GEARLESS Z4 - Z20
A.C. drive for lift
Installation and maintenance manual
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 (blocked 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 a Z range 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 technology in 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 \( \mathcal{C} \).

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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This document is the property of LEROY-SOMER.
It may not be reproduced in any form without prior authorisation.
All brands and models have been registered and patents applied for.
To ensure that the LEROY-SOMER Gearless Z 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 that is in operation, as it can reach high temperatures.**

Moving motor parts are painted yellow, except for the sheave grooves and brake discs.

**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 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 sheave are protected by a special varnish. This varnish must not be removed during storage.
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.

Greasing
- Bearings which cannot be regreased
  Maximum storage: 3 years. After this time, replace the bearings.
- Regreaseable bearings

<table>
<thead>
<tr>
<th>Storage period</th>
<th>Less than 6 months</th>
<th>More than 6 months Less than 1 year</th>
<th>More than 1 year Less than 5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>The motor can be commissioned without regreasing</td>
<td>Regrease before commissioning, as described in section 5.3</td>
<td>Replace the grease completely</td>
<td></td>
</tr>
</tbody>
</table>

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 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 heat sensor terminals as this may damage them.
If the required value is not reached, dry the motor using internal or external heating.

Drying using internal heating (Fig 2)
Winding connections for drying using internal reheating

- 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.

Check that the ropes 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 ropes.
The motors must be installed in such a way that the cooling air (not too damp, dust-free, and containing no vapour or corrosive gases) circulates freely.

4.1.1 - Cleaning
- Release the brake using the manual release system.
- Remove the protective varnish from the sheave grooves (if it has been applied).

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 rigid chassis and must be secured using 8 bolts and washers, tightened to the torque indicated in the table opposite. The overall chassis mating surface flatness error must be < 0.3 mm.

The bolts must only be tightened when the ropes, car, counterweights and sheave are perfectly aligned.

Before installing the ropes, check that the sheave can be rotated freely by hand when the brakes are released.

Check that the ropes are of the correct type for the sheave.

When the ropes have been installed, refit then tighten the guards.

<table>
<thead>
<tr>
<th>Motor type</th>
<th>Weight (kg)</th>
<th>Min. H (m)</th>
<th>Bolt fixing</th>
<th>Tightening torque (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z4</td>
<td>650</td>
<td>1.0</td>
<td>M20 cl 8.8</td>
<td>377 ±19</td>
</tr>
<tr>
<td>Z6 MR</td>
<td>900</td>
<td>1.0</td>
<td>M20 cl 8.8</td>
<td>377 ±19</td>
</tr>
<tr>
<td>Z6 MRL</td>
<td>900</td>
<td>1.0</td>
<td>M20 cl 8.8</td>
<td>377 ±19</td>
</tr>
<tr>
<td>Z10</td>
<td>1000</td>
<td>1.5</td>
<td>Ø28 cl 8.8 (M24/1+)</td>
<td>652 ±32</td>
</tr>
<tr>
<td>Z12</td>
<td>1200</td>
<td>1.5</td>
<td>Ø28 cl 8.8 (M24/1+)</td>
<td>652 ±32</td>
</tr>
<tr>
<td>Z20</td>
<td>2500</td>
<td>1.5</td>
<td>Ø28 cl 8.8 (M24/1+)</td>
<td>652 ±32</td>
</tr>
</tbody>
</table>

4.1.2.1 - Installation of Gearless Z4 and Z6

There is a high risk of jamming your fingers between the ropes and the sheave.
4.1.2.2 - Installation of Gearless Z6 MRL/Z10/Z12 and Z20

4.1.3 - Terminal boxes

Terminal box for Gearless Z4/Z6/Z10/Z12

Motor terminal block (U, V, W)

Left brake and associated microswitches

Right brake and associated microswitches

Terminal box for Gearless Z20

Microswitches and brake power supply

Thermal probe and ventilation

Internal connection

Do not alter

Motor terminal block
4.2 - Wiring

Wiring the motor and the thermal probe
The cables shielding must be connected to earth. The cables exit by means of cables glands.

