USE AND MAINTENANCE MANUAL

ROTOPIN-E COUPLINGS

ROTOPIN MANUAL VER.2018-11 CODE 24780-EN

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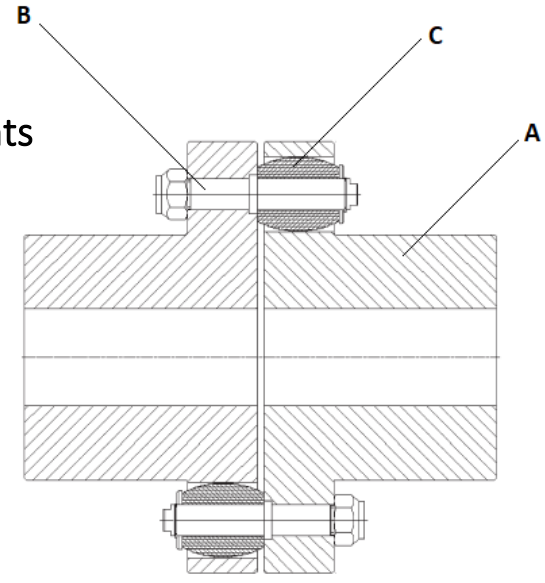
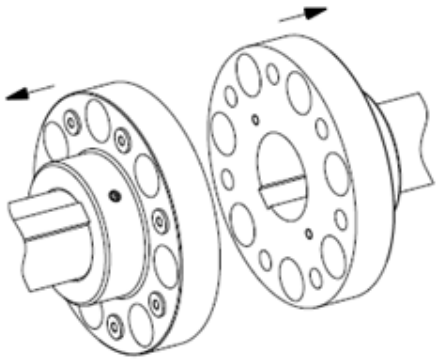
1) Parts of the coupling, construction elements

A. Coupling hubs
B. Pins
C. Flexible elements



Use original spare parts only

2) Installation of the coupling



(fig. 3)

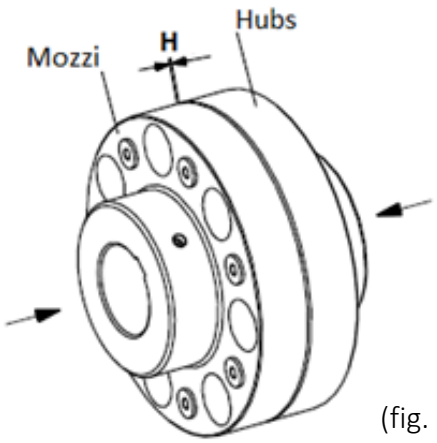
- Clean all surfaces before assembly, particularly those of the bores and shafts
- Align the hubs to the shafts (fig. 3)
  For large couplings, use suitable lifting equipment
  use suitable lifting equipment
- Assemble each hub in such a way that the shaft's head is aligned to the internal surfaces of the hub.
- Secure the hubs to the shafts by tightening any detent grub screws or head washers

  Ex in areas at risk of explosion, use a medium-strength threadlocker, such as Loctite 222

Note: In case of interference between the bore and the shaft, you may uniformly heat the hubs up to between 80 and 100 °C. Use gloves to protect your hands.
NB before heating the hubs, the elastic elements must be removed

Ex In areas at risk of explosion consider the danger of ignition

Warning: Before inserting the elastic element, make sure that the hubs are at room temperature.



(fig. 4)

- Insert the metal pins in their respective seats.
- Once the hubs have been installed, move the shafts closer together, respecting the clearance **H. (fig.** 4)

- Align the coupling according to the instructions in chapter 3 "Coupling alignment"

  Ex in areas at risk of explosion, use a medium-strength threadlocker, such as Loctite 222
- Provide adequate coupling protection

3) Coupling alignment

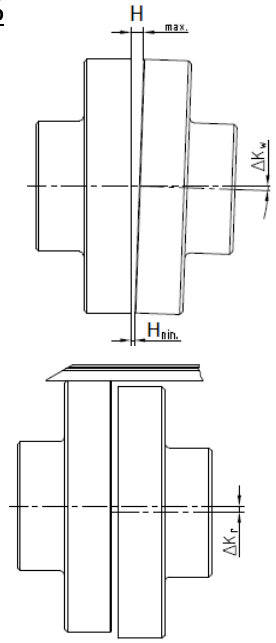
<u>If installing in an explosive zone, the indicated values must be reduced by 50%</u>

a) Angular Misalignment

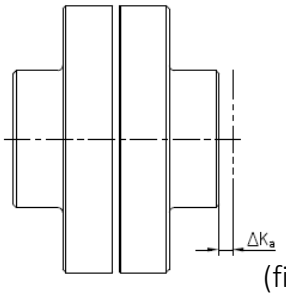
- Rotate the coupling through 360° and determine the maximum deviation between H_{max} and H_{min}
- Calculate the angular misalignment $H_{max} - H_{min} = \Delta Kw.$
- Compare the measured value with the values in the following table, valid up to 1500 rpm.

