RINGSPANN®
Power Transmission

Installation and operating instructions for Brake HW 165 FHM

E 09.774e

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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.

Contents

1 Description of the caliper

1.1 Principle

The HW 165 FHM calipers are hydraulic fail-safe calipers; the braking force is applied by spring washers and hydraulic pressure is necessary to hold the brake released. The stack of spring washers is adjusted in factory. This adjustment, combined with adjustment of the pads gap, determines the braking torque 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.

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.

The Caliper is describe as “manually readjusted”. This means that the pad wear must be compensated for by manual adjustment of the pad gap to avoid any loss of braking force.

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

1.2 Delivery condition

The caliper is delivered in the following conditions:

- With two breaking pin per saddle halv Ø46g6,
- In manual release position, i.e. manually locked in open position,
- With pads installed,
- Adjusted with the nominal lining gap,
- The holding force adjusted according to customer’s specifications,
- Mechanical contacts adjusted,
- With bleed screw in correct position.
- As well as these instructions, please also consider the catalogue data for the brake at www.RINGSPANN.de and the drawings in the individual sections.

Important!

Be careful: Check the support thickness is E+ 30mm

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.

Calipers are fail safe under spring pressure components.
All setting and repairs must be performed by skilled operators.

BE CAREFUL: The caliper is delivered in " manual release" position and the holding force is adjusted in the factory.
Instructions in this manual must be followed up to chapter 2.4 inclusive (INITIAL START-UP) to ensure that the brake is operational.

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

2.1 Preparing the positioning area

Ensure that the positioning surface is clean and dry.
Make sure that there is sufficient space around the brake.
Check that the attaching holes are in conformity (center distances, sizes and numbers).

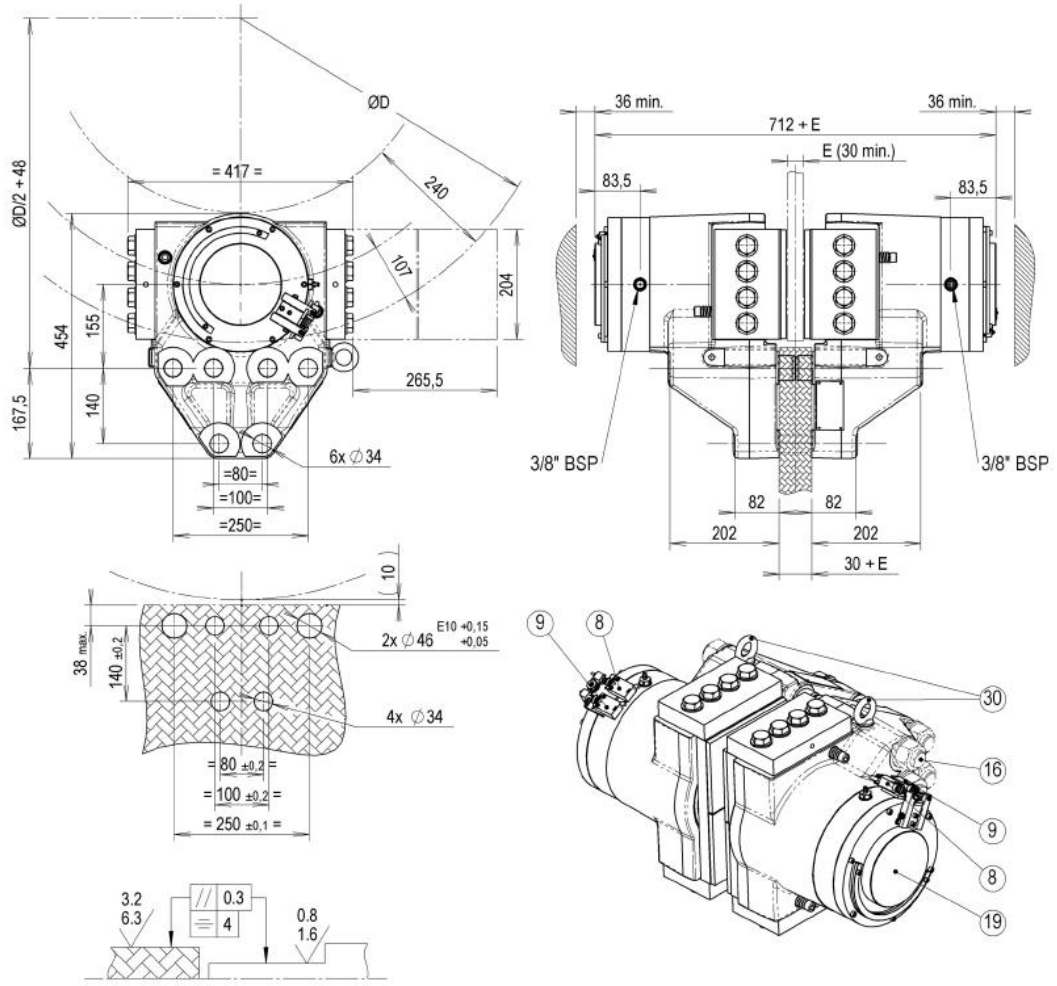


Fig. 2.1

8 Brake off monitoring switch
9 Pad gap monitoring switch
16 Optional mounting set
19 Manual release and adjustment screw
30 Lifting eyes

2.2 Installing the disc

Make sure that the disc is accurately positioned and attach it to its hub.
Check that the disc is not buckled more than 0.3mm.
Check that the disc is 30mm thick Standard arrangement.

