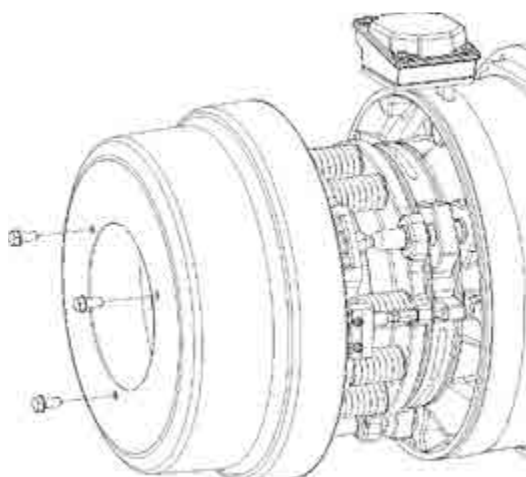


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Installation guide

FCPL60H brake motor

Part number: 5282 en - 2017.10 / b

LEROY-SOMERTM

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LEROY-SOMER reserves the right to modify the characteristics of its products at any time in order to incorporate the latest technological developments. The information contained in this document may therefore be changed without notice.

1 - INSTALLATION

When installing brake motors, follow the recommendations in the motor general manual. Make sure that the brake is engaged when the motor is stationary.

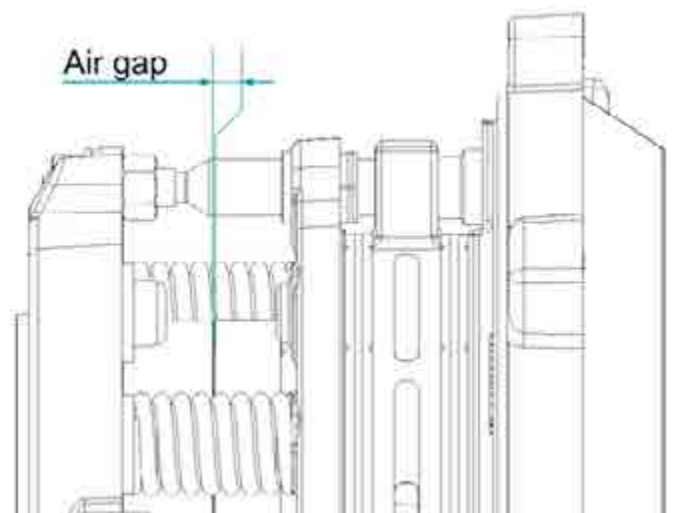
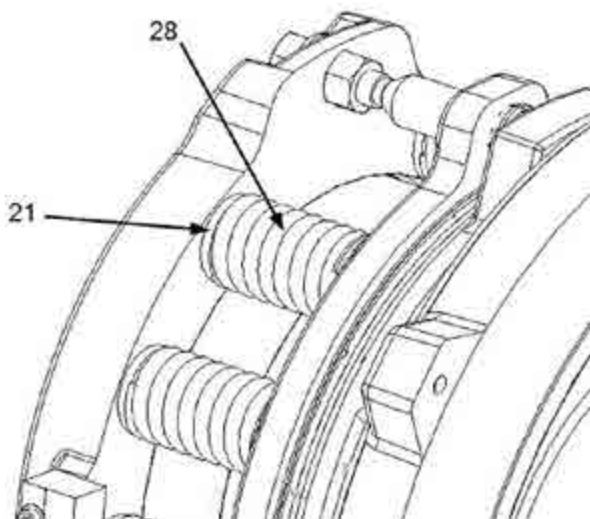
2 - CHARACTERISTICS

Braking torque:

Quantity x Reference		Brake with 1 Disk		Brake with 2 Disks	
Springs (No. 28)	Spacers (No. 21)	Torque (N.m)	Air gap (mm)	Torque (N.m)	Air gap (mm)
3 x 058E122054	3 x 070E202054	150	0.9	300	1
4 x 058E122054	-	170	0.9	340	1
4 x 058E122054	4 x 070E202054	200	0.9	390	1
6 x 058E122054	-	260	0.9	520	1
6 x 058E122054	6 x 070E202054	300	0.9	590	1
6 x 058E123054	-	(370)	0.9	740	1
6 x 058E123054	3 x 070E202054	400	0.5	(800)	0.6
6 x 058E123054	6 x 070E202054	(435)	0.5	870	0.6
7 x 058E123054	7 x 070E202054	(500)	0.5	1000	0.6
9 x 058E123054	-	570	0.5	1150	0.6
9 x 058E123054	9 x 070E202054	650	0.5	1300	0.6

The brake is designed to operate within the limits described in the brake motor catalogue. The thermal capacity and maximum number of braking operations per hour must be complied with to ensure safe brake operation.

In the event of uncertainty, check the brake disk thickness, its general condition and its lining before the equipment is returned to service. If any doubt remains, please consult Leroy Somer.



3 - ELECTRICAL CONNECTION

The FCPL60H brake is equipped with a D.C. coil.

For motors starting at reduced voltage or operating at variable voltage or frequency, a separate brake power supply should be provided.

Electrical characteristics of yokes:

Voltage (V)	Duty	R(Ω)	I(A)	Wire colours
20	S3	1,9	10,5	Green/Green
20	S1	4.1	4,8	Green/White
100	S3	55	1,8	Yellow/Yellow
100	S1	105	0.95	Yellow/White
180	S3	160	1.2	Blue/Blue
180	S1	320	0,6	White/Blue
200	S3	210	0.95	Black/Black
200	S1	427	0.46	Black/White

Duty:

Our coils are defined for a maximum operating factor of 60% in intermittent duty (S3) or for continuous duty (S1).

They can be distinguished, when the brake cover is removed, by the colour of the power supply wires.

If the brake is supplied by a CDF7 doping device, the coil is always in intermittent duty (S3), even if the brake is operating in continuous duty (S1).