b) Radial/Parallel Misalignment

- Rotate the coupling through 360° and determine the maximum deviation between Kr_{max} Kr_{min} (fig. 7)
- Calculate the radial misalignment $\Delta Kr = Kr_{max} - Kr_{min}.$
- Compare the measured value with the values in the following table, valid up to 1500 rpm.



Allineamento radiale/parallelo
Radial/parallel displacement



(fig.8)

Allineamento assiale
Axial displacement

c) Axial Misalignment

Measure the axial gap as indicated in (fig. 8)

Compare the "ΔKa dimension recorded with the values in the table below

Maximum misalignment values

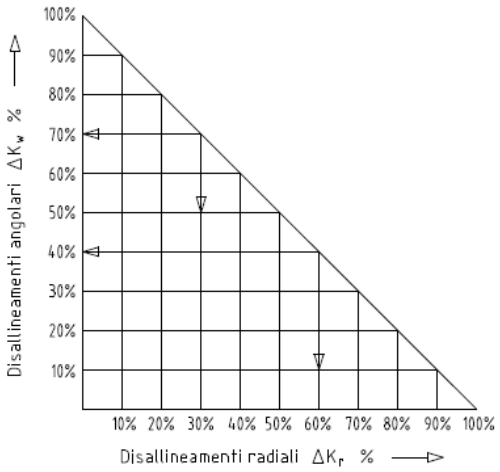
Type	ΔKw		ΔKr	ΔKa	Type	ΔKw		ΔKr	ΔKa
Type	mm	°	mm	± mm	*Type*	mm	°	mm	± mm
E|100	0.6	0.3	0.1	1	E 350	2.0	0.3	0.4	1
E 120	0.7		0.1		E 400	2.3		0.4	
E 140	0.8		0.1		E 450	2.6		0.4	
E 160	0.9		0.2		E 500	2.9		0.5	
E 180	1.0		0.2		E 550	3.2		0.5	
E 200	1.2		0.2		E 630	3.6		0.6	
E 225	1.3		0.2		E 680	3.9		0.7	
E 250	1.5		0.3		E 800	4.6		0.8	
E 300	1.7		0.3		E 900	5.2		0.9	

WARNING: the reference values indicated are maximum when the others are at zero.

See below for Simultaneous Alignment

d) Simultaneous misalignment

Examples of simultaneous misalignment, sum of multiple misalignments:



example 1:
ΔKw = 30%
ΔKr = 70%
Example 2:
ΔKw = 40%
ΔKr = 60%
$\Delta K_{total} = \Delta Kw + \Delta Kr \leq 100\%$

4) Coupling maintenance

The ROTOPIN coupling requires simple maintenance, the working life of the elastic element depends on the operating parameters.
During the routine system checks, you should:

- Check the alignment, see point 3
- Assess the condition of the elastic elements
- Remove any dust deposits.

a) Inspection and assessment of the condition of the elastic element

- Visually check for any cracks or signs of ageing
- Assessment of the wear and fatigue limit of the elastic elements.

If they are worn, replace them.

b) Replacement of the elastic element

- Loosen the pins and remove them from their seats
- Remove the old elastic elements
- Insert the new elastic elements on the respective pins; to facilitate this operation, use talcum powder
- Reposition the pins in their respective seats and lock them with the circlip Seeger or bolt provided

5) Inspection intervals

A check of torsional slack and a visual inspection of the coupling elastic element must be performed for the first time after 2,000 operating hours from commissioning, or at latest after 4 months.
If during this first inspection, little or no wear of the elastic element is found and the same operating conditions apply, further inspections may be performed with a 4,000 operating hour interval, or at the latest after 12 months. If signs of severe wear are found during the first inspection, requiring replacement of the elastic element (point 4), proceed as indicated in (points 3-6).