Important!

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

First clean the disc tracks with the degreasing agent:

- Quick drying degreaser (CRC / KF)

Important!

BE CAREFUL: The disc must be degreased and free of any deposits so as not to decrease the friction coefficient.

2.3 Installing the caliper

2.3.1 List of tools

1. 2500Nm torque wrench, socket measuring 50mm across flats for caliper attachment.

2. Spanner + Flexible pipe inside Ø6mm (Bleed).

2.3.2 Brake handling

Put the assembly in position on the disc, raising it with two lifting rings Fig. 2.1
Weight for 1 half caliper: 215kg

2.3.3 Alignment procedure

1. Check the disc parallelism on its support: max. 0.3mm.

2. Check the centering of the support with the disc: +/-2mm.

3. Place the first half-caliper by holding it with the lifting ring on its support and insert the 2 breaking pin provided. Keep it in position with the 6 axis of fixation M33 class 10.9 (unprovided: They are part of the optional mounting set).

4. Place the second half-caliper by holding it with the lifting ring **01**.

5. Place the 12 coarse washers **V5** type Z M33 then place and screw with attention, the 12 nuts **V6** M33 class 10.

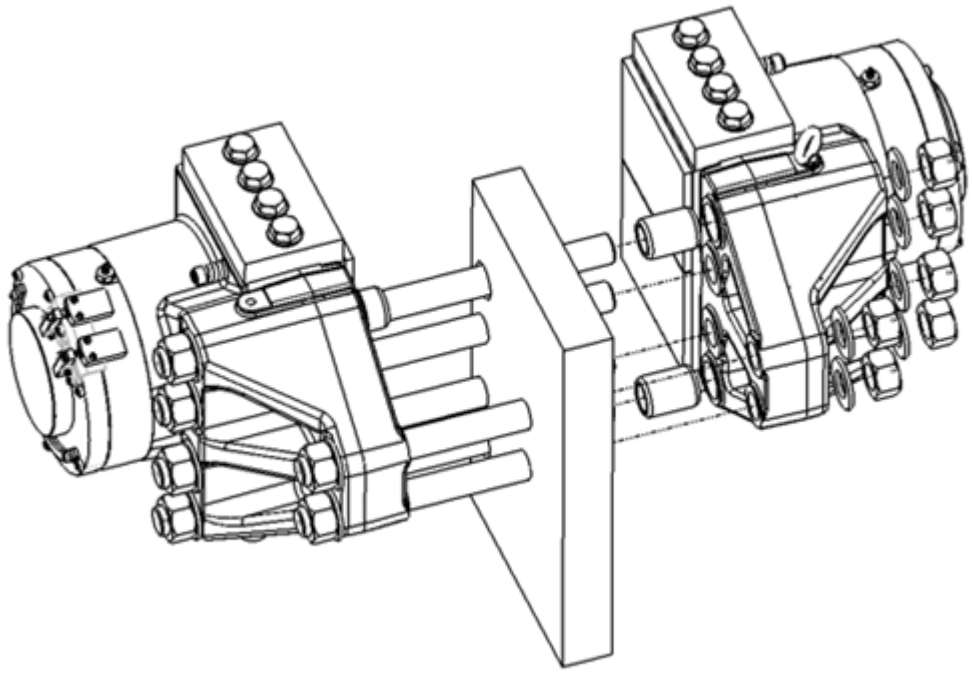


Fig. 2.2

6. Tighten to the torque the 12 nuts **V6**

The tightening torque (Cs) which has to be applied on the two screw rows for each nut is:
Cs = 1950 Nm ± 5% μ=0,1 with greased screws**.**

Important!

Check the tightening torque of the opposite nuts

7. Check, after having tightened to torque, that the whole part has not moved.

2.3.4 Orientation of the piston heads

If the caliper stands on a horizontal support, the orientation of the piston heads is not important.

For other positions, the piston heads must be oriented: Bleed screw 11271-17 on top Fig. 2.3 and connecting plug on bottom, in a vertical plan ± 30°. For more information, please contact RINGSPANN.

2.3.5 Hydraulic connection

Important!

RELEASE PRESSURE: 230bar
MAX PRESSURE: 250bar

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

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

Important!

This oil must be clean
(maximum permitted level of pollution as per NAS 1638: 10µm).
Use only new fluid and never mix several types all brands of fluid.

The caliper must be connected to its source by threaded plug G 3/8''. Fig. 2.3.
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.).

