

Disc brake - Caliper SHD2

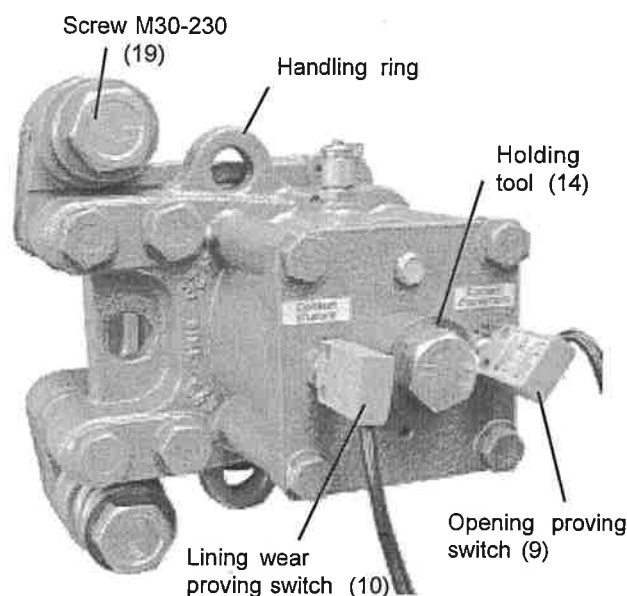
Installation and maintenance

1. PRESENTATION

1-1 Use

The caliper SHD2 (fig. 1) is designed for use as a holding brake or emergency brake.

Fig. 1



The braking force is performed by a spring.
An hydraulic power unit, connected to the caliper, delivers an hydraulic pressure which makes the caliper to open after switching on a solenoid valve.
Braking occurs by switching off this solenoid valve.

1-2 Operating conditions

Working conditions :

- Ambient temperature : -20°C à +60°C
 - Relative humidity : □ 70%
 - Dust in atmosphere □ 65μ
- Other conditions, consult us.

2. INSTALLATION

2-1 State of delivery (fig.1 and 13)

- The screws (19) M30-230 are fitted, with washers and springs, held by nuts.
- The caliper is open mechanically locked by means of the holding tool (14),
- packed separately :
 - lining pads,
 - lock of the setting screw + screw + washer (15) (fig.13 and 7).

2-2 Disc and supporting structure (fig.2)

Disc :

This should conform to the tolerance specified in the diagram (fig.2).

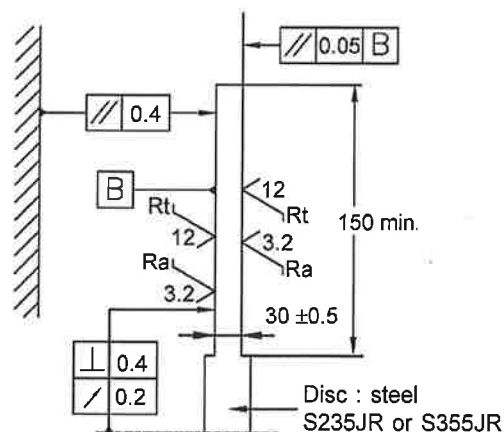
After installation, the disc should be cleaned.

Support :

Check that :

- installation dimensions are as per dimension leaflet. This will ensure that the calipers are correctly positioned
- the support faces (22) (fig.13) should be free of burrs and paint
- access is available to the calipers for adjustment and replacement of lining pads.

Fig. 2



Symbols as per NFE 04 552

If the instructions in this manual are not adhered to, the performance, correct operation and the safety of the equipment cannot be guaranteed.

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2-3 Fastening

- Remove the nuts of the screws (19).
- Move back the screws (19) while keeping the washers (25) fitted
- Grease contact faces of the screw heads and on the end of the screws.
- Check that the screw (20) is fully screwed in with its counter nut unlocked (fig.8, 9 and 13)
- Lift up the caliper by its handling ring (fig.1) with the help of a hoist
- Position the brake in relation to the disc.
- Position the brake in relation to the support to engage freely the screws (19) in their tapped holes.

