Lock bewegt.

Lock moves.

www.lockdrives.com
1 Declaration of Incorporation according to Machinery Directive 2006/42/EC, Appendix II, No. 1B

Lock Antriebstechnik GmbH
Freimut-Lock-Strasse 2
D-88521 Ertingen · Germany

We declare herewith that the following partly completed machinery is only intended to be incorporated into or assembled with other machinery or equipment as defined in Article 2g:

Power drives EWA 10 / EWA 12 / EWA 14 / EWA 16

The specific technical documents pursuant to Appendix VII Part B have been completed and will be made available to the competent national authority by mail on request.

This partly completed machine complies with the requirements of the following EC Directives:

EC Machinery Directive 2006/42/EC
EC EMC Directive 2004/108/EC

The following harmonised standards (or parts of these standards) have been applied:

DIN EN ISO 12100-1, -2:04/2004
Safety of Machinery: Basic concepts, general principles for design
DIN EN ISO 14121-1, 12:04/2007
Safety of Machinery: Risk assessment
DIN EN ISO 60204-1, 12:04/2007
Safety of Machinery: Electrical equipment of machines
DIN EN 60034-5:09/2007
Rotating electrical machines (only electric motors)

This partly completed machine may only be commissioned when it has been determined that the machinery, in which this partly completed machine is to be installed, complies with the provisions of the Machinery Directive.

Authorised representative responsible for compiling the technical documentation:
M. Bausch (address as above)
Frank Lock
President
Eringen, 06.11.2012

Thank you for choosing a Lock EWA 10/12/14/16 power drive.

As the leading manufacturer for natural ventilation and shading, we are committed to achieving the highest quality demands from our customers. We ask you to follow these Assembly Instructions during installation and setting in order to satisfy these high demands during later application as well.

Please contact us should any questions or problems arise. To call the Service Team:
Hotline Germany: +49 7371 9508-22
Hotline Benelux: +31 174 212833
Hotline North America: +1 (877) 562 5487

Your Lock Team
2 Explanation of Symbols and Safety Information

2.1 Explanation of symbols

**Warning information**

Warnings included in the text are marked with a triangular icon and the text framed.

A lightning symbol replaces the exclamation mark in the triangular icon to identify risks through electricity.

Signal words at the start of the warning information indicate the type and severity of consequences when measures to prevent risks are not followed.

- **NOTICE** means property damage can occur.
- **CAUTION** means light or medium personal injuries can occur.
- **WARNING** means serious personal injuries can occur.
- **DANGER** means personal injuries dangerous to life can occur.

**Important information**

Important information without risks for persons or property are identified with the symbol shown. The information is also framed.

### Further symbols

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>➤</td>
<td>Activity</td>
</tr>
<tr>
<td>T</td>
<td>Torque in Nm for 40 °C (104 °F) ambient temperature and 1000 m (3280 ft) above sea level</td>
</tr>
<tr>
<td>n</td>
<td>Rated speed in 1/min or min⁻¹ (rpm)</td>
</tr>
<tr>
<td>P</td>
<td>Power input for motor in kW</td>
</tr>
<tr>
<td>I</td>
<td>Current in A</td>
</tr>
<tr>
<td>U</td>
<td>Rated voltage in V</td>
</tr>
</tbody>
</table>

- Power type:
  - “3~” AC voltage, 3-phase
  - “1~” AC voltage, 1-phase
  - “=” DC voltage

<table>
<thead>
<tr>
<th>AL</th>
<th>Overall drive length in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD</td>
<td>Motor diameter in mm</td>
</tr>
<tr>
<td>WL</td>
<td>Output shaft length in mm</td>
</tr>
<tr>
<td>We</td>
<td>Type of shaft end</td>
</tr>
<tr>
<td>m</td>
<td>Weight in kg</td>
</tr>
<tr>
<td><img src="image" alt="Output shaft rotation direction" /></td>
<td>Output shaft rotation direction</td>
</tr>
<tr>
<td><img src="image" alt="Version &quot;A60&quot; suitable for outdoor installation" /></td>
<td>Version &quot;A60&quot; suitable for outdoor installation</td>
</tr>
<tr>
<td><img src="image" alt="Parts carrying voltage" /></td>
<td>Parts carrying voltage</td>
</tr>
<tr>
<td><img src="image" alt="Disconnect power supply and observe Installation Instructions" /></td>
<td>Disconnect power supply and observe Installation Instructions</td>
</tr>
</tbody>
</table>

Refer to the drive type plate and the relevant product catalogue for technical data.
2.2 Safety information

General safety information

Before installing the drive, read the Installation Instructions carefully and thoroughly. Follow the sequence of steps in the Installation Instructions exactly. Follow all specifications in the Installation Instructions, in particular, all details concerning safety, operation, maintenance and repair. Keep the Installation Instructions during the complete production service life and pass them on to the user/end customer.

