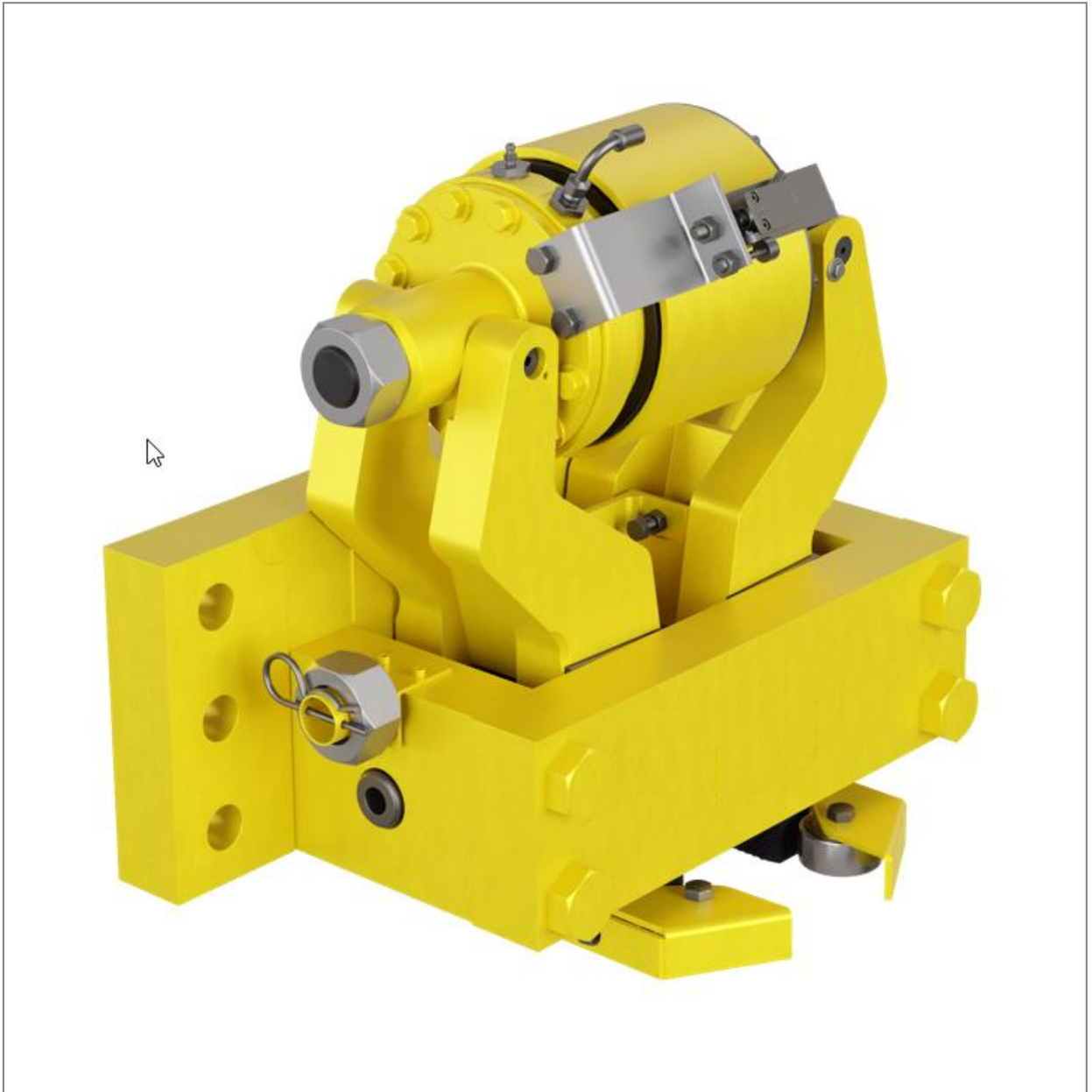


Installation and operating instructions for Rail Clamp DR 085/088 FHM

E 09.797e



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RINGSPANN	Installation and operating instructions for Rail Clamp DR 085/088 FHM spring activated – hydraulically released	E 09.797e			
Issue: 14.09.2022	Version: 2	Drawn: BAHS	Checked: OHLM	Pages: 39	Page: 2

Important

Please read these instructions carefully before installing and operating the product. Your particular attention is drawn to the notes on safety.

These installation and operating instructions are valid on condition that the product meets the selection criteria for its proper use. Selection and design of the product is not the subject of these installation and operating instructions.

Disregarding or misinterpreting these installation and operating instructions invalidates any product liability or guarantee by RINGSPANN; the same applies if the product is taken apart or changed.

These installation and operating instructions should be kept in a safe place and should accompany the product if it is passed on to others -either on its own or as part of a machine- to make it accessible to the user.

Safety Notice

- Installation and operation of this product should only be carried out by skilled personnel.
- Repairs may only be carried out by the manufacturer or accredited RINGSPANN agents.
- If a malfunction is indicated, the product or the machine into which it is installed, should be stopped immediately and either RINGSPANN or an accredited RINGSPANN agent should be informed.
- Switch off the power supply before commencing work on electrical components.
- Rotating machine elements must be protected by the purchaser to prevent accidental contact.
- Supplies abroad are subject to the safety laws prevailing in those countries.

This is a translation of the German original version!

In case of inconsistencies between the German and English version of this installation and operating instruction, the German version shall prevail.

RINGSPANN	Installation and operating instructions for Rail Clamp DR 085/088 FHM spring activated – hydraulically released			E 09.797e	
Issue: 14.09.2022	Version: 2	Drawn: BAHS	Checked: OHLM	Pages: 39	Page: 3

Contents

1 DESCRIPTION OF THE RAIL CLAMP

- 1.1 Operating principle

2 INSTALLATION

- 2.1 Delivery condition
- 2.2 Installing the rail clamp
- 2.3 Hydraulic connection

For rail clamps without built-in hydraulic power unit

For rail clamps with HCO2R built-in hydraulic power unit

For rail clamps with HTP3 built-in hydraulic power unit

- 2.4 Electrical connection
- 2.5 Bleeding the hydraulic circuit
- 2.6 Deactivating the manual release
- 2.7 Adjusting the pad clearance
- 2.8 Rail clamp balancing procedure
- 2.9 General operational check

3 OPERATIONAL FUNCTIONING

- 3.1 Tightening the rail clamp
- 3.2 Loosening the rail clamp
- 3.3 Manual release of the rail clamp
- 3.4 Hand pump operation of the rail clamp

4 PERIODIC MAINTENANCE

- 4.1 Maintenance level 1
- 4.2 Maintenance level 2
- 4.3 Maintenance level 3

5 MAINTENANCE

- 5.1 Manual release: activation
- 5.2 Manual release: deactivation
- 5.3 Adjusting the pad gap
- 5.4 Replacing the pads
- 5.5 Setting the braking force
- 5.6 Opening switch
- 5.7 Adjustment switch
- 5.8 Flow limiter (optional)

6 SPARE PARTS

7 TROUBLE SHOOTING

RINGSPANN	Installation and operating instructions for Rail Clamp DR 085/088 FHM spring activated – hydraulically released			E 09.797e	
Issue: 14.09.2022	Version: 2	Drawn: BAHS	Checked: OHLM	Pages: 39	Page: 4

1 DESCRIPTION OF THE RAIL CLAMP

1.1 Operating principle

The rail clamp DR 085/088 FHM are hydraulic fail-safe calipers; the braking force is applied by spring washers whereas hydraulic pressure is necessary to maintain the brake released. The stack of spring washers is factory-adjusted. This adjustment, combined with adjustment of the brake pads gap, determines the braking force value.

There is a type plate on the brake with a 16-digit article number. The exact design of the brake is defined by this article number only.

Furhter to these instructions, please also consider the catalogue data for the brake at www.ringspann.com and the drawings in the individual sections.

The rail clamps can be optionally delivered with an integrated hydraulic power unit type HCO2R or type HTP3 (see Fig. 1.2).

The rail clamps are fitted with a manual release device that mechanically maintains the rail clamp in released position without having to use the power source. This release is useful for installation and maintenance operations when the power source is not available. This manual release must be deactivated for the rail clamp to operate correctly.

The brakes have a manual release device mechanically holding the caliper open, without any need for hydraulic pressure. This release is useful for installation and maintenance work when there is no hydraulic pressure available.

These rail clamps are also fitted with a guide mechanism on the rail by steel rollers. The guide rollers ensure the centering of the rail clamp on the rail, in spite of the possible alignment faults of the latter.

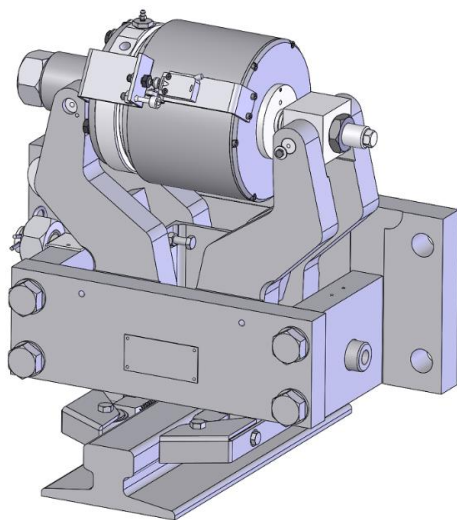


Fig. 1.1

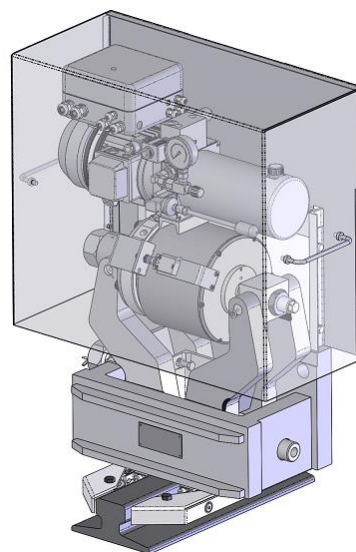


Fig. 1.2

RINGSPANN	Installation and operating instructions for Rail Clamp DR 085/088 FHM spring activated – hydraulically released			E 09.797e	
Issue: 14.09.2022	Version: 2	Drawn: BAHS	Checked: OHLM	Pages: 39	Page: 5



Life-threatening danger!

Disc must be absolutely degreased before all contact with the brakes linings.

In case of lining pollution with grease, the nominal brake force is not guaranteed.

**Rail clamps are fail safe components.
All setting and repairs must be performed by skilled operators.**

Caution: The rail clamp is supplied in “manually locked” position and the braking force is factory-set.

This manual must be followed up to chapter 2 included (General operational check) for the rail clamp to be operational.

The DR 085/088 FHM rail clamps with diamond-tipped pads are intended for purely static uses. Any dynamic braking requires a replacement of the pads.

When assembling, operating and maintaining the brake it is to be ensured that the entire drive train is secured against being switched on unintentionally. Moving parts can cause severe injury. Rotating parts (e.g. brake disc) must be secured by the operator against unintentional touching.

Strongly pre-loaded pressure springs are installed in the springed thrusters of the brake. The spring thruster may only be disassembled by the factory.

2 INSTALLATION

RINGSPANN rail clamps are easy to use and do not require extremely stringent mounting tolerances.