NOTE:

- Check that the washer of column base (rectified) (25) is between the guiding column (23) and the support (22) (fig.13).
- With the brake still held by the hoist, engage completely the screws, begin to tighten them one at a time (greased screws)
- Release the hoist
- Check that the brake slides on its guiding columns. For this, insert a coated lever, to prevent from making marks, between the caliper support (22) and its body. Lever the caliper off its balanced position. When the lever is released, the caliper must move back to its original balanced position under the action of its springs (21)
- If the caliper does not slide back, untighten the upper screw (19), slide the caliper to release the internal constraints. Retighten the screw (19).
- Check the sliding.
- Tighten the fixing screws (19) M30 class 8-8 to the torque : 1300Nm \square 10%.
- Check the sliding again.



3-CONNECTIONS

3-1 Electrical connections

a) Opening proving switch

The caliper SHD2 is equipped with an opening proving switch (9) (fig.1).

The opening switch is released when the caliper is closed on the disc, under no voltage.

The switch is delivered with a 5 x 0,75 mm² wire of 5 m length (see fig.A for wire colours).

The opening proving switch is preset in factory.

b) Lining wear proving switch

The caliper SHD2 is equipped with a lining wear proving switch (10) (fig.1).

The lining wear switch is released when the wear limit is reached.

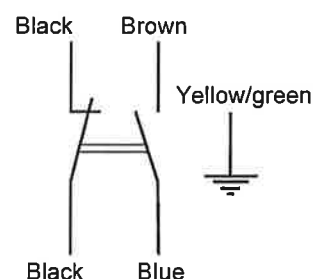
The switch is delivered with a 5 x 0,75 mm² wire of 5 m length (see fig.A for wire colours).

The opening proving switch is preset in factory.

Fig. A

Switches wire colours (released)

Normally Open connection NO : brown and blue wires,
Normally Closed connection NC : black wires



2-4 Recommended oil

A mineral oil must be imperatively used.
Characteristics conform to the standard ISO 6743/4
Grade L-HV

Avoid to mix oils of different makers

For oils with other characteristics, consult us.

c) Thermistors

Thermistors, fitted inside the shoes, indicate when the disc temperature reaches about 180°C.

Temperature threshold detection: 140°C \pm 5 (about 180°C on the disc)

Resistor (PTC): - R \square 550 \square at 135°C
- R \square 1330 \square at 145°C

for a voltage \square 2.5 V.

Connect (white/blue wires) the 2 thermistors to the customer's PLC.

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3-2 Hydraulic connections

NOTE!

Also refer to the relevant hydraulic power unit leaflet.



All hydraulic components, particularly the valve and supply unit, should preferably be located as near as possible to the caliper. If the supply is remote, caliper response time will be increased. Pipework between the valve and the caliper must be as short as possible so as to avoid unnecessary head loss. If several calipers are being installed, the same kind of pipework (section, length, ...) should be fitted to obtain similar response times. Nothing should be allowed to obstruct the return flow of oil.

Last connection toward caliper must be flexible as caliper is sliding on its columns : provide an extra length of piping (a loop for example, see fig.3) at the brake cylinder oil intake port.

4. START UP (fig. 13)

Tools required : 5mm Allen key - 21 mm flat spanner
36mm ring wrench or reversible ratchet with sockets

DANGER!

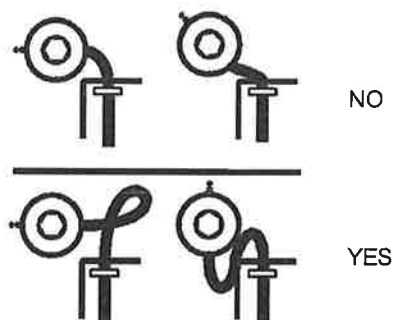
When the caliper is **depressurized**, never use the screw (12) for setting or releasing the caliper. Caliper **pressurized**, take care not to leave one's fingers close to the pads when the holding tool (14) is no more in place.