![Internal connections of the motor and the thermal probe](image)

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

<table>
<thead>
<tr>
<th>Nominal current (A) per phase</th>
<th>9.5</th>
<th>12</th>
<th>16</th>
<th>25</th>
<th>34</th>
<th>40</th>
<th>46</th>
<th>60</th>
<th>70</th>
<th>96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min cable section (mm²)</td>
<td>1.5</td>
<td>1.5</td>
<td>2.5</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>10</td>
<td>16</td>
<td>16</td>
<td>25</td>
</tr>
</tbody>
</table>

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 cables, with a maximum length of 10 m. Above this, line drops due to the cables 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).

![Correct and Incorrect tightening of nuts](image)

Wiring the brakes and microswitches
Connect the brakes to suit the supply. Connect the microswitches to suit the monitoring. If using an optional CDF power supply, please refer to the card manual. The brake microswitches must be «NC» type, see appendix.

Encoder wiring
Identify the encoder by means of the reference indicated on the encoder label (Fig. 7). Connect the encoder to the inverter with the HD15 socket.

ECN 413 encoder: SinCos encoder with EnDat link

<table>
<thead>
<tr>
<th>HD15</th>
<th>ECN 413</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cos</td>
</tr>
<tr>
<td>2</td>
<td>CosRef</td>
</tr>
<tr>
<td>3</td>
<td>Sin</td>
</tr>
<tr>
<td>4</td>
<td>SinRef</td>
</tr>
<tr>
<td>5</td>
<td>Data</td>
</tr>
<tr>
<td>6</td>
<td>Data¹</td>
</tr>
<tr>
<td>7</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>-</td>
</tr>
<tr>
<td>11</td>
<td>Clock out</td>
</tr>
<tr>
<td>12</td>
<td>Clock out¹</td>
</tr>
<tr>
<td>13</td>
<td>+5V</td>
</tr>
<tr>
<td>14</td>
<td>0V</td>
</tr>
<tr>
<td>15</td>
<td>-</td>
</tr>
</tbody>
</table>

Wiring the forced ventilations
Refer to the indication fitted in the terminal box. Characteristics of each of the forced ventilations:

- Voltage : 24VDC
- Power : 2,5W
- Flow : 54m³/h

The forced ventilations should not be supplied permanently. The motor is equipped with an additional thermal sensor (PTO) that must be used for the control of the forced ventilations. Below is a proposal of connection for a motor equipped with 2 forced ventilations. Before to do the final connection, supply the forced ventilations and check that the air-flow is going from the outside to the inside of the motor.

![Connection diagram for forced ventilations](image)
4.3 - Installing the ropes
- Remove the ropes guards.
- Install the ropes.
- Refit the ropes guards leaving a gap g of between 2 and 4 mm.

Important: When lubricating the ropes, avoid contaminating the friction surfaces of the brake disc.
Use alcohol to clean any traces of grease from the disc.

4.4 - 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

4.4.1 - Optional setting of the brakes stop device
In case of the brakes stop device must be set (see chapter 5 - MAINTENANCE / SERVICING), the procedure below must be followed.

Tools requested for the setting:

1x 0,15mm
1x HEX 4mm
1x SW13
1x Loctite 7400

Instruction:
5 - MAINTENANCE/SERVICING

5.1 - After one month’s operation

- If an excess of dust is witnessed on the brakes and at the vertical of the braking disc, this is necessary to set the brakes stop device (see chapter 4.4.1 Optional setting of the brakes stop device).
- 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

- 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.