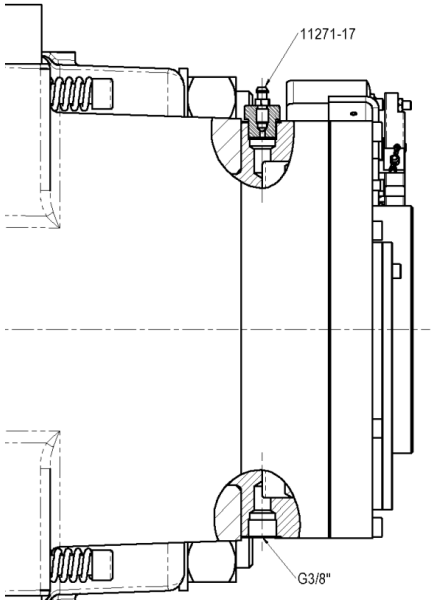


Fig. 2.3

2.3.6 Electrical connection

Opening and wear contact:

Two poles fast action

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

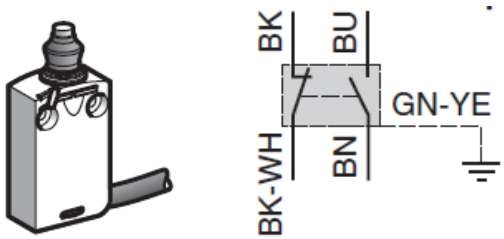


Fig. 2.4

2.4 Initial start-up

2.4.1 Hydraulic circuit bleed

Tools: Spanner, 6mm inner diameter flexible hose.

Important!

Take the necessary precautions to avoid the oil being sprayed onto the disc.

1. Connect the bleed screw 11271-17 to a 6mm inner diameter flexible hose and put the end of the hose into a container Fig. 2.5.
2. Feed oil to the caliper from the power pack, then from the hand pump.
3. Loosen slightly the bleed screw 11271-17.
4. When the oil pours out continuously and there are no more air bubbles at the end of the hose, tighten the bleed screw 11271-17.
5. Disconnect the flexible hose (beware of any oil remaining in the hose)

Important!

This file must be clean
(maximum permitted level of pollution as per NAS 1638: 10µm).
Use only new fluid and never mix several types all brands of fluid.

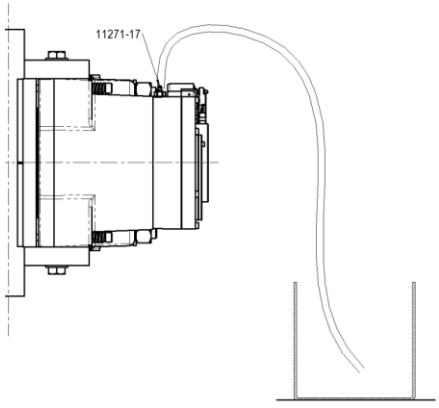
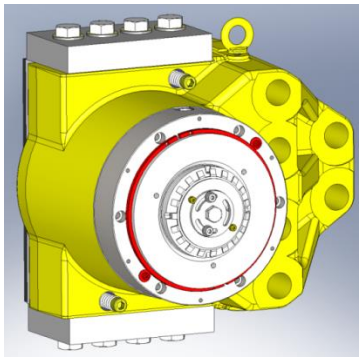


Fig. 2.5

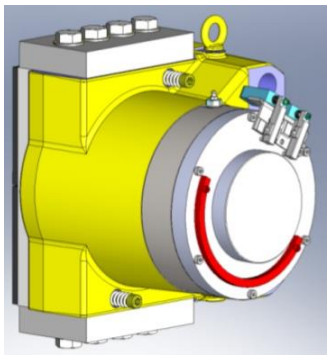
2.4.2 Deactivate the manual release

The principle is to position the stopping rings in the piston groove once the pressure is applied. They are fixed in position by 2 screws Fig. 2.6.

When the caliper is in operating mode, the rings are screwed to the cover in holding position.



Manual release in place



Manual release pending

Fig. 2.6

Refer to 5.2 for more information about the manual release mode

Important!

The manual release must be deactivated to ensure a well running of the brake.

2.4.3 Adjustments of pad gap

Important!

Contact are factory set and do not need any adjustment.
If necesary, follow the procedure 5.3

Beforehand, verify the thickness of the disc

Use a set of laminated shims to verify that total gap between the pads and the disc is equal to the “PG” Pad Gap on the identification plate.

The gap must be equal both side PG= (a+b).

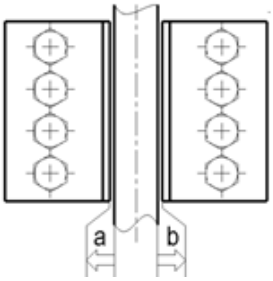


Fig.2.7

2.4.4 Control of the general running

Important!

Be Careful: The disc must be degreased and free from any deposits so as not to decrease the friction coefficient.

Check the well running of the electric contacts.
Run the brake under no-load with the disc turning, 20 or so times, to bed in the pads.

Information!

THE SYSTEM IS NOW OPERATIONNAL

3 Operational RUNNING

3.1 Caliper tightening

Whitout hydraulic pressure the pads can be tightened on the disc.
The opening contact is not activated.

3.2 Caliper untightening

Apply a minimum release pressure to open the brake.
The opening contact is activated.

3.3 Caliper manual release

Manual release keeps the caliper open without hydraulic pressure.
Refer to chapter 5.1 and chapter 5.2.

4 PERIODIC MAINTENANCE

Every two months, check:

- As a general rule, inspect the entire system for correct operation
- Check that there is not any leakage
- Also, check the brake pad gap see chapter 5.3.

Attention!

When the remaining lining thickness reaches 3mm, proceed to pad exchange as per chapter 5.4. If this rule is not observed, a loss of breaking force may occur.