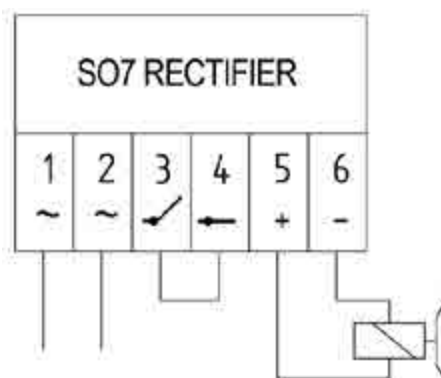
Depending on the braking torques or options chosen, the brake can be supplied via:

- an SO7 rectifier, or
- a CDF7 doping device (boost)

3.1 - Power supply via SO7 rectifier

Principle: the SO7 rectifier can be used to supply a D.C. brake directly from the A.C. supply. It is usually integrated in one of the motor terminal boxes.

Mains voltage (VAC)	Cell	Brake rated voltage (VDC) \pm 10%
45V	SO7	20
220 - 230 V	SO7	100
380 - 400 V	SO7	180
440 - 480 V	SO7	200



To reduce the brake application response time, the coil should be disconnected on the D.C. supply, between the rectifier terminals 3 and 4. (In this case, disconnection should not be less than 3 metres from the coil).

This action is obligatory in hoisting applications.

Remove the bridge between terminals 3 and 4 of the rectifier cells and connect them to the brake contactor.

3.2 - Power supply via CDF7 doping device

Principle:

The CDF device can be used to supply a D.C. brake directly from the A.C. supply.

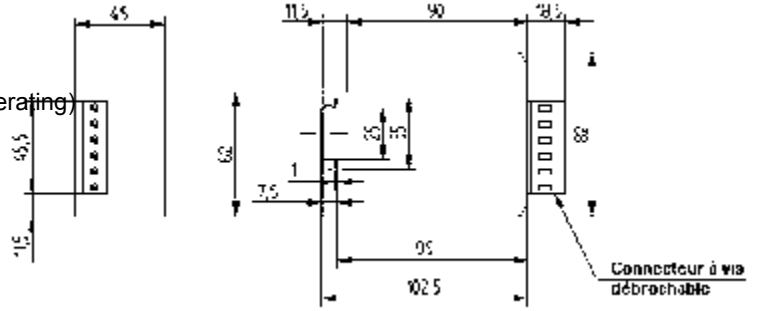
Two functions are integrated in an automatic sequence:

- a doping time (0.5 s) is applied to reduce the brake response time
- a reduced holding voltage allows the brake to remain attracted while reducing the coil temperature rise.

This device is not integrated in the motor, it is provided separately and should be mounted inside the brake motor control cabinet.

Mechanical characteristics

Mounting:
 DIN RAIL ref. EN 50022 – NFC 63015 – DIN 46277-3.
 Ingress protection: IP20 (except for removable connector)
 Ambient temperature: -16°C to 55°C (-25°C to 85°C with derating)
 Relative humidity: 98% max (non condensing)
 Storage temperature: -40°C to 100°C
 Shock: < 100 m/s² 16 ms (IEC 60 068-2-29)
 Vibration: < 5 m/s² 10... 150 Hz (IEC 60 068-2-6)
 Cable connection cross-section: 2.5 mm² max
 Weight: 200 g



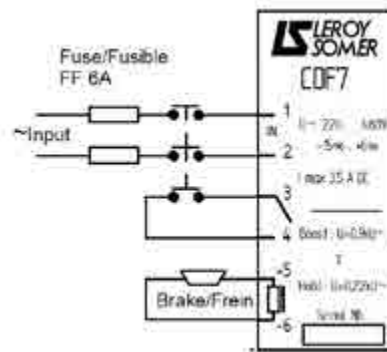
Electrical characteristics

A.C. power supply: 220 V to 480 V (-15%; +6%)
 Doping voltage (D.C.): 0.9 x input voltage
 Holding voltage: 0.22 x input voltage
 Maximum current: 3.5 V RMS (5 s integration)
 Doping time: 0.5 s
 Doping starting time: 15 ms max

IMPORTANT :

To reduce the brake application response time, the coil should be disconnected on the D.C. supply, between the rectifier terminals 3 and 4.

This action is obligatory in hoisting applications.



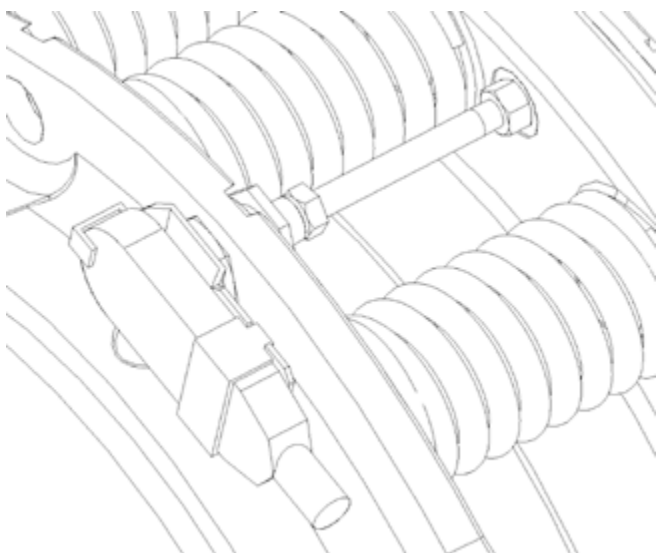
4 - WIRING FOR OPTIONS

4.1 - Microswitch(es)

The brake may be fitted with two microswitches:

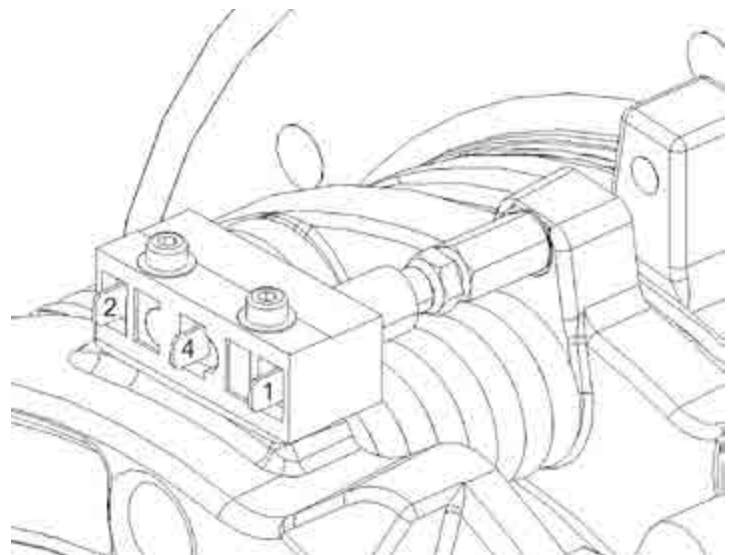
- Brake release indicator microswitch
- Brake disk wear indicator microswitch

Depending on the brake yoke supplied, the microswitch looks different:



Type 1 microswitch:

- Black: common
- Blue: normally open
- Brown: normally closed



Type 2 microswitch:

- 1: common
- 4: normally open
- 2: normally closed

Brake release indicator

The normally open contact is **open** when the braking torque is applied (coil not energised). It closes after the brake is released.