5.3 - Every 3 years

For motor end shields fitted with grease nipples, lubricate the bearings with the grease shown on the lubrication nameplate:

<table>
<thead>
<tr>
<th>Motor Bearings</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE : BS2-2213-2CS BS2-2224-2CS</td>
</tr>
<tr>
<td>Grease : LGEP2 (SKF)</td>
</tr>
<tr>
<td>Regreasing interval: 3 years</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Motor type</th>
<th>NDE</th>
<th>DE (sheave)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z4</td>
<td>6310-2RS-C3 X</td>
<td>BS2-2211-2CS 25</td>
</tr>
<tr>
<td>Z6</td>
<td>BS2-2213-2CS 25</td>
<td>BS2-2213-2CS 25</td>
</tr>
<tr>
<td>Z10</td>
<td>BS2-2213-2CS 25</td>
<td>23120-2CS2 40</td>
</tr>
<tr>
<td>Z12</td>
<td>BS2-2213-2CS 35</td>
<td>BS2-2218-2CS 45</td>
</tr>
<tr>
<td>Z20</td>
<td>BS2-2218-2CS 50</td>
<td>BS2-2224-2CS 100</td>
</tr>
</tbody>
</table>

Bears which cannot be regreased are marked « X » in the table below.

X: Bearings which cannot be regreased

* : On the first regreasing, increase these quantities by 15 g
See the position of the grease nipples in section 4.2.1.

6 - BRAKE AND MICROSWITCH ADJUSTMENT PROCEDURE

On each maintenance visit, it is important to check the air gap and that the microswitches are working properly.
Refer to the brake manual in the appendix 1.

7 - REPLACING THE ENCODER, BRAKES AND MICROSWITCHES

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

7.1 - Replacing the encoder

Equipment required:
- T8 TORX screwdriver
- Flat screwdriver

7.1.1 - Dismantling the encoder

- Disconnect the encoder.
- Unscrew the 2 encoder fixing screws on the support (no. 1).
- Unscrew the encoder shaft locking screw on the axis (no. 2).
- Take out the encoder (no. 3).

7.1.2 - Reassembling the encoder

- Tighten the encoder shaft screw on the axis (no. 2) to a torque of 1.1 Nm +/- 0.1 Nm.
- Retighten the 2 encoder fixing screws on the support (no. 1).
- Phase in the encoder (see the procedure in the inverter manual).

![Diagram](image-url)
7.2 - Replacing the brakes

Warning: This operation must be carried out by an approved person.
LS will not accept responsibility in the event of failure to comply with the instructions given in this document. Since the brake is a safety device, it is vital to secure the lift car before performing any work.

Tools required:
- Flat spanners/torque wrenches 19mm.
See the brake manual in appendix 1.

7.2.1 - Dismantling the brakes
- Disconnect the power supply cables on the brake to be replaced or disconnect it in the cabinet (no. 1).
- Remove the ropes guard which links the guide columns (no. 3).
- Release the brake either with an appropriate power supply or with an optional mechanical lever (no. 2). See appendix 1 for the different lever positions.
- Unlock the M12 fixing screws on the brake columns.
Caution: If the screws are stuck; push against the columns with screw + locknut on the opposite side.
- Remove the guide columns then the brake without damaging the linings and the sheave disc.

7.2.2 - Reassembling the brakes

IMPORTANT: The braking torque depends on the state of the surface and the cleanliness of the sheave disc. If necessary, clean any traces of grease with an alcohol-based substance or non-greasy solvent to avoid contaminating the brake linings, then dry the surface with a clean cloth. Do not use abrasive equipment.
- Insert a guide column.
- Insert the brake on the column.
- Release the brake (see section 7.2.1).
- Swivel the brake on the disc (without damaging the linings or the sheave disc).
- Insert the second column.
- Lock the brake column M12 fixing screws on the shield end with removable threadlocker. **Tightening torque: 79 Nm.**
- Refit the ropes guard which links the guide columns (no. 3).
- Lock the brake by releasing the mechanical lever (if present). If necessary, fit the return spring (no. 2).
- Connect the brake power supply cables (no. 1).
- Check the air gap and the microswitches are set correctly (see appendix 1).
8 - 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.