2.1 Delivery condition

The rail clamp is delivered:

- With handling slings (option power unit).
- In manual release position, i.e. manually locked in released position.
- With pads smooth (dynamic) type installed or diamond type (static) installed.
- With a non-set nominal pad gap. (fully released).
- Braking force is set according to customer specifications.
- Bleed screw oriented according to customer specifications.
- Balancing lever screws not adjusted.
- Mechanical switches adjusted.
- For power unit option, breather plug of the hydraulic power unit removed.

RINGSPANN	Installation and operating instructions for Rail Clamp DR 085/088 FHM spring activated – hydraulically released			E 09.797e	
Issue: 14.09.2022	Version: 2	Drawn: BAHS	Checked: OHLM	Pages: 39	Page: 6

- For optional cover with built-in unit, only the base plate is mounted.
- To be removed with the retaining screw on the roller holder according to assembly (see 2.2.3).
- Please also note the brake catalogue data at www.RINGSPANN.de and the drawings in the individual paragraph.

2.2 Installing the rail clamp

2.2.1 Tooling list

1. Torque wrench 2000 Nm, socket 46 mm A/F (Bracket attachment).
2. Flat 8mm wrench + Hose int. Ø6mm (Bleed ref. 11271-17).

2.2.2 Rail clamp handling

Place the assembly by lifting with the two lifting rings or handling sling if the rail clamp is fitted with hydraulic power unit (see Fig. 2.2).

Weight for 1 rail clamp approx. 200-350kg see RINGSPANN Datasheet for precise weight.

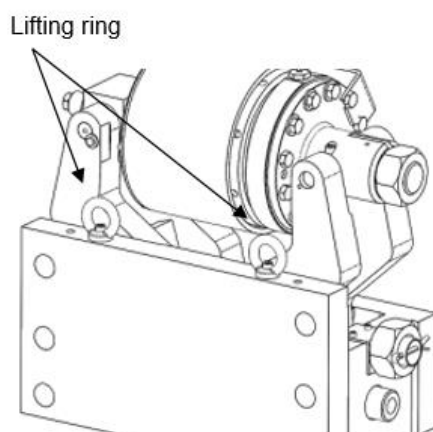


Fig. 2.1



Fig. 2.2

2.2.3 Installing pads with guide rollers

1. Check screws **V1** and **V2**. Make sure they do not extend into the inside of the roller support. Do the same for **V3** and remove it, if necessary.

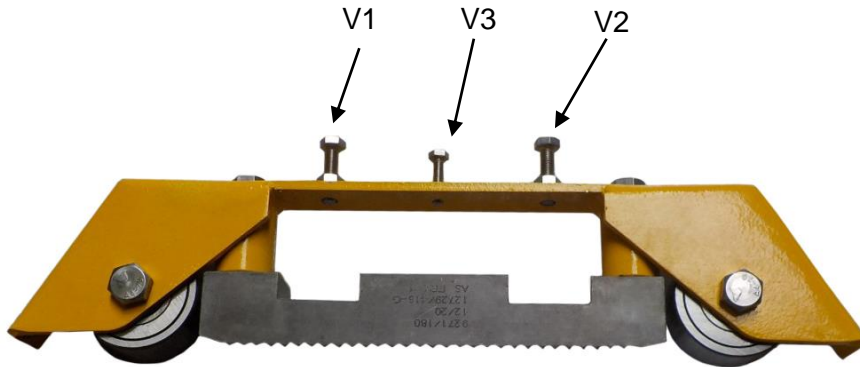


Fig. 2.3

2. Place assembly in the greased slots of the clamp lever ensuring that the roller screw heads are facing upwards.

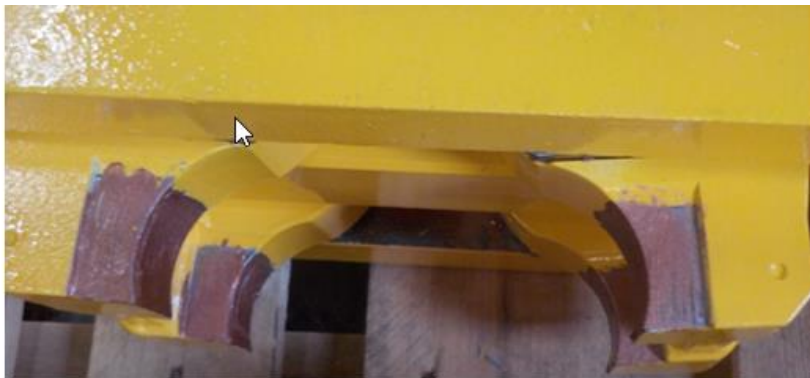


Fig. 2.4

3. Screw the 2 screws **V1** and **V2** until they come into contact with the bottom of the lever lamages.

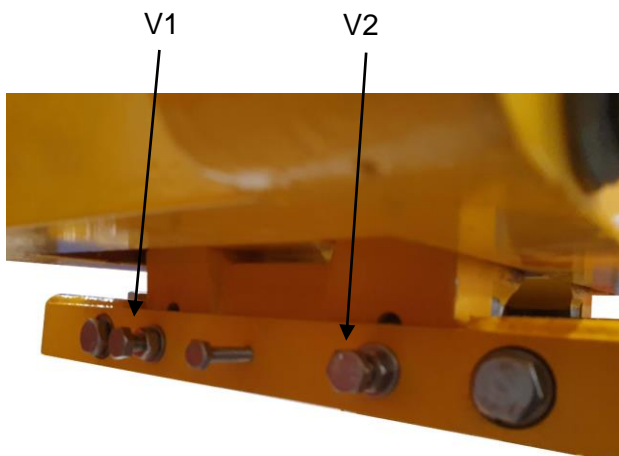


Fig. 2.5

RINGSPANN	Installation and operating instructions for Rail Clamp DR 085/088 FHM spring activated – hydraulically released			E 09.797e	
Issue: 14.09.2022	Version: 2	Drawn: BAHS	Checked: OHLM	Pages: 39	Page: 8

4. Loosen **V1** and **V2** for $\frac{3}{4}$ of a turn
5. Lock the locknut.
6. Check that the assembly is free without too much clearance. The assembly must not fall without the presence of a rail.

2.2.4 Alignment procedure

Make sure that the support surface is clean and dry.
 Make sure that there is sufficient space around the rail clamp.
 Check that the attachment holes are compliant (spacers, dimensions and number).



Important!

If these conditions are not complied with, the caliper cannot be assembled or will not operate to standard. Contact RINGSPANN for more details.



Important!

Make sure that pads are mounted on the rail clamp before to installation on the rail.