Every two years, replace:

- Oil in the *power pack* (refer to the power pack instructions)

Every five years:

- Plan complete overhaul of the entire unit (replace worn parts, seals, spring washers, flexible hoses…)

5 Maintenance

5.1 Manual release: activation

1. Supply the caliper with release pressure and maintain the pressure until point 6.
2. Remove the 2 retaining segments **14** by their 2 screws **V03** on the cover **21**.
3. Remove the cover **21** via its 6 Allen screws **V09**.
4. For an easier handling, it is possible the remove the connector of indicator switches Fig.5.1. Unlock the connector by insert the screwdriver behind the connector and turn it a 1/4 of a turn counter-clockwise and then insert the screwdriver into the slot at the side to release the connector.

In 'ATEX' execution, it is not possible to remove the connector

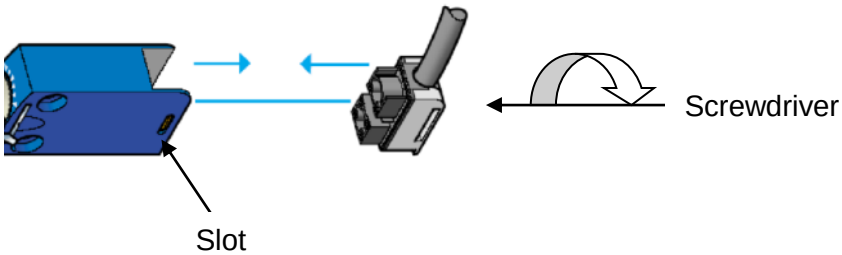


Fig. 5.1

5. Put the 2 retaining segments **14** in the piston groove **04** Fig. 5.2.
6. Screw the 2 screws **V03** into the unlock position to securely hold the retaining segments.
7. Cut off the release pressure.
8. Remove the 2 screws **V03** to put them on the cover **21**
9. Replace the cover **21** and tighten the 6 screws **V09**.
10. Re-engage the connectors in the switches and lock with the flat screwdriver by a 1/4 of a turn clockwise.

Attention!

MOVEMENT IS STILL POSSIBLE AFTER CUTTING OFF THE PRESSURE.