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

Part names:

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>sheave/magnet rotor</td>
</tr>
<tr>
<td>2</td>
<td>Stator</td>
</tr>
<tr>
<td>3</td>
<td>Brake</td>
</tr>
<tr>
<td>4</td>
<td>Encoder kit</td>
</tr>
<tr>
<td>5</td>
<td>Terminal box(es)</td>
</tr>
<tr>
<td></td>
<td><strong>Option</strong> CDF brake motor power supply</td>
</tr>
</tbody>
</table>
SM429gb - rev 04/16

Electrically Released Brake
ERS VAR11-01 FT = 4100 N
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1- EU Declaration of conformity

The Product described in this manual is in conformity with the relevant EU harmonized legislation:

- **Directive 2014/33/EU**  Ensuring lift safety
- **Directive 2014/35/EU**  Electrical safety: Low-voltage electrical equipment
- **Directive 2006/42/EC**  Machinery safety

Evidence of conformity to the Directives is assured through the application of the following standards:

- **DIN VDE 0580:2011**  Electromagnetic devices and components, General requirements.
- **ASME A17.1/CSA B44-2013**  Safety code for elevators and escalators

2- Precautions and Safety Measures

**Precautions and safety measures must be read before any installation or maintenance of the brake.**

Compliance with the instructions and values given by the documentation and marking of the unit is imperative in order to ensure a proper functioning of the brake.

2.1 - Symbols used in this manual

- ⚠️  Action that might damage the brake.
- ⚠️  Action that might be dangerous to human safety.
- ⚠️  Electrical action that might be dangerous to human safety.
- ⚠️  Handling of loads that might be dangerous to human safety.
- ⚠️  Surface temperature that might be dangerous to human safety.
2.2 - Safety precautions for installation and maintenance

During maintenance, make sure that the driving mechanism is stopped and that there is no risk of accidental starting. The intervention must be signaled and the work area delimited.

All intervention must be done by authorized and qualified personnel, having read and understood this manual, using adapted procedures and professional tools. All intervention must be done according the regulation of the country of the installation.

All works on the electrical connections must be done with power off.

Magnetic field generated by the magnet, can create dysfunctions on near machine or device. Users must also be careful about attractions of tools or other devices during interventions.

Due to the magnetic field generated by the magnet, the bearers of a heart pace-maker or an implant must avoid the proximity of the unit.

During operation the brake surface can reach temperatures higher than 80°C. Users must be careful during contact with the unit.

**Respiratory protection**

Inhalation of large amounts of dust can cause coughs and difficulty in breathing.

Respirator must be worn if exposed to friction material dust. [Dust mask FFP2].

Move to fresh air in case of accidental inhalation of dusts.

In the event of persistent symptoms receive medical treatment.

Provide appropriate exhaust ventilation at places where friction material dust can be generated.

Do not use brushes, pressurized air or hazardous agents to clean the brake. The use of a vacuum cleaner is recommended.

**Hand protection**

Protective and dust-resistant gloves.

**Eyes protection**

Friction material dust particles, like other inert materials, may be mechanically irritating the eyes.

Safety goggles with side protection.

In case of contact with eyes, carefully rinse with plenty of water.

In the event of persistent symptoms seek medical treatment.

**Skin protection**

Prolonged skin contact may cause mechanical irritation.

Dust resistant protective clothing.

In case of contact with skin, wash with soap and water as a precaution.

Consult a doctor if skin irritation persists.

**Feet protection**

Safety shoes must be worn.

**Helmet protection**

Safety helmet must be worn.
Protective and hygiene measures
Do not breathe friction material dust.
Wash hands before breaks and at the end of workday.
During maintenance, do not eat, drink or smoke.
Handle in accordance with the general hygienic rules.
Remove and wash contaminated clothes before re-use.

2.3 - Precautions for handling

Avoid any impact or damage to the brake during handling.

To avoid risk of injury (see mass of the units in the service manual of the brake), use an adapted device, hoist or crane, for the handling of the unit.

When handling, use the handling holes intended for this purpose.
Never lift the brake using the coil cables.

2.4 - Precautions on use

Customer is responsible of brake qualification with his interface in order to guaranty that brake performances are not reduced.
This brake is designed to work in dry conditions. Any contact with oil, grease, water or abrasive dust causes a decrease in torque.

