

Nidec
All for dreams



Installation and maintenance




GEARLESS XAP

A.C. Drive for lifts

Part number: 4319 en - 2017.08 / d

LEROY-SOMER™

IMPORTANT

These symbols    appear in this document whenever it is important to take special precautions during installation, operation, maintenance or servicing of the motors.

It is essential that electric motors are installed by experienced, qualified and authorised personnel.

In accordance with the main requirements of EEC Directives, the safety of people, animals and property should be ensured when fitting the motors into machines.

Particular attention must be given to equipotential ground or earthing connections.

The following preliminary precautions must be taken before working on any stationary device:

- Mains voltage disconnected and no residual voltage present
- Careful examination of the causes of the stoppage (jammed transmission - loss of phase - cut-out due to thermal protection - lack of lubrication, etc)



Even when not supplied with power, there is voltage at the terminals of a rotating synchronous motor with magnets.

Accordingly, before carrying out any work check carefully that the motor is not rotating.



For dismantling the XAP motor only

Assembly or maintenance of the rotor must not be carried out by people with pacemakers or any other implanted medical electronic device.

The motor rotor contains a powerful magnetic field. When the rotor is separated from the motor, its field may affect pacemakers or disturb digital devices such as watches, mobile phones, etc.

Dear Customer,

You have just acquired a LEROY-SOMER motor.

This motor benefits from the experience of one of the largest manufacturers in the world, using state-of-the-art technologies – automation, specially selected materials and rigorous quality control. As a result, the regulatory authorities have awarded our motor factories **ISO 9001, Edition 2000 international certification from the DNV**. Similarly, our environmental approach has enabled us to obtain **ISO 14001: 2004**.

Products for particular applications or those designed to operate in specific environments are also approved or certified by the following organisations: **CETIM, LCIE, DNV, ISSEP, INERIS, CTICM, UL, BSRIA, TUV, CCC and GOST**, which check their technical performance against the various standards or recommendations.


We thank you for making this choice, and would ask you to read the contents of this manual.

By observing a few essential rules, you will ensure problem-free operation for many years.

LEROY-SOMER MOTORS

CE conformity

Our motors conform to standard EN 60034 (IEC 34), and therefore to the Low Voltage Directive 73/23/EEC modified by Directive 93/68, which is demonstrated by their marking with the symbol **CE**

LEROY SOMER	
MOTEURS LEROY-SOMER USINE	
DECLARATION OF CONFORMITY AND INCORPORATION	
<p>LEROY-SOMER MOTORS declares that the components :</p> <p>conform to the harmonized standard EN 60 034 (IEC 34) and thus meet the essential requirements of Low Voltage Directive 73-23 EEC of 19th February 1973 modified by Directive 93-68 EEC of 22nd July 1993.</p> <p>The components thus defined also meet the essential requirements of the Electromagnetic Compatibility Directive 89-336 EEC of 3rd May 1989 modified by Directives 92-31 EEC of 28th April 1992 and 93-68 EEC of 22nd July 1993, if they are used within certain voltage limits (IEC 34).</p> <p>By reason of such conformity, these component ranges may be used in machines governed by the Machinery Directive 98/37/CE, provided that the method of integration or incorporation and/or assembly conforms to at least the regulations in standard EN 60204 "Electrical Equipment for Machinery" and our installation manual.</p> <p>The components defined above must not be installed unless the machine in which they are incorporated has been declared as conforming to the relevant directives.</p> <p>N.B. : When components are powered by specially adapted electronic converters and/or servo-controlled by electronic control-command devices, they must be installed by a professional person. This person must take responsibility for complying with the regulations concerning electromagnetic compatibility in the country where the machine is used.</p>	
Declaration made by	At
Quality Director	On
MOTEURS LEROY-SOMER	Signature
 <p><small>MOTEURS LEROY-SOMER USINE SOCIAL 80 MARCELLIN LEROY - 4615 ANCOULEME CEDEX SOCIETE ANONYME AU CAPITAL DE 111 800 000 F - RCS ANCOULEME 9 238 987 238 - SIRET 238 987 238 00011</small></p>	

NOTE:

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.