Wear indicator

The normally open contact is **closed** when the disk is new. It opens when the air gap needs to be adjusted.

This option is marked in one of the motor terminal boxes, either by a label attached to the cables in the terminal box, or on a connection diagram if supplied.

4.2 - Space heater

The brake can be fitted with a space heater for operation in a harsh environment.

Depending on the brake and its IP, the space heater is rated 50 W or 60 W if supplied at its rated voltage of 230 VAC.

It is fixed either on the brake support plate, or on the brake yoke. Unless it needs to be replaced, no maintenance nor dismantling is necessary on this option.

This option is marked in one of the motor terminal boxes, either by a label attached to the cables in the terminal box, or on a connection diagram if supplied.

4.3 - Temperature sensors

The brake yoke winding can be fitted with a maximum of 2 PTC, PTO, PTF sensors on request.

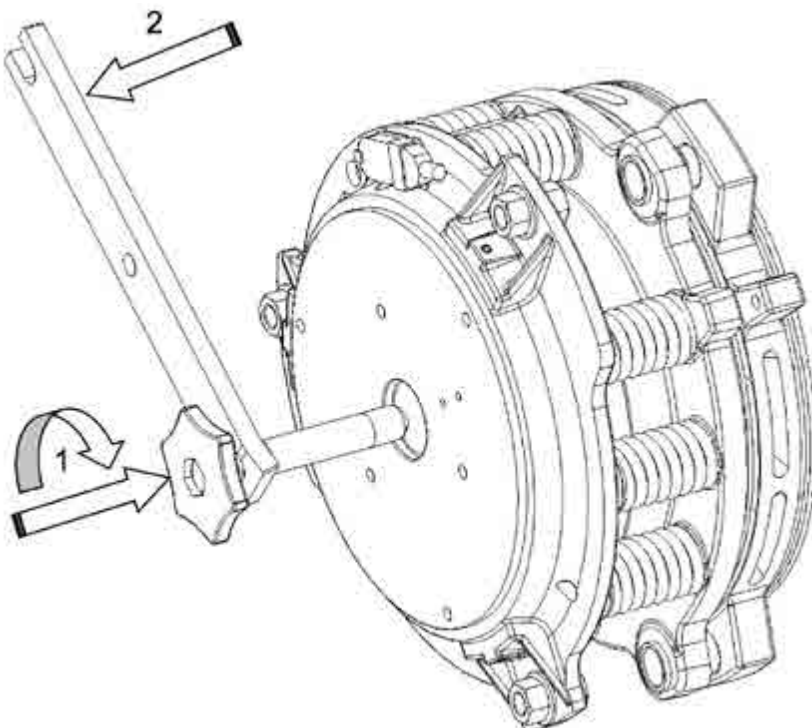
Installation is identical to the thermal sensors fitted on the motor. (Refer to the motor commissioning manual).

This option is marked in one of the motor terminal boxes, either by a label attached to the cables in the terminal box, or on a connection diagram if supplied.

5 - RELEASE BY LEVER(S) WITH AUTO-RETURN (OPTIONAL)

CAUTION : Before any work is carried out on the brake, it is essential to disconnect the brake motor and check that it is fully discharged.

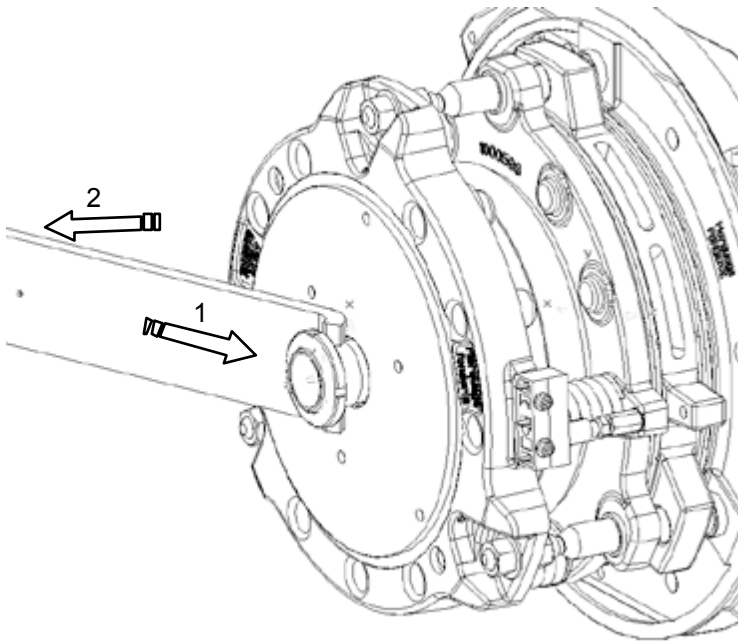
Depending on which brake and options are chosen (encoder, 2nd shaft extension), the brake release lever(s) look different. To use this(these) lever(s), direct access to the brake is required. For this, refer to the dismantling section corresponding to your motor.

5.1 - Central brake release lever (without options)

1: insert the lever through the yoke and screw it into the brake electric magnet.

