PENCOflex

ATEX

1. TABLE OF CONTENT

2. ASSEMBLY

- During the final boring of couplings supplied with a pre-bore, make sure that the hub 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 fig.1 page 5). In this case, use a hub without a hole.
- It is not advisable to assemble the hubs 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 Thrust Bearing will greatly simplify the task (see fig.2 page 5).
- -To facilitate the assembly of large size couplings, the prior heating of the hubs is advisable. However, avoid exceeding a temperature of 100°C and first remove the rubber elements

3. ALIGNMENT

Correct alignment presupposes that the shaft to be connected are :

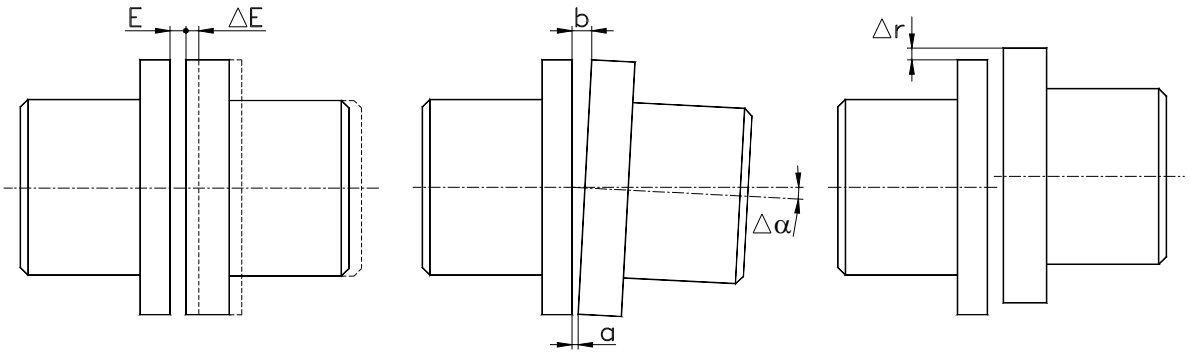
a) Parallel (see fig.3A page 6) ;

b) Not offset radially one to the other (see fig.3B page 6).

When inspection using a thickness gauge shows that the clearance between the hubs is equal all over (see at bottom of fig.4 page 6) shaft axis are reputed 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 page 6), 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 elements



Size		145	155	175	200	235	245	280	315	355	385
EΔE	PN & PB	3.5±1.5	3.5±1.5			4±2				5.5±2.5	
	PD		$3.5^{+1.5}$			$4^{+1.5}$					
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	5.5±2.5	7±3			8.5±3.5			10.5±4.5		
	PD										
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. 0,25mm for a PN280)

dα: value of measured angular misalignment

Δα: value of maximum angular misalignment (e.g. (b-a)=0,45mm for a PN280)

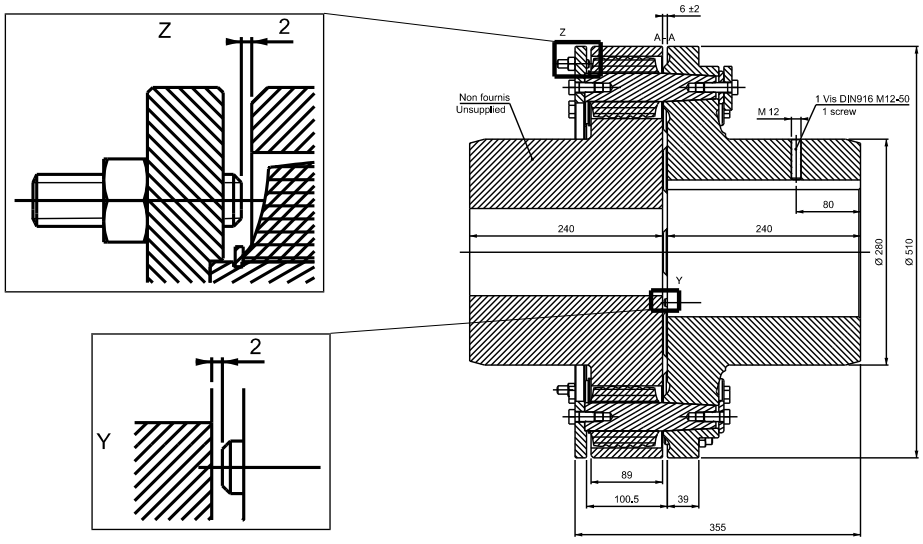
The misalignment measurements must be made on two perpendicular planes and the verification measurements be made at four points at 90°.

Check the adjustment values when the machine is warm.