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All brands and models have been registered and patents applied for.

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To ensure that the LEROY-SOMER Gearless XAP motor you have just purchased is entirely satisfactory, it is essential to adhere to the following instructions.

⚠ Contact with energised or rotating parts may cause injury. Do not touch the housing of a motor during operation, as it can reach high temperatures.

REMINDER: Installation, servicing and maintenance must only be carried out by qualified personnel. Failure to follow the instructions in this document, or to apply them correctly, releases the manufacturer from liability.

The product is covered by the warranty during the guarantee period as long as any partial or total dismantling has only been performed with the assistance of LEROY-SOMER (or its approval).

⚠ Check that the lift car has been immobilised before performing any work on the motor or the brakes.

1 - RECEIPT

Checks:

- As soon as you receive the machine, check that the nameplate on the machine conforms to your order.
- Inspect the machine as soon as it is received. If there is any damage that has been caused by transportation, contact the carrier in the usual way.

2 - STORAGE

2.1 - Storage location

This location must be dry and protected from harsh weather conditions, cold (temperature above -15°C), frequent temperature variations (to prevent the risk of condensation), and free from vibration, dust and corrosive gases.

If there is any vibration in the storage area, it is advisable to rotate the driving sheave at least twice a month (Supply power to the brakes in order to be able to turn the sheave).

In certain transport conditions the grooves of the driving sheave are protected by a special varnish. This varnish must not be removed during storage.

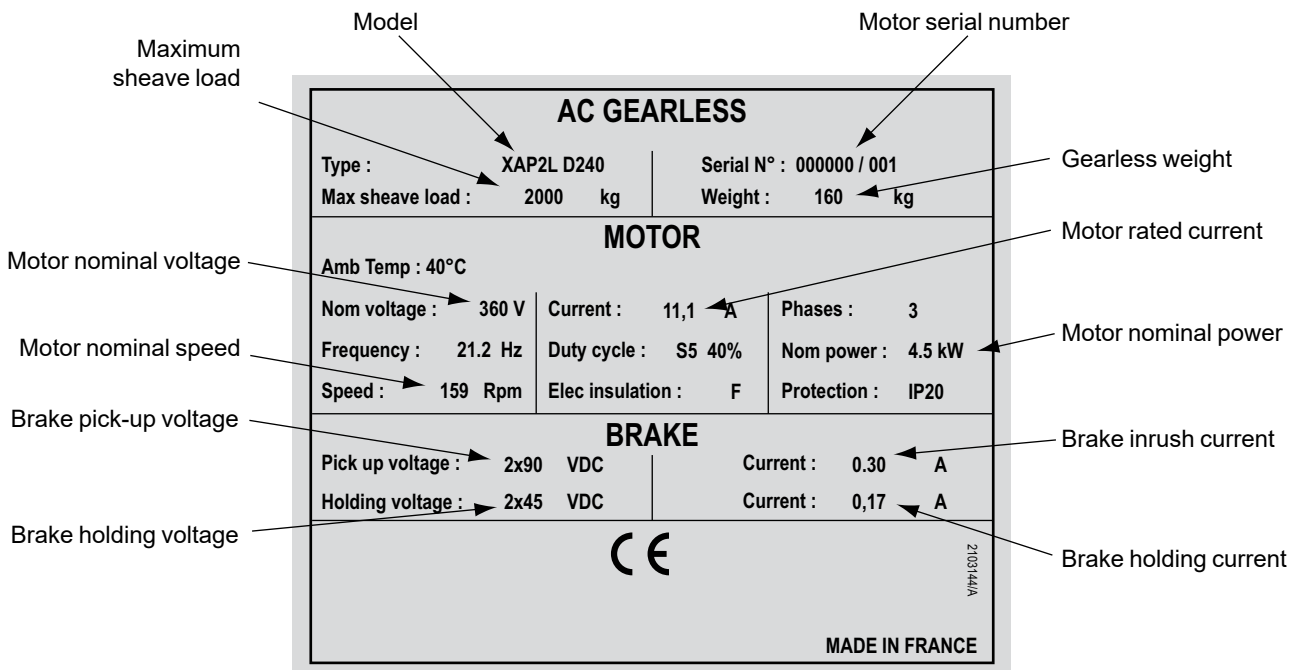


Fig. 1: Nameplate

2.2 - Prolonged storage (> 3 months)