2: apply force in the direction of the arrow to release the brake

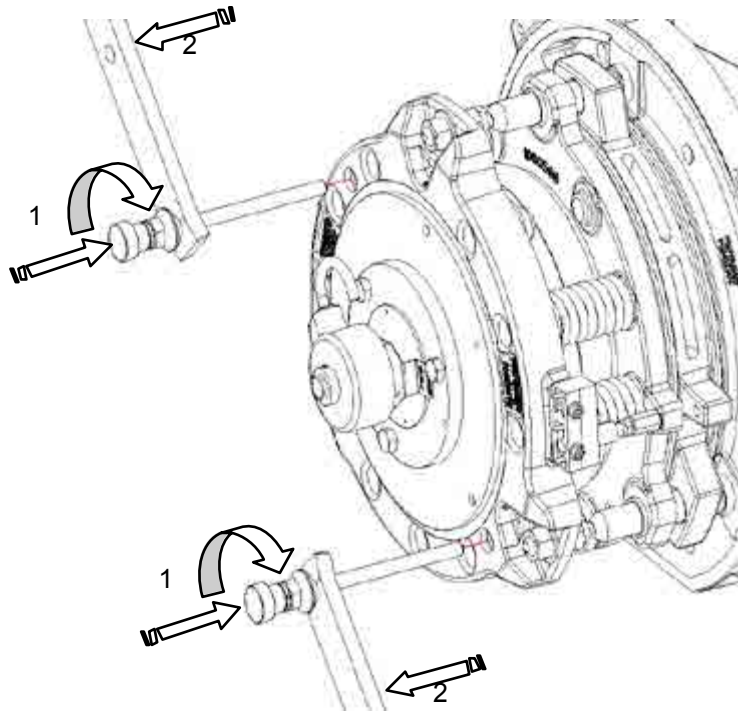
5.2 - Central brake release lever (with 2nd shaft extension option)



1: push the brake release lever between the brake yoke and the locknut.

2: apply force in the direction of the arrow to release the brake.

5.3 - Side brake release levers (with option)



1: insert the levers through the yoke and screw them into the brake electric magnet.

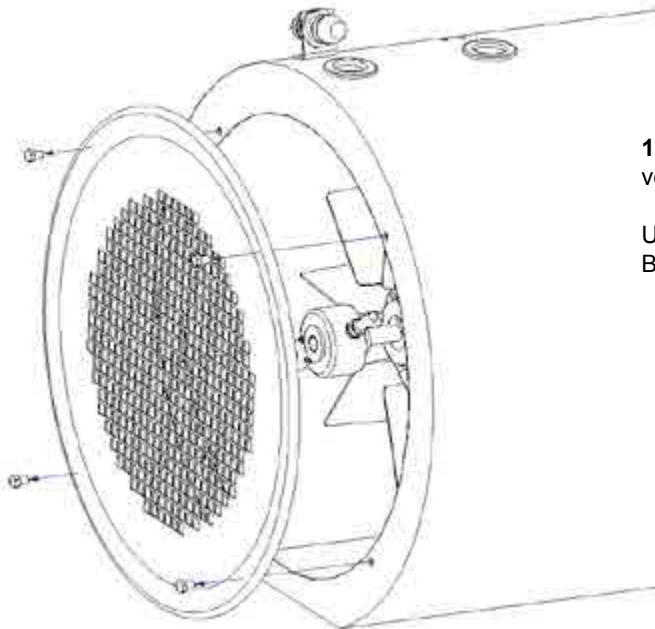
2: apply force in the direction of the arrow to release the brake.

6 - DISMANTLING (ACCESS TO THE BRAKE)

6.1 - LS – FLS 225, 250, 280, IP55 and IP56 motors

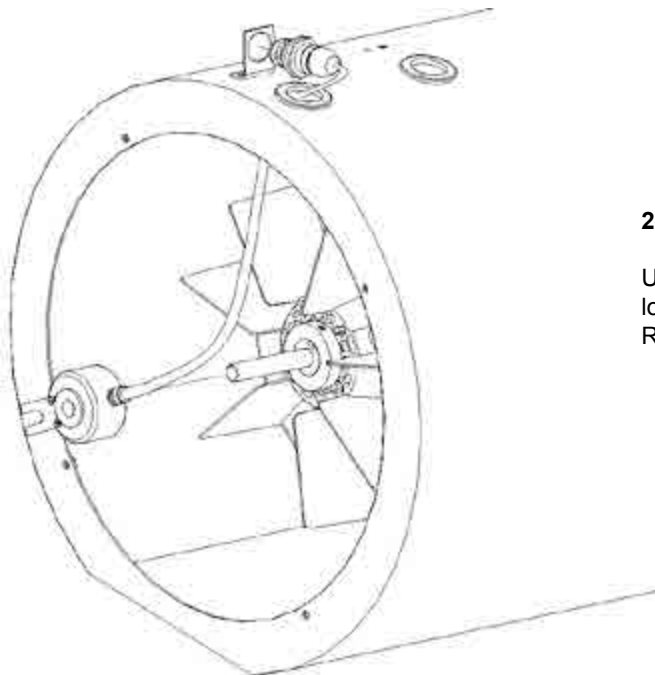


CAUTION: before any work is carried out on the brake, it is essential to disconnect the brake motor and check that it is fully discharged.



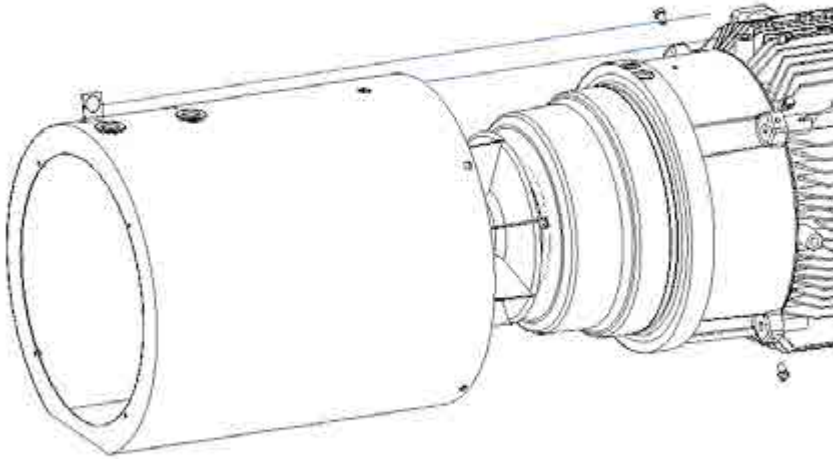
1: remove the NDE protective grille or forced ventilation unit .

Undo the four H M6 screws.
Be careful with the encoder rotating stop finger.