4-1 Purge

- **Pressurize the caliper**, then unscrew **slowly** the bleed screw or the Minimes screw (provided by the Customer) till obtaining an oil stream free of air,
- Complete oil level if necessary.

Fig. 3



During installation, the greatest care should be kept so as to avoid any introduction of dust (filings, etc...). Moreover, it will be necessary to clean the pipework with a 5μ filter unit, to ensure it is clean.

The filling oil must be also filtered at 5μ.

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4-2 Mounting the pads

- The caliper is mechanically opened and locked by means of the holding tool (14) (fig.4),
- Push the caliper until the moving shoe (fig.13), comes into contact with the disc

Fig. 4

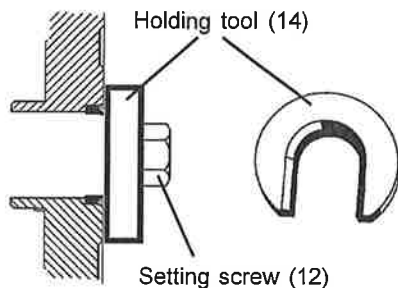


Fig. 5

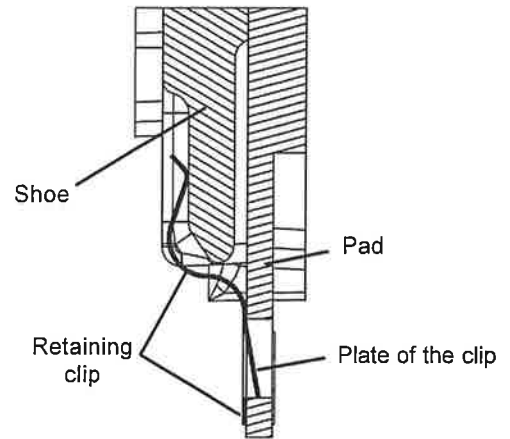
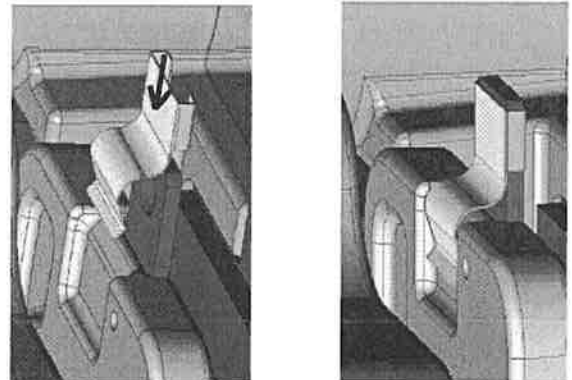


Fig. 6



- Fit the first pad (1) in the fixed shoe (fig.13) by doing the following operations (fig.5 and 6) :

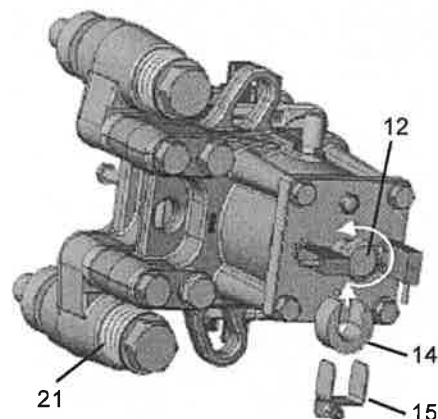
- 1) Engage a first retaining clips on one of the pad shanks (if necessary use a mallet).
- 2) Fit the pad into its recess by the bottom while fixing the first clips on the shoe (fig.5).
- 3) Engage the second retaining clips on the top pad shank while fixing it on the upper part of the shoe (fig.6).
- 4) Check that the plate of the clips is locked in the hole of the pad shanks (fig.5).

DANGER!

In case of a faulty mounting of the retaining clips, pad could escape during caliper working.



Fig. 7



- Push the caliper until the first pad touches the disc and maintain the caliper in this position with the screw (20) (fig.8 and 9)
- Fit the second pad (1) in the moving shoe (fig.13) by following the same operations as the first pad (see fig.5 and 6)
- **Pressurize the caliper**
- Remove the holding tool (14) (fig.4 and 7) and keep it for a further utilization.