<u>If installing in an explosive zone, the indicated values must be reduced by 50%</u>

6) Malfunctions, causes and solutions

PROBLEM	CAUSES	RISK IN EXPLOSIVE AREAS	SOLUTIONS
The onset of abnormal noises and/or vibrations	Misalignment	Temperature rise: danger of ignition due to hot surfaces	1) Stop the motor/take the coupling out of service 2) Eliminate the cause of misalignment, e.g. loose motor fixing bolts, crankcase structural failure, thermal expansion. 3) Assess the condition of the elastic elements and replace them if necessary. 4) Restore proper alignment. (see assembly procedure)
	Wear of elastic elements, possible brief torque transmission with contact of metal parts	Ignition hazard due to sparking	1) Stop the motor/take the coupling out of service 2) Open the coupling and remove rubber residues 3) Check the coupling components, replace any damaged parts of the coupling 4) Insert the new elastic elements and assemble the coupling components 5) Check and if necessary restore proper alignment. (see assembly procedure)
	Loose axial detent grub screws on the hub	Ignition hazard due to hot surfaces and sparking	1) Stop the motor/take the coupling out of service 2) Check coupling alignment 3) Tighten the hub detent grub screws and secure them so that they do not loosen again 4) Check the wear of the elastic elements. (see assembly procedure)
	Loose fixing bolts.	Ignition hazard due to hot surfaces and frictional sparking	1) Stop the motor/take the coupling out of service 2) Check the wear of the elastic element. 3) Tighten the elastic element fastening bolts and secure them so that they do not loosen again 4) Check coupling alignment (see assembly procedure)
Shear/wear of metal pins.	Wear of elastic elements, possible protracted torque transmission with contact of metal parts	Ignition hazard due to sparking	1) Stop the motor/take the coupling out of service 2) Completely replace the joint and check the alignment. (see assembly procedure)
	Shear of the metal pins due to a torsional overload or a peak torque/overload		1) Stop the motor/take the coupling out of service 2) Completely replace the joint and check the alignment. (see assembly procedure) 3) Determine and resolve the reason for the overload.
	The usage parameters do not correspond to the performance of the coupling		1) Stop the motor/take the coupling out of service 2) Check the coupling's operational specifications against the requirements and switch to a higher size if necessary. 3) Fit the new joint and check the alignment. (see assembly procedure)
	Incorrect use of the unit in the system		1) Stop the motor/take the coupling out of service 2) Install the new coupling and check the alignment. (see assembly procedure) 3) Instruct and train personnel in the proper use of the unit
Premature wear of the elastic element	Misalignment	Rise in temperature of the elastic elements: Danger of ignition due to temperature rise.	1) Stop the motor/take the coupling out of service 2) Eliminate the cause of misalignment, e.g. loose motor fixing bolts, crankcase structural failure, thermal expansion. 3) Assess the condition of the elastic elements and replace them if necessary. 4) Restore proper alignment. (see assembly procedure)
	Contact with corrosive liquids or oils, ozone action, and other conditions that cause physical changes to the elastic element	Danger of ignition, spark formation due to contact between metal parts.	1) Stop the motor/take the coupling out of service 2) Open the coupling and remove rubber residues 3) Check the coupling components, replace any damaged parts of the coupling 4) Insert the new elastic elements and assemble the coupling components 5) Check and if necessary restore proper alignment. (see assembly procedure)