Place the machine in a sealed waterproof enclosure with a dehydrating sachet inside corresponding to the volume to be protected and the degree of humidity of the location.

3 - ENVIRONMENT

The rated characteristics are given for operation in a standard environment (see IEC 60034-5):

- altitude less than 1000 m
- maximum humidity: 95%
- temperature between 0 and 40°C

Derating may be provided for if special conditions are indicated at the time the equipment is ordered.

4 - COMMISSIONING

BEFORE INSTALLATION

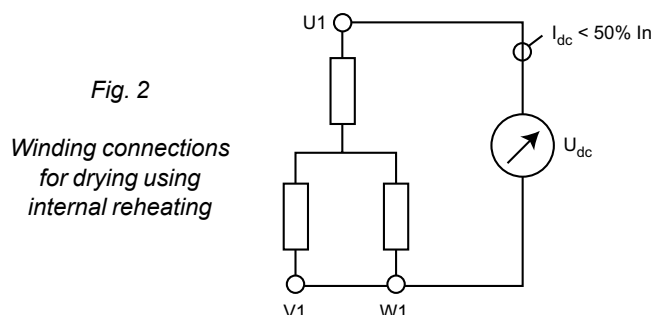
If the equipment has been stored for several months, it is essential to check the correct insulation between the phases and the earth terminal on the motor (minimum 100 MΩ at 500 V D.C. for 60 seconds) after having disconnected all the electronic circuits if necessary.

! Do not apply the megohmmeter to the terminals of the thermal sensors as this may damage them.
If the required value is not reached, dry the motor using internal or external heating.

Drying using external heating

- Place the motor in an oven at 70°C for at least 24 hours until the correct insulation is obtained (100 MΩ).
- Take care to increase the temperature gradually to clear the condensation.
- After drying at ambient temperature during the cooling phase, check the insulation value regularly, as it will initially tend to fall then rise.

Drying using internal heating (Fig 2)



- Connect motor windings V1 and W1 in parallel in relation to U1.
- Read off the resistance between U and V//W.
- Apply a low voltage D.C. current to them (to obtain 10% of the rated current calculated using the winding resistances), then increase the voltage until 50% of the rated current is reached
- Maintain the power for 4 hours. The temperature of the motor should increase slightly.

! If the brakes are released, the sheave will move slightly on power-up (angular setting of the rotor in relation to the stator).

4.1 - Mechanical installation

The installation must comply with the motor characteristics indicated on the nameplate (see section 1).
It must include electrical safety devices.
Check that the handling equipment (slings, etc.) is suitable for the weight of the machine.
Use the attachment points provided on the machine.