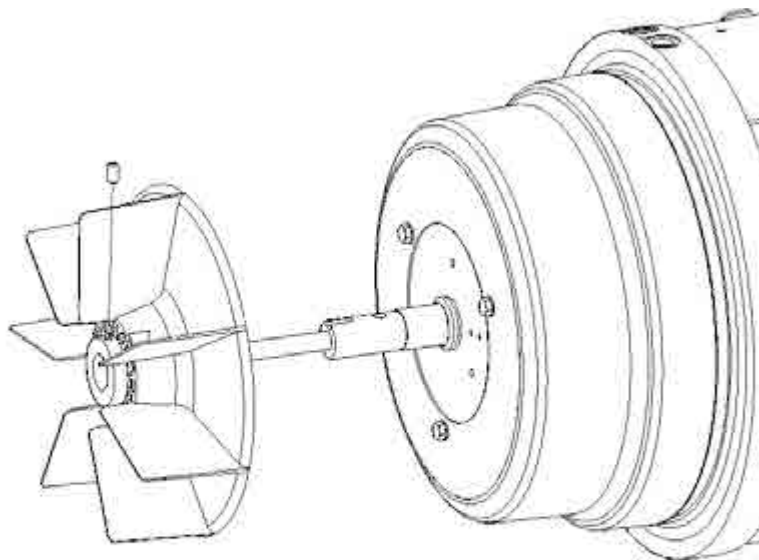
2: remove the encoder.

Undo the HC M2.5 radial screw on the encoder locking ring.
Remove the connector from its holder.



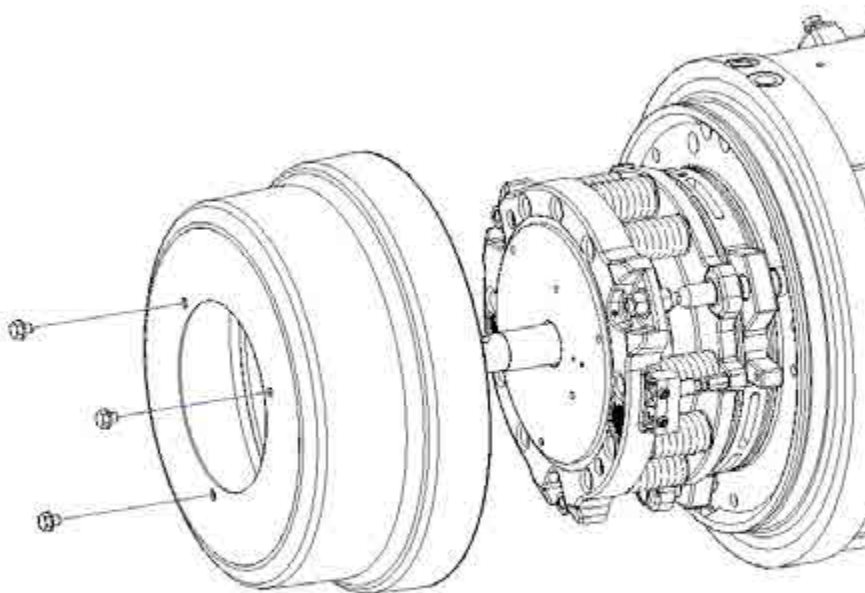
3: remove the fan cover.

Undo the four H M8 radial screws.
Remove the cover.



4: remove the fan (IC411 motor).

Undo the HC M8 radial screw.
Caution, this screw is glued in.
Remove the fan and its hub.



5: remove the brake cover

IP 55 version

Undo the three H M8 screws and their packing washer.
Remove the brake cover.

IP 56 version

Undo the six CHC M6 screws around the edge of the cast iron cover.
Remove the brake cover.

Caution: be careful not to damage the seals on the shaftway when removing the cover.

Reassembling the motor

To reassemble the motor, follow the dismantling instructions in reverse order.

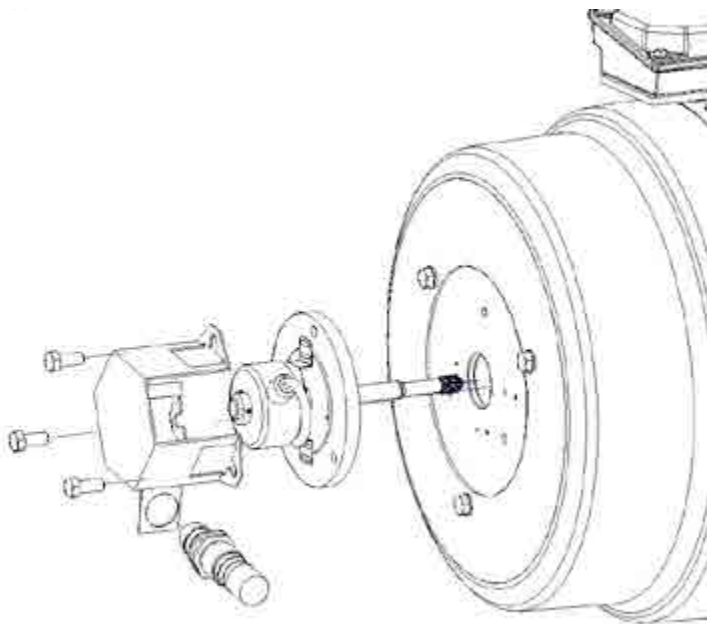
At step 5, for the IP56 version, if necessary, replace the seal on the shaftway and lightly grease it.



At step 4, don't forget to glue in the HC M8 radial screw with Loctite 542 adhesive or equivalent.

6.2 - P – PLS and LS – FLS IP55 motors

CAUTION : before any work is carried out on the brake, it is essential to disconnect the brake motor and check that it is fully discharged.



1: dismantling the encoder.