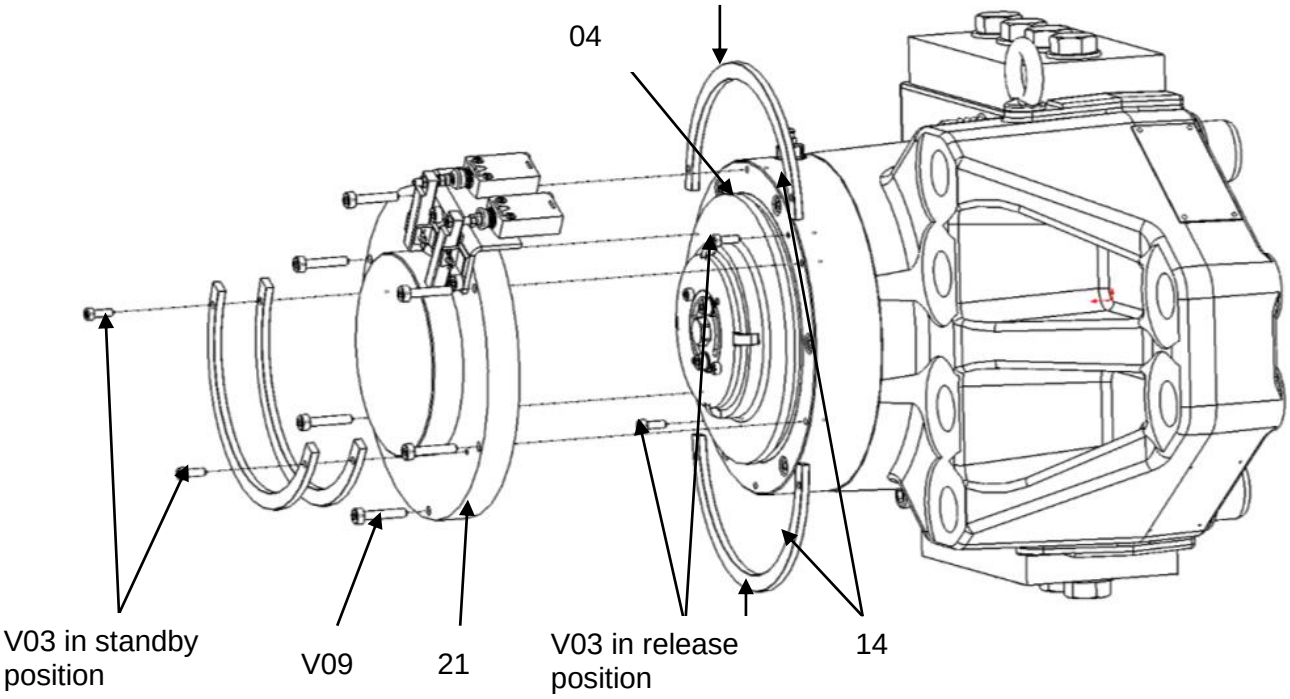


Fig. 5.2

5.2 Manual release: deactivation

1. With the pressure cut off, remove the cover **21** with its 6 Allen screws **V09**.

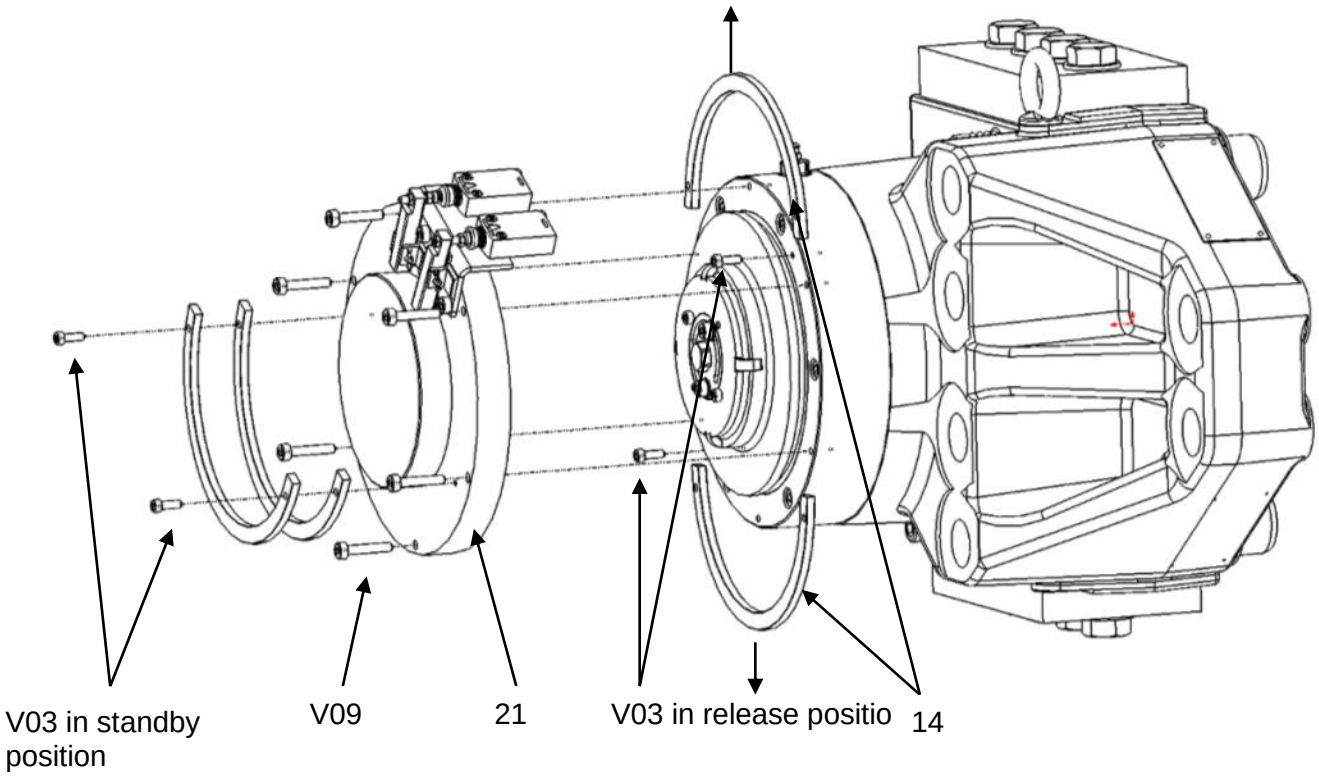


Fig. 5.3

2. For an easier handling, it is possible the remove the connector of indicator switches Fig. 5.4. Unlock the connector by insert the screwdriver behind the connector and turn it a 1/4 of a turn counter-clockwise and then insert the screwdriver into the slot at the side to release the connector. In 'ATEX' execution, it is not possible to remove the connector see Fig. 5.11

3. Supply the brake saddle with the release pressure and maintain it throughout the operation.

Attention!

Retaining segments 14 can be fall. Do not cutting off the pressure without removed these retaining segment.

4. Remove the 2 retaining segments **14** Fig. 5.2 and install them in the standby position on the cover **21**, one on the other, using the 2 screws **V03**. See Fig.5.3.

5. Reinstall cover **21** and retighten 6 screws **V09** Fig.5.2 chapter 5.1.

5.3 Adjustment of brake pad clearance, pad wear take up

Danger!

Frequently check the total gap between pads and the disc.
(a 1mm increase to this gap corresponds to 8% loss of torque).
Refer to the RINGSPANN Datasheet for the nominal clearance.

Attention!

When the remaining lining thickness reaches 3mm, proceed to pad exchange as per chapter 5.4. If this rule is not observed, a loss of breaking force may occur.

Only original RINGSPANN brake pads may be used.

Tools: open end wrench, allen wrench, screwdriver

Procedure: This operation must be executed on both sides – 2 half caliper

1. Release brake by releasing hydraulic pressure to the caliper and maintain the pressure throughout the entire procedure.

Attention!

DO NOT USE THE MANUAL RELEASE DEVICE

2. Remove the cover **21** by its 6 screws **V09** Fig.5.2.
3. Remove the 2 connectors of opening and wear contacts Fig.5.1.
4. Unscrew and remove 2 screws **V04** Allen wrench and 2 washers **V14** Fig.5.4.
5. Remove the locking washer **15** to free the wear take up screw **06** Fig.5.4.
6. Screw or unscrew using a open end wrench Fig.5.7 the wear take up screw **06** until the gap between the pad and the disc reaches the required value see identification plate “PG” Pad Gap.

