=0.45 mm for PN280)

The misalignment measurements must be made on two perpendicular planes and the verification measurements be made at four points at 90°.

Check the adjustment values when the machine is warm.

### **3- EARTHING**

The plates or the shafts on which they are mounted must be grounded.

### **4-INSPECTION AND REPLACEMENT OF RUBBER COLLETS**

Disassemble the nuts or circlips retaining them. This means that the inspection and possible replacement of the collets may be effected without having to back off or move the coupled devices. It is advisable to smear the spindles with grease when replacing the collets. The spindles may also be removed without needing to move the two plates.

For sizes PN510 to PN1420 and for all the PD devices, simply remove the bolts or nuts retaining the spindles. These taper end spindles can be removed through the facing holes. When the spindles are put back in place for sizes PN145 to PN200, they must be coated with Loctite 601.

It is advisable to check the collets at regular intervals to detect any wear or misalignment occurring after bearing wear or a movement of the foundation.

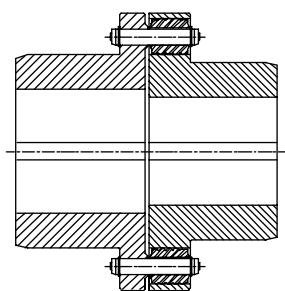
### **5 - CLEANING OF ELASTIC ELEMENTS**

Clean the elastic elements with a damp cloth. Do not use solvent but soapy water.

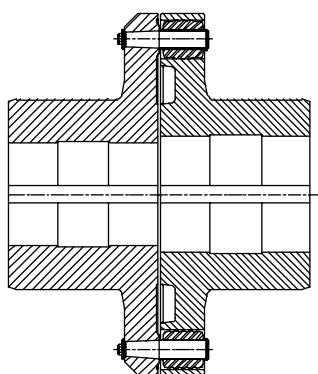
### **6 – COUPLING DISASSEMBLY**

All the coupling plates have two tapped holes that can be used with suitable accessories (see fig.5), for removing with ease (and without hammer blows) the shaft end plates.

Any retaining screws should be released beforehand.