- Disconnect the power supply before carrying out any work on the drive.
- Clear and leave the danger zone before reconnecting the power supply.
- Injuries to persons and damage to property cannot be excluded in the event of faulty installation, start-up, maintenance, etc., because of the high torque of the drive.
- Due to the high torques, there is a risk of overloading the drive if electrical connection limits are exceeded.
- Persons are not permitted to be present in the danger zone of suspended loads.
- Screws, couplings or other parts may not be loosened while the drive is under load.
- Also observe local national regulations, standards and guidelines as well as safety and accident prevention regulations.

Warnings on risks and residual risks

- Disconnect the power supply before carrying out any work on the drive and secure the drive against being switched on again, e.g. with a lock. This also applies to auxiliary power lines such as, e.g., limit switches or standstill heating. Just switching the control to “Stop” is not sufficient. The drive can move even in the “Stop” position as a result of higher ranking functions such as wind or rain signals.
- When all technical specifications are complied with, the drive is designed for a service life conforming to drive group 1Cm according to DIN 15020.
- Attachments or driven parts can have shorter service lives than the drive.
- When using a 3-phase mains connection, a phase reversal in the power supply system reverses the drive’s rotational direction. The limit switches are ineffective if phases are switched.
- The drives are fitted with self-locking devices for design reasons. Nevertheless, a failure of the self-locking device cannot be completely excluded (self-locking = the output shaft remains in its position after the motor is switched off, even under load).
- There is a danger of becoming entangled or crushed by attachments or driven parts.
- The drive temperature can rise above 60°C (140°F). Provide, e.g. protection against touching or contact.
- Despite careful planning and maintaining all regulations, not all risks can be excluded.

2.3 Qualified personnel

All the work described in the following must be carried out by qualified personnel. Qualified persons are those who, based on their training, experience or instruction (e.g. installers certified by Lock) as well as their knowledge of relevant standards, regulations, accident prevention rules and plant conditions, are authorized by those responsible for plant safety to carry out such work, and can recognise and avoid possible risks.
3 Product Identification

3.1 Manufacturer
Lock Antriebstechnik GmbH
Freimut-Lock-Strasse 2
D-88521 Ertingen · Germany

3.2 Identification

<table>
<thead>
<tr>
<th>Power drive</th>
<th>Article number</th>
<th>Type</th>
<th>Torque T</th>
<th>Article number</th>
<th>Rated speed n</th>
<th>Version A60, outdoor model/animal shed</th>
<th>Batch number</th>
<th>Limit switch type</th>
<th>Customer order number</th>
<th>Rated voltage U</th>
<th>Year/month of manufacture</th>
<th>Shaft end We</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EWA 12210</td>
<td>10</td>
<td></td>
<td>12212</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>EWA 12212</td>
<td>12</td>
<td></td>
<td>12214</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>EWA 12214</td>
<td>14</td>
<td></td>
<td>12216</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.3 Type plate

Electric motor (example)

<table>
<thead>
<tr>
<th>1 Motor type</th>
<th>2 Power drive type</th>
<th>3 Number of phases</th>
<th>4 Motor serial number</th>
<th>5 Article number of motor manufacturer</th>
<th>6 Motor technical data</th>
<th>7 Motor power-on duration</th>
<th>8 Protection class IP (DIN EN 60529)</th>
<th>9 Insulation material class, electric motor</th>
<th>10 CE symbol, electric motor</th>
</tr>
</thead>
</table>

4 Intended Use

4.1 Application
For the exact product description of the delivered version, see the delivery note and type plate.

Special drive exclusively for ventilation and shading, for
- Roof ventilation: Ridge-mounted overhead glazing, e. g. greenhouses, garden centres, offices, halls, animal sheds, ventilation for multispan greenhouses
- Side ventilation: Ridge-mounted overhead glazing, e. g. greenhouses, facades, halls, roller shades for animal sheds and greenhouses
Shading: E. g. rope or rack shading in greenhouses, vertical blind systems on facades

Special drive to position flaps and sliders after consultation with the manufacturer.

Available special versions include the following (not available for every type):
- Version A60, outdoor model/animal shed
- Version with special motor/with frequency converter