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4-3 Setting the opening gap

- Caliper open **pressurized**.
- Screw the setting screw (12) (36mm ring wrench or reversible ratchet with sockets) (fig.7) so as to bring the linings into contact with the disc, without tightening. If necessary, help the caliper to slide. Screw back to the nominal opening gap value of 2 mm in total : it means 2/3 of turn.

ATTENTION!

A larger opening gap value than the one specified would reduce the braking force and the spring washer stack life. For any other setting, consult us.

A new setting after running tests of the pads or after commissioning a new brake is recommended.

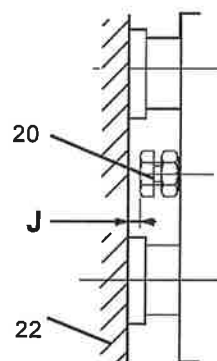
The sliding of the caliper must be free and the springs (21) must push it back to the balanced position while freeing the pad of the fixed shoe (fig.13).



4-4 Centering of the caliper

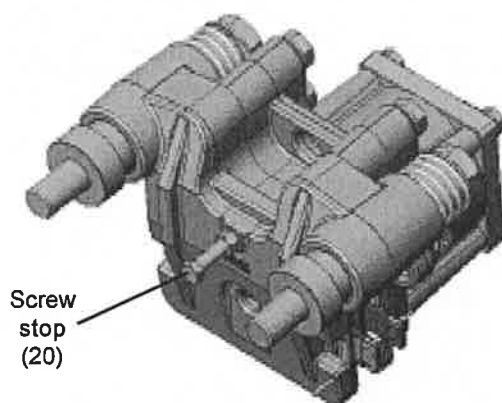
- Caliper **depressurized** (closed on the disc).
- Set the screw stop (20) in order to reach a gap J of 1mm between its head and the support (22) of the caliper (2/3 of turn). Tighten the lock nut (fig. 8 and 9).

Fig. 8



Top view of the screw stop

Fig. 9



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4-5 Other operations

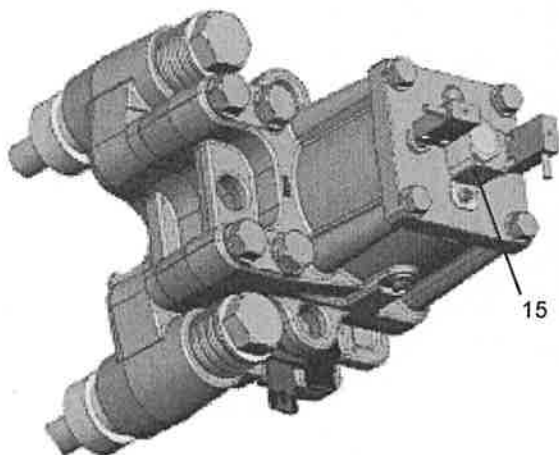
- Check for proper operation of hydraulic assembly and electrical monitoring as well as pads clearance balance (1 mm on each side of the disc).
- Mount the lock (15) of the setting screw (5mm Allen key) to avoid any out of order of the opening gap (fig.10).

The caliper is ready to operate.

4-6 Protections

The brake must be protected against direct harm such as vertical falling waters, sea spray or flams.

Fig. 10



ATTENTION!

The disc must be degreased and free of any possible deposit which could decrease the friction coefficient. It will also be necessary to bed-in the lining pads in order to obtain the best performances.

STOP

If the instructions in this manual are not adhered to, the performance, correct operation and the safety of the equipment cannot be guaranteed.

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5. MAINTENANCE

DANGER!

Before any maintenance on the caliper, be sure that the caliper can be opened at no risk.
When the caliper is **depressurized**, never use the screw (12) for setting or releasing the caliper.
Caliper **pressurized**, take care not to leave one's fingers close to the pads when the mechanical release tool (14) is no more in place.