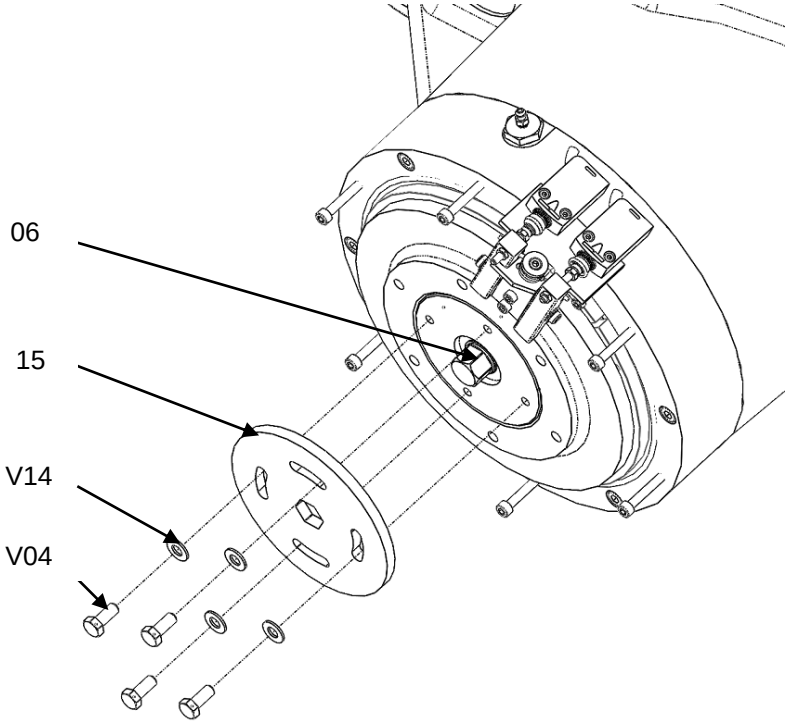


Fig. 5.4

7. Reinstall locking washer **15** on the flats of wear take up screw and lock it with its 2 screws **V04** and 2 washers **V14**.

8. Reinstall cover **21** and retighten 6 screws **V09**.

9. Reengage connectors in the contacts and lock it using screwdriver turn it to 1/4 turn clockwise.

10. Be careful to not inverted attribution of connectors on 2 contacts.

Attention!

Be careful to not inverted attribution of connectors on 2 contacts.

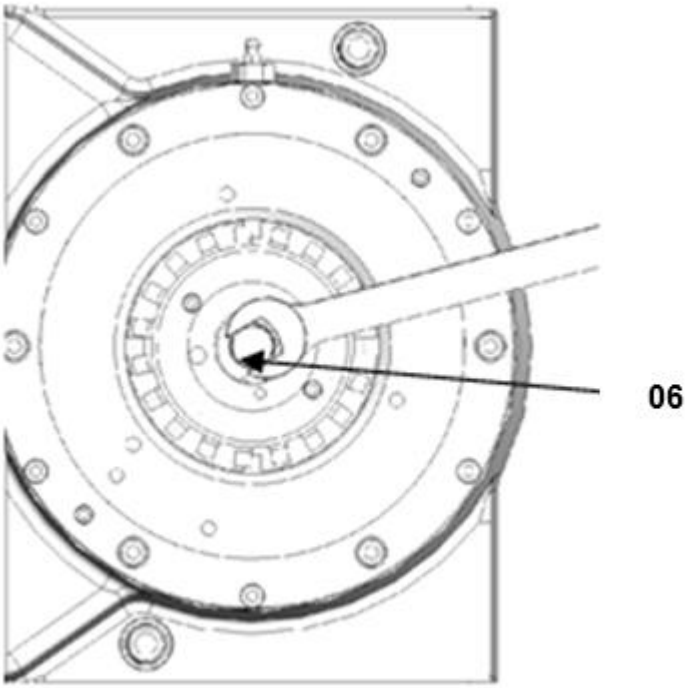


Fig. 5.5

5.4 Replacement of worn brake pads

Tools: open end spanner, 5mm Allen wrench

Procedure: For each pad

1. Put the caliper into manual release position, see chapter 5.1 and switch off the pressure**.**

2. Cover being removed, unscrew and remove 2 screws 6 **V04** and 2 washers **V14** Fig. 5.4 see chapter 5.3

3. Remove the locking washer **15** to free the wear take up screw **06** Fig. 5.5 see chapter 5.3.

4. Screw or unscrew using a wrench or socket on flats the wear take up screw **06** until the gap between the pad and the disc enables to put the new pad in position Fig.5.6 see chapter 5.3.

5. Remove [1 reatining plate **09** + 4 screws **V08** + 4 washers **V17**] on the side where the pad is to be removed.

6. Loosen 2 screws **V07** pad holding

7. Fit a screw M10 **V30** into the end of the pad **11** (recommended length: 60 mm).

8. Remove pad **11** from its pad holder **01** by pulling screw M10.

9. Fit the new pad **11** in its housing. If necessary, use the screw M10 to helps.

10. Assemble the 2 screws **V07** of the pad holder.

11. Replace the retaining plate **09** onto **01** with 4 [screw **V08** + washer **V17**].

Tightening torque: Cs = 470 N.m ±10%+ Loctite 243.