Type 145-460



Type 510-1220

Fig. 1

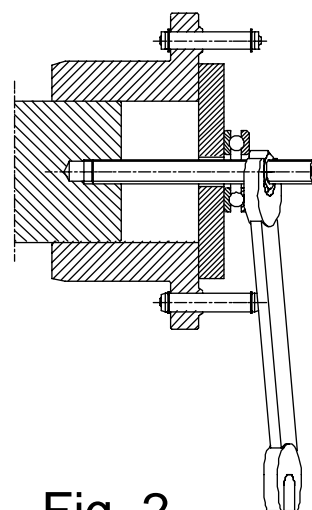


Fig. 2

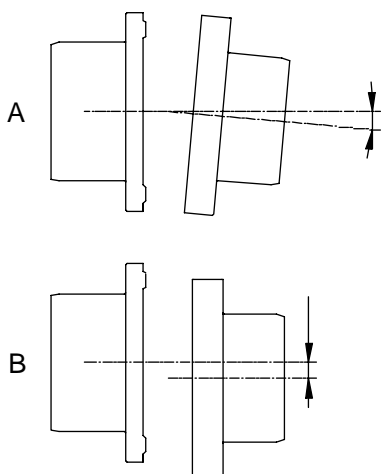


Fig. 3

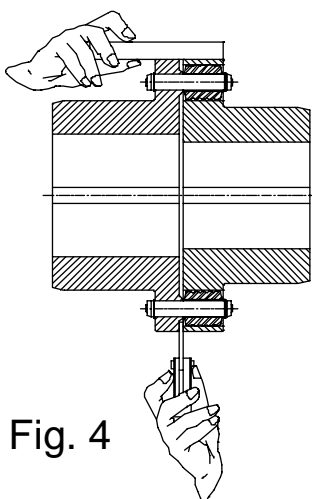


Fig. 4

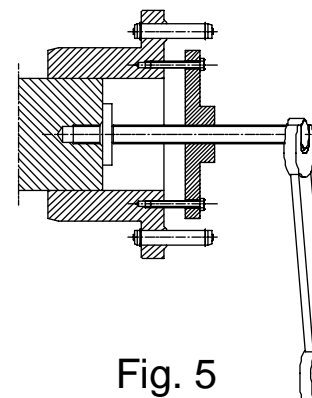
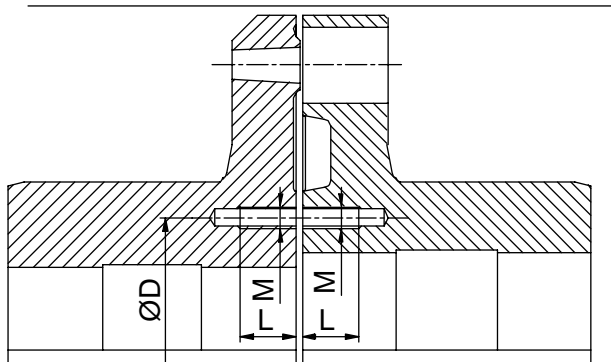
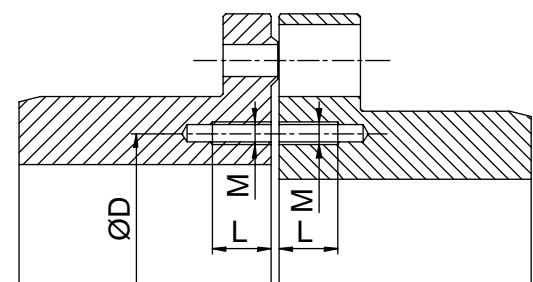
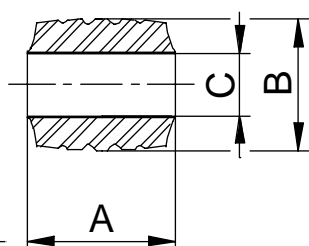


Fig. 5



Size	M	L	ØD
145	M8	15	75
155	M8	15	80
175	M10	20	95
200	M10	20	105
235	M12	22	120
245	M12	22	135
280	M12	22	145
315	M12	22	165
355	M16	30	190
385	M16	30	220
460	M20	34	232
510	M20	40	260
575	M24	45	300
670	M24	45	320
725	M24	45	350
850	M30	60	390
990	M30	60	430
1060	M30	60	470
1220	M36	75	515
1420	M36	75	560



Size	Number of spindles			Collet No	Number	Dimensions		
	Type of coupling					Rubber collets		
	PN	PB-L	PD			PN	PB-L	PD
145	PN1M			PN1	4	27	24	10
155	PN1M	PN1M	PN1D	PN1	6			
175	PN1M	PN1M	PN1D	PN1	8			
200	PN1M	PN1M	PN1D	PN1	10			
235	PN2		PN2D	PN2	6	41	36	16
245	PN2	PN2M	PN2D	PN2	9			
280	PN2	PN2M	PN2D	PN2	12			
315	PN2	PN2M	PN2D	PN2	16			
355	PN3			PN3	12	59	52	24
385	PN3			PN3	15			
460	PN3			PN3	18			
510	PN4			PN4	12	86	76	35
575	PN4			PN4	15			
670	PN4			PN4	18			
725	PN5			PN5	13	120	106	50
850	PN5			PN5	16			
990	PN5			PN5	19			
1060	PN6			PN6	14	166	146	70
1220	PN6			PN6	17			
1420	PN6			PN6	21			

## 7-USE IN EXPLOSIVE ATMOSPHERES



Indications and instructions concerning use in explosive zones:

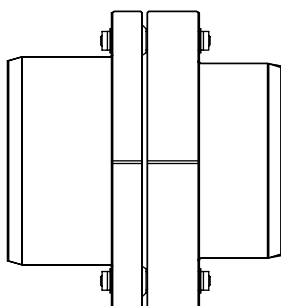
### 7-1- Inspection intervals for use in an explosive atmosphere

Explosion group	Inspection intervals
II 2D c 120°C	<p>The visual inspection of elastic element wear must be carried out after 100 hours of operation, or one month at the latest. If no significant deformation is observed, the following inspections can be performed every 2000 hours of operation or at most every 3 months.</p> <p>If the elements are worn or show signs of major deformation and if tearing is observed, it will be necessary to replace the elements and seek the possible causes as described in the chapter "Malfunctions and remedies".</p> <p>The periodicity of the maintenance intervals must be restarted if the operating parameters are changed.</p>

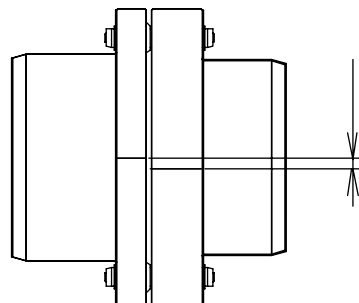
### 7-2-Indication of wear values

The wear of the elastic elements is checked by the angular offset between the plates:  
The measurement must be made at a

stop and without any load in order to measure the angular clearance.



New elements



Worn elements

Size	145	155	175	200	235	245	280	315	355	385
Max play mm	1,8		1,7		2,5		2,4		3,5	3,4

Size	460	510	575	670	725	850	990	1060	1220	1420
Max play mm	3,3	5,1	5	4,9	7	6,7	6,5	9,3	9	8,8



**CAUTION:** To ensure lasting operation, risk-free in an explosive atmosphere, its is particularly important to check misalignment.  
If the values indicated in chapter 2 are exceeded, the couplings should be considered as damaged and replaced.

### 7-3- Materials used.

Plate materials: EN-GJL-200 (formerly FGL200).

Elastic element material: Mixture of natural rubber – Styrene Butadiene –Carbon black.