5-1 Holding the caliper open

Tools : holding tool (14) - 36mm ring wrench or reversible ratchet with sockets

Remove the lock of the setting screw (15) (5mm Allen key) and keep it beside the caliper.

The opening is operated by **pressurizing** the caliper by means of the hydraulic power unit or a hand pump. Pressure value must be at least equal to the opening maximum pressure [+0,+20 bar] (refer to the Technical Data leaflet)

Unscrew the setting screw (12) (36mm ring wrench or reversible ratchet with sockets). Mount the holding tool (14) (for the operator safety).

Depressurize the caliper, the caliper stay open.

5-2 Lining wear adjustment

Tools required : 36 mm ring wrench or reversible ratchet with sockets - 5mm Allen key

Lining wear must be periodically checked and set again after 0,5 mm of wear on each lining (it means a gap disc/lining of about 1,5 mm per side).

Make sure that the caliper can be opened with no risk of machine runaway, then :

- remove the lock of the setting screw (15) (5mm Allen key)
- **pressurize the caliper**
- screw the setting screw (12) (36mm ring wrench or reversible ratchet with sockets) so as to bring the pads into contact with the disc, without tightening, and screw back to the nominal opening gap value of 1mm per side or 2/3 of turn.

ATTENTION!

A larger opening gap value than the one specified would reduce the braking force and the spring washer stack life. For any other setting, consult us.

- **Depressurize** the caliper (caliper closed on the disc)
- set the screw stop (20) to keep a gap J of 1mm between its head and the support (22) of the caliper (2/3 of turn) (fig.8 and 9). Tighten the counter nut.
- Mount the lock of the setting screw (15) (5mm Allen key) to avoid any out of order of the opening gap (fig.10).

When the lining thickness is reduced to 2mm on one pad, the pads must be replaced (§5-3).

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5-3 Replacing a set of pads

DANGER!

Imperatively check that the new lining quality is the same as the worn one. The quality is stamped on the pad back.
If doubt, consult us.



Tools required : 5mm Allen key - 21mm flat spanner - 36mm ring wrench or reversible ratchet with sockets

Make sure that the caliper can be opened with no risk of machine runaway, then :

- Screw in the screw stop (20) (fig.8)
- Remove the lock of the setting screw (15) (5mm Allen key) and keep it beside the caliper.
- **Pressurize the caliper**
- Unscrew the setting screw (12) (36mm ring wrench or reversible ratchet with sockets) to move the pads back
- As a safety measure, fit the holding tool (14),
- Remove the retaining clips of the pads, they won't be re-used (to free the plate of the clips, we need to twist it with a pin driver)
- Remove the worn pads
- Push the caliper until the moving shoe (fig.13) comes into contact with the disc
- Fit the first new pad (1) in the fixed shoe (fig.13) by doing the following operations (fig.11 and 12) :
 - 1) Engage a first retaining clips on one of the pad shanks (if necessary use a mallet).
 - 2) Fit the pad into its recess by the bottom while fixing the first clips on the shoe (fig.11).
 - 3) Engage the second retaining clips on the top pad shank while fixing it on the upper part of the shoe (fig.12).
 - 4) Check that the plate of the clips is locked in the hole of the pad shanks (fig.11).

DANGER!

In case of a faulty mounting of the retaining clips, pad could escape during caliper working.



- Push the caliper until this first pad touches the disc and maintain the caliper in this position with the screw (20) (fig.8 and 9)
- Fit the second new pad (1) in the moving shoe (fig.13) by following the same operations as the first pad (see fig.11 and 12)
- Remove the holding tool (14) and keep it for a further utilization.