Note: Check that the 4 screws **V08** located on the opposite side are correctly torqued to 470Nm.

12. Remove the manual release chapter 5.2 and proceed with the adjustment of the pad gap chapter 5.3.

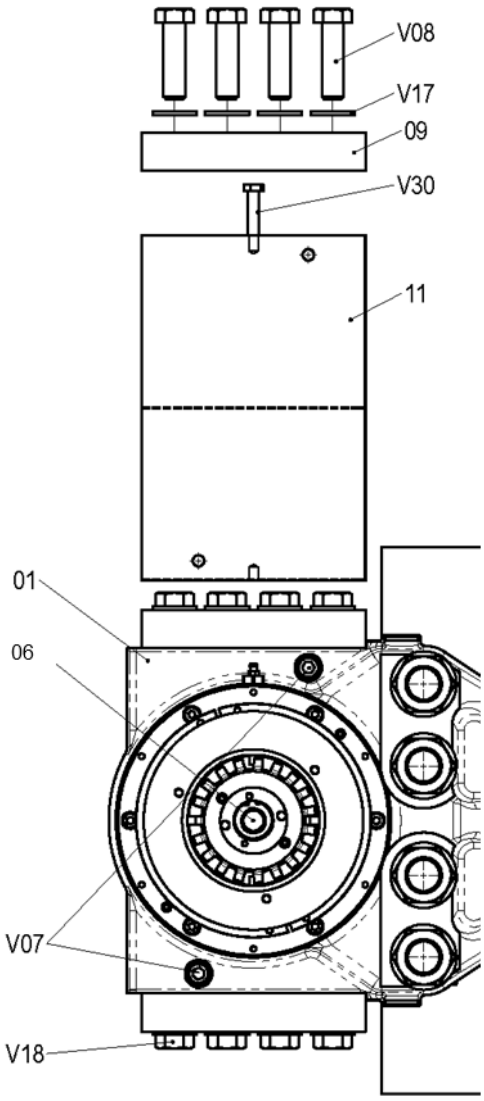


Fig. 5.6

5.5 Opening and wear contacts (mechanicals) adjustment

Information!

Contacts are factory set and do not need any adjustment.
If necessary, follow this procedure.

Verify the gap for the pad at each caliper, otherwise perform all the operations in chapter 5.3.
Refer to the “PG” Pad Gap identification plate for the nominal clearance.

Tools: Allen wrench, open end spanner.

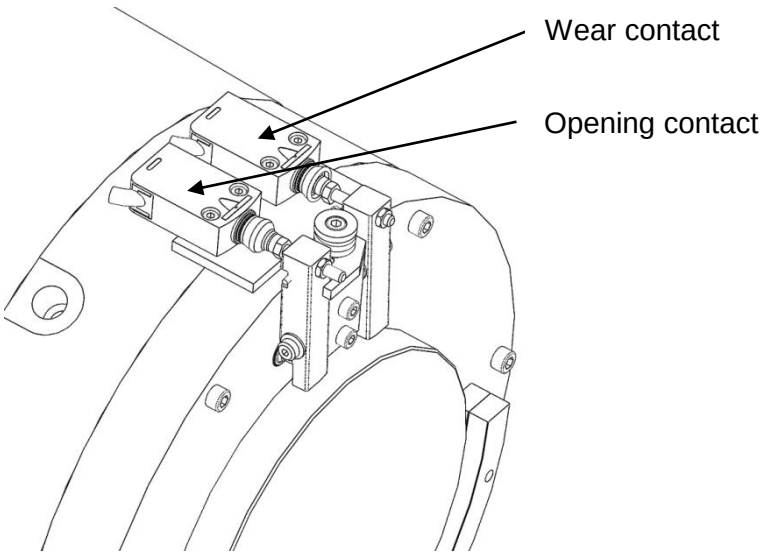


Fig. 5.7

5.5.1 Adjustment of ‘brake released’ switch

This switch monitors the status of the brake (closed or released)
It closes when the brake is released (set under pressure).

- Power the brake with release pressure.
- Unscrew nut **V11** with open end spanner.
- Check that the axle **22** is in contact onto lever **41.**

- Adjust the screw HC **V02** with Allen wrench until the activation of contact. Check that state contact is "Open".
- Release pressure. When the brake is close, Check the contact state (Position "closed"). If this information is not obtained, unscrew the screw HC **V02** until change of state.
- Power the brake with release pressure.
- Check that state contact is "Open". Execute this operation till correct monitoring of the" open & closed" status.

- After an adjustment is finished, do not forget to retighten nut **V11** with open end spanner.