Warning: It is the responsibility of the customer to install the necessary protection to prevent pollution of the friction surfaces and to ensure that these same friction surfaces are thoroughly degreased and clean before mounting the brake.

Torque subject to decrease in case of water contamination.

This brake is designed to work in ambient temperature between 0°C and 40°C.

Warning: at low temperature, any freezing of the friction face, due to condensation, generates a loss of torque. It is the responsibility of the customer to take measures to avoid this problem.

This brake is designed to work with duty cycle of 50% (Insulation class: 155°C).

This brake may only be used in a “horizontal axis”. The customer must be careful not to alter the factory-set airgap and the working clearance of the brake and the hand lever.

When switching on DC-side the coil must be protected against voltage peaks, according DIN VDE0580.

Make sure the rated supply voltage is set within the tolerances, an under-voltage supply, generates a reduction of the maximum air gap.

An over-voltage supply generates additional heat on the surface of the brake, with risks of injury by burning and possible damage to the coil.

Emergency braking: for emergency braking the switching OFF must be connected on DC current side, in order to obtain short engaging time of the brake.

Service braking: for service braking, the switching OFF and ON must be connected on AC current side, in order to obtain silent switching.
2.5 - Restrictions on use

Any modification made to the brake without the express authorisation of a representative of Warner Electric, as far as, any use out of the contractual specification accepted by "Warner Electric", will result in the warranty being invalidated and Warner Electric will no longer be liable in any way with regard to conformity.

If maximum rotation speed is exceeded, the guarantee is no longer valid.

The brake must be replaced it is submitted to water projections.

For the brake to comply with directive 2014/33/EU, the installer must observe the general conditions for installations and use as defined in the EU type certificate, drawn up by the TÜV SÜD Industrie Service (see EU-BD number in table 1), including the mandatory use of a speed limiting device, in compliance with EN 81-20 paragraphs 5.6.2.2.1 and 5.6.6.10. Under no circumstances, this device can replace the system case against the car overspeed in the descending phase.

The customer must be careful to not alter the factory set parameters: Microswitch adjustment.

This brake must not be dismantled.

This brake is designed for static applications. Dynamic brakings are restricted to emergency braking and test braking.

When connecting the conduits on the conduit box (see Fig. 4), the customer must avoid any restraint, able to prevent the self-floating of the brake.

Unless otherwise specified in the manual service, this range of product is not designed to be used according 2014/34/EU directive “Equipment for explosive atmospheres” (ATEX).

3- Storage

These devices are delivered in a package guaranteeing the preservation of the product providing it is by surface transportation.

In case of a specific request (air or sea transport, long-term storage, etc) contact our factory.
4- Technical Specification

4.1 - Brake description

4.2 - Technical data

Table 1

<table>
<thead>
<tr>
<th>Certificate:</th>
<th>ERS VAR11-01 FT = 4100 N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Directive 2014/33/EU</td>
<td>EU-BD 775</td>
</tr>
<tr>
<td>- Norm EN81-20&amp;50 *</td>
<td>ABV 775/1 - ESV 775</td>
</tr>
<tr>
<td>Directive 95/16/EC</td>
<td></td>
</tr>
<tr>
<td>- Norm EN81-1+A3**</td>
<td></td>
</tr>
</tbody>
</table>

CAUTION: Use a power supply with overexcitation

<table>
<thead>
<tr>
<th>Tangential force of braking</th>
<th>N</th>
<th>4100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overexcitation voltage Vdc</td>
<td>207</td>
<td>103</td>
</tr>
<tr>
<td>Holding voltage Vdc</td>
<td>103,5</td>
<td>52</td>
</tr>
<tr>
<td>Overexcitation power Watt</td>
<td>204</td>
<td>176</td>
</tr>
<tr>
<td>Holding power Watt</td>
<td>51</td>
<td>44,5</td>
</tr>
<tr>
<td>Resistance Ω</td>
<td>210</td>
<td>60,8</td>
</tr>
<tr>
<td>Maximum linear speed (outer Ø of pulley) m.s⁻¹</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Nominal static torque Nm</td>
<td></td>
<td>See curve on customer's drawing</td>
</tr>
<tr>
<td>Nominal Air gap mm</td>
<td>0,3</td>
<td>+0,1/0</td>
</tr>
<tr>
<td>Maximum Air gap (after wear) mm</td>
<td>0,6</td>
<td></td>
</tr>
<tr>
<td>Cyclic duration factor ED</td>
<td></td>
<td>60%</td>
</tr>
<tr>
<td>Maximum force on the hand lever N</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>Weight Kg</td>
<td></td>
<td>14,3</td>
</tr>
</tbody>
</table>