4.2 Operating conditions

The following operating conditions apply when using the drive:
- Refer to the type plate and relevant product catalogue for torques, supplementary installation dimensions and further technical data
- Do not use the drive for continuous operation, maximum power-on time relative to 60 minutes: 1 cycle S3/40 % and 5 cycles S3/20 % (i. e. 1 cycle with 4 minutes running time and 6 minutes standstill as well as 5 cycles each with 2 minutes running time and 8 minutes standstill possible within 60 minutes). Drive group 1Cm according to DIN 15020.
- Ambient temperature range for operation with standard drive; at rated speed 1–5 rpm: –5 °C (23 °F) up to +60 °C (140 °F); at rated speed 6–9 rpm: +5 °C (41 °F) up to +60 °C (140 °F). See the catalogue for other versions. Humidity up to maximum 90 %, short peaks up to 100 % are possible.
- The drive can be installed in any position
- Maximum force on output shaft (distance from housing 50 mm (1.97 in)); Radial 5000 N (1124 lb), axial 400 N (90 lb)
- Fall protection is mandatory during operation involving lifting free-hanging loads (not persons) such as, e. g. suspended heating, assimilation lights or when stricter safety factors must be maintained
- Suitable for “cold smoke venting” in sprinkled sales rooms, e. g. in Germany according to the Sales Area Directive, and in sprinkled industrially used rooms, e. g. in Germany according to the Industrial Building Directive 03/2000
- Functionally capable for ambient temperature of 105 °C (221 °F) (trigger temperature 72 °C (162 °F)) in short-time operation of 4 minutes max. with a maximum of 55 % of the specified maximum torque T
- The service life of the drive is increased considerably when using duty cycles which allow the drive to cool off regularly
- Lower loads and shorter power-on times considerably lengthen the service life

Special versions are available to extend the application options.

4.3 Restrictions in usage

The following restrictions are applicable for drive usage:
- Do not load the drive with torques greater than the maximum torque T.
- Do not use the drive for operating parts in areas frequented by people (accessible area). Observe safety distances according to ISO 13857.
- Do not subject the drive to direct rainfall/overhead irrigation.
- Do not use the drive to actuate smoke and heat extraction equipment according to DIN 18232.
- Do not use the drive to actuate automatically opening and closing doors or gates.
- Do not use the drive in potentially explosive atmospheres unless explicitly planned for such use.

Constructional alterations/modifications to the drive are prohibited. The manufacturer accepts no liability for any violation thereof.

4.4 Misuse

Explicit warning is given for misuse under the following circumstances:
- Do not use the drive to lift free-hanging loads in areas where persons are present.
- Do not use the drive for transporting people (e. g. as passenger lift or similar).
4.5 Storage

Observe the following information on storage:
- Store in a well ventilated, dry room
- Protect against ground dampness by storing on shelves or wooden grates
- Cover to protect against dust and dirt
- Treat unpainted surfaces with suitable anticorrosive agents

5 Installation

Only allow qualified personnel to carry out installation work.

5.1 Installing the drive

5.1.1 Transport

**NOTICE:**
The maximum torque for the couplings must not be exceeded. For torques ≥ 600 Nm (5310 lbf-in), especially on version EWA 16, the torque must be transferred equally at both shaft ends. Even coupling load can be achieved by positioning the drive in the middle of the output chain.

**DANGER:**
Danger to life through falling objects!
Falling objects can endanger persons.
- Cordon off the danger zone with barrier tape.
- Use a lifting platform or fasten the drive to the drive shaft on the lifting equipment using suitable lifting straps.

5.1.2 Base mounting

- Fasten the drive loosely to the console on the housing feet using four M12 screws (EWA 12, EWA 14, EWA 16) or M10 screws (EWA 10) and 4 lock nuts. Minimum screw strength 8.8.

The output shaft and output tube must be flush.
- Use a flexible coupling in case of an alignment error.

- Position spacer shims under the fastening element to align the output shaft and output tube.
- Screw the drive tight with the 4 screws and tightening torque 50 Nm (442 lbf-in) (M10) or 80 Nm (708 lbf-in) (M12).

Determine which screws and tightening torques are suitable when installing with wood screws or dowels.
5.1.3 Side installation

The screws (EWA 10, EWA 16) or foot screws (EWA 12, EWA 14) provided can be used when these correspond to the screw-in depth in the Table.

- Pay attention to the screw-in depth and install the drive loosely on the console by screwing 4 screws into the fixing openings. Minimum screw strength 8.8.
- Screw the drive tight with the 4 screws and tightening torque 50 Nm (442 lbf-in) (M10) or 80 Nm (708 lbf-in) (M12).

<table>
<thead>
<tr>
<th>Type</th>
<th>Screw size</th>
<th>Screw-in depth in drive, min/max</th>
</tr>
</thead>
<tbody>
<tr>
<td>EWA 10</td>
<td>M10</td>
<td>10/12 mm</td>
</tr>
<tr>
<td>EWA 12</td>
<td>M10</td>
<td>10/12 mm</td>
</tr>
<tr>
<td>EWA 14</td>
<td>M10</td>
<td>10/12 mm</td>
</tr>
<tr>
<td>EWA 16</td>
<td>M12</td>
<td>12/15 mm</td>
</tr>
</tbody>
</table>

The output shaft and output tube must be flush.
- Use a flexible coupling in case of an alignment error.
- Screw the drive tight with the 4 screws and tightening torque 50 Nm (442 lbf-in) (M10) or 80 Nm (708 lbf-in) (M12).

5.2 Installing the gear ventilation

The gear ventilation serves to prevent excess or low pressure in the gearbox housing.

- Use the following Figures to determine the correct position for the ventilation screw depending on the installation position.