Rail clamp DR 085 FHM-050/100

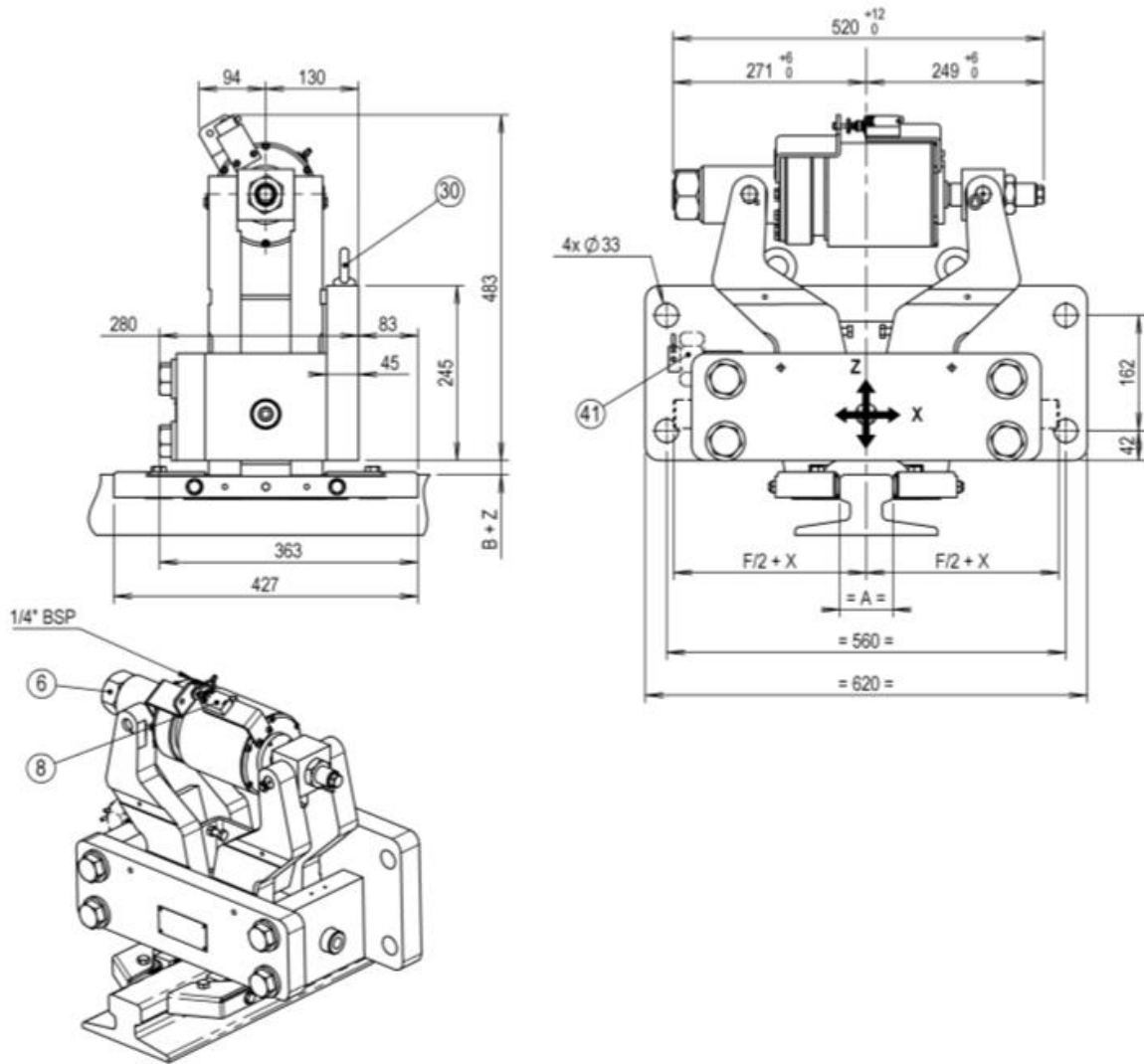


Fig. 2.6

Rail clamp DR 085 FHM-200/300/400

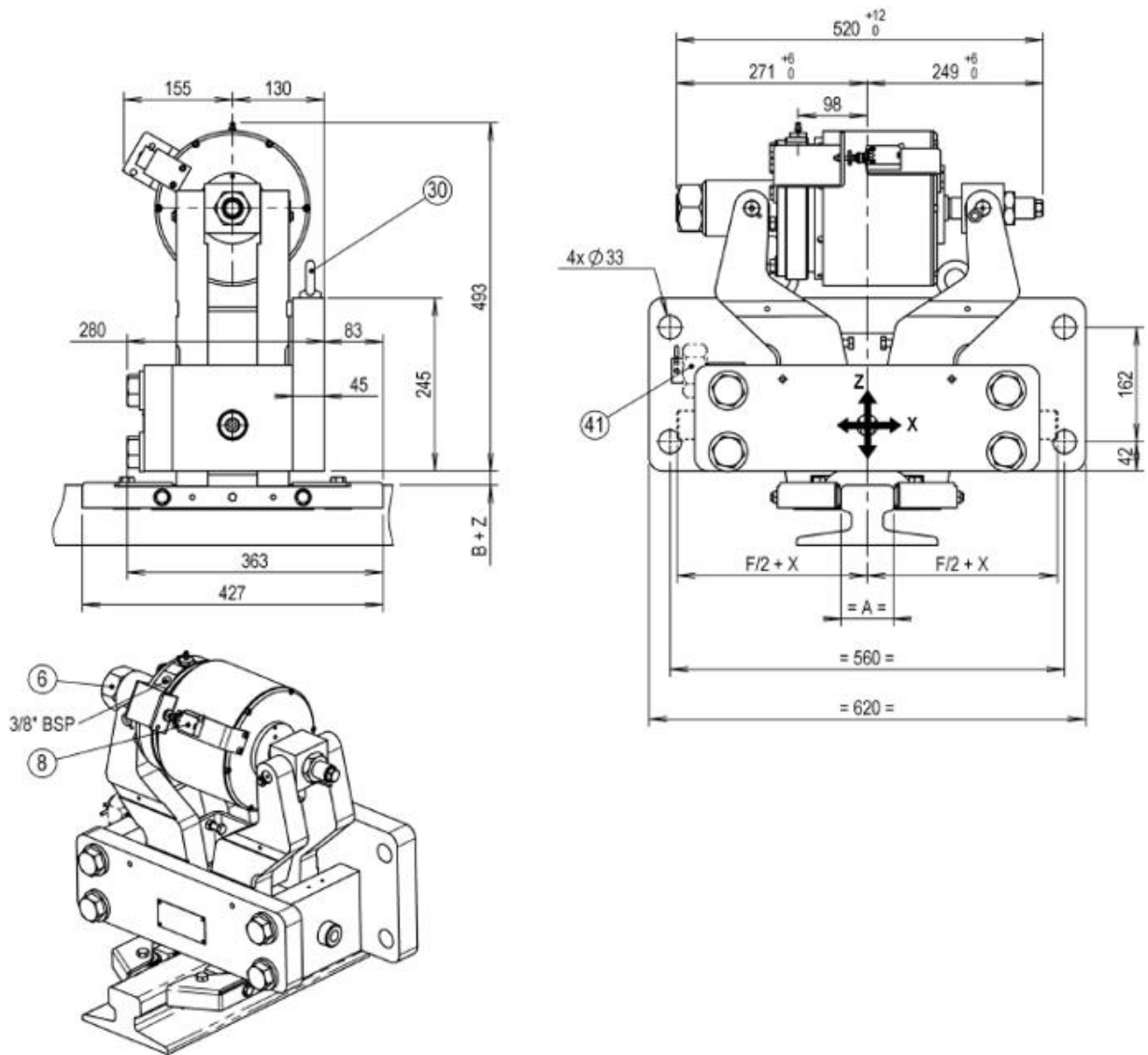


Fig. 2.7

Rail clamp DR 088 FHM-500

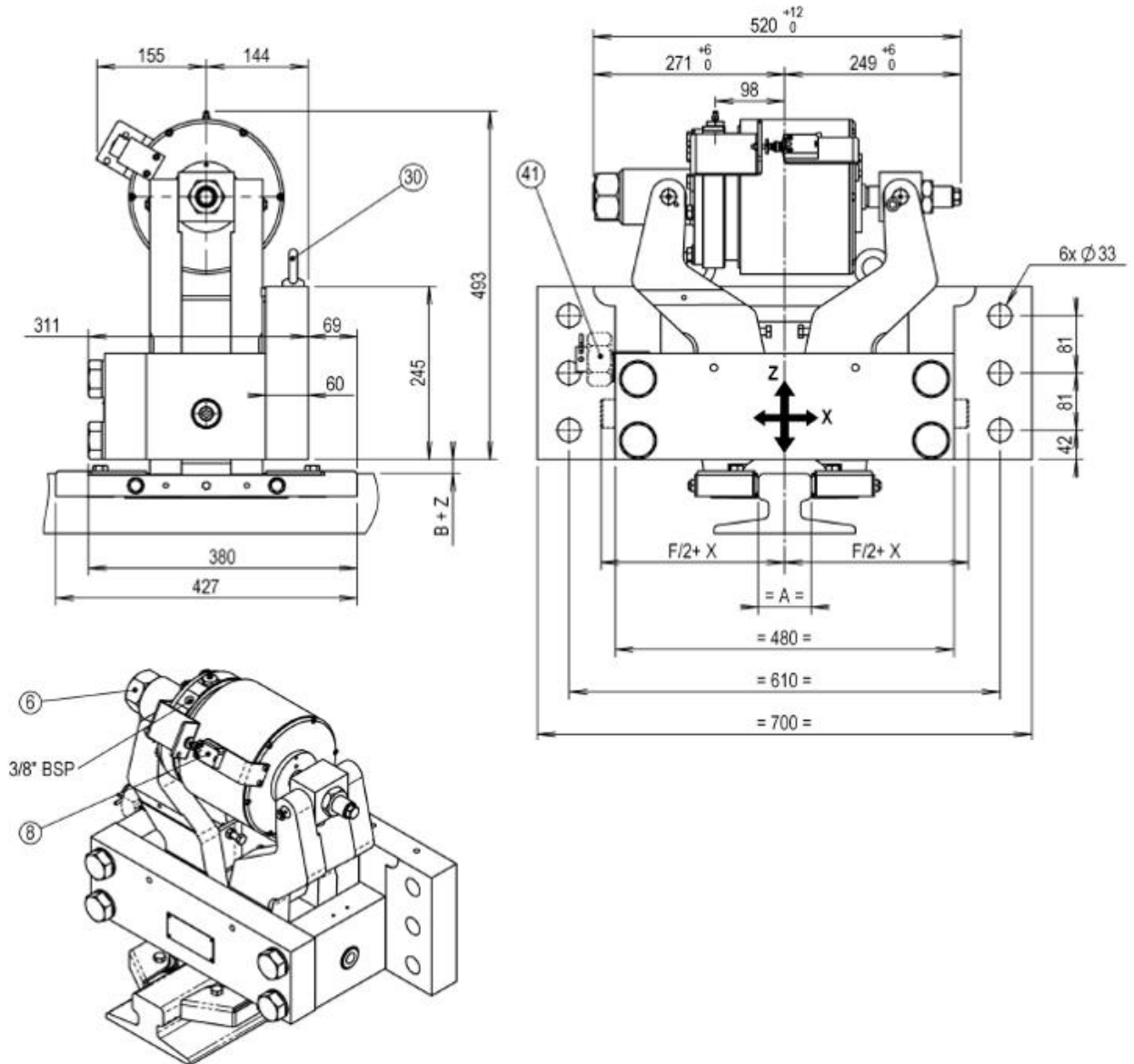


Fig. 2.8

Image description:

- Pos. 6 Manual release
- Pos. 8 Brake off monitoring switch
- Pos. 30 Eyebolts
- Pos. 41 Storage position for release nut

Rail type	Dimension B (mm) $\pm 2,5$ mm	Vertical tolerance TV (mm)
A55	25	+1/-3
A65	20	+/-4
A75	20	+2/-5
A100	15	+/-5
A120	15	+/-5
60E1	15	+2/-5
Other types	Please consult RINGSPANN	

Tab. 2.1

1. Observe the dimensions B with $\pm 2,5$ indicated (see Tab. 2.1).
2. Center the rail clamp transversely in relation to the rail.
3. Guide pads/rollers or pads alone (optional) carefully on either side of the rail when engaging the rail clamp on the rail.

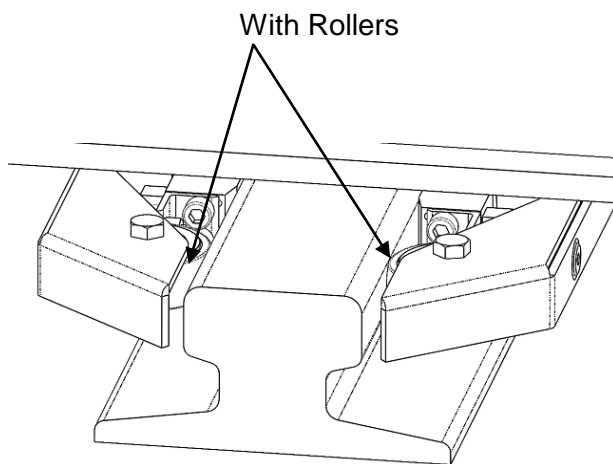


Fig. 2.9

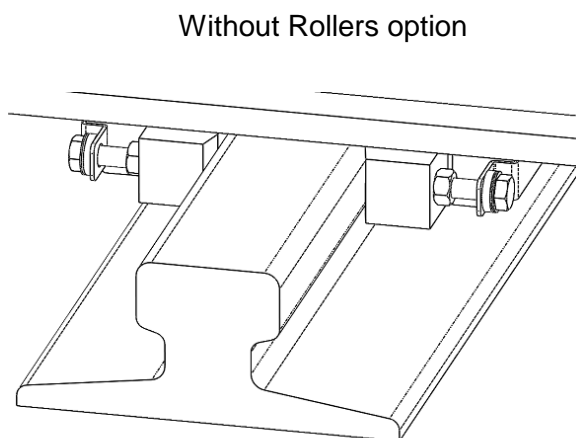


Fig. 2.10

RINGSPANN	Installation and operating instructions for Rail Clamp DR 085/088 FHM spring activated – hydraulically released			E 09.797e	
Issue: 14.09.2022	Version: 2	Drawn: BAHS	Checked: OHLM	Pages: 39	Page: 14



Information!

**The max. opening between the rollers / runners is approximately:
Rail thickness + 3 mm (complete opening of the rail clamp).**

4. Fit the attachment screws of the rail clamp without tightening them and if all screws hand mounted tightening with the correct tighenning torque Cs.

Rail clamp DR 085 FHM-50/100/200/300/400 4 screws M30 class 10.9

Rail clamp DR 088 FHM-500 6 screws M30 class 10.9

The tightening torque Cs which has to be applied on the screws M30 class 10.9 rows for each nut is: **Cs = 1515Nm ±5% μ=0,10** with greased screws.



Important!

Check the tightening torque

After tightening with the torque, make sure that the entire assembly has not shifted. The swiveling brake pad holders and the swiveling rail caliper levers make it possible to compensate for centring errors.



Important!

**The 2 upper screws should not look upside from the 40mm thick plate!
These could prevent the lever movement.**

5. Fort he rail clamp version with guide rollers: Remove the retaining screw on each side to release the guide roller holder.

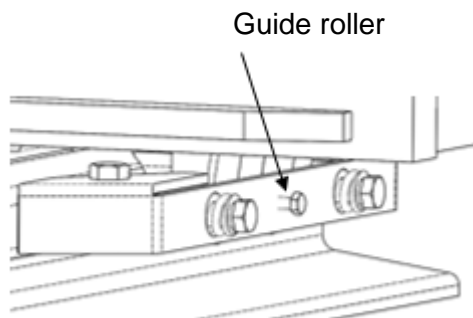


Fig: 2.11

RINGSPANN	Installation and operating instructions for Rail Clamp DR 085/088 FHM spring activated – hydraulically released			E 09.797e	
Issue: 14.09.2022	Version: 2	Drawn: BAHS	Checked: OHLM	Pages: 39	Page: 15

2.3 Hydraulic connection


For rail clamps DR 085/088 without built-in hydraulic power unit. The Rail clamp must be connected to its source over a flexible hydraulic tube.

