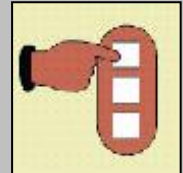


# Operating instructions

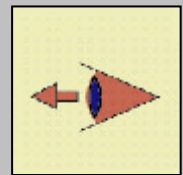
Customer-Specific  
Data

**Customer** ROBERT BOSCH LIMITED



**Order no.** 0001313519

**Designation of unit** Rotationunit, pneum.



**Equipment Model**

**Article No. (Assembly)** 52.51.3.0090.100.06

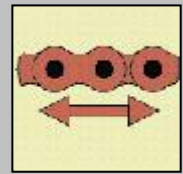


**Serial - No**



**Customer Id. No** PCS020876

**Ordering code no.** 374008 / 900999



**FIBRO LÄPPLER TECHNOLOGY GMBH**

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# OPERATING INSTRUCTIONS

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## PNEUMATIC ROTARY UNIT

### REGISTER

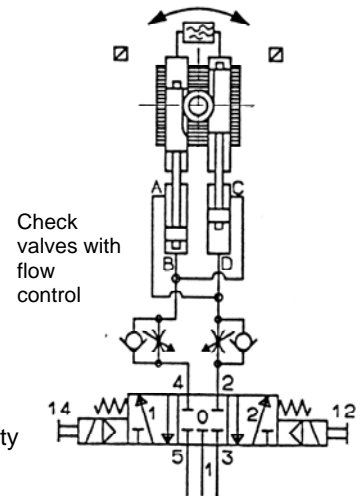
<b>1</b>	<b>DESCRIPTION OF DESIGN FEATURES</b>	<b>2</b>
<b>2</b>	<b>INSTALLATION / OPERATION</b>	<b>2</b>
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## 1 Description of Design Features

A tandem rack/pinion system converts the opposed linear motion of the two air cylinders into rotary motion - be way of the two racks engaging with the same pinion. The doubleacting cylinders are pressurised, in crosswise opposed fashion, via ports A,B,C, and D.

Consequently, when A and D are pressurised, B and C are on exhaust, and anti-clockwise rotation results. Conversely, when B and C are charged with compressed air A and D will be on exhaust: clockwise rotation is obtained

### VALVE CONNECTION DIAGRAM



## 2 Installation / Operation

In order to avoid damage, installation and commissioning should be done in the following manner:

- ⇒ Check oil level inside reservoir Fill completely with hydraulic oil HLP DIN 51524/II; viscosity rating ISO VG 46.
- ⇒ mounting of the actuator via the tapped holes in the housing - or by way of those in the turntable flange.
- ⇒ remove plastic plugs from ports; connect air supply in crosswise fashion acc. to connection diagram above.
- ⇒ for fine adjustment of the rotary angle loosen lock adjusting nut and then turn nut to increase or decrease angle, which is effected through axial displacement of damping bushing
- ⇒ Adjustment amounts to + 2,5° in either terminal position.
- ⇒ After adjustments, lock nut pos.20 against adjusting nut.
- ⇒ close flow control check valves and check that system pressure is 6 bar.
- ⇒ ensure that the unit can rotate freely.
- ⇒ under manual control, set actuator into motion by gradual opening of flow valves
- ⇒ Check terminal positions. Adjust angle if necessary.
- ⇒ set the desired rotational speed at the flow valves. Observe specifications as per catalogue.
- ⇒ check terminal damping. Adjust as required. Note that damping on size 2-unis is fixed and cannot be adjusted.
- ⇒ if damping is found insufficient or absent, check oil level inside reservoir - see oil specs above.
- ⇒ Replenishment necessitates removal of unit from certain installation positions. Re-install thereafter.
- ⇒ check all mounting screws, accessories and hose connections for tightness.
- ⇒ adjust both terminal positions. Also ensure proximity switch actuators are set to correct switching distance

## 3 Maintenance

The pneumatic seals will have to be replaced in accordance with prevailing conditions such as contamination and corrosive environment. Unit cycle time also influences seal life, which normally amounts to one year.

- ⇒ in the case of oil losses, the seals ought to be replaced and the oil replenished. Oil specifications - see above. Note that damping/cushioning function can be lost through lack of oil, and that the actuator will be severely damaged if it is kept running without terminal cushioning.
- ⇒ as far as possible the unit should be protected from contamination through installation of suitable guards etc. Upon cleaning of the actuator it is important to ensure that the seals are not damaged by thinners etc.