Case of coupling equipped with end float limiting

Proceed with the alignment as above.

Then set the end float limiting screws as described here under



Turn manually the coupling in order to check the good running.

4. EARTHING

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

5. INSPECTION AND REPLACEMENT OF ELASTIC ELEMENTS

5.1. RUBBER ELEMENTS

Remove the nuts or circlips retaining them. This means that the inspection and possible replacement of the rubber elements may be effected without having to back off or move the coupled devices. It is advisable to smear the spindles with grease for slides adapted to your environment when replacing the rubber elements. The pins may also be removed without needing to move the two halves.

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

Check that rubber bushes freely rotate around the pins. If this is not the case, correct defects preventing their free rotation or replace pins if this correction is not possible.

5.2. PINS

After being removed from coupling flange, pins must be replaced together with their mounting accessories (Hardware, washers and snap rings).

- **To identify pins, please refer to Illustration 1: Types of Pins and Tableau 3: Pins and bushes per types of couplings**

5.2.1 Pins type PN1M (PN & PB 145 to 200) & PN2M (PB 235 to 315)

Present pins fro the back of the coupling in their location holes after having coated a length equal to flange thickness in front of shoulder on their back with *Loctite 601.* Push them in their location hole with a soft hammer up to contact of shoulder with the back of the coupling flange. Then, fit rubber bushes from the other side after coating of pins with a grease for slides dedicated to your particular environnement. Finish assembly in put nuts and tighten them to a moderate torque (5 Nm).

For disassembly, proceed reversely to Assembly. A slight heating of flange may help in freeing the part glue with *Loctite 601*.

5.2.2 Pins type PN2 (PN 235 to 315) & PN3 (PN & PB 355 to 460)

Heat up male flange (Maximum temperature: 100 °C) and cool pins in order to get a difference in temperature of around 120 °C. Present pins on the front of the male hub and hammer them into their location holes taking great care to strike onto the boss on the end of pins in order not to damage taper end and surface receiving the rubber elemnt. Fit pin in sufficiently to allow the fit of the snap ring on the back of flange. When snap ring is in place, hammer it backwards to get snap ring in contact to the back of flange. Then, fit rubber bushes from the other side after coating of pins with a grease for slides dedicated to your particular environnement. Finish assembly in fitting the snap ring of the bush side.

For disassembly, hammer the pin out of its location hole using a pin pusher after removing snap ring on the back of the coupling.

5.2.3 Pins type PN1D (PD 145 to 200) et PN2D (PD 235 to 315)

Coat the taper end with an assembly paste like *Klüber Altemp* or equivalent. Fit it into its taper location. From the back of flange, fit the axial washer and then nut and tighten it to the required torque (See Tableau 1: Tightening torques of nuts for PN.D). Then, fit rubber bushes from the other side after coating of pins with a grease for slides dedicated to your particular environment. Finish assembly in putting nuts on bush side and tighten them to a moderate torque (5 Nm).

For disassembly, hammer onto thread end after having removed its nut and washer in order to release it from its taper location. Remove it from the other side.

Type	PN1D	PN2D
Nut on flange side	18 Nm	62 Nm
Nut on bush side	5 Nm	5 Nm

Tableau 1: Tightening torques of nuts for PN.D

5.2.4 Pins type PN 4 to 6 (PN 510 to 1420)

Coat the taper end with an assembly paste like *Klüber Altemp* or equivalent. Fit it into its taper location. From the back of flange, fit the axial washer and then screw and tighten it to the required torque (See Tableau 2: Tightening torque for screws on pins PN4 to 6). Then, fit rubber bushes from the other side after coating of pins with a grease for slides dedicated to your particular environment. Finish assembly in fitting the snap rings on the bush side.

For disassembly, unscrew axial srew on taper side by 2 rotations. Strike screw head in order to release pin from its taper location. Then, remove totally the screw and washer and remove pin from the other side of the flange.

Type	PN4	PN5	PN6
Tightening torque / fixing screws	62 Nm	153 Nm	534 Nm

Tableau 2: Tightening torque for screws on pins PN4 to 6

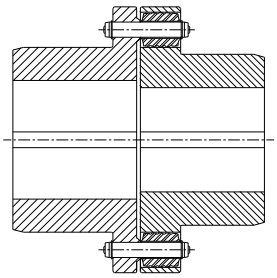
6. CLEANING OF RUBBER ELEMENTS

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

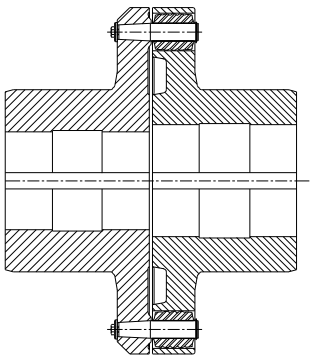
7. COUPLING DISASSEMBLY

All coupling halves have two tapped puller holes that can be used with suitable accessories (see fig.5 page 6), for removing with ease (and without hammer blows) the hubs from shafts.