Rail clamp DR 085 FHM-050/100 hydraulic connection G1/4“

Rail clamp DR 085 FHM-200/300/400 hydraulic connection G3/8“


Rail clamp DR 088 FHM-500 hydraulic connection G3/8“

As well as these instructions, please also consider the catalogue data for the brake at www.RINGSPANN.com and the drawings in the individual sections.

	<p>Important!</p> <p>Opening pressure min.: DR 085-FHM-050 110bar Opening pressure min.: DR 085-FHM-100 110bar Opening pressure min.: DR 085-FHM-200 105bar Opening pressure min.: DR 085-FHM-300 105bar Opening pressure min.: DR 085-FHM-400 115bar Opening pressure min.: DR 088-FHM-500 110bar</p> <p>MAX PRESSURE: 130bar</p>
---	---

For an ambient temperature range from 0 through 60°C, recommended oil is ISO HM32. As example, RINGSPANN uses, FUCHS RENOLIN EXTRA 32S.

Outside of the above mentioned temperature range, the viscosity must be adjusted to range between 12 and 100 mm²/s with the possibility to extend this range to between 10 and 400 mm²/s in case of exceptional use.

	<p>Important!</p> <p>The oil must be clean (maximum permitted level of pollution as per NAS 1638: 10µm). Use only new fluid and never mix several types of different-brands of fluid.</p>
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Do not use hemp, mastic, Teflon (etc.) and use flexible hoses exclusively. It is preferable to use liquid joints. Clean the pipes and couplings while ensuring that they are perfectly clean (soiling, scale, swarf, etc.).

RINGSPANN	Installation and operating instructions for Rail Clamp DR 085/088 FHM spring activated – hydraulically released			E 09.797e	
Issue: 14.09.2022	Version: 2	Drawn: BAHS	Checked: OHLM	Pages: 39	Page: 16

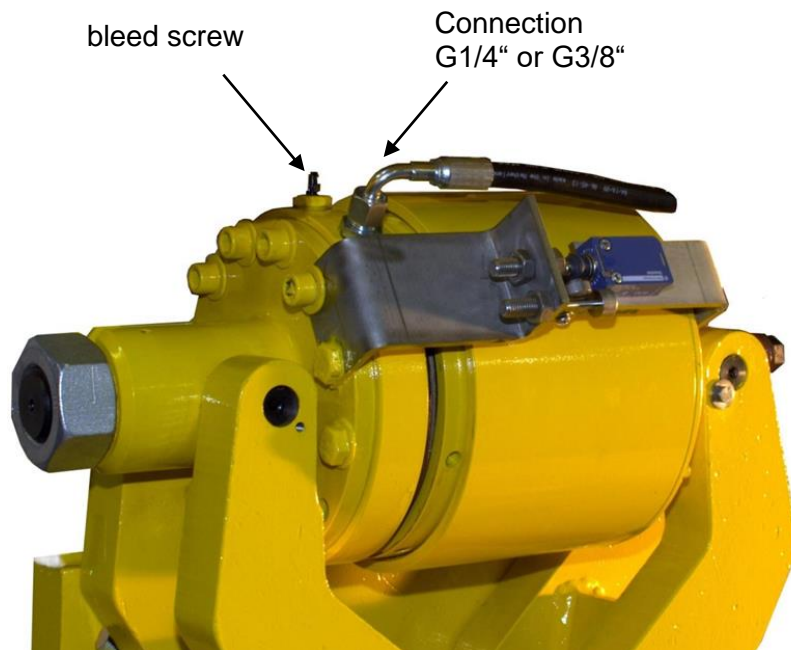


Fig. 2.12

For rail clamps DR 085/088 FHM with HCO2R built-in hydraulic power unit:

Refer to the hydraulic power unit HCO2R manual for more information.



Important!

Power units are normally supplied with oil and are ready for operation. However, check that the level is correct and that transport has not caused any leakage.

Transport protection remove before usage: Remove the plug screwed onto the filler hole and screw the breather plug supplied.

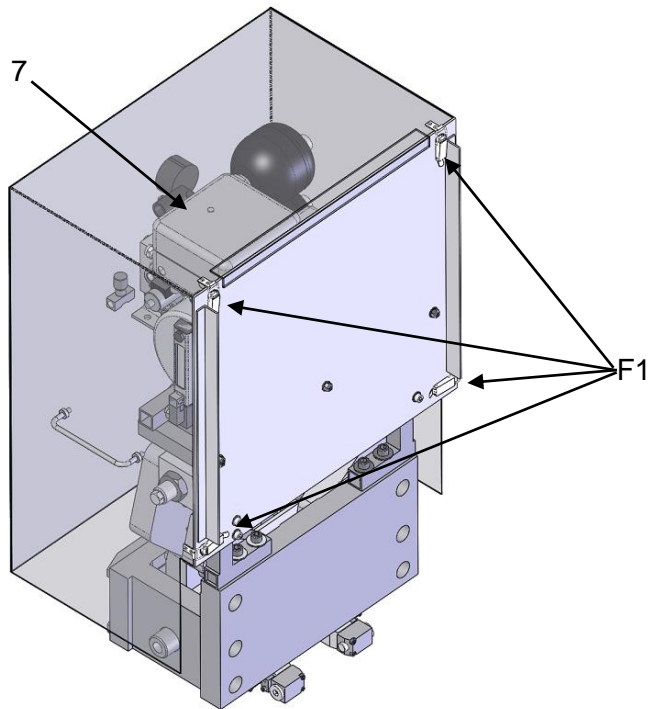


Fig. 2.13

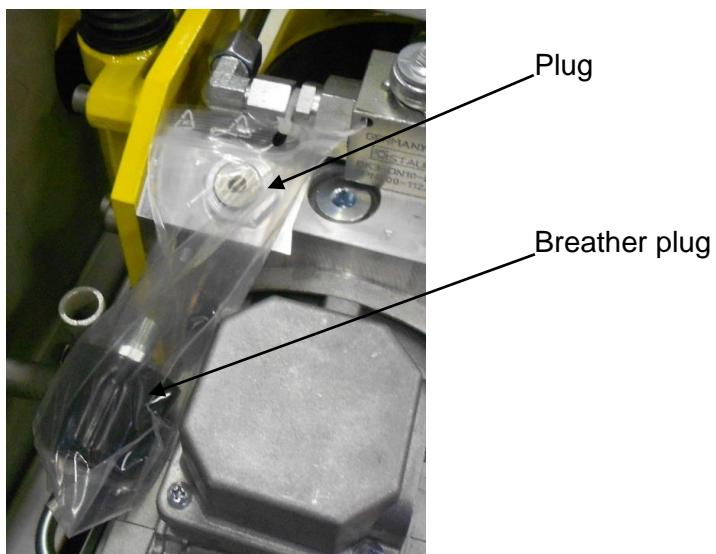



Fig. 2.14

For rail clamps DR 085/088 FHM with HTP3 built-in hydraulic power unit:

Refer to the hydraulic power unit HTP3 manual for more information.

	<p>Important!</p>
<p>Power units are normally supplied with oil and are ready for operation. However, check that the level is correct and that transport has not caused any leakage.</p>	
<p>Transport protection remove before usage: Remove the plug screwed onto the filler hole and screw the breather plug supplied.</p>	

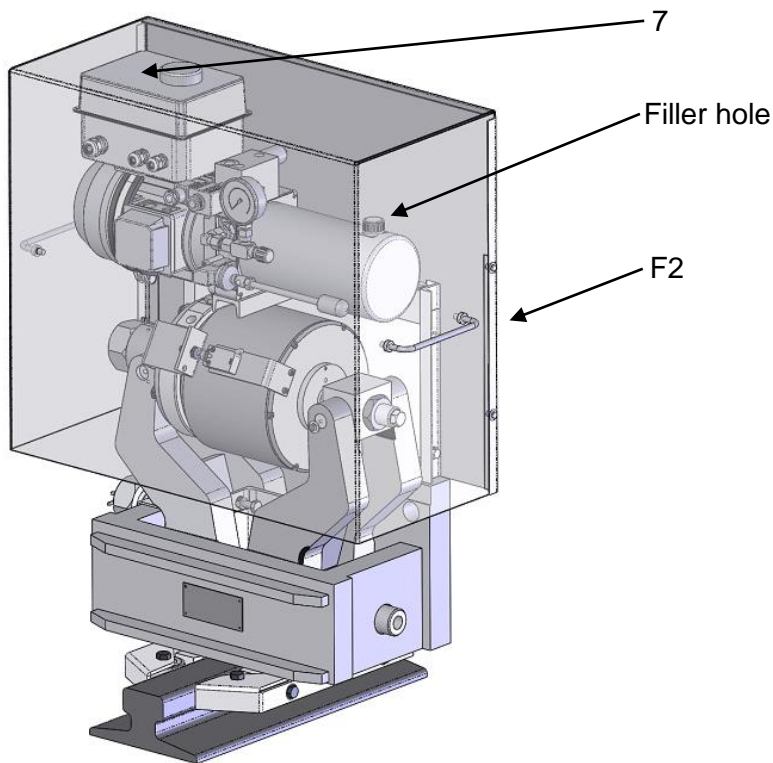


Fig. 2.15

RINGSPANN	Installation and operating instructions for Rail Clamp DR 085/088 FHM spring activated – hydraulically released			E 09.797e	
Issue: 14.09.2022	Version: 2	Drawn: BAHS	Checked: OHLM	Pages: 39	Page: 19

2.4 Electrical connection

HCO2R power unit: Only for Rail clamp with power unit type.

1. Remove the unit's cover (optional) by unclipping the 4 clips F1 (see Fig. 2.13).
2. For the electrical connection of the unit 7, refer to the hydraulic power unit's manual HCO2R

HTP3 power unit: Only for Rail clamp with power unit type.

3. Remove the unit's cover (optional) by unscrews the 4 screws F2 (see Fig. 2.15).
4. For the electrical connection of the unit 7 (see Fig. 2.12), refer to the hydraulic power unit's manual HTP3

2.4.1 Electrical connection switches

Opening and excessive pad gap contact:

Bipolar switch
Mechanical contact output by
cable 5 wire x 0.75mm²
Standard length of the cable: 2m.

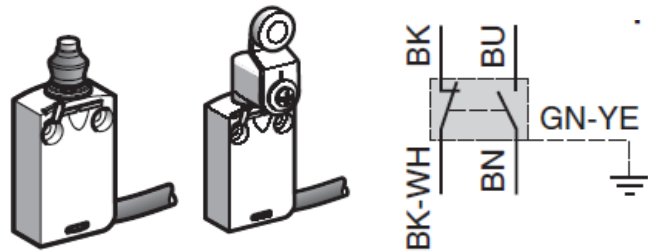


Fig. 2.16

RINGSPANN	Installation and operating instructions for Rail Clamp DR 085/088 FHM spring activated – hydraulically released			E 09.797e	
Issue: 14.09.2022	Version: 2	Drawn: BAHS	Checked: OHLM	Pages: 39	Page: 20

2.5 Hydraulic circuit bleed

Tools: Spanner, 6mm ID flexible hose.