* Brakes produced from 20 April 2016
** Brakes produced until 19 April 2016
4.3 - Labeling details

Braking unit labels (example)

In case of presence of QR code label, here is the information contained.

<table>
<thead>
<tr>
<th>Identify</th>
<th>Data Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Product name</td>
</tr>
<tr>
<td>2</td>
<td>Release (NA)</td>
</tr>
<tr>
<td>3</td>
<td>Revision (NA)</td>
</tr>
<tr>
<td>4</td>
<td>Identification number</td>
</tr>
<tr>
<td>5</td>
<td>Serial number</td>
</tr>
<tr>
<td>6</td>
<td>Batch number (NA)</td>
</tr>
<tr>
<td>7</td>
<td>Manufacturer name</td>
</tr>
<tr>
<td>8</td>
<td>Manufacturer postal code</td>
</tr>
<tr>
<td>9</td>
<td>Manufacturer town</td>
</tr>
<tr>
<td>10</td>
<td>Manufacturer country code</td>
</tr>
</tbody>
</table>

Encoded date details:

Example: YN16 is, 2010, 16th February
5- Installation

5.1 - Customer Interface Specification

Customer friction disc specification:

- Material: Steel (150 to 250 HV) or cast iron,
- Roughness: Ra <1,6
- Thickness of the friction disc: 15 mm +0/-0,1,
- Finishing: Dry phosphate with manganese or Nitriding
- Geometrics tolerances:

Data for mounting pins:

- Material: Steel (min. 900 N/mm2), diameter 25h8,
- Roughness: Ra ≤0,8
- Protection: Dry phosphatizing or Nitriding
- Geometrics tolerances:

5.2 - Hand lever configuration

According to the hand lever side of actuation, the customer must fit the pins, for limitation of the hand lever travel, in the selected position. Dimension of the pin out of the magnet: 6 max. (See Fig. 9).
5.3 - Brake Mounting

Reminder:
Precautions and safety measures must be read before any installation or maintenance of the brake. Compliance with the instructions and values given by the documentation and marking of the unit is imperative in order to ensure a proper functioning of the brake.

- Avoid any impact or damage to the brake during handling.
- Never lift the brake using the coil cables.
- This brake is designed to work in clean conditions. Friction faces must be kept completely clean of any oil, water, grease or abrasive dust.
- The brake is delivered pre-assembled with pre-set microswitches and airgaps.
- Engage the brake, armature attracted under voltage or with hand release, on his disc.
- Mount the mounting pins, then the connecting bar and tighten with the indicated torque for the locknuts.

5.4 - Stroke limiter

Warner Electric Europe recommend on each brake the installation of a “Stroke Limiter” equipped with a control screw and counter nut to minimize lining wear. Warner Electric Europe proposes a standard stroke limiter Ref. 212096597 – 30327321 (see Service Manual Ref. SM476gb). However, due to the varying characteristics of the overall drive systems, the specifics of the application, and the varying conditions under which VAR11-01 brakes are utilized, it is ultimately the responsibility of the customer to determine the need for a Stroke Limiter based on the conditions under which the VAR11-01 brakes will operate. If the customer is unable to use a stroke limiting device as recommended by Warner Electric Europe, then it is the sole responsibility of the customer to identify, design, qualify and implement an equivalent device.
6- Electrical Connection

Brake **ERS VAR11-01** operates on a direct current supply. Polarity does not affect the brake operation.

All works on the electrical connections have to be made with power off.