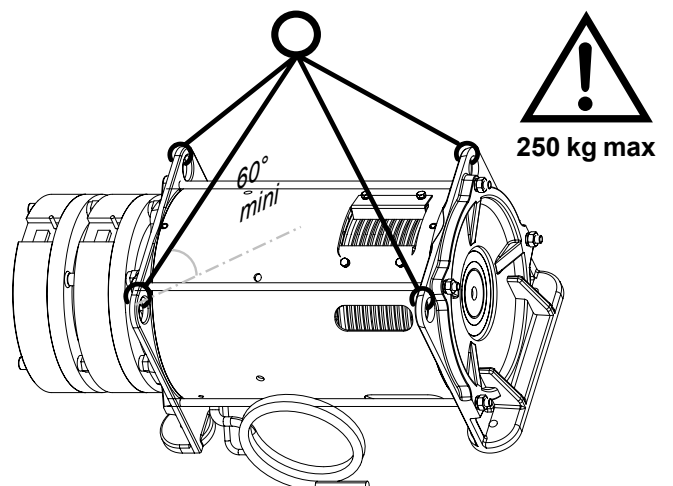


Fig. 3: Lifting the motor
Lifting diagram for illustration only

Check that the cables are correctly positioned so that they are not damaged.
Provide the necessary mechanical protection devices to prevent people working on the machine becoming caught or trapped by the sheave and/or the cables.
The motors must be installed in such a way that the cooling air (not too damp, dust-free, and containing no corrosive gases or vapours) circulates freely.