Important!

Take the necessary precautions to avoid the oil being sprayed onto the rail. If the pads are contaminated with oil, they must be cleaned or replaced.

To ensure that the rail clamp DR 085/088 FHM operates properly, the cylinder must be bled. On the bleed screw 11271-17, install a hose- \varnothing 6 mm whose end is immersed into a container.

1. Pressurize the rail clamp.
2. Hold the hose in place, slightly loosen the bleed screw until there is a release of oil and air.
3. Wait until there are no more air bubbles in the oil during the release.
4. Tighten the bleed screw without forcing.
5. Check the oil level in the hydraulic unit.
6. Check that the bleed screw is leak-tight.

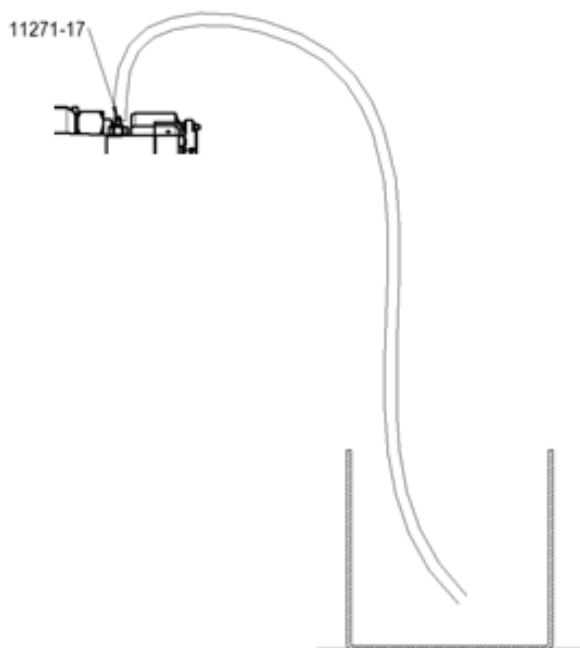



Fig. 2.17



Important!

**The oil and hose must be clean
(maximum permitted level of pollution as per NAS 1638: 10 μ m).
Use only new fluid and never mix several types of different-brands of fluid.**

2.6 Deactivating the manual release

	<p>Important!</p> <p>Manual release must be deactivated for the rail clamp to operate correctly.</p>
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To make the rail clamp operational, the nut **4** must imperatively be removed and stored on the tube **5** with its pin.

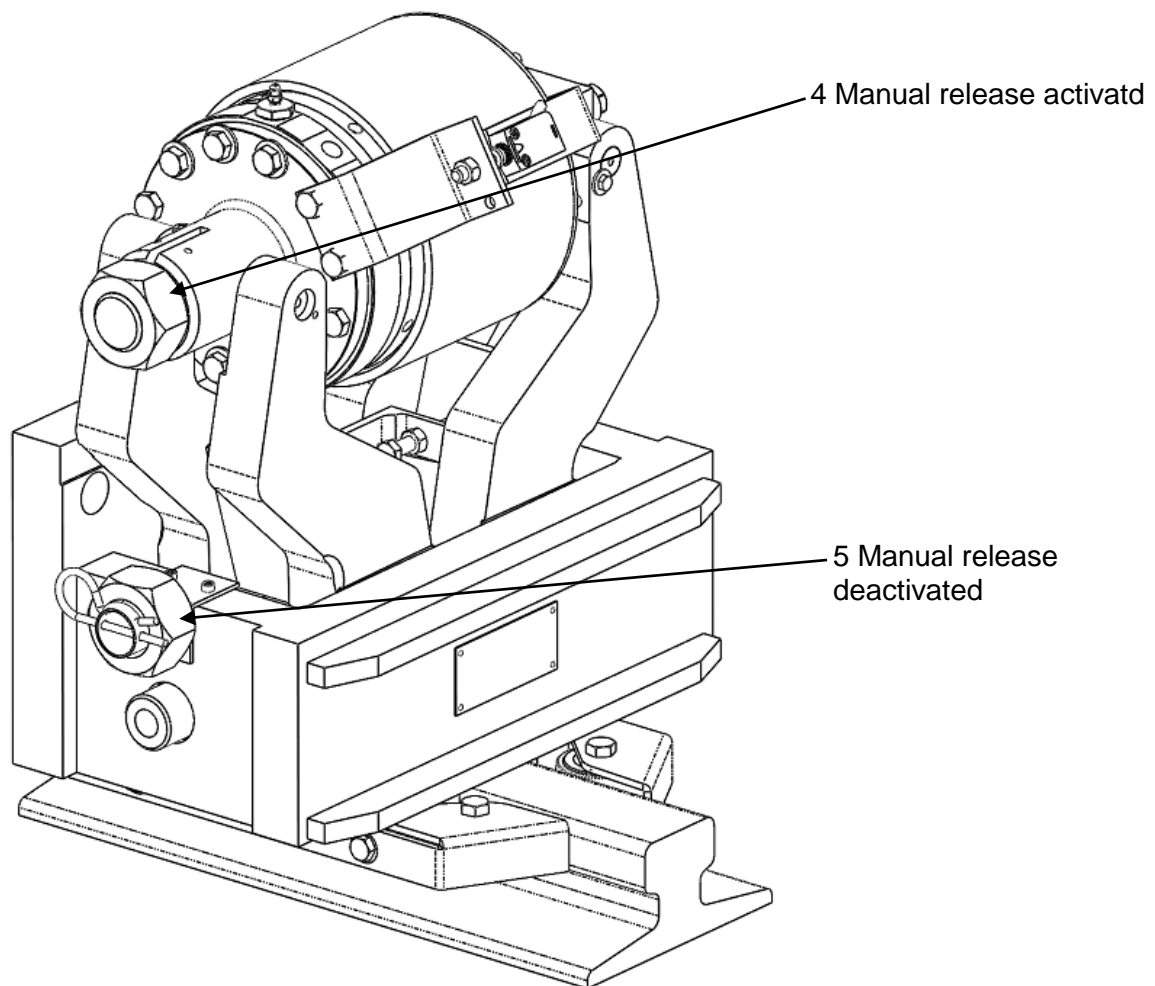


Fig. 2.18

RINGSPANN	Installation and operating instructions for Rail Clamp DR 085/088 FHM spring activated – hydraulically released			E 09.797e	
Issue: 14.09.2022	Version: 2	Drawn: BAHS	Checked: OHLM	Pages: 39	Page: 22

2.7 Adjusting the pad clearance



Important!

**THE PAD GAP IS NOT FACTORY-SET.
TO OPERATE THIS SETTING, FOLLOW THE PROCEDURE BELOW.**

Tooling: Wrenches 21 and 46 mm A/F



Information!

The rail clamp is supplied with the block 10 in contact against the end part 9

Procedure:

1. Supply the rail clamp with its minimum release pressure and maintain the pressure during the entire operation.



Important!

Do not use manual release to do this; the hydraulic pressure must be maintained.

2. Loosen the locknut **8** (46 mm A/F)
3. Tighten the screw **2** using the hex wrench 21 mm A/F until the pads are moderately tightened on the rail.
4. To obtain the pad gap, loosen the screw **2** by:
 - 3 turns Rail clamp DR 085 FHM-050/100
 - 2.75 turns Rail clamp DR 085 FHM-200
 - 2.25 turns Rai clamp DR 085 FHM-300
 - 1.75 turns Rail clamp DR 085 FHM-400
5. Lock the locknut **8** then place a varnish mark on the latter.

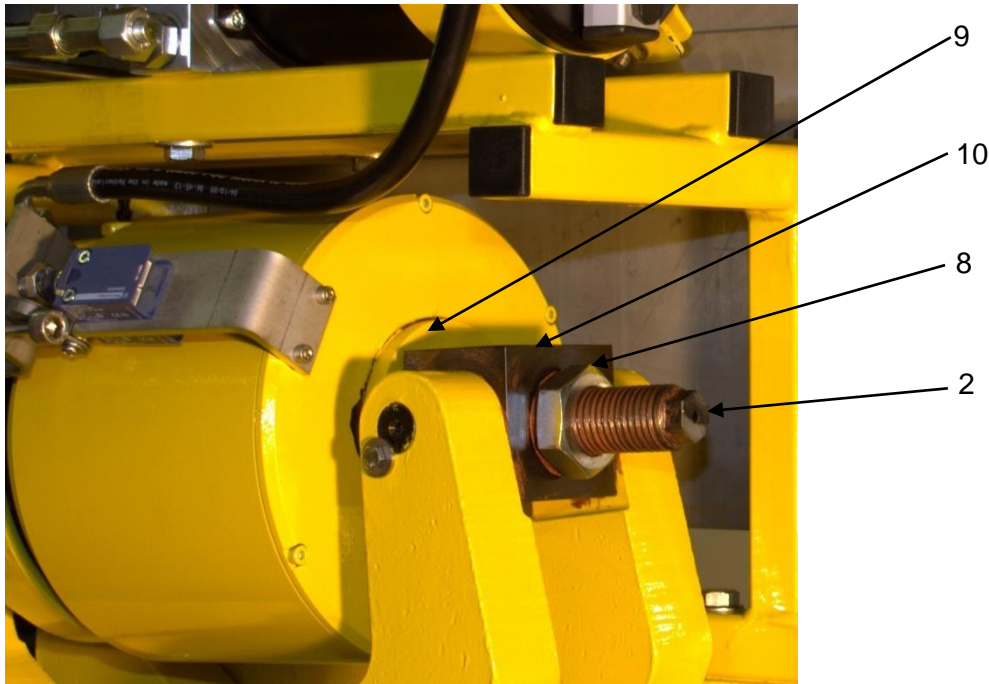


Fig. 2.19

	<p>Important!</p> <p>Manual release must be deactivated for the rail clamp to operate correctly.</p>
---	--

2.8 Rail clamp balancing procedure

After setting the pad gap, the two levers must be oriented vertically in relation to the rail. For this, the two screws **17**, which act as a stop for the two levers **16**, will balance the rail clamp.

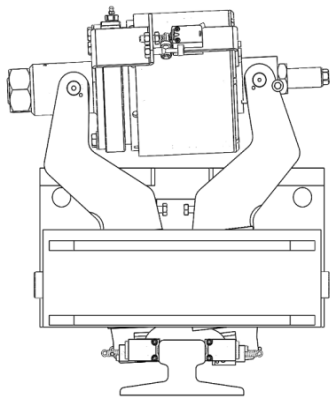


Fig. 2.20

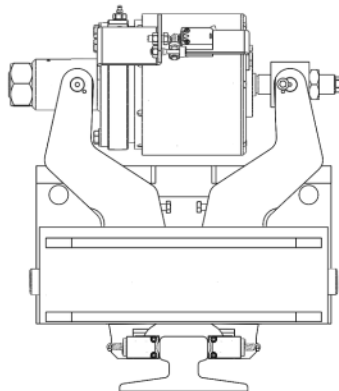


Fig. 2.21

RINGSPANN	Installation and operating instructions for Rail Clamp DR 085/088 FHM spring activated – hydraulically released			E 09.797e
Issue: 14.09.2022	Version: 2	Drawn: BAHS	Checked: OHLM	Pages: 39 Page: 24

Tooling: 16 mm A/F wrenches

Procedure:

1. Unlock the 2 locknuts **18** on the two balancing screws **17** (16 mm A/F)
2. Adjust the two screws **17** to distribute the pad gap in relation to the rail.
3. Adjust the two screws **17** so that they exceed by an equal distance (see Fig.2.23) in order to get the thruster in a horizontal position.
4. After setting apply Loctite on the thread of screws **17** and block the two locknuts **18** then place a varnish mark on the latter.