- The ventilation screw is located under the limit switch cover, see Section 5.4.
- Replace the ventilation screw with the determined screw and reuse the existing copper sealing ring.
- Keep the exchanged screw.
5.3 Fitting the coupling

5.3.1 Installing the chain coupling KKS

Lock offers chain couplings to compensate small alignment inaccuracies of 1° and 6°. The various types cannot be combined together.

- Install both coupling halves onto the output shaft and output tube using the screws provided (tightening torque 40 Nm (354 lbf-in)) and secure these, for example, for hexagonal shaft (We66) or key shaft (We19) using the retaining ring provided. Make sure the coupling has no axial movement and therefore can not slip from the shaft.

- Turn the coupling halves until the teeth are aligned.

- Place the double chain around the teeth of the coupling halves so that the chain ends are at the top.

- Install the chain as shown in the following figures.

5.3.2 Installing the bush coupling BKS

- Install the bush coupling onto the output shaft of the drive and output tube using the screws provided (tightening torque 40 Nm (354 lbf-in)) and secure these, for example, for hexagonal shaft (We66) using the retaining ring provided. Make sure the coupling has no axial movement and therefore can not slip from the shaft.

5.3.3 Installing the flange coupling FKS

- With flange couplings, align the drill holes of both coupling halves to each other and tighten the 3 M10 screws with 50 Nm (442 lbf-in).

5.4 Setting the limit switch

The installed E20 or E20S limit switch covers a switching range from 0 – 580 revolutions (EWA 10, EWA 12, EWA 14) or 0 – 395 revolutions (EWA 16) of the output shaft. Limit switch E20S differs from limit switch E20 in that it has an additional secondary switch.

Go to www.lockdrives.com to see an animation on setting the limit switch.
The following switch functions are preset:
– Switch "HI" switches rotation direction "I" off
– Switch "HII" switches rotation direction "II" off

► Remove the limit switch cover and the rubber seal.

EWA 16: This rubber seal serves as parts mount and is stored loose in the limit switch compartment; it must be kept outside the limit switch compartment together with these Installation Instructions after setting is completed.

► The potentiometer of the position repeater can be removed temporarily when it is in the way when setting the limit switch.

► Make sure the 6 screws on the adjusting rings are loose and the limit switch rollers are positioned in the recesses of the adjusting rings. The limit switch rollers must not be tilted. The 6 screws must be in a line. This corresponds to the delivery state, see also the following Figure.

► Connect a drill with the adapter from the rubber seal to the motor shaft drive.

► Use the drill to turn in rotation direction "I" (see rotation direction arrow next to the output shaft) up to the end position.

► Use the Allen key from the rubber seal to tighten the 3 adjusting ring screws of limit switch "HI" as follows: First position the screws by turning the thin end of the Allen key until the tip of the set screw makes contact. Now tighten the screws with 3 – 4 turns. Do not tighten too tight otherwise the limit switch gear jams and the gear can be severely damaged.

NOTICE:
Use suitable covers to protect the installation area against moisture and dust when plant start-up/completion is to be interrupted.

NOTICE:
When using a drill and adapter, run the drill at low speeds, max. 1400 rpm, and approach the end positions slowly. Do not use an impact screwdriver!

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A torque spanner can be used as an alternative, tightening torque 0.17 Nm (1.5 lbf-in). A suitable hexagon SW 1.5 mm (0.06 in) torque spanner is available as a Lock accessory.

NOTICE:
Always tighten the screws in all 3 adjusting rings of each rotation direction!

Turn the drive to the other end position as previously described.

Tighten the 3 adjusting ring screws of limit switch “II” as previously described.

NOTICE:
Ensure the limit switch compartment is dry or dry as necessary.

Refit the limit switch cover and rubber seal with the 4 screws and 4 plastic washers. For the EWA 16 only, do not put the flat seal back into the limit switch compartment as this seal is to be stored separately with these Installation Instructions outside the gearmotor.

On versions with secondary switch E20S, secondary switches “SI” and “SII” are also set automatically when limit switches “I” and “II” are set.

5.5 Installing the position repeater

The position repeater is already fitted at the factory when ordered. Please continue reading at Section 5.6 to adjust the position repeater. To retrofit the position repeater, proceed as follows:

The standard position repeater PA6 covers a switching range from 0 – 85.4 revolutions (EWA 10, EWA 12, EWA 14) or 0 – 57.9 revolutions (EWA 16) of the output shaft.

Remove the limit switch cover and the rubber seal, see Section 5.4.

Fit the pinion gear with the axle and the screw in the limit switch bracket, tightening torque 10 Nm (88 lbf-in). Use the Allen key from the rubber seal to retain the axle. The gear must engage in the teething of the small gear in the limit switch.
Use the following Table to select the desired output shaft speed, potentiometer and gear. The specifications in the Table are maximum values and the actual number of revolutions must always be lower. The highest precision is attained when the number of revolutions is as close as possible to the value in column 1 or 2 of the following Table.