Fig. 11

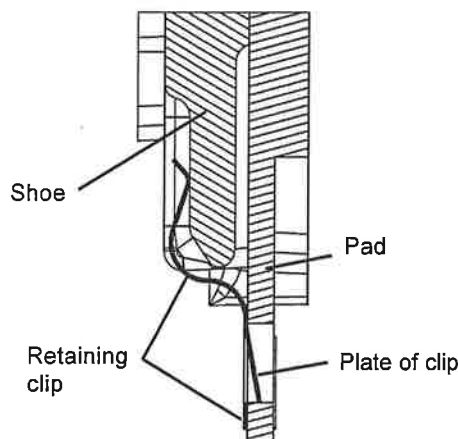
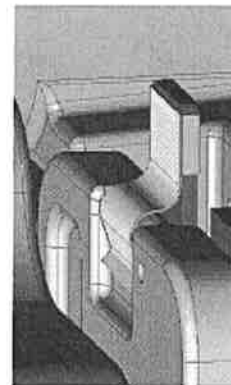
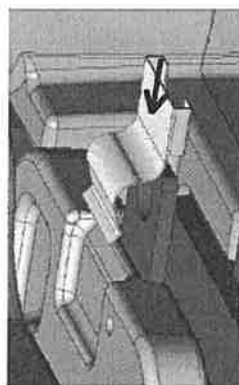


Fig. 12



- Screw the setting screw (12) (36mm ring wrench or reversible ratchet with sockets) (fig.7) so as to bring the linings into contact with the disc, without tightening. If necessary, help the caliper to slide. Screw back to the nominal opening gap value of 1 mm per side : it means 2/3 of turn.

ATTENTION!

A larger opening gap value than the one specified would reduce the braking force and the spring washer stack life. For any other setting, consult us.

STOP

- **Depressurize** the caliper (caliper closed on the disc) : check the gap J (fig.8) between the screw stop head (20) and the support (22) of the caliper. If it is not equal to 1 mm, set it. Tighten the lock nut.
- Mount the lock of the setting screw (15) (5mm Allen key) to avoid any out of order of the opening gap (fig.10).
- Check brake operation.

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5-4 Periodic checking

- Avoid deposits of oil or grease on the disc or pads and ensure that they have maximum protection, in general.
- Monitor the state of the disc surface.
- Monitor the state of the pads.
- Remove the brake pads from any caliper which is out of service in an exposed position for any great length of time (store the pads in a dry place).

5-5 Brake reconditioning

Proceed with reconditioning after 200,000 actuations or every 5 years in order to insure the caliper's performance. Proceed also with oil replacement using an absolute 5µm filtering equipment.

6. SPARE PARTS

Refer to relevant leaflet.

ATTENTION!

Only the use of original SIME Stromag spare parts can guarantee our equipment's reliability.