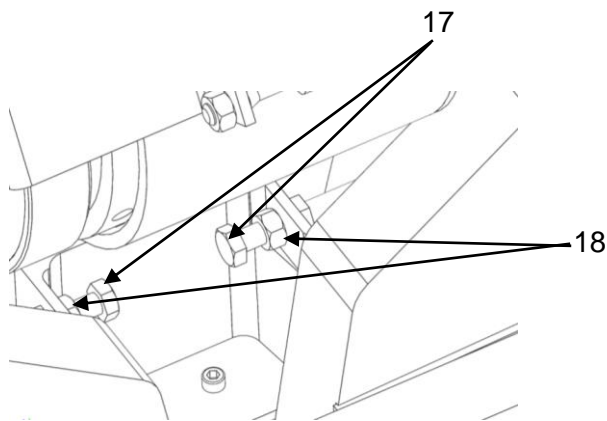


Fig. 2.22

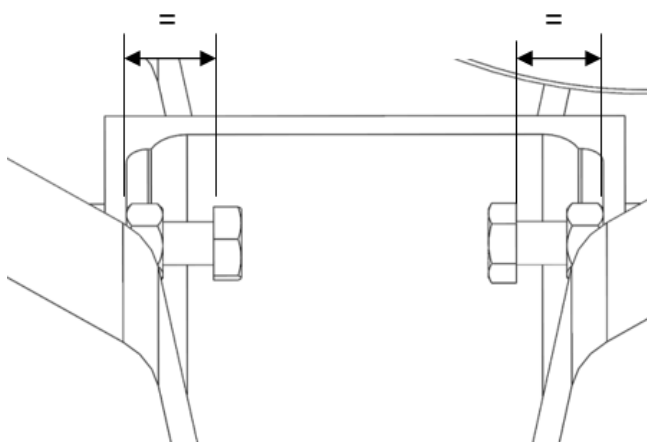
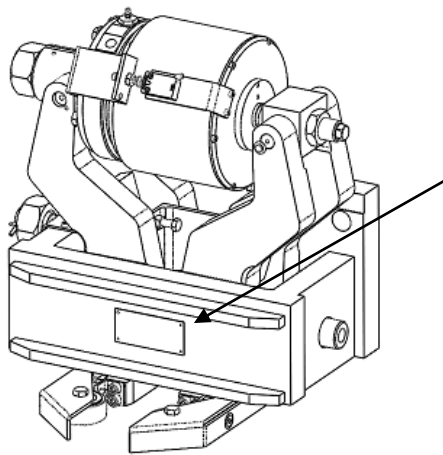


Fig. 2.23

2.9 General operational check

- Do a few opening/closing operations to check that the assembly is functioning properly.
- Check that the rollers are positioned correctly on the rail.
- Check gap pads indicated on the identification plate => PG=X mm
- Check for correct balancing of the rail clamp (see chapter 2.8).
- Check the correct function of the sensor



Identification plate

RINGSPANN

Type:	Brake DR 08X FHM-XXX	
Part number:	4457-08XXXX-XXXXX	Series: XXX
Clamping force:	XXX kN	Braking force: XXX kN
Pressure min:	XXX bar	max: 130 bar
Hydraulic fluid:	DIN 51525	
Serial number XXXXXXXX-X PG=X		

Fig. 2.24



Information!

THE SYSTEM IS NOW OPERATIONAL.

3 OPERATIONAL FUNCTIONING

3.1 Tightening the rail clamp

The absence of hydraulic pressure tightens the pads on the rail.

3.2 Loosening the rail clamp

Supply the rail clamp with hydraulic pressure to open it.

3.3 Manual release of the rail clamp

Manual release helps to maintain the rail clamp released without hydraulic pressure. Refer to section chapter 5.1

RINGSPANN	Installation and operating instructions for Rail Clamp DR 085/088 FHM spring activated – hydraulically released			E 09.797e	
Issue: 14.09.2022	Version: 2	Drawn: BAHS	Checked: OHLM	Pages: 39	Page: 26

3.4 Hand pump operation of the rail clamp

Use the hand pump (if supplied) to release open the rail clamp manually (without electric current).

Refer to the corresponding hydraulic power unit for more information.



Information!

Refer to the corresponding hydraulic power unit for more information.

4 PERIODIC MAINTENANCE



Attention!

The rail clamps DR 085/088 FHM with diamond pads are intended for purely static uses. Any dynamic braking requires a replacement of the pads.

The rail should be free of lubricants and oils so that the coefficient of friction does not drop. If this instruction is not observed, braking force may be lost.

The air gap must be adjusted after replacing the friction block.



Attention!

When changing the friction block, replace the friction block according to chapter 5. If this instruction is not observed, braking force may be lost.

Only original RINGSPANN friction pads may be used.

Maintenance frequency		
	Standard environment	Hard working environment*
Maintenance level 1	Every year	Every 3 months
Maintenance level 2	Every 2 years	Every year
Maintenance level 3	Every 10 years	Every 7 years

*Hard working environment: Rail clamp subject to be in contact with seawater, in sea sprays.

4.1 Maintenance level 1

It is necessary to check the following points:

1. Ensure that the rail brake is movable on these 2 pins. If necessary, clean and lubricate the following parts:

Remove the pads See chapter 5.4. Swing completely the rail clamp on one side, clean and lubricate the following part (see Fig. 4.1 and Fig. 4.2).

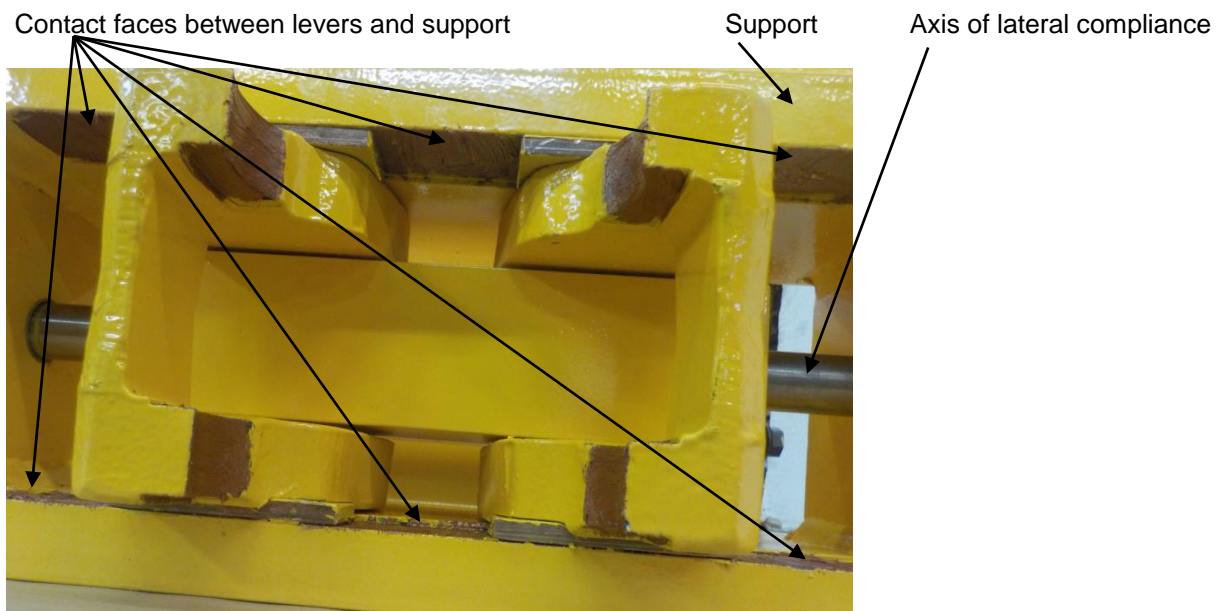


Fig. 4.1

Contact faces between levers and support Axle lubricators of the levers (optional)

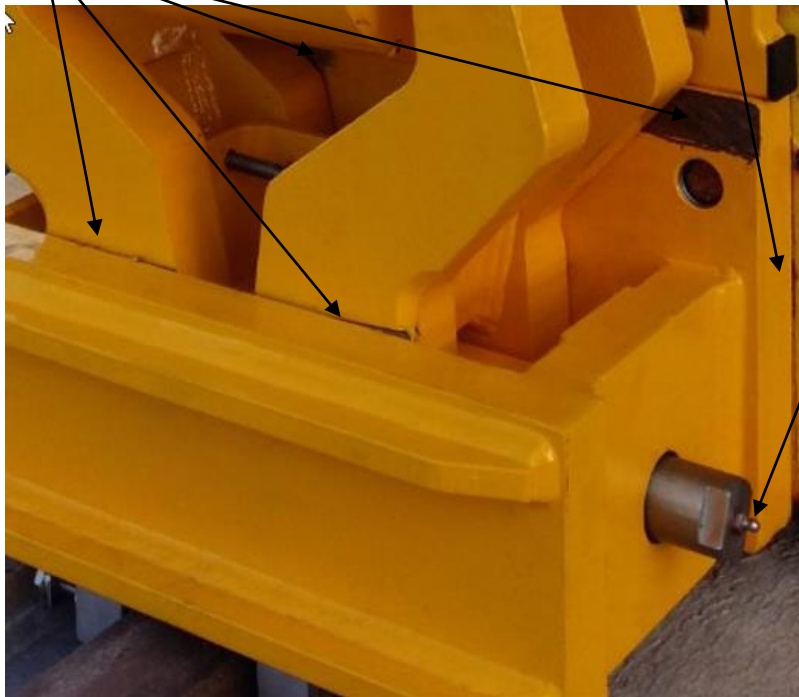


Fig. 4.2

Areas of contact with pads.

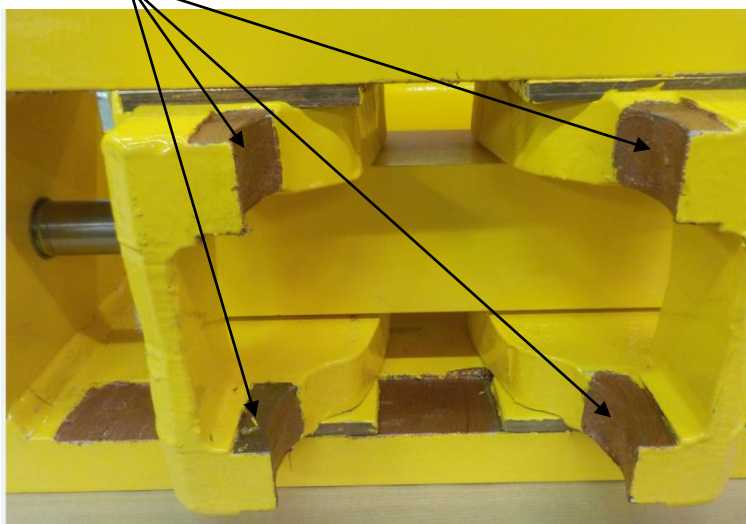


Fig. 4.3

Swing completely the rail clamp on other side, repeat operation of greasing.