Make sure that the nominal supply voltage is always maintained. A lack of power results in a reduction to the maximum air gap.

When switching on DC-side the coil must be protected against voltage peaks, according DIN VDE0580.

**Emergency braking**: for emergency braking the switching OFF must be connected on DC current side, in order to obtain short engaging time of the brake.

**Service braking**: for service braking, the switching OFF and ON must be connected on AC current side, in order to obtain silent switching.

The connecting wires must be thick enough to help prevent sudden drops in voltage between the source and the brake.

<table>
<thead>
<tr>
<th>Cable length m</th>
<th>0 -&gt; 10</th>
<th>10 -&gt; 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross section mm²</td>
<td>1.5</td>
<td>2.5</td>
</tr>
</tbody>
</table>

**Table 2**

Tolerances on the supply voltage at the brake terminals: +5% / -10%.

6.1 - Microswitch Technical Data

According to versions, the brake is supplied either with a male connector, or with free wires of 1500 mm length (see chapter 6.3).

- Normally closed (Connector version) =>

- Normally closed or normally opened, with the choice. (Free wires version) =>

- **Current range**: 10 mA à 100 mA at 24 Vdc

- For maximum electrical lifetime of the microswitch ensure switching under resistive load only.
6.2 - Grounding

To be compliant with VDE 580, the customer must ground the brake (see Fig. 1). Grounding screw and safety washer supplied.

6.3 - Connector / free wires

According to versions, the brake is supplied either with a male connector (Fig. 5), which is linked to the coil and the microswitch, or with free wires of 1500 mm length (Fig. 6).

**Male connection supplied with the brake**
AMP male connector ref: 003507791
AMP contact ref. 926-894-1

**Female connection (not supplied)**:
AMP female connector ref: 003507801
AMP contact ref. 926-893-1 (indicative)

The brake version with free wires is supplied with conduit box where it is possible to connect a protective sheath.

⚠️ When connecting the conduits on the conduit box (Fig. 6), the customer must avoid any restraint, able to prevent the self-floating of the brake.
7- Maintenance

7.1 - Air Gap Checking

Check the air gap at each maintenance inspection.

This brake is intended for a static application as a safety brake. Any dynamic braking is restricted to emergency and test braking. Under no circumstances, this device can replace the system case against the car overspeed in the descending phase.

Do not introduce the feeler gauge more than 10 mm into the air gap.
Avoid the springs and the dampers of noise.

Any modification made to the brake without the express authorisation of a representative of Warner Electric, as far as, any use out of the contractual specification accepted by "Warner Electric", will result in the warranty being invalidated and Warner Electric will no longer be liable in any way with regard to conformity.

The customer must be careful to not alter the factory set parameters: Microswitch adjustment, air gap adjustment and dampening system. This brake must not be dismantled.

The airgap adjustment must be reset before the max. airgap is reached. This to eliminate any functional problems because of the hand release travel. We therefore require to perform dynamic brakings (According ASME A17.1/ CSAB44 - 2013) in order to validate the installation.

- Slide two feeler gauges 0,3 mm thick in the airgap, avoiding the dampers, between the armature and the magnet (Fig. 7).
- Energize magnet.
- Tighten the airgap adjusting screws H M12 (18 A/F), until you reach contact, with a torque of 2 Nm.
- Tighten the counter nut (18 A/F) with a torque of 40 Nm ± 4 Nm in holding the screw to avoid it rotating.

Replace brake when space between screw-head and counter-nut, (see Fig. 2) **A < 1,5mm**.
7.2 - Brake exchange

During maintenance, make sure that the driving mechanism is stopped and that there is no risk of accidental starting. The intervention must be signaled and the work area delimited.

All intervention must be done by authorized and qualified personnel, having read and understood this manual, using adapted procedures and professional tools. All intervention must be done according the regulation of the country of the installation.

**Warning:** It is mandatory that disassembling and assembling of the encoder is done according the instructions of the drive manufacturer.