<table>
<thead>
<tr>
<th>Max. output shaft revolutions</th>
<th>EWA 10/12/14</th>
<th>EWA 16</th>
<th>Potentiometer</th>
<th>Number of gear teeth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2</td>
<td>0.8</td>
<td>1:1</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>4.0</td>
<td>2.6</td>
<td>3:1</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>6.7</td>
<td>4.5</td>
<td>5:1</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>13.5</td>
<td>9.1</td>
<td>10:1</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>19.3</td>
<td>13.0</td>
<td>3:1</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>25.5</td>
<td>17.3</td>
<td>3:1</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>32.2</td>
<td>21.8</td>
<td>5:1</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>42.6</td>
<td>28.9</td>
<td>5:1</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>64.5</td>
<td>43.7</td>
<td>10:1</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>85.4</td>
<td>57.9</td>
<td>10:1</td>
<td>37</td>
<td></td>
</tr>
</tbody>
</table>

Position the potentiometer, together with the gear selected from the Table and the nut and lock washer, in the limit switch bracket.

Shift the gear so that the teeth are not engaged. Slightly tighten the M3 screws in the gear.

5.6 Setting the position repeater

Set the limit switch, see Section 5.4, before setting the position repeater.

Let the drive move in rotation direction “I” (see rotation direction arrow next to the output shaft) up to the end position.

Use the attached gear to turn the potentiometer against the shaft rotation direction to just before the end position.
Loosen the M3 screws in the gear again. Shift the gear on the potentiometer shaft so that its teeth engage in the gear. Now tighten the M3 screws, tightening torque 0.5 Nm (4.42 lbf-in).

Make a test drive run. Make sure the rotation direction of the output shaft matches the control signal.

Use a voltage measuring device to check the correct setting and function of the position repeater.

**NOTICE:**

Ensure the limit switch compartment is dry or dry as necessary.

Fit the limit switch cover and the rubber seal, see Section 5.4.

The cables and wires must not touch the gears.

Lay the cable for the control, e.g., in a recess in the limit switch bracket, and use cable straps.

6 **Electrical Connection and Start-Up**

Only allow qualified personnel to carry out connecting and starting.
6.1 Mains connection for 1-phase AC motors

For 1-phase mains connections, the motor is switched off directly via limit switches "HI" and "HII". Optional secondary switches "SI" and "SII" are switched in series with "HI" and "HII" when delivered.

DANGER:
Voltage and frequency of the power source must match the specifications on the type plate of the electric motor.

The motors are fitted with a 4-core connecting cable when delivered.

- Connect the connecting cable to a suitable junction box under consideration of the wire designations and the wiring diagram from the control manufacturer.

European version:
- Yellow-green lead = earth lead (PE)
- Blue lead = neutral lead (3/N=N)
- Grey lead = phase for rotation direction I (1/A=L)
- Black lead = phase for rotation direction II (2/Z=L1)

North American version:
- Green lead = earth lead (PE)
- White lead = neutral lead (N)
- Black lead = phase for rotation direction I (L)
- Red lead = phase for rotation direction II (L1)

The limit switches are already wired. To change the wiring, proceed according to Section 6.2.1.

When several drives are connected, each drive must be switched by a separate switch or relay.

6.2 Mains connection for 3-phase AC motors and DC motors

For drives with 3-phase mains connection or DC connection, limit switches "HI" and "HII" and the optional safety limit switches "SI" and "SII" are connected to the control. Limit switching must be ensured using the control.

6.2.1 Connecting limit switches

NOTICE:
Observe the maximum switching capacity of the switches for conductor cross-section 0.75 mm²:
Main switch standard switch 250VAC, 6 A
Safety limit switch usage category AC15 230VAC, 1.5 A.

- Remove the limit switch cover and the rubber seal, see Section 5.4.

Lead the connecting cable (cable cross-section 6–12 mm² (0.24–0.47 in)) through the M20x1.5 cable gland.

- Connect the cable to the connection strip as follows:
  - Connection switch "HI": Terminals 1 and 2.
  - Connection switch "HII": Terminals 7 and 8.

Optional:
  - Connection switch "SI": Terminals 4 and 5.
  - Connection switch "SII": Terminals 10 and 11.
▶ Connect the earth lead to the PE connection. The shield can be applied to the PE connection when a shielded line is mandatory according to the control manufacturer.

▶ When using “SI” and “SII”, switch these to a separate backup circuit with emergency shut-off (e.g. separate contactor).

6.2.2 Electrical connection for 3-phase motors

DANGER:
Voltage and frequency of the power source must match the specifications on the type plate of the electric motor.

The motors are fitted with leads connected for test purposes when delivered. These are used for the function test at the factory.
▶ Remove these leads when connecting the motor and use suitable connecting cables.