Any retaining screw should be released beforehand.



Type 145-460



Type 510-1220

Fig. 1

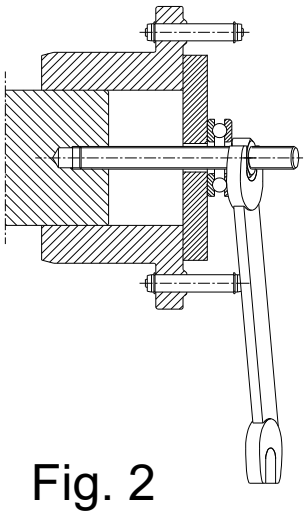


Fig. 2

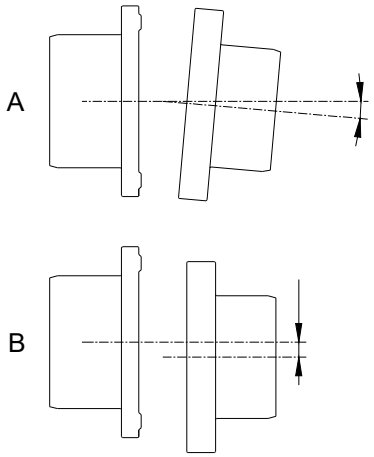


Fig. 3

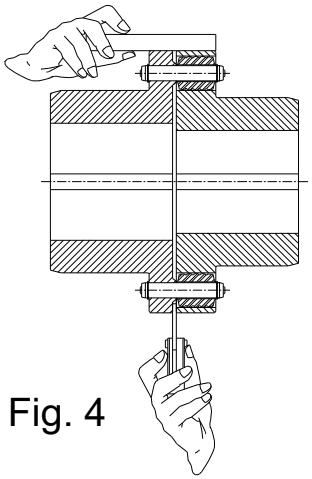


Fig. 4

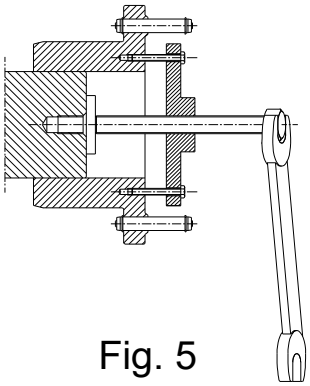
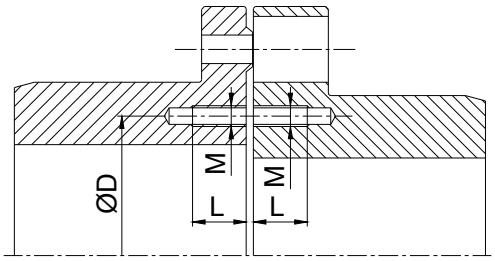
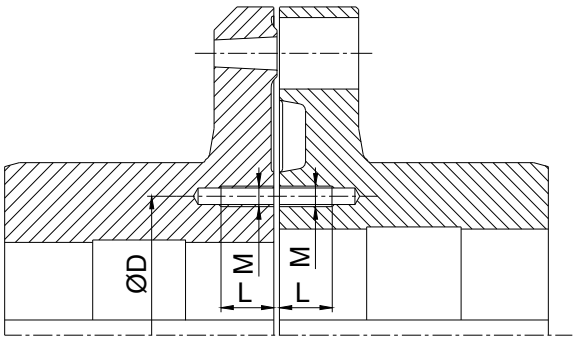


Fig. 5





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

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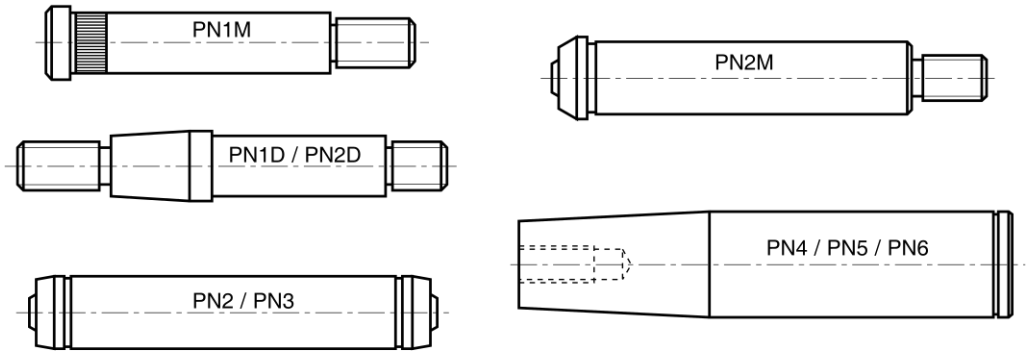
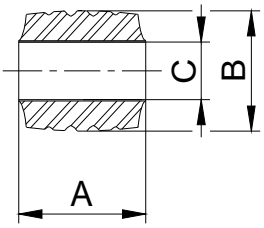