**Warning:** not to damage the electric cables during the maintenance action.

These brakes are designed to work in dry conditions. Any contact with oil, grease, water or abrasive dust causes a decrease in torque.

- Disconnect the electrical connection, of the brake.
- Remove the brake.
- Clean the friction surfaces with a clean dry cloth.
- Mount the new brake, following the instructions in chapter 5.2.

**Warning:** after replacement, it is necessary to make a dynamic braking test in order to check the compliance to the applicable standards and to validate the installation.

7.3 - Detection setting

- Slide a wedge 0,10 mm thick close to the screw between the face of the magnet and the moving armature.
- Switch on the current and tighten the adjusting screw H M5 (8/flat) in contact with the microswitch until you reach the commutation point.
- Check that it functions correctly by a few successive draws and releases (see Fig. 9).
- Fit again a 0,10 mm thick gauge and check if the adjustment is stable.
- Fit a 0,15 mm thick gauge and check that the microswitch is not actuated.

![Fig. 9](image-url)
7.4 - Microswitch exchange

During maintenance, make sure that the driving mechanism is stopped and that there is no risk of accidental starting. The intervention must be signaled and the work area delimited.

All intervention must be done by authorized and qualified personnel, having read and understood this manual, using adapted procedures and professional tools. All intervention must be done according the regulation of the country of the installation.

**Warning:** not to damage the electric cables during the maintenance action.

- Unplug the microswitch
- Remove the microswitch fixing screws
- Replace the microswitch
- Tighten the fixing screws to the torque of 0.8 N.m (±10%)
- Re-connect microswitch wires (see chapter 6.1)
- Set the detection as it is shown in the chapter 7.3

8- Spare parts

Available spare parts for this brake are the following:

- Microswitch

Please, join to your spare part request the following information:

- Warner Electric Europe Reference
- Production Number
- Serial Number
- Production Date

---

![Fig. 10](image-url)
## 9- Tooling

<table>
<thead>
<tr>
<th>Tools</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeler gauge</td>
<td>Airgap &amp; microswitch adjustment</td>
</tr>
<tr>
<td>Open jawed spanner 18 mm A/F</td>
<td>Airgap adjustment</td>
</tr>
<tr>
<td>Torque wrench (measurement range &gt; 50 Nm) with open ended spanner attachment 18 mm A/F</td>
<td>Airgap adjustment</td>
</tr>
<tr>
<td>Open jawed spanner 8 mm A/F</td>
<td>Microswitch adjustment</td>
</tr>
<tr>
<td>Multimeter</td>
<td>Voltage checking</td>
</tr>
</tbody>
</table>

## 10- Troubleshooting

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible</th>
<th>Cause Remedy / Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brake doesn’t release</td>
<td>Voltage too low</td>
<td>Re-set voltage</td>
</tr>
<tr>
<td></td>
<td>Power supply is interrupted</td>
<td>Re-connect the support supply, check detection</td>
</tr>
<tr>
<td></td>
<td>Air gap too large</td>
<td>Rep-adjust the airgap and check “stroke limiter” adjustment</td>
</tr>
<tr>
<td></td>
<td>OEX time too short</td>
<td>Re-set OEX time</td>
</tr>
<tr>
<td></td>
<td>Coil damaged</td>
<td>Replace the brake</td>
</tr>
<tr>
<td>Brake doesn’t brake</td>
<td>Voltage present at switch OFF position</td>
<td>Check detection and customer’s power supply</td>
</tr>
<tr>
<td></td>
<td>Grease on friction faces</td>
<td>Clean the friction faces and replace the brake</td>
</tr>
<tr>
<td></td>
<td>Hand release lever actuated</td>
<td>Release the lever</td>
</tr>
<tr>
<td>Nuisance braking</td>
<td>Voltage too low</td>
<td>Re-set voltage</td>
</tr>
<tr>
<td></td>
<td>Wrong information from microswitch</td>
<td>Re-set detection</td>
</tr>
</tbody>
</table>

## 11- Contact

Any question? You can contact us at: info@warnerlectric-eu.com

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GEARLESS Z4 - Z20
A.C. drive for lift