NOTICE:
Always connect the earth lead according to DIN VDE 0100 to the marked earth conductor terminal of the electric motor.

The cables and wires must not touch the gears.
▶ Lay the cable for the control, e.g. in a recess in the limit switch bracket, and use cable straps.

▶ Tighten the cable gland.
▶ Refit the limit switch cover and rubber seal with the 4 screws and 4 plastic washers. For the EWA 16 only, do not put the flat seal back into the limit switch compartment as this seal is to be stored separately with these Installation Instructions outside the gearmotor.

NOTICE:
▶ Do not clamp any cables.
▶ Make sure all connections are tight.
▶ Ensure the limit switch compartment is dry or dry as necessary.
Translation Installation Instructions

▶ Remove the terminal box lid.

NOTICE:
When using a drill and adapter, run the drill at low speeds, max. 1400 rpm, and approach the end positions slowly. Do not use an impact screwdriver!

▶ Switch the motor on for a short time to determine the drive rotation direction and compare this against the rotation direction arrow next to the output shaft.

▶ Switch the phases to change the rotation direction when necessary.

▶ Refit the terminal box lid.

NOTICE:

Use suitable covers to protect the installation area against moisture and dust when plant start-up/completion is to be interrupted.

▶ Lead the connecting cable through the M20x1.5 cable gland, remove the sealing plugs when necessary.

▶ Connect the electric motor:
  – Earth lead to terminal PE
  – Phase L1 to terminal U1
  – Phase L2 to terminal V1
  – Phase L3 to terminal W1

▶ Use the drill to turn the drive to a position between both end positions.

NOTICE:

Do not clamp any cables.
Make sure all connections are tight.
The cable glands should point downwards when possible.
Ensure the installation area is dry or dry as necessary.

DANGER:

Danger to life through mechanical forces!
Switching the phases in the power supply network reverses the drive rotation direction. The limit switches are ineffective if phases are switched.

▶ Install phase sequence monitors before the drive control.

6.2.3 Electrical connection for DC motor

DANGER:

Voltage of the power source must match the specifications on the type plate of the electric motor.
Remove the terminal box lid.

Lead the connecting cable through the M20x1.5 cable gland, remove the sealing plugs when necessary.

Connect the electric motor:
- Lead A1 = plus (+) 24VDC
- Lead A2 = minus (−) 24VDC

Use the drill to turn the drive to a position between both end positions.

Switch the motor on for a short time to determine the drive rotation direction and compare this against the rotation direction arrow next to the output shaft.

When necessary, swap leads A1 and A2 to change the rotation direction.

Refit the terminal box lid.

**NOTICE:**
- Do not clamp any cables.
- Make sure all connections are tight.
- The cable glands should point downwards when possible.
- Ensure the installation area is dry or dry as necessary.

6.3 Setting the motor protection switch on-site

Adjust the motor protection switch on the on-site control to the connection value according to the type plate of the electric motor.

A winding protection contact is integrated in all 1-phase motors at the factory to protect the motor against overloads.

6.4 Connecting the position repeater

Lay the connecting cable of the potentiometer as functional extra-low voltage, separated from or shielded against other circuits.

Screw a cable gland, size M16x1.5, in the housing when the position repeater is not pre-assembled at the factory. Pull the connecting cable (cable cross-section 4 – 10 mm (0.15748 – 0.3937 in)) through and seal the gland off.

**NOTICE:**
- Use suitable covers to protect the installation area against moisture and dust when plant start-up/completion is to be interrupted.
- Use a drill and adapter, run the drill at low speeds, max. 1400 rpm, and approach the end positions slowly. Do not use an impact screwdriver!
Connect the connecting cable with terminals 21, 22, 23 of the potentiometer according to the following connection Figure.

6.5 Starting-up

NOTICE:

A basic criterion for a long service life of the drive is to use the corresponding drive group 1Cm, according to DIN 15020.

- Set the control/regulation to match this drive group.
- Lock recommends fitting an operating hours counter.

Carry out a test run after successful installation. Take the following steps here:

- Clear and leave the danger zone before switching on the drive.
- Do not start the drive in automatic mode but in on/off operation instead.
- Check the function of the limit switch as well as the switch-off point for both rotation directions.
- If necessary, correct the limit switch setting.
- Check the correct seating and installation location of the ventilation screw, see Section 5.2, as well as the installation of the limit switch cover and terminal box lid.
- Check that rotation directions "I" and "II" match "On"/"Off".

The cables and wires must not touch the gears.

- Lay the cable for the control, e.g. in a recess in the limit switch bracket, and use cable straps.
# 7 Operation

## 7.1 Noise

The noise development (sound pressure level) at the workplace is under 70 dB (A).

## 7.2 Heat build-up

The drive is not suitable for continuous operation. Observe the specifications on power-on duration in Section 4.2.

### WARNING:

Risk of burns!

The drive temperature can rise above 60 °C (140 °F).

- Provide, e. g. protection against touching or contact.