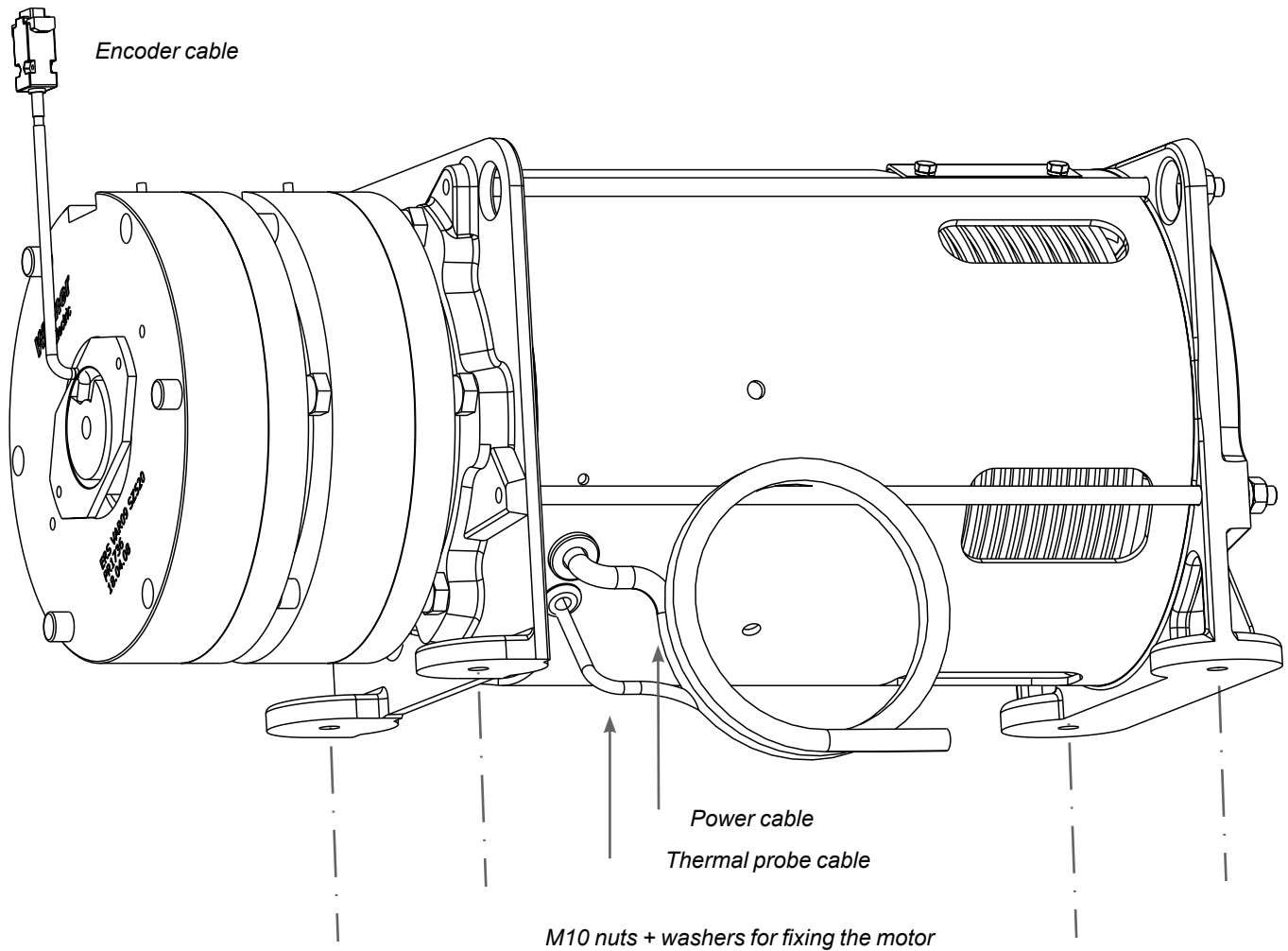


Fig. 4: Motor fixing points

4.1.1 - Cleaning

- Release the brake by supplying it with power (section 4.2.2)
- Remove the protective varnish from the sheave grooves

! Do not use abrasive equipment. Use only a cloth soaked in alcohol. Care must be taken not to get any alcohol or grease on the brake disc.

WARNING: Use the alcohol in a well-ventilated area.

4.1.2 - Mechanical installation

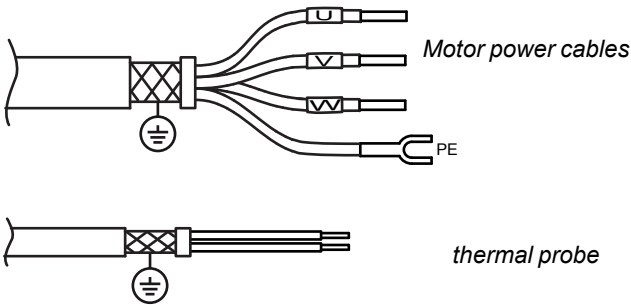
- The GEARLESS machine must be installed on a chassis that is not subject to vibration and must be secured using 4 M10 nuts cl. 8.8 and washers, tightened to a torque of 45 Nm.
- Check that the cables are of the correct type for the sheave.
- When the cables have been installed, refit then tighten the guards.

! There is a high risk of jamming your fingers between the cables and the sheave.

4.2 - Wiring

4.2.1 - Wiring the motor and the thermal probe

The cable shielding must be connected to earth. The cables exit by means of cable glands.



Connect the motor using cables of the correct cross-section (the cables and tags must be sized according to the current: see the table below).

Nominal I (A) per phase	9.5	12	16	25	34	40	46
Min cable section (mm ²)	1.5	1.5	2.5	4	6	10	10

! It is the responsibility of the user to connect the motor in accordance with the current legislation and regulations in the country of use. This is particularly important as regards the size of the cables, the type and size of fuses, the earth or ground connection, powering down, acknowledging insulation faults and protection against overcurrents.

This table is given for information only, and must under no circumstances be used in place of the current standards.

The recommended cross-sections are given for a single-wire cable, with a maximum length of 10 m. Above this, line drops due to the cable length must be taken into account.

Particular care must be taken to tighten the nuts on the terminals. (Incorrect tightening may lead to the connections being damaged by overheating: see diagram Fig. 6)

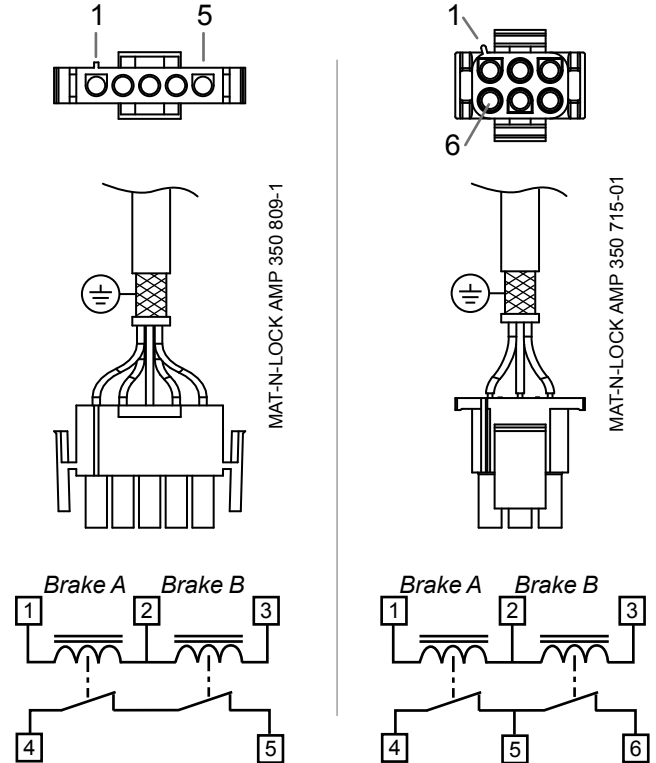
- Connect the power cables to terminals U1, V1 and W1, in accordance with IEC 600034-1.
- Connect the thermal probe to the drive.
- Connect the motor ground to earth.