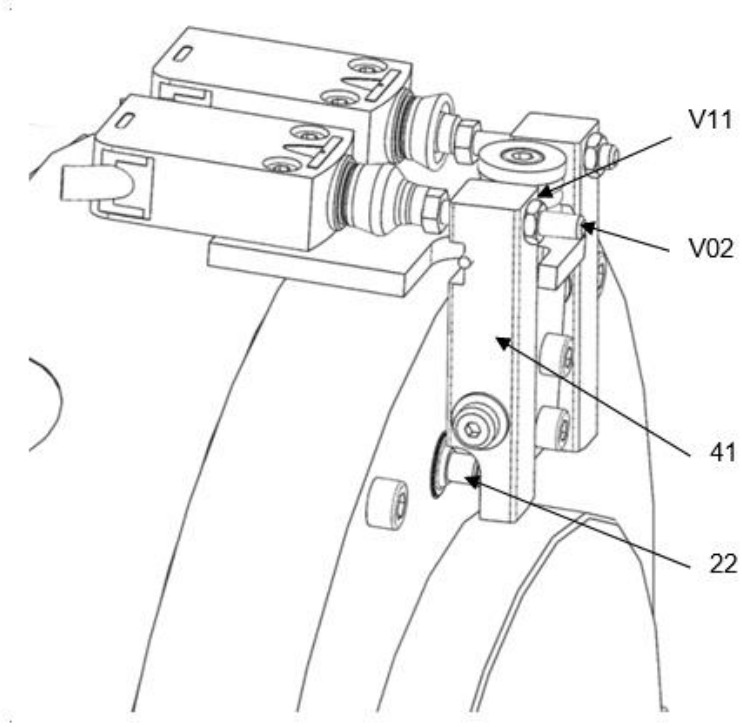


Fig. 5.8

5.5.2 Adjustment of ‘pad wear’ switch

This switch is permanently closed and opens when the pad wear reaches 1mm.

- Power the brake with release pressure.
- Check that the pads clearance is correctly adjusted, otherwise proceed to adjustment.
- Brake being open, check that the connection pin **22** is in contact onto lever **42.**
- Release pressure to close the brake 0bar.
- Unscrew nut **V11** open end spanner then adjust screw HC **V02** Allen wrench to free it from the switch end (adjust the screw skimming the lever).
- Adjust the screw HC **V02** until the switch triggers (status « worn pads »). When the pads will reach a 1 mm wear, the switch will release (as the hysteresis of the switch is 1mm).
- After an adjustment is finished, do not forget to retighten nut **V11**.

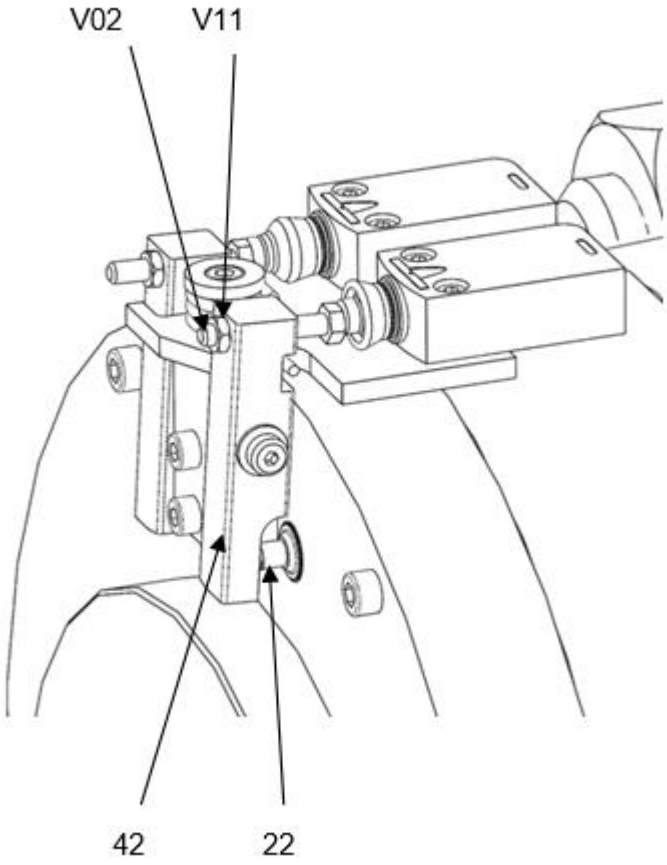


Fig. 5.9

6 Spare parts

- Monitoring switches (Opening/wearing) Ref.: CONOUVREG-PIN-HW

- Set of pads:

- 2 pads 11 " Dynamic " Ref: JG ST5 RINGSPANN 132

- Hydraulic control parts comprising (Refer to assembly drawing):

- 1 Piston 12660-026
- 1 Rod seal JOITIG-090 105 Z
- 1 Piston seal JOIPIS-200 184 E
- 1 Static piston seal JOISTA-95.6-90-1
- 1 Cylinder 12660-005

In case of order, please specify:

Type, Nr. of the caliper 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 Troubleshooting

NATURE	VERIFICATION	SOLUTION
Decrease in braking force	- Check the pad gap	- Proceed with pad gap adjustment chapter 5.3
	- Check the condition of the pads and the disc (wear or grease particles).	- Replace the pads and clean the disc.
	- Check the pressure is zero	- No more pressure
Abnormal overheating of the disc during start-up.	- Insufficient gap between the pads and the disc in released position. - Check that pressure is at 230 bars	- Re-adjust the pads. chapter 5.3 - Re-adjust pressure at 230 bars
The caliper releases and closes slowly	- Air may be in the circuit	- Bleed according to chapter 2.4