### DANGER:

Danger to life through mechanical forces!

The drive can start even in the “Stop” position as a result of higher ranking functions such as wind or rain signals.

Drives with 1-phase motors are internally connected with a winding protection contact (temperature control). If the winding protection contact has triggered, the drive starts again automatically after cooling down.

- Disconnect the power supply before carrying out any work on the drive and secure the drive against being switched on again, e. g. with a lock. This also applies to auxiliary power lines such as, e. g., limit switches, standstill heating or frequency converters. Just switching the control to "Stop" is not sufficient.

### DANGER:

Danger to life through falling objects!

Falling objects can endanger persons.

- Cordon off the danger zone with barrier tape.

### DANGER:

Danger to life through falling objects!

Falling objects can endanger persons.

- Cordon off the danger zone with barrier tape.

### DANGER:

Danger to life through electrical or mechanical forces!

The drive can start uncontrolled in the “Stop” position as a result of higher ranking functions such as wind or rain signals.

- Disconnect the power supply before carrying out any work on the drive and secure the drive against being switched on again, e. g. with a lock. This also applies to auxiliary power lines such as, e. g., limit switches, standstill heating or frequency converters. Just switching the control to “Stop” is not sufficient.

### WARNING:

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- Provide, e. g. protection against touching or contact.

# 8 Inspection and Maintenance

Inspection and maintenance work may only be carried out by qualified personnel.

### DANGER:

Danger to life through mechanical forces!

The drive can start even in the “Stop” position as a result of higher ranking functions such as wind or rain signals.

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### WARNING:

Risk of burns!

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- Provide, e. g. protection against touching or contact.

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### WARNING:

Risk of burns!

The drive temperature can rise above 60 °C (140 °F).

- Provide, e. g. protection against touching or contact.

### Period Task

| 3 months or 25 operating hours | - Check the outside of the gear and underneath the installation location for oil leaks, see Section 10.4 |
| 6 months or 50 operating hours | - Check the drive for unusual running noise, contact the supplier when necessary |

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| 3 months or 25 operating hours | - Check the outside of the gear and underneath the installation location for oil leaks, see Section 10.4 |
| 6 months or 50 operating hours | - Check the drive for unusual running noise, contact the supplier when necessary |
8.2 Maintenance steps

8.2.1 Checking the worm gear on the shaft for wear

▶ Disconnect the power supply.
▶ Move the drive to a load-free position, e.g. ventilation closed, and disconnect the power supply.

It must be ensured for the subsequent work that the load cannot move independently after uncoupling the drive.

DANGER:

Danger to life through mechanical forces!
The limit switches are ineffective when the coupling is loosened and the output chain is uncoupled.
▶ Couple the drive and drive chain in the same position again or set the limit switch again before starting-up.

<table>
<thead>
<tr>
<th>Period</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 months or 100 hours</td>
<td>- Check the worm gear on the shaft for wear, see Section 8.2.1</td>
</tr>
<tr>
<td></td>
<td>- Check switching function and switch-off points of limit switches &quot;HI&quot;, &quot;HII&quot;, &quot;SI&quot; and &quot;SII&quot;</td>
</tr>
<tr>
<td></td>
<td>- Check the couplings on the output chain for firm seating and wear, tighten or exchange as necessary</td>
</tr>
<tr>
<td></td>
<td>- For KKS chain couplings, lightly oil the chain and teeth, and remove excess grease</td>
</tr>
<tr>
<td></td>
<td>- Check the chain and teeth of both coupling halves for wear and corrosion, exchange as necessary</td>
</tr>
<tr>
<td></td>
<td>- Check the drive for firm seating, tighten as necessary</td>
</tr>
<tr>
<td></td>
<td>- Check electrical connections on the motor and limit switches</td>
</tr>
</tbody>
</table>

▶ Uncouple the drive from the output chain so that the drive shaft can be rotated freely.
▶ Turn the output shaft of the drive to check whether the gear has "play". If "play" is clearly noticeable, disconnect the drive and send it to the manufacturer for inspection, see Section 9. When "play" is low, reconnect the drive to the output chain.

<table>
<thead>
<tr>
<th>Type</th>
<th>Maximum “play” on the output shaft</th>
</tr>
</thead>
<tbody>
<tr>
<td>EWA 10</td>
<td>3 °</td>
</tr>
<tr>
<td>EWA 12</td>
<td>4 °</td>
</tr>
<tr>
<td>EWA 14</td>
<td>3 °</td>
</tr>
<tr>
<td>EWA 16</td>
<td>2 °</td>
</tr>
</tbody>
</table>

8.3 Cleaning

▶ Disconnect the power supply.
▶ Carefully remove rough dirt. Never use sharp or pointed objects!
▶ Use a soft brush and not much water for damp cleaning. Ensure no water enters the gear through the vent opening. This can damage the gear.
▶ Never use solvents or aggressive cleaning agents. These can corrode seals which then age faster.
▶ Never use high-pressure cleaners to clean the gear. The is a risk of water penetrating the gear and damaging the seals.
9 Dismantling

Only allow qualified personnel to carry out dismantling work.