4.2.2 - Wiring the brakes and microswitches

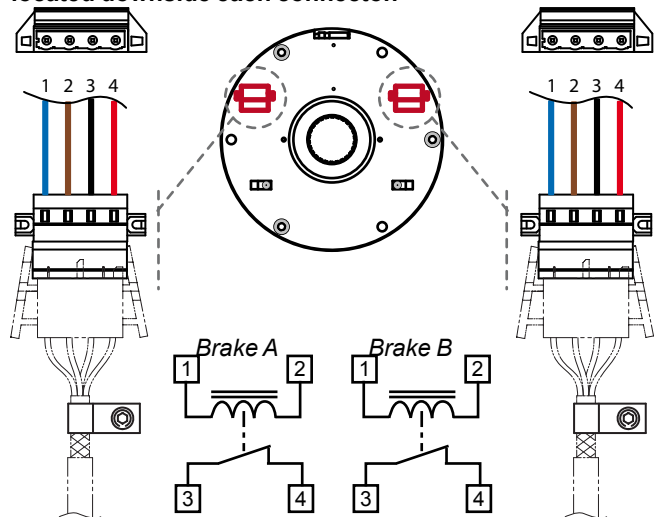
The brake microswitches are «NC» type. If using an optional CDF9 power supply, please refer to the card manual.

3 connections possibilities are available on the XAF range (except terminal box option) :

Cable with 5 pin or 6 pin connector :



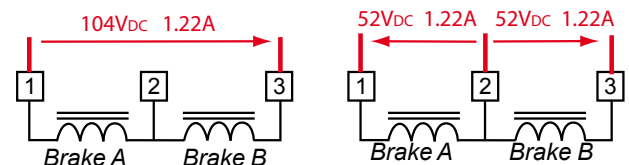
4 pin connector installed on the brake : 2 WAGO 731-604/019-000 connectors are located on the motor back face (brake). Shield cable fixation bracket is located downside each connector.



Brake electrical connection :

Brake inductor voltage and current values on nameplate are given for each brake device.

Example : Holding Voltage : 52V_{dc} / Current : 1.22A



4.2.3 - Encoder wiring

Identify the encoder by means of the reference indicated on the encoder label (Fig. 7)

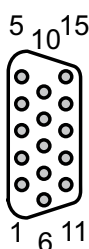
Connect the encoder to the drive with the HD15 socket.

ECN 413 encoder: SinCos encoder with EnDat link

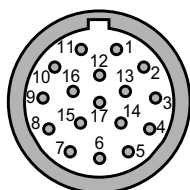
ERN 426 encoder: incremental encoder

CONNECTOR		ENCODER TYPE	
HD15 PIN	M23 17 P	ECN 413	ERN 426
1	15	Cos	A
2	16	CosRef	A/
3	12	Sin	B
4	13	SinRef	B/
5	14	Data	Z
6	17	Data \	Z/
7		-	U
8		-	U/
9		-	V
10		-	V/
11	8	Clock _{out}	W
12	9	Clock _{out} \	W/
13	1 & 7	+5V	+5V
14	4 & 10	0V	0V
15	11	-	-

HD15 male connector



M23 17p male connector



4.3 - Commissioning

Check that the electrical equipment is correctly earthed before starting work.