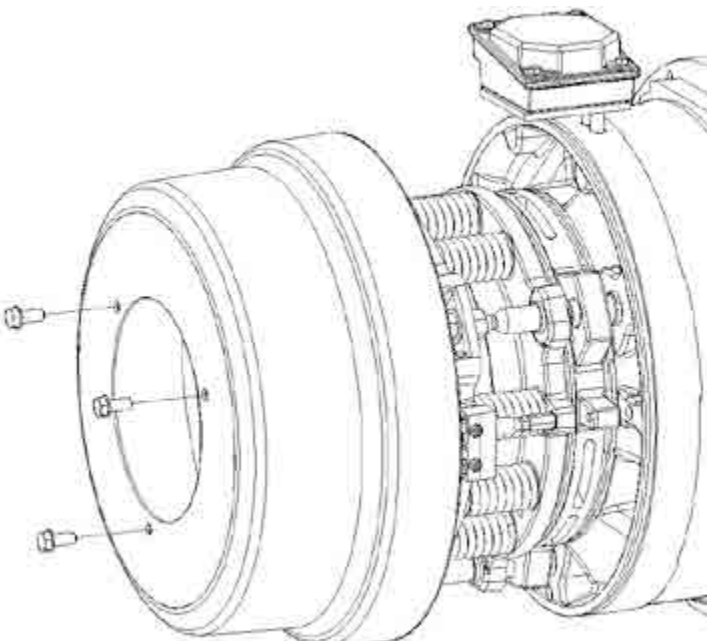
Note: depending on the type of encoder, the bearing assemblies may be different from the standard shown here.

If you are unsure about the dismantling procedure, please consult Leroy Somer.

Remove the three H M8 screws or nuts holding the encoder protective cover.

If the encoder assembly is fitted with an aluminium support washer (as in the picture opposite), the encoder–encoder shaft assembly can be directly removed.

If not, remove the radial screw on the encoder locking ring then remove the encoder. The encoder shaft cannot then be removed.



2: remove the brake cover

Undo the three H M8 screws and their packing washer.

Remove the brake cover.

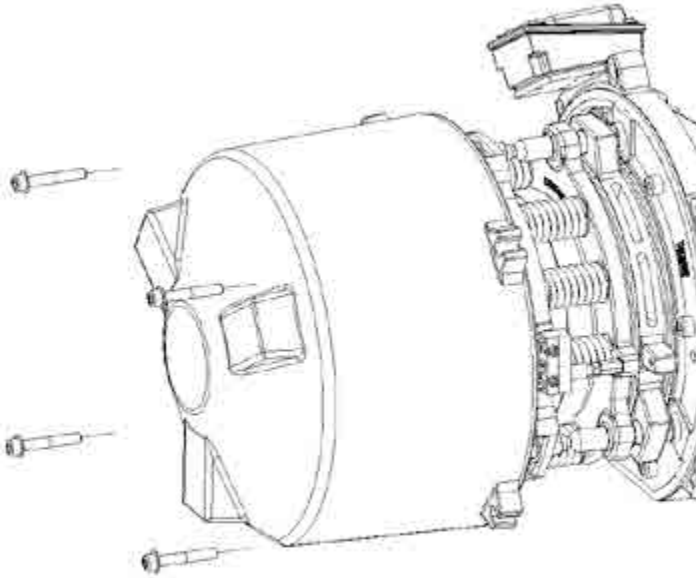
Reassembling the motor

To reassemble the motor, follow the dismantling instructions in reverse order.

6.3 - LS – FLS IP56 and CPLS motors

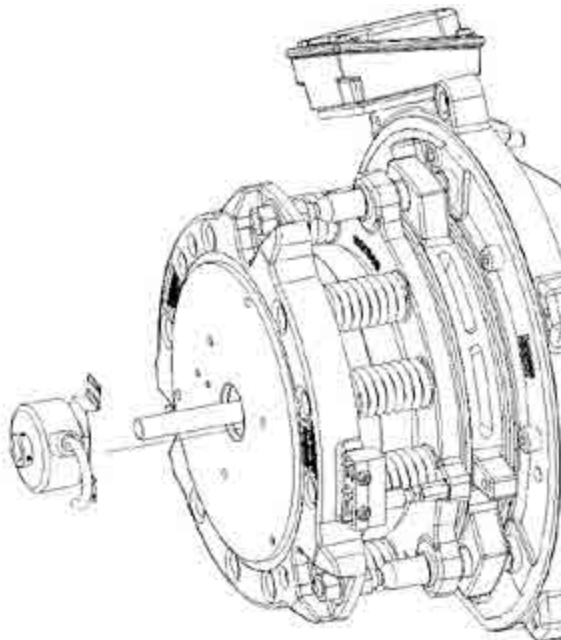


CAUTION : before any work is carried out on the brake, it is essential to disconnect the brake motor and check that it is fully discharged.



1: Remove the brake cover.

Undo the four (on CPLS) or six (on LS – FLS IP56) CHC M6 screws and their washer around the edge of the cast iron cover.



2: Dismantling the encoder.

Note: depending on the type of encoder, the bearing assemblies may be different from the standard shown here.

If you are unsure about the dismantling procedure, please consult Leroy Somer.

If the encoder assembly is fitted with an aluminium support washer, the encoder–encoder shaft assembly can be directly removed.

If not (as in the picture opposite), remove the radial screw on the encoder locking ring then take out the encoder. The encoder shaft cannot then be dismantled.

Reassembling the motor

To reassemble the motor, follow the dismantling instructions in reverse order.

7 - MAINTENANCE



CAUTION : before any work is carried out on the brake, it is essential to disconnect the brake motor and check that it is fully discharged.

A maintenance operation should be performed:

- when the brake air gap is too big: > 1.5 mm
- when the brake disk(s) is (are) worn: minimum permitted lining thickness: 1.5 mm

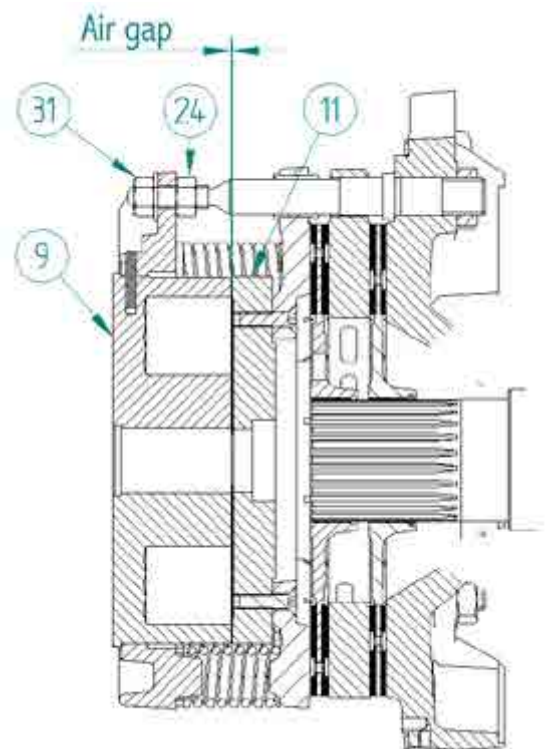
To perform these operations, direct access to the brake is required. For this, refer to the dismantling section corresponding to your motor.