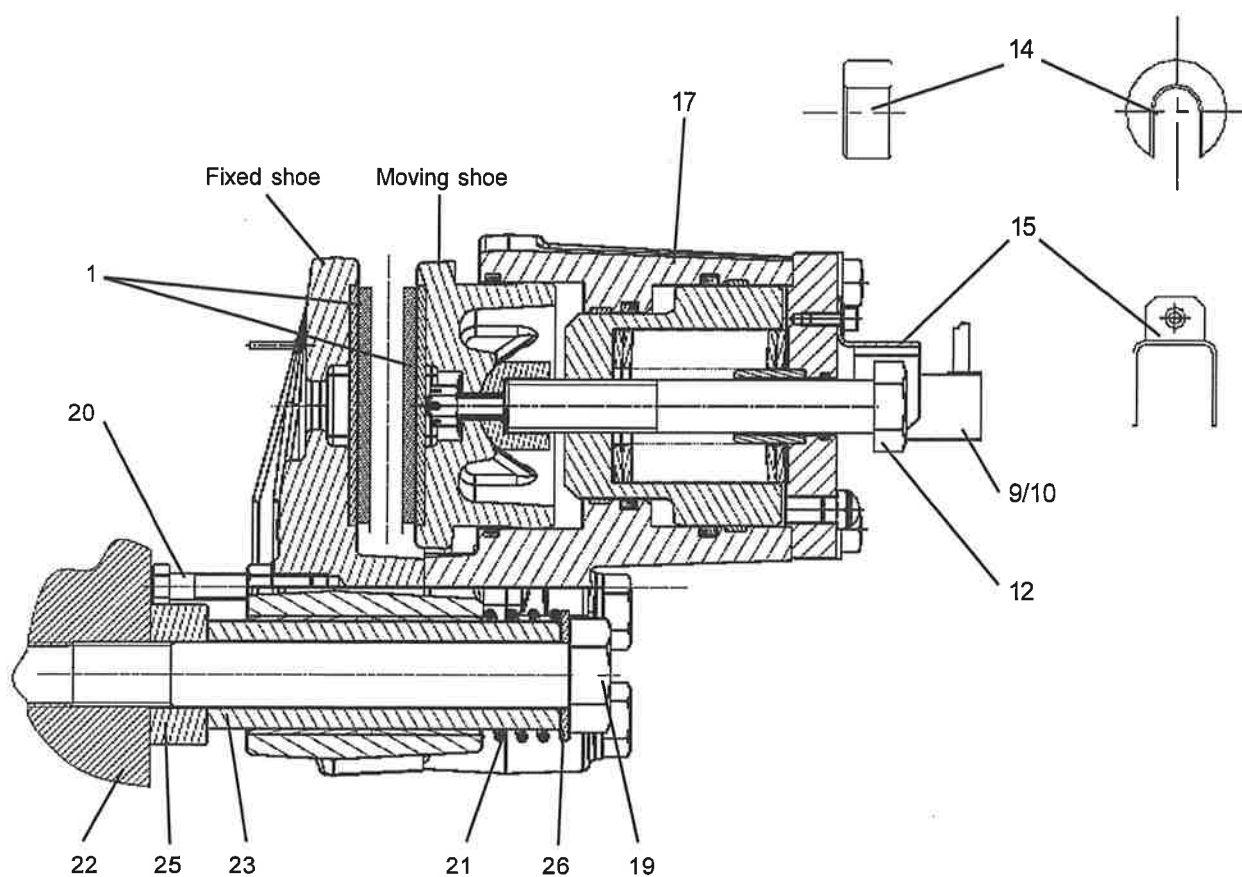
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Fig. 13



- | | |
|----|----------------------------|
| 1 | Lining pads |
| 9 | Opening proving switch |
| 10 | Lining wear proving switch |
| 12 | Setting screw |
| 14 | Holding tool |
| 15 | Lock of the setting screw |
| 17 | Jack |
| 19 | Screw M30-230 |
| 20 | Screw stop |
| 21 | Spring |
| 22 | Support |
| 23 | Guiding column |
| 25 | Washer of column base |
| 26 | Washer of column head |

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Scheibenbremsen

Technische Daten und Abmessungen

Zange SHD2

Bremsung mit Federkraft
 Hydraulische Bremsöffnung
 Öffnungskontakt (SPS-fähig)
 Belagverschleißkontakt (SPS-fähig)
 Meerwasserschutzanstrich

Betriebsbedingungen:

- Umgebungstemperatur: -20°C bis $+60^{\circ}\text{C}$
 - relative Luftfeuchtigkeit: $\leq 70\%$
 - staubhaltige Umgebung $\geq 65\mu$
- Andere Bedingungen, bitte nachfragen.