Before commissioning the machine, check that all the fixings and electrical connections are correctly tightened.

After commissioning, check for:

- Noise
- Vibration
- Operation of the buttons/switches
- Also check the current and voltage on the machine while it is operating with the rated load.

5 - MAINTENANCE/SERVICING

5.1 - After one month's operation

- Check that the screws and electrical connections are correctly tightened.
- Check the vibration. Check that there is no abnormal noise.
- If the brake wear needs to be checked: measure the brake air gap to check that it conforms to the dimension stated in table 1 of appendix 1.

5.2 - Every year

Same as section 5.1.

5.3 - Every 5 years


If the motor is fitted with grease nipples, regrease the bearings in accordance with the information on the nameplate.

6 - BRAKE AND MICROSWITCH ADJUSTMENT PROCEDURE

Correspondence between type of motor/type of brake:

Motor model	Brake model
XAP 2 M	VAR07 SZ 300/300
XAP 2 L	VAR09 SZ 600/500

6.1 - Brake adjustment

 This operation must be made by an agreed Leroy-Somer Service Center.

6.2 - Microswitch adjustment

See appendix 1 section 3.1.

7 - REPLACING THE ENCODER

⚠ Secure the load before any work is carried out on the motor. Check that no torque is applied to the rotor.

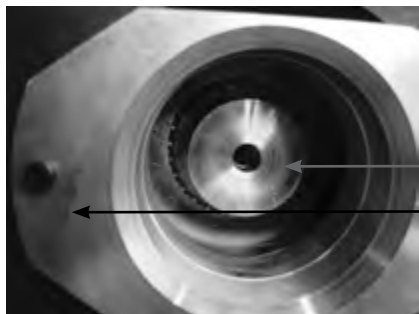


Fig. 9:
encoder support

- Disconnect the encoder.
- Disconnect the brake connector(s).
- Check that the encoder supplied is identical to the one on the motor.

IMPORTANT: Do not dismantle the encoder support piece (Ref. 2 fig. 7) fixed on the brake. It is centremounted in the factory to the nearest 0.1 mm using a special tool.

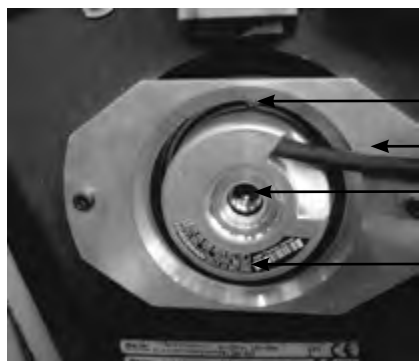


Fig. 7:
Fixing the encoder

7.1 - Dismantling the encoder

- Undo (2 turns with a SW2 spanner) the fixing screw on the encoder casing (Ref. 1 fig. 7) in the support piece.
- Undo the encoder plug (SW4 spanner or screwdriver).
- Undo (SW4 spanner) the central encoder fixing screw (Ref. 3 fig. 9) on the motor shaft.
- Remove the encoder from its support (depending on the model).

7.2 - Reassembling the encoder

- Place the encoder support washer (Ref. 1 fig. 9) on the motor shaft extension. Make sure that it is firmly in place by hitting it gently with a drift and a hammer.
- Undo the new encoder plug (SW4 spanner or screwdriver).
- Insert the encoder in the support piece (Ref. 2 fig. 9) fixed on the brake, then tighten the M5 X 50 chc central screw (SW4 torque wrench) to tightening torque 5 Nm 0/+0.5 Nm. Screw with removable threadlocker to be used a maximum of 3 times.
- Tighten the small M2.5 chc screw (Ref. 1 fig. 7) (SW2 torque wrench or screwdriver) on the encoder casing to a torque of 1.25 Nm 0/-0.2 Nm.
- Retighten the encoder plug (SW4 spanner or screwdriver).
- If necessary, phase the encoder (see drive manual)

8 - REPLACING THE SHEAVE, THE BRAKE AND MICROSWITCHES

8.1 - Replacing the sheave

⚠ As the endshields must be removed to replace the sheave, this operation must be made by an agreed Leroy-Somer Service Center.