Illustration 1: Types of Pins



Size	Type of pins			Size of Element	Quantity	Dimensions		
	Coupling Typet					Rubber Elements		
	PN	*PB-L*	*PD*			**A**	**B**	**C**
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			

Tableau 3: Pins and bushes per types of couplings

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8. USE IN EXPLOSIVE ATMOSPHERES

➡ **IMPORTANT : Any coupling not presenting marking as detailed in chapter 8.4 MUST NOT be used in explosive atmosphere.**

Indications and instructions regarding use in explosive atmospheres:

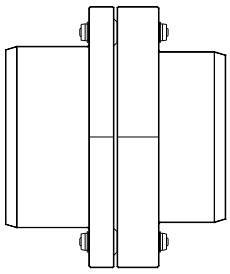
8.1. INSPECTION INTERVALS FOR USE IN EXPLOSIVE ATMOSPHERE

Explosion Group	Inspection Intervals
II 2D c 120°C II 2G c T4	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. 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 ». The periodicity of the maintenance intervals must be restarted if the operating parameters are changed

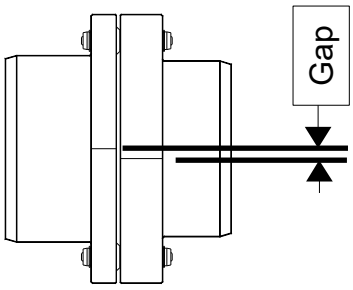
8.2. INDICATION OF WEAR VALUES

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. Gap 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. Gap mm	3,3	5,1	5	4,9	7	6,7	6,5	9,3	9	8,8

CAUTION : To ensure a Risk-free longlasting operation in an explosive atmosphere, its is particularly important to check misalignment.

If values shown in chapter 3 are exceeded, the coupling should be considered as damaged ands must be replaced

8.3. MATERIAL USED

- Material of Hubs: EN-GJL-200 (formerly FGL200).
- Material of rubber elements: Mixture of Natural Rubber with Styrene Butadien and Carbon Black.
- Material of Pins: Steel.

8.4. MARKING OF COUPLINGS FOR EXPLOSIVE ZONES

Couplings certified for use in explosive zones are marked:

II 2 D 120°C II 2 G T4 II 3 D 120°C II 3 G T4

8.5. FIRST START

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.

8.6. MALFUNCTIONS AND REMEDIES

Malfunction	Cause	Indication of risk in Hazardous Area.	Solution
Nois and vibration during operation.	Misalignment.	Danger of Rubber 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 Rubber Elements, risk on the short-term of metal to 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

Malfunction	Cause	Indication of risk in Hazardous Area.	Solution
	Loosening of axial screws fixing coupling hubs.		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 Rubber 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.
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		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.		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		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.
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	1) Turn off the machine. 2) Disassemble the end stop of the elastic elements and remove them. 3) Check the coupling parts and replace them if necessary. 4) Assemble new coupling elements while checking the correct assembly of the stopping parts. 5) Check the alignment at a stop and in operation and correct if necessary.

Malfunction	Cause	Indication of risk in Hazardous Area.	Solution
Premature wear of elastic elements.	Contact with harsh product such as hydrocarbons, ozone…	Danger of overheating and ignition due to sparks.	1) Turn off the machine. 2) Disassemble the end stop of the elastic elements and remove them. 3) Check the coupling parts and replace them if necessary. 4) Fit new elastic elements. 5) Protect the coupling from all contact with the fluid in question.
	Operating temperature outside the authorized range –20°C/+40°C.		1) Turn off the machine. 2) Disassemble the end stop of the elastic elements and remove them. 3) Check the coupling parts and replace them if necessary. 4) Assemble new coupling elements. 5) Measure and regulate the ambient temperature.
	Misalignment		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.

CAUTION ! : PTP INDUSTRY cannot assume liability or provide guarantee coverage in the event of parts that are not original PTP INDUSTRY parts being used.