RINGSPANN	Installation and operating instructions for Rail Clamp DR 085/088 FHM spring activated – hydraulically released			E 09.797e	
Issue: 14.09.2022	Version: 2	Drawn: BAHS	Checked: OHLM	Pages: 39	Page: 29



Information!

We recommend **MOLYSLIP** copper grease

After greasing has been done, the rail clamp assembly must tilt freely by pushing one of the levers.

2. Check roller position by ensuring that the convex contact face of the rollers supporting in the flat area of the rail.

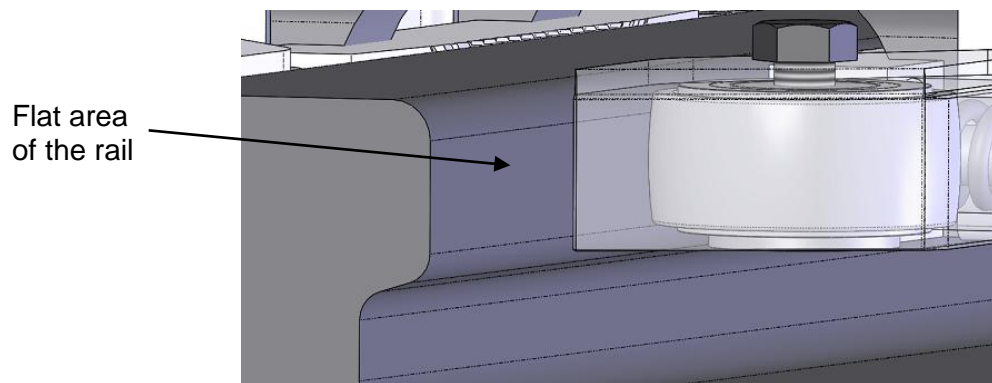


Fig. 4.4

3. Pad gap and pads condition **14**. diamond-tipped not dull.
4. Proceed to pad gap adjustment as per chapter 2.7.
5. Check the condition of the actuator's **15** dust seal.

4.2 Maintenance level 2

- Perform level 1 maintenance.
- Check gap pads (see chapter 2.7).
- Replacing oil of hydraulic pack

4.3 Maintenance level 3

- Perform level 1 and level 2 maintenance.
- Replacing Spring washers. (Consult RINGSPANN maintenance service)
- Replacing seals. (Consult RINGSPANN maintenance service)
- Replacing Pads + rollers. (Consult RINGSPANN maintenance service)

RINGSPANN	Installation and operating instructions for Rail Clamp DR 085/088 FHM spring activated – hydraulically released			E 09.797e	
Issue: 14.09.2022	Version: 2	Drawn: BAHS	Checked: OHLM	Pages: 39	Page: 30

5 Maintenance

5.1 Manual release: Activation

1. Supply the rail clamp with minimum pressure See table in chapter 2.3 to open it and maintain the pressure during the entire operation.
2. Tighten the nut **4** onto the screw **11** (see Fig.5.1). The rail brake is fully released when the tip of the screw is flush with the nut (see Fig.5.2).

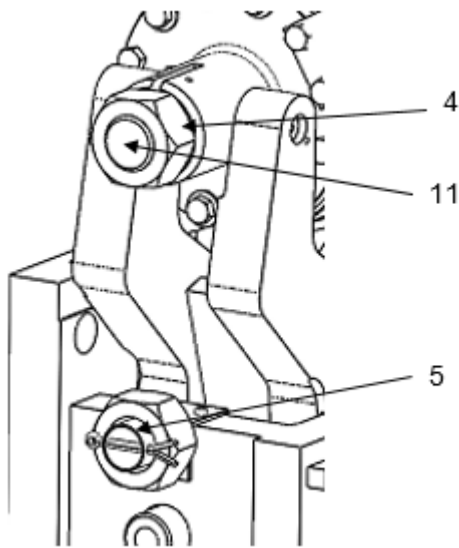


Fig. 5.1

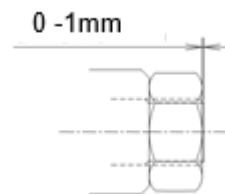


Fig. 5.2



Information!

It is not necessary to use a wrench; the nut can be placed manually. If however a wrench is used, the tightening torque is limited to 1100Nm.

5.2 Manual release: Deactivation

1. Supply the rail clamp with a minimum pressure of 120bar to open it. Maintain the pressure during the entire operation.
2. Loosen the nut **4** from the screw **11**.
3. Place the nut **4** on the tube **5** with its pin.

RINGSPANN	Installation and operating instructions for Rail Clamp DR 085/088 FHM spring activated – hydraulically released			E 09.797e	
Issue: 14.09.2022	Version: 2	Drawn: BAHS	Checked: OHLM	Pages: 39	Page: 31



Attention!

Manual release must be deactivated for the rail clamp to operate correctly.



Attention!

MOVEMENTS ARE STILL POSSIBLE EVEN AFTER THE OPENING PRESSURE HAS BEEN SWITCHED OFF.

5.3 Adjusting the pad gap

See section 2.7.

5.4 Replacing the pads



Attention!

The rail clamps DR 085/088 FHM with diamond-tipped pads are intended for purely static uses.

Dynamic braking requires a replacement of the pads.

Procedure:

1. Activate the manual release (see chapter 5.1).
2. Untighten the two counternuts **18** on both adjusting screws **17**.
3. Unscrew both screws **17** in order to maximize the travel of levers **16**.

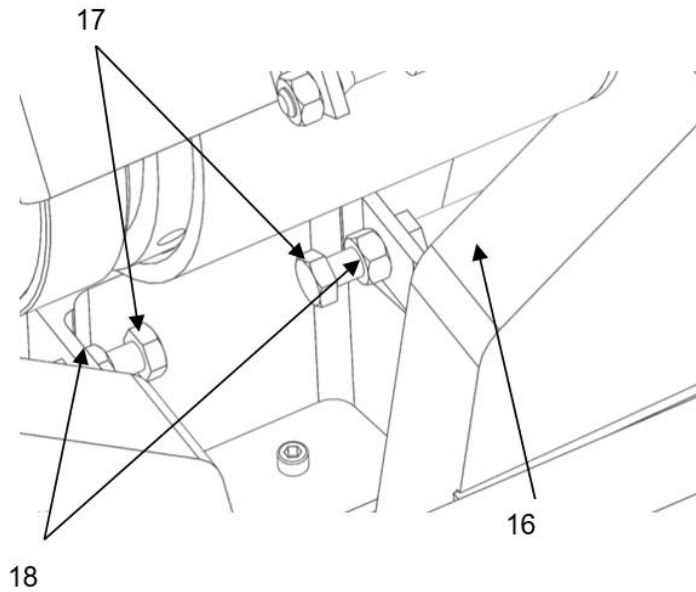


Fig. 5.3

4. Unlock the counternut **8** (see Fig. 5.4).
5. Undo the screw **2** (see Fig. 5.4) by means of the hexagon end in order to maximize the pad gap.



Fig. 5.4

6. To change one pad, swing the rail clamp to the opposite side

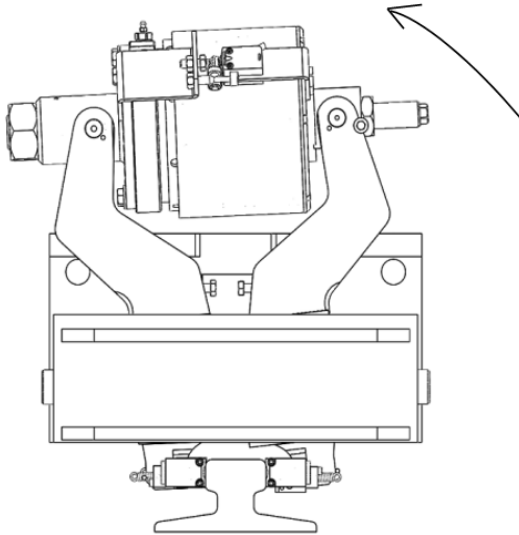


Fig. 5.5

7. Remove from each roller set the two screws 19, the two tube 23 the two helical springs 20 as well as spacers 24 in case of rails A55 or A120.

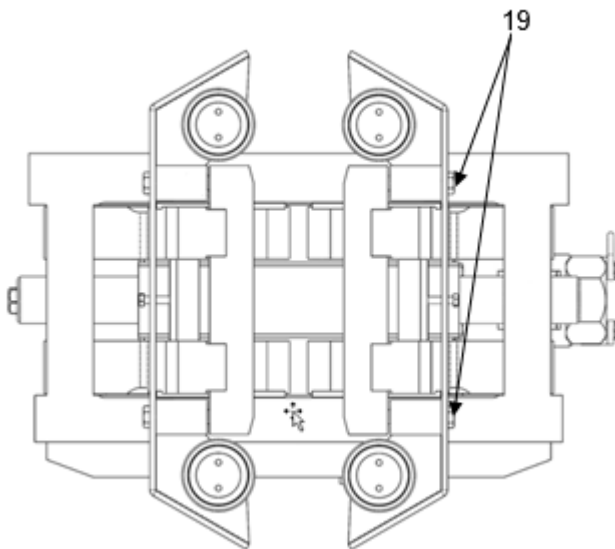


Fig. 5.6

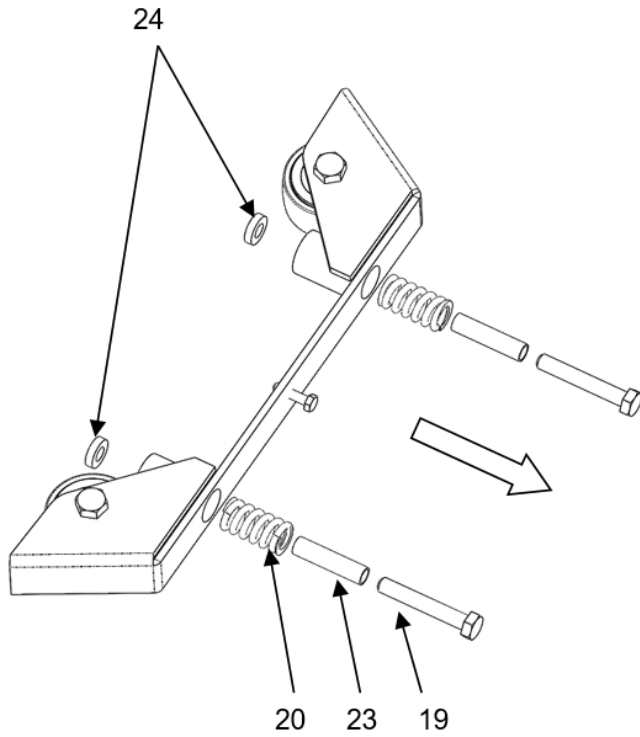


Fig. 5.7

8. Remove the pads as shown below

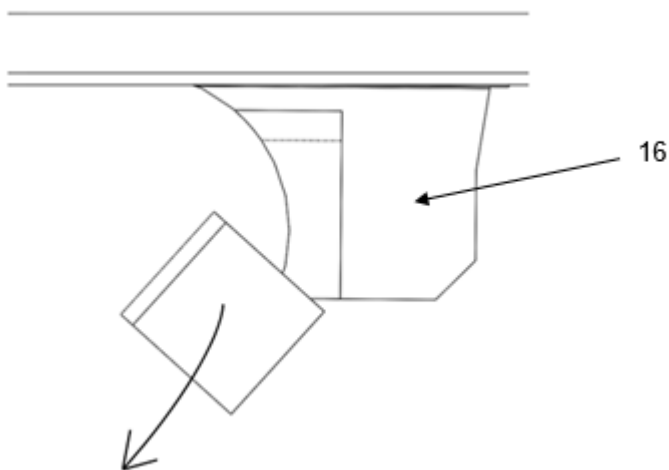


Fig. 5.8

RINGSPANN	Installation and operating instructions for Rail Clamp DR 085/088 FHM spring activated – hydraulically released			E 09.797e	
Issue: 14.09.2022	Version: 2	Drawn: BAHS	Checked: OHLM	Pages: 39	Page: 35