7.1 - Adjusting the air gap

The air gap is the distance separating the armature 11 from the yoke 9 when the coil is not energised. It will be necessary to adjust it when the brake no longer releases normally or when its value reaches 1.5 mm.

How often the air gap is checked and adjusted depends on the duty, operating factor, motor position and the application. An upright motor with S1 duty-6 sts/hr will require greater monitoring than a horizontal motor with S2 duty-30 min.

- Loosen the three nuts 24 (19 spanner) to bring the yoke 9 closer to the armature 11 by tightening the nuts 31 (18 spanner).
- Insert a gauge corresponding to the air gap (see section 2: Characteristics) between the yoke 9 and the armature 11. The gauge should be able to slide effortlessly and without play at three points the same distance apart around the edge of the yoke. The gauge with the value Air gap + 0.1 mm must not be able to pass between the yoke 9 and the armature 11.
- Retighten the three nuts 24 and 31. If the air gap is set correctly, the brake should engage crisply when energised, and the disk should not rub against it.
- Reassemble the motor.



7.2 - Replacing a brake disk

The disk should be changed when one of the linings is worn down to the minimum permitted thickness, ie. 1.5 mm.

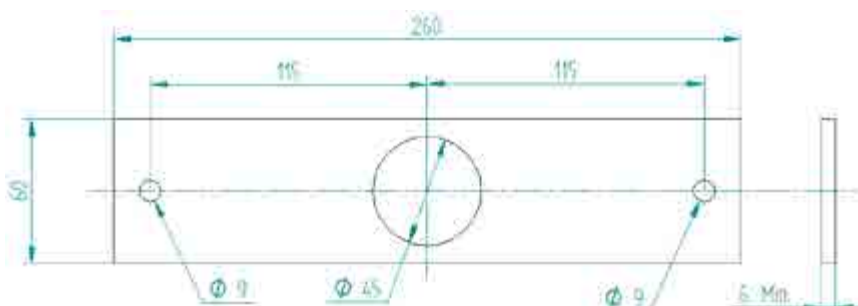
To perform these operations, direct access to the brake is required. For this, refer to the dismantling section corresponding to your motor.

Tools needed to release the brake (not supplied).

Without encoder or 2nd shaft extension option: 1 M16 Threaded rod + 1 Washer (Min outer Ø45) + 1 M16 Nut (Central brake release)

With encoder or 2nd shaft extension option: 2 M8 Threaded rods + 2 Washers + 2 M8 Nuts + Load bearing plate.

Definition of the load bearing plate. The dimensions are in millimetres. Steel plate:

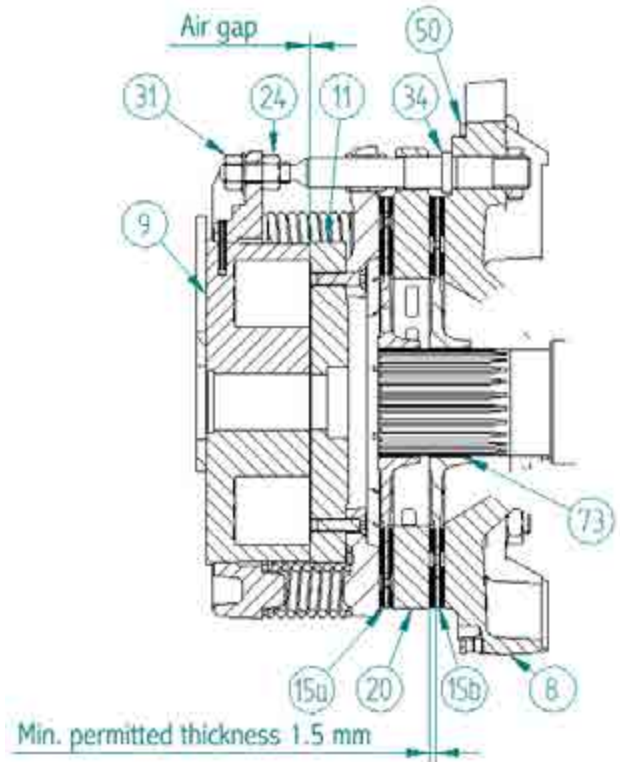


Dismantling

- Disconnect the brake connections and options.
- Insert the threaded rods through the yoke 9 and screw them into the armature 11.
- Tighten the nut(s) to reduce the air gap: a block is created to neutralise the springs and release the brake.
- Loosen the three adjusting nuts 31 (18 spanner).
- Gradually unscrew the nuts 24 (19 spanner) then slide out the columns 34 from this block.
- Remove the worn brake disk(s) 15a (20 - 15b).
- Clean the friction faces of the end shield 8 and the armature 11 (of the spacer 20), and check that they are clean and dry.
- Place the O ring seal 73 in the disk hub. For 2-disk brakes, **only the disk in contact with the end shield 8 is fitted with an O ring seal 73.**
- Refit the new disk(s) (and the spacer 20), with the hub(s) at the shield end.

Reassembly

- Replace the brake block by first engaging the armature 11 on the columns, then fit the nuts 24 before finally passing the yoke lugs 9.
- Bring the friction face of the armature 11 into contact with the disk by gradually tightening the nuts 31.
- Position the nuts 24 and bring them into contact with the yoke lugs 9.
- Remove the brake release device.
- Adjust the air gap (see section 7.1).
- Change the seal 50 (brake cover seal).
- Reconnect the brake and options.



7.3 - Adjusting the microswitches



CAUTION: for this operation you will need an ohmmeter or a test lamp (not supplied)

The microswitch is factory-set differently according to whether it is used as a disk wear indicator (air gap indicator) or as a brake release indicator.

In theory, there is no need to alter the microswitch setting unless the brake yoke 9 has been changed.

However, depending on how carefully the air gap is set, certain adjustments may be necessary.

The microswitch must always be set with the air gap at its rated value, brake applied (not energised).