## 4 Fault Finding and Repairs

### 4.1 Fault Analysis

COMPLAINT	CAUSE	REMEDY
⇒ Actuator stuck in terminal position	<ul style="list-style-type: none"> <li>⇒ lack of pressure</li> <li>⇒ flow control valve defective</li> <li>⇒ proximity switch defect, or excessive actuator setting</li> </ul>	<ul style="list-style-type: none"> <li>⇒ check supply and valves</li> <li>⇒ check valves</li> <li>⇒ check setting; replace switch</li> </ul>
⇒ Terminal position inaccurate	<ul style="list-style-type: none"> <li>⇒ flange worked loose</li> <li>⇒ loose connections</li> <li>⇒ excessive speed</li> <li>⇒ seals defective</li> </ul>	<ul style="list-style-type: none"> <li>⇒ tighten ring nut pos.30</li> <li>⇒ tighten connections</li> <li>⇒ reset speed</li> <li>⇒ replace seals</li> </ul>
⇒ Actuator creeps away from terminal position	<ul style="list-style-type: none"> <li>⇒ seals defective</li> </ul>	<ul style="list-style-type: none"> <li>⇒ Replace seals</li> </ul>
⇒ Actuator jammed	<ul style="list-style-type: none"> <li>⇒ broken gear teeth</li> <li>⇒ piston seized up</li> </ul>	<ul style="list-style-type: none"> <li>⇒ replace broken parts</li> <li>⇒ replace damaged parts</li> </ul>
⇒ Cushioning malfunctions	<ul style="list-style-type: none"> <li>⇒ excessive speed</li> <li>⇒ wrong damper setting</li> <li>⇒ load capacity for requisite installation position exceeded</li> <li>⇒ oil loss from reservoir</li> <li>⇒ damper needle or -bush damaged, encrusted</li> </ul>	<ul style="list-style-type: none"> <li>⇒ reset speed</li> <li>⇒ reset damping</li> <li>⇒ reduce loading</li> <li>⇒ replenish (see above)</li> <li>⇒ clean; replace if required</li> </ul>

### 4.2 Repair Work

Repairs should be executed in the following sequence:

- ⇒ try to locate the cause - replace damaged parts.
- ⇒ thereafter test the running of the actuator
- ⇒ refer all repairs beyond the capacity of in-house facilities only to our appointed agent

λ **The manufacture and quality of the module has been closely controlled.**

## Installation instructions :

### Before fitting seals, note the following:

- Machine guide chamfer on rod and housing (illustration. 7)
- Avoid seal contact with all sharp corners, mask threads, etc.
- Thoroughly wipe off all chips, dirt, and dust.
- Do not use sharp tools for installation.
- Lubricate seals and replacement components with oil or grease before installation.
- Use only lubricants without MOS2 ingredient. Molybdändisulfid and Zinkdisulfid are unsuitable.

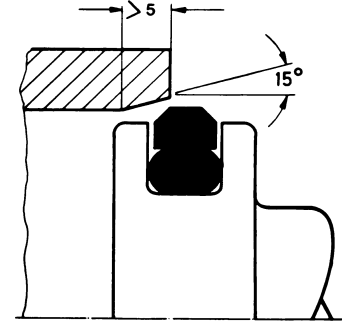


Illustration 7

### Internal seals :

TURCON-GLYD-Rings and TURCON-Stepseal can be installed in closed grooves.

TURCON-Ring with O-Ring (illustration 8).

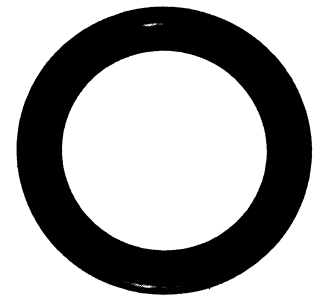


Illustration 8

Installation of O-ring into groove. Shape the TURCON-Ring as illustration. Be careful not to kink the ring (illustration 9).

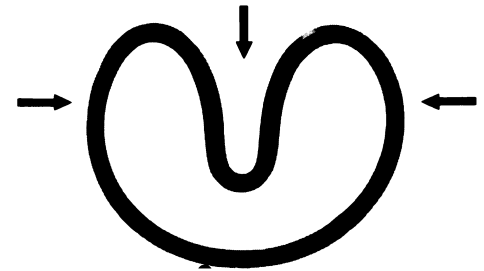


Illustration 9

Place the TURCON-Ring over the O-ring and press it into the groove in direction of arrow. (illustration 10)



Illustration 10

TURCON-Ring installed (illustration 11).

Note, the O-ring must have axial play.

Split grooves are recommended for rod diameters 30 mm. If this design is not adaptable, use series S 55015 and S 55025.

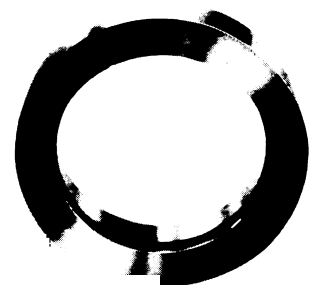
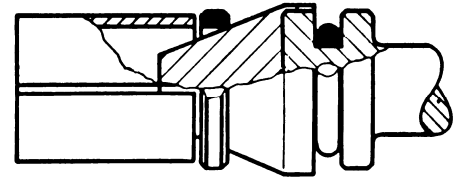


Illustration 11

## External seal:

Install O-ring into groove (a conical mounting sleeve may be used).