PROBLEM	CAUSES	RISK IN EXPLOSIVE AREAS	SOLUTIONS
Premature wear of the elastic element	Misalignment	Rise in temperature of the elastic elements: Danger of ignition due to temperature rise.	1) Stop the motor/take the coupling out of service 2) Eliminate the cause of misalignment, e.g. loose motor fixing bolts, crankcase structural failure, thermal expansion. 3) Assess the condition of the elastic elements and replace them if necessary. 4) Restore proper alignment. (see assembly procedure)
	Contact with corrosive liquids or oils, ozone action, and other conditions that cause physical changes to the elastic element	Danger of ignition, spark formation due to contact between metal parts.	1) Stop the motor/take the coupling out of service 2) Open the coupling and remove rubber residues 3) Check the coupling components, replace any damaged parts of the coupling 4) Insert the new elastic elements and assemble the coupling components 5) Check and if necessary restore proper alignment. (see assembly procedure)
	Exceedingly high ambient/contact temperatures for elastic elements	Danger of ignition, spark formation due to contact between metal parts.	1) Stop the motor/take the coupling out of service 2) Open the coupling and remove rubber residues 3) Check the coupling components, replace any damaged parts of the coupling 4) Insert the elastic elements and assemble the coupling components 5) Check and if necessary restore proper alignment. (see assembly procedure) 6) Check and adjust the ambient/contact temperature, in extreme cases change the type of coupling e.g. use a fully metal coupling
	System vibrations	Rise in temperature of the elastic elements: Danger of ignition due to temperature rise.	1) Stop the motor/take the coupling out of service 2) Check the coupling components, replace any damaged parts of the coupling 3) Insert the elastic elements and assemble the coupling components 4) Check and if necessary restore proper alignment. (see assembly procedure) 5) Detect the cause of the vibrations, they may be remedied by switching to a larger or smaller size, taking into account the torques involved.
	The usage parameters do not correspond to the performance of the coupling		1) Stop the motor/take the coupling out of service 2) Check the coupling's operational specifications against the requirements and switch to a higher size if necessary. 3) Fit the new joint and check the alignment. (see assembly procedure)
	Incorrect use of the unit in the system		1) Stop the motor/take the coupling out of service 2) Install the new coupling and check the alignment. (see assembly procedure) 3) Instruct and train personnel in the proper use of the unit
Accumulation of electrostatic charge	Accumulation of electrostatic charge on the elastic elements	Possible spark formation	Ground the motor and the driven machine
	Accumulation of electrostatic charge on metal parts		Ground the motor and the driven machine
	Accumulation of electrostatic charge on coated parts		If painting is required, anti-static paints or coating thicknesses of less than 200 µm should be used

7) Disposal

The coupling should be disposed of in compliance with prevailing environmental regulations

8. Liabilities

This item must be used only for the functions for which it was designed, in accordance with the standard safety parameters, taking into account the applicable operational parameters and information regarding use, assembly, alignment, control and maintenance indicated in the respective technical catalogue and in these assembly and maintenance instructions. Failure to comply with said information shall free WESTCAR from all liability in this regard.

9) Specific indications for hazardous areas

a. The ROTOPIN coupling is suitable and confirmed for use in hazardous areas at risk of explosion. When using the coupling in these areas, observe the special instructions and measures stated in the catalogue and in these instructions.
b. ROTOPIN couplings with attached parts capable of generating heat, sparks and electrostatic discharges (e.g. in combination with brake drums/discs and overload systems such as friction joints and impellers) are NOT to be used in explosive areas; in such cases, a separate risk assessment is required.
c. Sizing of the coupling with adequate Service Factor -- in areas at risk of explosion, increase the SF by 20% compared to the standard value for the application.
d. In explosion hazard areas, detent grub screws and/or pins for fastening tapered sleeves must be secured against loosening e.g. bonding with Loctite (medium strength).
e. Conical sleeve assemblies without tabs or keys, self-locking hubs and/or similar solutions devoid of keyways are NOT to be considered admissible in explosive zones.
f. The greater the alignment accuracy of the coupling, the longer its life. Misalignment values must be reduced by 50% in case of use in explosion hazard zones (see point 3).
g. If the couplings are used in areas at risk of dust explosion and in mining areas, excessive accumulation of dust between the coupling and its protective cover must be avoided.
   The coupling must not operate in a dusty environment.
h. If couplings are used in ATEX Zones I and II, protective covers must not be made of metals with a risk of sparking (prefer AISI 316L stainless steel). Aluminium may be used only if the Mg value is less than 7.5% in ATEX Zones IM2, the cover surfaces must be protected with suitable paint coatings.
   These protection covers must be spaced at least 10 mm from the coupling and have adequate ventilation holes.
i. When used in explosion hazard zones and where surface coating is required, the conductivity and thickness requirements of the paint layer must be observed.
   The build up of electrostatic charges is not expected for coating thicknesses less than 200 µm. When thicknesses exceed 200 µm, appropriate cycles with specific anti-static paints are required.
j. Both the motor and the machine must be grounded.
k. To avoid unforeseeable consequences, perform inspections regularly and check that coupled moving parts are in proper working order.
l. Do not stress the coupling beyond the operating limits prescribed by the speed/torque specifications stated in the catalogue.
m. It is forbidden to tamper with or improperly replace the components of the flexible couplings.