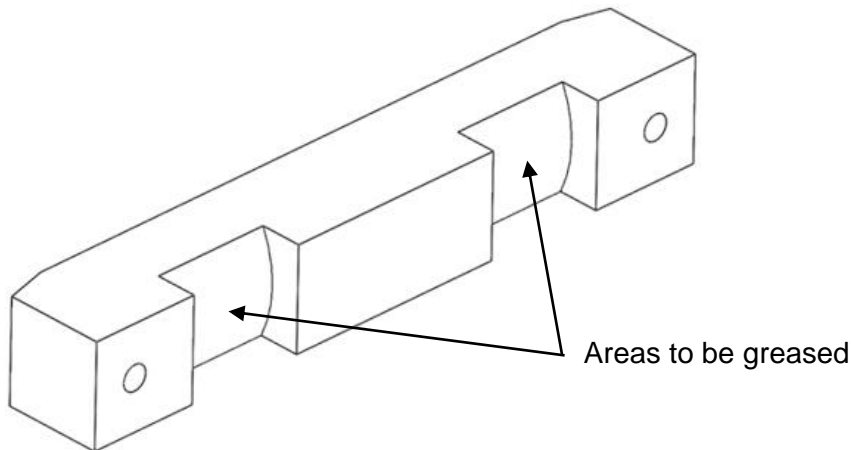


Fig. 5.9

9. Grease the new pads with copper paste type MOLYSLIP area (see Fig. 5.9) and insert them on the levers **16**.
10. Put the guideroller set with its two screws **19**, the two tubes **23**, the two helical springs **20** as well as spacers **24** in case of rails A55 or A120 back in place.
11. Proceed to pad gap adjustment as per chapter 2.7.
12. Proceed to rail clamp balancing as per chapter 2.8.
13. Control the correct positioning of the guide roller onto the rail sides

5.5 Setting the braking force



Information!

The braking force is factory-set and checked by using a test bench.

Force value may be adjusted, giving more or less strain to the stack of spring washers.



Attention!

This operation can interfere with safety and must be performed only if fully aware of the consequences. If necessary, ask our engineers for the procedure.

RINGSPANN	Installation and operating instructions for Rail Clamp DR 085/088 FHM spring activated – hydraulically released			E 09.797e	
Issue: 14.09.2022	Version: 2	Drawn: BAHS	Checked: OHLM	Pages: 39	Page: 36

5.6 Opening switch



Information!

The switch is factory-set and does not need any adjustment.

The switch **12** enables to know the position of the rail clamp (closed or released). It is triggered by the stop plate **13** connected to the displacement of the piston. The switch must be pressed in when the rail clamp is released.

If this switch needs to be adjusted: Please contact RINGSPANN.

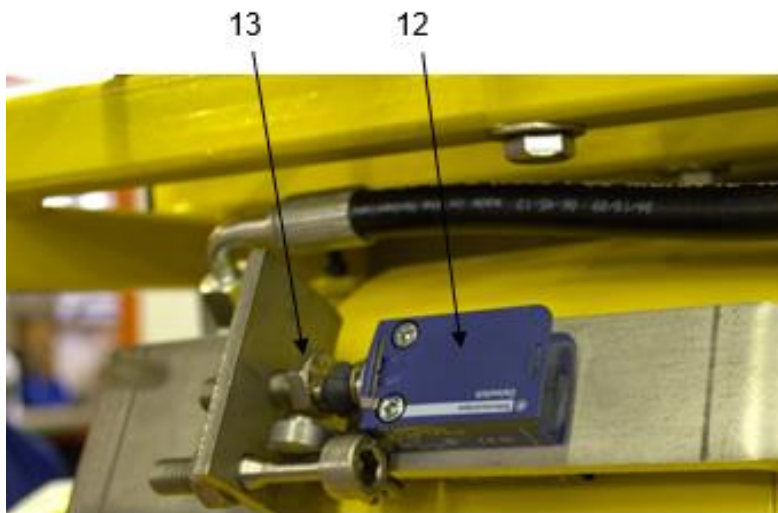


Fig. 5.10

5.7 Adjustment switch



Information!

The switch is factory-set and does not need any adjustment.

The switch **14** is used to indicate excessive pad gap. This detection guarantees a compliant braking force value. It is triggered by the stop plate **15** connected to the displacement of the piston. The switch is activated when the gap has increased by 3mm. In this case, adjust the pad gap (see chapter 2.7).

If this switch needs to be adjusted: Please contact RINGSPANN.

RINGSPANN	Installation and operating instructions for Rail Clamp DR 085/088 FHM spring activated – hydraulically released			E 09.797e
Issue: 14.09.2022	Version: 2	Drawn: BAHS	Checked: OHLM	Pages: 39 Page: 37

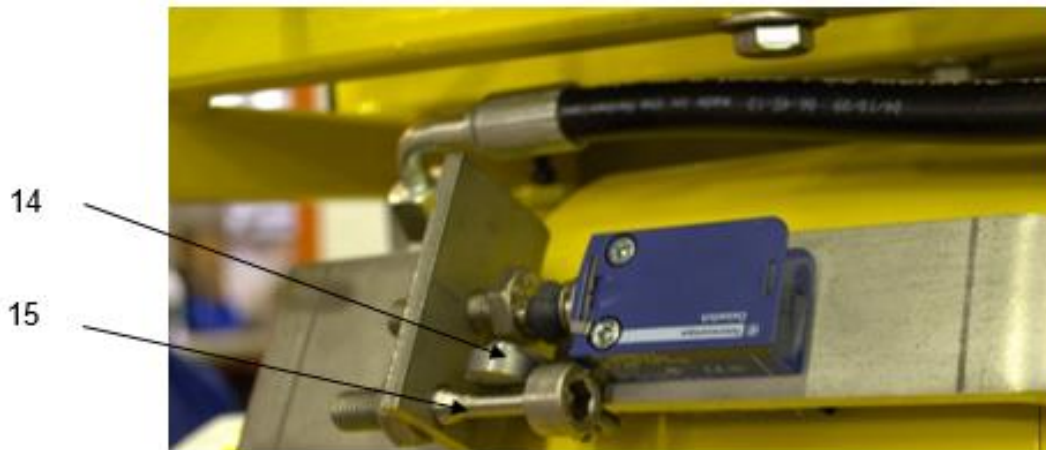


Fig. 5.11

5.8 Flow limiter (optional)



Information!

The limiter 1L is available only in the case of rail clamp with built-in hydraulic power unit.
Adjustment range 0 to 15 sec..

This limiter, which can be adjusted using a knob, is used to slow down the closingtime of the rail clamp.

Procedure:

- Supply the brake with a minimum pressure of 120 bar to open it.
- Tighten or loosen the limiter knob to the desired closing time.
- Cut off the pressure and check the closing time.
- Adjust the knob if necessary.



Attention!

NEVER CLOSE THE LIMITER FULLY.

There are two different hydraulic units that can be mounted on the rail brake as an option. The following two pictures show the position of the flow limiter.

RINGSPANN	Installation and operating instructions for Rail Clamp DR 085/088 FHM spring activated – hydraulically released	E 09.797e		
Issue: 14.09.2022	Version: 2	Drawn: BAHS	Checked: OHLM	Pages: 39 Page: 38

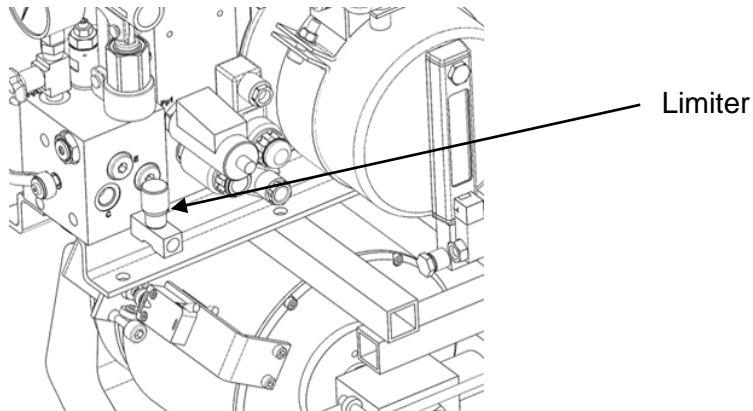


Fig. 5.12 shows the HCO2R power unit



Fig. 5.13 shows the HTP3 power unit

6 SPARE PARTS

- Set of smooth pads:
 - Rail A55 => JGS DR 085 RINGSPANN-A55-GL
 - Rail A65 / 75 /100 => JGS DR 085 RINGSPANN-A100-GL
 - Rail A120 => JGS DR 085 RINGSPANN-A120-GL

- Set of diamond pads:
 - Rail A55 => JGS DR 085 RINGSPANN-A55-DIAM
 - Rail A65 / 75 /100 => JGS DR 085 RINGSPANN-A100-DIAM
 - Rail A120 => JGS DR 085 RINGSPANN-A120-DIAM

In case of order, please specify:

Type, Nr. of the rail clamp and item Nr. of the part.

There is a type plate on the brake with a 16-digit article number. The exact design of the brake is defined by this article number only.

7 TROUBLE SHOOTING

KIND OF DEFECT	Rail clamp	Rail clamp with integrated power unit	CHECK	SOLUTION
The rail clamp does not release		<ul style="list-style-type: none"> • • • • 	<p>The power supply voltage</p> <p>The fuses</p> <p>The phases are in the right direction</p> <p>The fluid level</p>	<p>replace</p> <p>reverse</p> <p>top up</p>
	•		Pressure available	Supply the pressure
The rail clamp does not remain released.	•	•	Tightness of the hydraulic unit / hose / fittings / cylinder / piston	Replace the defective element
The opening time is long	•		Check the pump rate and the circuit bleed	<p>Change the pump</p> <p>Bleed the circuit (see chapter 2.5)</p>
Locking force is not provided	•	•	Check the pad gap	Adjust the pad gap (see chapter 2.7)
	•	•	Check the condition of the pads	Replace the pads
The power unit starts up too often		•	<p>Tightness of the circuit</p> <p>Impurities make the oil leak out</p>	<p>Correct the tightness</p> <p>Bleed according to chapter 2.5</p>
The rail clamp releases and closes slowly		•	There may be air in the circuit	Bleed according to chapter 2.5