9.1 Dismantling the drive

▶ Move the drive to a load-free position, ventilation closed.
▶ Disconnect all electrical connections.
▶ Disconnect the connection between output shaft and output tube.
▶ Replace the ventilation screw with the delivered M6 screw.
▶ Remove the drive.

10 Fault Clearance

Only allow qualified personnel to clear faults.

10.1 Fault: Power loss

▶ Disconnect the power supply, e.g. disconnect the fuse, to prevent the drive starting uncontrolled.
▶ For emergency operation, use a drill and the adapter from the rubber seal, see Section 5.4, to rotate the drive on the motor shaft to the desired working position.

DANGER:
Danger to life through electrical or mechanical forces!
The drive could start uncontrolled.
▶ Disconnect the power supply before carrying out any work on the drive and secure the drive against being switched on again, e.g. with a lock. This also applies to auxiliary power lines such as, e.g., limit switches, standstill heating or frequency converters. Just switching the control to “Stop” is not sufficient.

DANGER:
Danger to life through falling objects!
Falling objects can endanger persons.
▶ Cordon off the danger zone with barrier tape.

DANGER:
Danger to life through electrical or mechanical forces!
The drive can start uncontrolled in the “Stop” position as a result of higher ranking functions such as wind or rain signals.
▶ Disconnect the power supply before carrying out any work on the drive and secure the drive against being switched on again, e.g. with a lock. This also applies to auxiliary power lines such as, e.g., limit switches, standstill heating or frequency converters. Just switching the control to “Stop” is not sufficient.

NOTICE:
When using a drill and adapter, run the drill at low speeds, max. 1400 rpm, and approach the end positions slowly. Do not use an impact screwdriver!

Do not overrun the end positions here.
10.2 Fault: Motor does not start

▶ Check the electrical connections, including the limit switch connection.
▶ Check the on-site motor protection switch and check its setting, see Section 6.3. An overload could cause the fault to occur repeatedly.
▶ Check whether the limit switch roller is tilted, see Section 5.4 for setting.
▶ On drives with 3-phase mains connection, check that rotation direction “I”/”II” matches limit switches “HI” and “HII”.
▶ The motor temperature control could have triggered on drives with 1-phase motors. Disconnect the power supply. Let the drive cool down for about 20 minutes. Reconnect the power supply. An overload could cause the fault to occur repeatedly.

10.3 Fault: End position overrun

▶ Check the adjusting rings in the limit switch for firm seating and that the limit switch setting is correct. Readjust the limit switch when necessary, see Section 5.4.
▶ Check the electrical switching function of switches “HI” and “HII” as well as secondary switches “SI” and “SII”. The switches must be connected and checked as break contacts. Swivel the limit switch roller away to simulate the end position. The limit switch rollers must not be tilted during operation, see Section 5.4.
▶ Check the switch functions of the contactors of the contactor type reverser and exchange as necessary.

10.4 Fault: Oil loss

▶ Check the correct seating and installation location of the ventilation screw, see Section 5.2.
▶ Contact the supplier when oil losses occur.
The gearbox has lifetime lubrication. Normally, no change of gearbox oil is required.

11 Spare Parts and Replacement

Only allow qualified personnel to exchange parts. Only use original spare parts and original lubricants.
For product safety reasons, Lock only provides complete gears, electric motors, limit switches and potentiometers as spare parts.
Gear parts may only be exchanged or repaired by a customer service facility authorised by Lock.
We offer reasonably priced replacement drives in the event of a drive failing despite the most stringent production and testing procedures.

11.1 Exchanging the motor

▶ Remove the drive, see Section 9.1.
▶ Place the drive on a firm base so that the motor points upwards.
▶ Loosen the hexagon bolts on the motor flange and take off the motor.
▶ Check whether sealing residues adhere to the flange surface of the gearbox housing and remove them carefully when necessary.
▶ Screw the new motor and the new seal with hexagon screws to the gearbox housing, tightening torque 25 Nm (221 lbf-in) (M8) or 10 Nm (88 lbf-in) (M6).
▶ For 1-phase motors: Connect the limit switch cable in the terminal box of the motor, see Section 11.2.
▶ Fit the drive, see Sections 5 and 6.
11.2 Internal wiring

The internal wiring shown here is only needed when faults occur/when exchanging the motor. All connections are made at the factory.

11.2.1 Internal wiring of a 1-phase motor

The wiring diagram can be found at the end of these Instructions, see Page 117.

11.2.2 Internal wiring, limit switch

12 Warranty

Please see our general terms of delivery for warranty periods and conditions.

Basis for the warranty period is the specified service life of the drive according to the drive group under observance of all technical specifications.

Subject to alteration without prior notice.
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