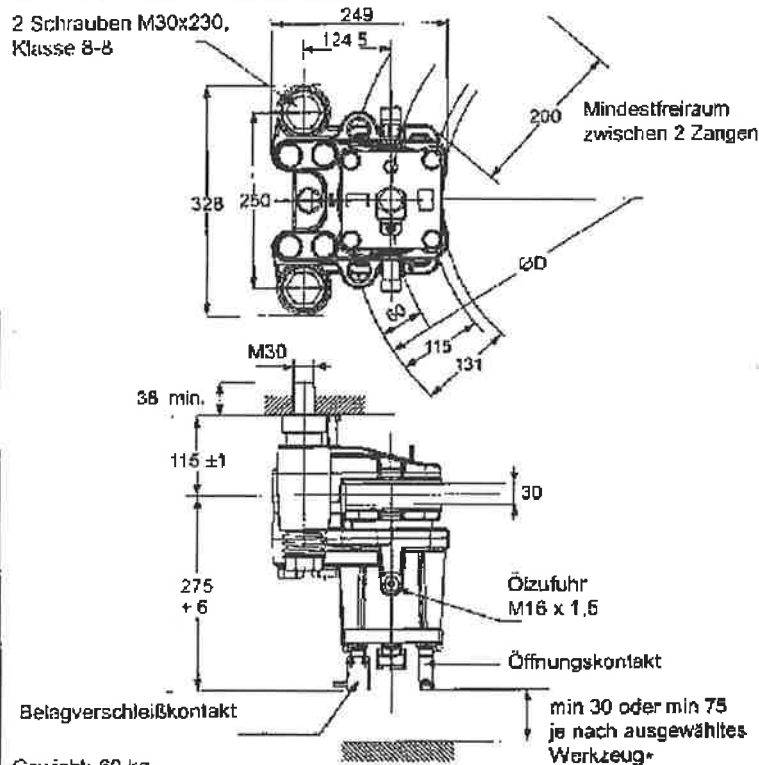
Anwendung:

- Nothaltebremse, die im Fall von überhöhter Geschwindigkeit oder bei Fehlern im elektrischen System einfällt.

Option:

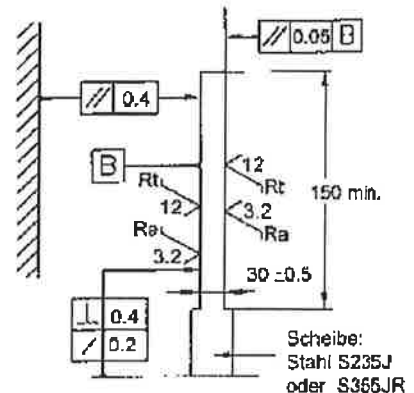
- Überwachung der Scheibentemperatur

2 Schrauben M30x230, Klasse 8-8



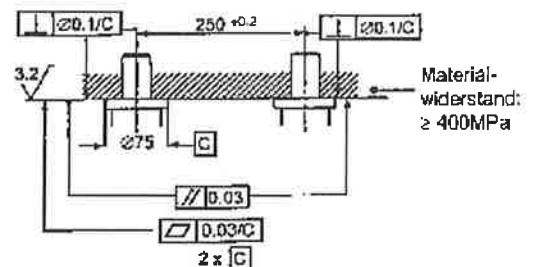
Gewicht: 60 kg
 Einfallzeit bei Nulleinstellung < 0.3s
 Max. Betriebsdruck: 200 bar
 Die Toleranz für Haltekraft und Moment beträgt $\pm 10\%$

Angaben zur Installation



Symbole nach Norm NF E04 552

Bearbeitungstoleranz des Unterbaus



Bezeichnung	Zange	SHD2-3	SHD2-2	SHD2-1
	Belag	ES3-5		
Haltekraft ET für einen Weg Belag / Scheibe von 1 mm	dynamisch N	23000	15400	10540
Lineargeschw. der Scheibe bei ET	m/s	< 60	< 60	< 60
dynamisches Bremsmoment 630 mm		5870	3930	2690
M_{br} (Nm) für eine Zange	710 mm	6790	4540	3110
auf einer Scheibe	800 mm	7820	5240	3580
Ø D mm	1000 mm	10120	6780	4640
	Nm	$M_{br} = ET (D/2 - 0,06)$		
Öffnungsdruck	min bar	155	110	75
	max bar	175	130	95
bewegtes Ölvolumen	cm ³	8 pro Hub (bei einem Weg Belag / Scheibe von 1 mm / Seile)		
max. Zylinderfüllung	cm ³	45		

Elektrische Daten:

- Kontakte: 240V, 5A, 50VA CA
220V, 5A, 50W CC

- 30 möglich mit Ringschlüssel 75, wenn Umschaltknarenschlüssel verwendet wird

Änderungen in Konstruktion und Abmessungen vorbehalten.

Betriebs- und Wartungsanleitung

Blatt Nr. 8401

Ersatzteile

Blatt Nr. 9401

01/04

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