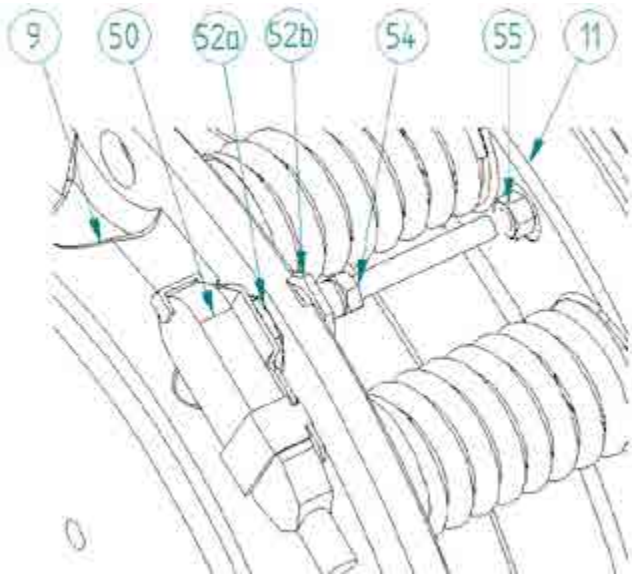
- Fix the microswitch 50 on the yoke 9. (Screws 52a and 52b on the body or nuts 52a and 52b on the plunger depending on the model)
- Connect an ohmmeter or a test lamp:
 - type 1 microswitch: between the black wire and the blue wire.
 - type 2 microswitch: between terminals 1 and 2 (end terminals)

7.3.1 - Brake release indicator microswitch

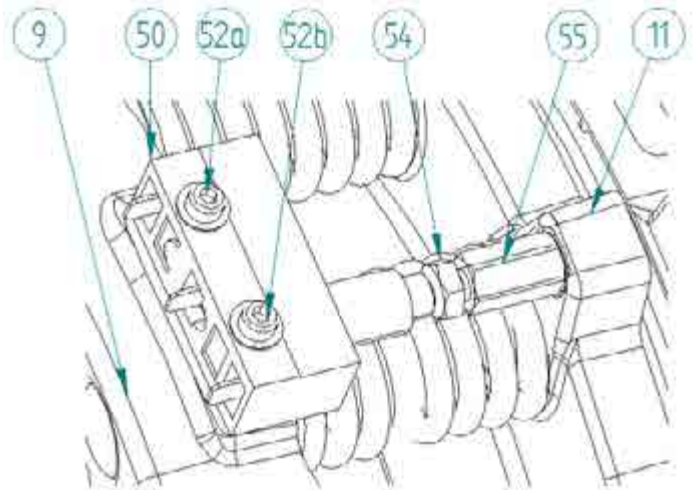
- Partially loosen the nut 55.
- Bring the screw 54 into contact with the plunger until the microswitch switches. The resistance drops to zero.
- Tighten the screw by a 1/4 turn (< 2 sides of the hexagonal threaded stud with 1.5 mm pitch), the resistance becomes infinite.
- Check that, when the armature 11 is in contact with the yoke 9 (brake released), the resistance drops to zero.
- Lock the nut 55.

7.3.2 - Wear indicator microswitch

- Partially loosen the nut 55.
- Bring the screw 54 into contact with the plunger until the microswitch switches. The resistance drops to zero.
- Continue undoing screw 54 by 1 turn, a value which corresponds to the permitted maximum air gap of 1.5 mm. The resistance stays at zero.
- Lock the nut 55.



Type 1 microswitch



Type 2 microswitch

8 - TROUBLESHOOTING GUIDE

Incident	Possible cause	Diagnostics/Remedy
The brake will not release	There is voltage at the coil terminals	The air gap is too big, the brake yoke is not attracting the electric magnet. Adjust the setting and check the disk wear.
		The voltage is too low ($U < 0.8 U_n$). Correct the voltage to its rated value.
		The coil is disconnected, its resistance is infinite. Change the yoke.
The pick-up time is too long	There is no voltage at the coil terminals	The SO7 rectifier or CDF7 doping device has stopped working. Test the rectifier or device.
	Check the voltage at the coil terminals	It should not be less than $0.9 \times U_n$ with a CDF7 doping device or $0.45 \times U_n$ with an SO7 rectifier. Correct the voltage to the rated value.
	The air gap is too big	Readjust the air gap
The brake engage time is too long	You have increased the braking torque	Revert to the initial setting or consult Leroy-Somer about your problem.
	Check that disconnection is on the D.C. supply	Connect the SO7 rectifier or CDF7 doping device using terminals 3 and 4.
The braking torque is inadequate	The friction faces are not clean and dry	Clean the friction faces. Redefine your braking torque.
	The disk is worn	Change the disk.
Constant friction against the lining	The air gap is inadequate	Adjust the air gap.

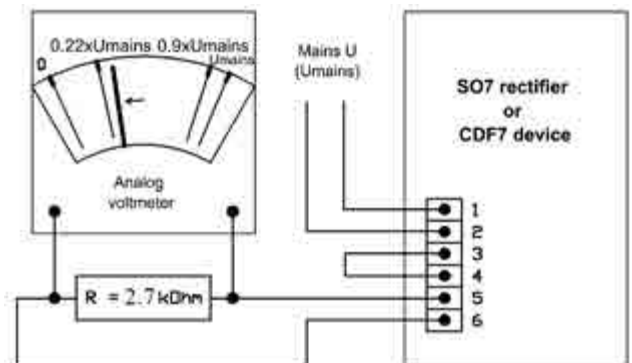
8.1 - CDF7 device test

To test that the device is working correctly, connection should be as follows:

- 1 and 2 connected to the mains
- 3 and 4 connected together (shunt)
- 5 and 6 connected to the brake winding (or a resistor between 1 and $2.7 \text{ k}\Omega$)

An analogue voltmeter should be used to display how the voltage changes at the resistor terminals.

The device is working if when powered with the mains, the voltmeter is close to 90% of mains voltage (corresponding to the doping voltage for 500 ms) and then stabilises at 22% of mains voltage (holding voltage).



8.2 - SO7 rectifier test

To test that the rectifier is working correctly, create the same assembly as for the CDF7 device test. The rectifier is working if the voltage indicated by the voltmeter stabilises at 45% of mains voltage.

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