Spindle material: steel.

### 7-4- Marking of couplings for explosive zones.

Couplings for use in an explosive zone are marked:



II 2 D 120°C

### 7-5-Startup.

Before startup, check that the radial screws (if there are any) are tight, or check that the shaft end screw is tight.

Check the alignment and the size between the plates.

Check the tightness of the elastic element attaching nuts (or the correct positioning of the circlips).

**In an explosive atmosphere, the screws must be protected from any possible loosening off, for instance, by the application of threadlock to the threads.**

## 7-6-Malfunctions and remedies



Malfunction	Cause	Indication of risk in hazard zone.	Solution
Noise and vibration during operation.	Misalignment.	Danger of elastic elements overheating.	1) Turn off the machine. 2) Eliminate the cause of misalignment (loose attaching screw, broken fastener, and dilatation, assembly dimensions not complied with, deformation of support under load). 3) Check the wear of the components and replace as necessary.



	Wear of elastic elements, short-term risk of metal on metal contact.	Danger of ignition due to sparks	1) Turn off the machine. 2) Disassemble the end stop on the elastic elements and remove them. 3) Check the coupling parts and replace them if necessary. 4) Fit new elastic elements. 5) Check the alignment at a stop and in operation and correct if necessary.
	Loosening of the plate end attaching screws.	Danger of ignition due to sparks.	1) Turn off the machine. 2) Check the alignment of the coupling. 3) Tighten the end attaching screws of the plates and lock them. 4) Check the wear of the elements. 5) Check the alignment at a stop and in operation and correct if necessary.
Premature wear of elastic elements (degradation of material inside plates).	Machine vibration.	Danger of elastic elements overheating.	1) Turn off the machine. 2) Replace the elastic elements. 3) Check the alignment at a stop and in operation and correct if necessary. 4) On the machine seek the cause of vibration.

## 7-6-Malfunctions and remedies (continued)



Malfunction	Cause	Indication of risk in hazard zone.	Solution
Pin breakage	Wear of elastic elements, transmission of torque by metal on metal contact.	Danger of ignition due to sparks.	1) Turn off the machine. 2) Replace the entire coupling 3) Check the alignment at a stop and in operation and correct if necessary.

	Pin breakage due to shock or overtorque.	Danger of ignition due to sparks.	1) Turn off the machine. 2) Identify and eliminate the cause of overload. 3) Replace the entire coupling 4) Check the alignment at a stop and in operation and correct if necessary.
	The conditions of use do not correspond to the coupling performance.	<b>Danger of ignition due to sparks.</b>	1) Turn off the machine. 2) Check the operating conditions and select a larger coupling. 3) Install the new coupling 4) Check the alignment at a stop and in operation and correct if necessary.
	Error on machine commissioning	Danger of ignition due to sparks.	1) Turn off the machine. 2) Replace the entire coupling 3) Check the alignment at a stop and in operation and correct if necessary. 4) Train the operating and maintenance personnel.

## 7-6 - Malfunctions and remedies (continued)



Malfunction	Cause	Indication of risk in hazard zone.	Solution
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Loosening of nuts or circlips retaining the elastic elements.	Incorrect assembly of elastic elements.	Danger of destruction of elastic elements and ignition due to sparks.	<ol style="list-style-type: none"> <li>1) Turn off the machine.</li> <li>2) Disassemble the end stop of the elastic elements and remove them.</li> <li>3) Check the coupling parts and replace them if necessary.</li> <li>4) Assemble new coupling elements while checking the correct assembly of the stopping parts.</li> <li>5) Check the alignment at a stop and in operation and correct if necessary.</li> </ol>
Premature wear of elastic elements.	Contact with harsh product such as hydrocarbons, ozone...	Danger of overheating and ignition due to sparks.	<ol style="list-style-type: none"> <li>1) Turn off the machine.</li> <li>2) Disassemble the end stop of the elastic elements and remove them.</li> <li>3) Check the coupling parts and replace them if necessary.</li> <li>4) Fit new elastic elements.</li> <li>5) Protect the coupling from all contact with the fluid in question.</li> </ol>
	Operating temperature outside the authorized range -20°C/+40°C.	<b>Danger of overheating and ignition due to sparks.</b>	<ol style="list-style-type: none"> <li>1) Turn off the machine.</li> <li>2) Disassemble the end stop of the elastic elements and remove them.</li> <li>3) Check the coupling parts and replace them if necessary.</li> <li>4) Assemble new coupling elements.</li> <li>5) Measure and regulate the ambient temperature.</li> </ol>
	Misalignment	Danger of overheating and ignition due to sparks.	<ol style="list-style-type: none"> <li>1) Turn off the machine.</li> <li>2) Eliminate the cause of misalignment (loose attaching screw, broken fastener, and dilatation, assembly dimensions not complied with, deformation of support under load).</li> <li>3) Check the wear of the components and replace as necessary.</li> </ol>

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