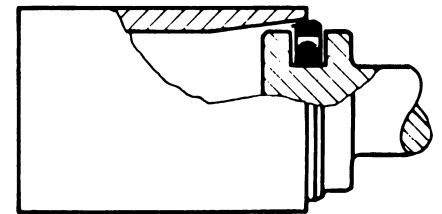
Push the TURCON-Ring with an expansion sleeve into the mounting sleeve, expanding the ring (2)



**Figura 12**  
**Illustration 12**

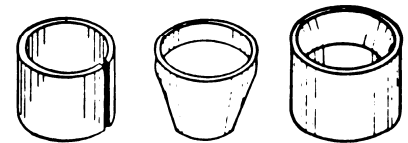
The TURCON-Ring will snap into groove, but will extend somewhat over the groove. Use a calibrating sleeve, chamfered inside, reshape the expanding ring. (illustration 12)

The inside diameter of the calibrating sleeve must be that of the cylinder.



**Figura 13**  
**Illustration 13**

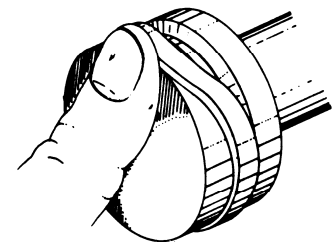
The installation tools are to be made of suitable materials (NYLON, DELRIN etc.). (illustration 14).



Expansions sleeve      Calibrating sleeve  
Mounting sleeve

**Illustration 14**

In most cases it is possible to install the TURCON-Rings without the aid of a special installation tool (illustration 15), or just by using an installation sleeve.



**Figura 15**  
**Illustration 15**

Pre-warming the TURCON-GLYD-Ring in oil or water ( 80° C to 120° C) makes the installation easier.

The calibration can be done at the chamfer of the cylinder.

11 = Spare parts  
 12 = Wear parts  
 13 = Work piece contacting  
 15 = Assembly

## Spare- and wear parts list

	Pos	Part no.	Part description	Part code	Drawing no.	Quant.		Code	Remarks
1~	0	1.694.00145	Rotary pneumatic	52.51.3.0090.100	A1.694.00145	1	pc	15	
~2~	30	0.206.00071	(L) Tube		D0.206.00071	2	pc	11	
~2~	40	0.107.00035	(L) Rod		D6.107.035	2	pc	11	
~2~	50	0.114.00129	(L) Rod		D6.114.129	2	pc	11	
~2~	60	0.107.00020	(L)Shaft		D0.107.00020	1	pc	11	
~2~	80	0.683.00122	(L) Flange		D0.683.00122	1	pc	11	
~2~	140	0.156.00028	(L)Pin		E0.156.00028	2	pc	11	
~2~	160	0.197.00124	(L)Bushing		D0.197.00124	2	pc	11	
~2~	170	0.112.00400	(L)Rod		E6.112.400	2	pc	11	
~2~	180	0.213.00083	(L)Cover	6307 LLU	E6.213.083	2	pc	11	
~2~	190	0682351	Deep broove bvall bearing	35x80x21	NTN	1	pc	11	
~2~	200	0681197	Needle bearing	RNA 4906-2RS		1	pc	11	
~2~	220	0699280	Seal - O-Ring 43,00 x 3,50			2	pc	11	
~2~	240	0650598	Seal - O-Ring 7,00 x 1,5	PT0200500-T40N		2	pc	11	
~2~	250	0686766	Turcon-Glyd-Ring D 50 with seal		Busak+Shamban	2	pc	11	
~2~	280	0688432	Clamping sleeve	RS1300160-T10N		2	pc	11	
~2~	290	0658625	Turcon-Stepseal D 16 with seal	70 Shore	Busak+Shamban	2	pc	11	
~2~	300	0669655	Seal - O-Ring 10,00 x 2,00			2	pc	11	
~2~	370	0651471	Seal - O-Ring 19,00 x 3,00	PS1400250-T46N		2	pc	11	
~2~	380	0688523	Turcon-Stepseal D 25 with seal		Busak+Shamban	4	pc	11	
~2~	420	0650663	Seal - O-Ring 18,00 x 2,00	70 Shore		4	pc	11	
~2~	430	0651695	Seal - O-Ring 2,00 x 1,00			4	pc	11	

11 = Spare parts  
 12 = Wear parts  
 13 = Work piece contacting  
 15 = Assembly

## Spare- and wear parts list

	Pos	Part no.	Part description	Part code	Drawing no.	Quant.		Code	Remarks
~2~	500	1.591.00019	(L)Oil reservoir Alu kompl.	(52.51.3)		1	pc	11	
~3~	100	0705061	Seal - O-Ring 101,32 x 1,78		Busak+Shamban	1	pc	11	



