Framo Morat **Linear actuator Mini**

Operating Manual

D8-20-107e/01.06

Subject to technical changes

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Installation and operating instructions

1.0 Safety precautions

- Please read all documents carefully before assembling and putting into operation Strictly follow the instructions of this operating manual.
- Only trained personnel should perform the installation, electrical connection and operational work.
- Please follow the technical operating data and instructions attached to the actuator.
- Please secure movable parts against unintended contact Failings during the set-up can cause injuries. The manufacturer explicitly states that this is the user's responsibility.
- Do not modify the actuator. This can lead to additional hazards and will result in non-liability.
- Do not block the motor during stroke movement.
- Never overload the motor; stroke force and duty cycle cannot exceed the levels indicated on the name plate. Disregarding the warnings can cause serious damage to the actuator.

- Before working on electrical lines, ensure that the electricity supply is disrupted and secured against unintended turn-on.
- Connect the actuator only to a circuit with working protective ground wire.
- It is imperative to read the respective electrical connection diagrams.

- Do not touch the actuator during operation, it can reach temperatures of up to 90°C, failure to abide may result in burns.

1.1 Conditions of use

Only use the actuator to operate machinery, apparatuses and equipment where direct or indirect endangerment of persons is eliminated and the ambient temperature is -20°C up to 60°C.
The transport of passengers is not permitted without first consulting the manufacturer (or responsible representative).
If direct or indirect endangerment of persons cannot be eliminated, additional mandatory measures (cover, barrier, etc.) need to be implemented minimizing the risk potential accordingly.

Do not use the actuator in dangerously explosive areas. Our actuators are certified according to directive 94 / 9 / EG (ATEX 95) and have the following symbols (optional):

EEx II 3D, Ex bck II T5

Please ensure that the actuator cannot be overloaded.

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2.0 Accessories

Every drive is shipped with operating instructions and circuit diagram.
It is attached to the drive in a protective envelope when supplied.
The documentation is available in German and English.

3.0 Installation, attaching parts and electrical start-up

3.1 Installation and attaching parts

Always wear protective footwear during transport and assembly. A falling actuator can cause injuries. Assemble the actuator without rigging. Do not push or strike when assembling attaching parts.
The strength category of the fixing bolts must be at least 8.8.

Fastening torque for clamping flange of fixing D, E, F and G	
Mini 0	6 Nm
Mini 01	10 Nm
Mini 1	25 Nm
Mini 2	55 Nm
Mini 3	110 Nm

3.2 Electrical start-up

- Before start-up ensure that the electricity supply is disrupted and secured against unintended turn-on.
- Connect the actuator only to a circuit with working protective ground wire.
- Carefully read the wiring diagram and pay attention to the correct operating voltage (see name plate).
- All external cables have to be connected according to the wiring diagram. The actuator can be destroyed, if limit or thermal motor protection switches are not connected. If the actuators thermal protection responds, it must be totally switched off with allowance to cool down (Break contact element).
  Attention!
  When temperatures decline the actuator will automatically resume operation (bimetal).
- Determine the lifting stroke direction by using cyclic operation mode. To reverse the lifting direction switch two supply lead phases.
- IP 54 is the standard protection class for all Framo linear actuators.

4.0 Important notices

4.1 Piston rod blocking

Piston rod blocking through excessive stroke force or permanent stop forcing can damage the actuator!

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4.2 Special safety equipment

By using a cushioned connection head or a force dependent shut-off (see options), the actuator can achieve a high safety standard. Generally, enough safety features should be included when choosing the actuator size.

4.3 Ambient temperatures, condensate

Consult the manufacturer if the actuator operates in environmental temperatures below 0°C. Delayed start-up performance must be expected with minus temperatures. In the minus temperature range suitable connection cables have to be used.
Constantly changing temperatures facilitate condensate formation. This is also the case when used outside of buildings or in high humid environments. The default application of condensation holes (ø 2 mm) by specifying the respective installation position (combined with humidification seal coating for rotor and stator) causes significant improvement.
Attention!
The condensation holes will impact the protection class (IP65).

A constant heating serves the same purpose. Leave one phase of the mains connection under current when the actuator has come to a standstill. The actuator thereby stays at a temperature of approx. 30°C. Please contact the manufacturer for details because, depending on the motor type, different voltages are necessary.

Do not stop the actuator by reversing the mains polarity, this will shorten the durability significantly.

4.4 Operating temperature

Consult the manufacturer if the actuator's temperature exceeds 90°C despite correct use. A defect could be possible.

4.6 Lubrication loss:

If a defect should cause a loss of lubrication, the floors will be slippery as grease might spill on the floor! Caution, danger of injury!
Under certain conditions an adverse effect on the environment is possible.

4.7 Self-locking ability

The self-locking ability depends on spindle pitch, the surface quality of the spindle/nut, the sliding speed, lubrication and temperature. We distinguish between dynamic (out of motion) and static (stationary) self-locking.

Vibrations can eliminate self-locking.
A certain number of factors such as lubrication, sliding speed and load can also create such favorable sliding characteristics that the self-locking is negatively impacted. A theoretically self-locking spindle cannot therefore replace a brake. Therefore it is impossible to assume guarantee obligations regarding self-locking.

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Important: Self-locking is not intended to satisfy security-related characteristics!

To minimize additional dangers, observe the usual care for technical products.

5.0 Maintenance and lubrication

The drives are provided with lifetime lubrication. Depending on the working conditions, the service life can be many years. Relubrication is usually not necessary.

For special applications (such as continuous operation, maximum spindle load, vertical fitting position, etc.) and to increase the operational reliability, we recommend relubricating the spindle nut on a regular basis. The drives can be optionally equipped with a grease nipple for this purpose.
The relubrication intervals must be defined depending on the actual loads (we recommend relubricating after approx. 5000 double strokes). We recommend using 3 - 5 grams of the lubricant "Syntheso D680 EP".

5.1 Warranty and repair

All actuators pass through a 100% test run before dispatch and are checked according to order data. During the warranty period, the actuator must not be opened. Any disassembly releases the manufacturer of any guarantees.

If repairs are necessary, send the unit to the manufacturer or to the appropriate representative. At extra cost, the manufacturer can dispatch a service technician on short notice.

6.0 End of service life

6.1 If the service life of the product has ended you can send it to the manufacturer for reconditioning.

6.2 If you would like to dispose of the actuator, you have to find an environmentaly friendly way and abide by all legal regulations.

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