8.2 - Replacing the brake and microswitches

⚠ This operation must be made by an agreed Leroy-Somer Service Center.

9 - ORDERING SPARE PARTS

To ensure optimum after-sales service, the following information must be provided with each spare parts order:

- Type and serial number of the motor

and for each spare part:

- Name and (or) reference number of the part

- Quantity ordered.

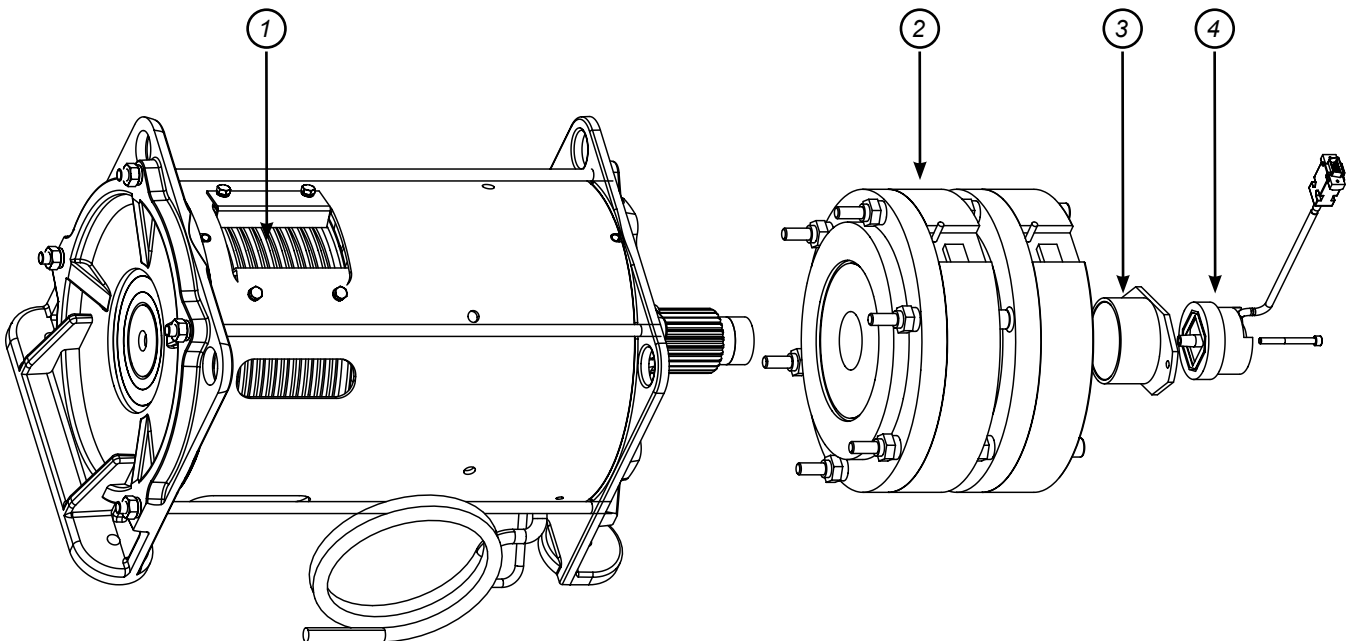
For instant identification, please give the reference of the document used for the order (drawing or manual number). The type and serial number can be found on the nameplate of the motor.



Shields must only be dismantled by an establishment approved by Leroy-Somer.

Part names:

Reference	Name
1	Sheave
2	Complete brake
3	Encoder support
4	Encoder kit
Option	CDF brake motor power supply



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Moteurs Leroy-Somer
Headquarter: Boulevard Marcellin Leroy - CS 10015
16915 ANGOULÈME Cedex 9

Limited company with capital of 65,800,512 €
RCS Angoulême 338 567 258

www.leroy-somer.com