

**Damper actuator for LONWORKS®
for adjusting air control dampers in
ventilation and air conditioning systems
in buildings**

- Air control damper size up to approx. 2 m²
- Torque 10 Nm
- Nominal voltage AC/DC 24 V
- Communication via LONWORKS® (FTT-10A)
- Conversion of sensor signals


Technical data
Electrical data

Nominal voltage	AC 24 V, 50/60 Hz / DC 24 V
Power supply range	AC 19.2 ... 28.8 V / DC 21.6 ... 28.8 V
Power consumption in operation	3.5 W @ nominal torque
At rest	1.25 W
For wire sizing	5.5 VA
Connection	Cable 1 m, 6 x 0.75 mm ²

Data for LONWORKS®

Certified	According to LonMARK® 3.3
Processor	Neuron 3120
Transceiver	FTT-10A, compatible with LPT-10
Functional profile	According to LONMARK® Damper actuator object #8110 Open loop sensor object #1
LNS plug-in for actuator / sensor	Can be run with any LNS-based integration tool (min. for LNS 3.x)
Service button and status LED	According to LONMARK® guidelines
Conductors, cables	Conductor lengths, cable specifications and topology of the LONWORKS® network according to the ECHELON® directives

Functional data	Factory settings	Variable	Settings
Torque (nominal torque)	Min. 10 Nm @ nominal voltage	25%, 50%, 75% reduced
Position feedback (measuring voltage U)	DC 2 ... 10 V, max. 0.5 mA	Starting point DC 0.5 ... 8 V End point DC 2.5 ... 10 V
Uni-rotation	±5%		
Direction of rotation	Can be selected with 0 / 1 switch		
Direction of motion at Y = 0%	In switch position 0 ↶ or 1 ↷	Electronically reversible
Manual override	Disengaging the gearing latch by means of a pushbutton, self-resetting		
Angle of rotation	Max. 95° ↶, can be limited at both ends with adjustable mechanical end stops		
Running time	150 s	43 ... 173 s
Automatic adjustment of running time, control and feedback to match the mechanical angle of rotation	Manual triggering of the adaption by pressing the „Adaption“ button or with the PC-Tool	Automatic adaption whenever the supply voltage is switched on, or manual triggering
Override controls, controllable via nviManOvrd	MAX (maximum position) = 100% MIN (minimum position) = 0% ZS (intermediate position, only AC) = 50%	MAX = (MIN +30° ↶) ... 100% MIN = 0% ... (MAX -30° ↶) ZS = MIN ... MAX
Sound power level	Max. 35 dB (A)	With a running time of 43 s = 45 dB (A) 173 s = 35 dB (A)	
Position indication	Mechanical, plug-on		

Technical data *(continued)*

Safety	
Protection class	III Safety extra-low voltage
Degree of protection	IP54 in all mounting positions
EMC	CE according to 89/336/EEC
Mode of operation	Type 1 (in acc. with EN 60730-1)
Rated impulse voltage	0.8 kV (in acc. with EN 60730-1)
Control pollution degree	3 (in acc. with EN 60730-1)
Ambient temperature range	-30 ... +50 °C
Non-operating temperature range	-40 ... +80 °C
Ambient humidity range	95% RH, non-condensating (in acc. with EN 60730-1)
Maintenance	Maintenance-free
Dimensions/weight	
Dimensions	See „Dimensions“ on page 5
Weight	approx. 830 g

Safety notes

- The damper actuator is not allowed to be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.
- It may only be installed by suitably trained personnel. All applicable legal or institutional installation regulations must be complied with.
- The device may only be opened at the manufacturer's site. It does not contain any parts that can be replaced or repaired by the user.
- The cable is not allowed to be removed from the unit.
- When the required torque is calculated, it is necessary to observe the specifications supplied by the damper manufacturers (cross section, design and installation site) as well as the air flow conditions.
- The device contains electrical and electronic components and is not allowed to be disposed of as household refuse. The local and currently valid regulations and requirements must be observed.

Product features

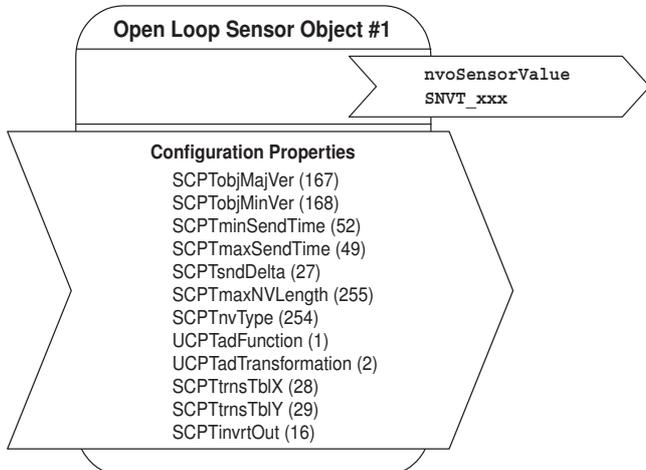
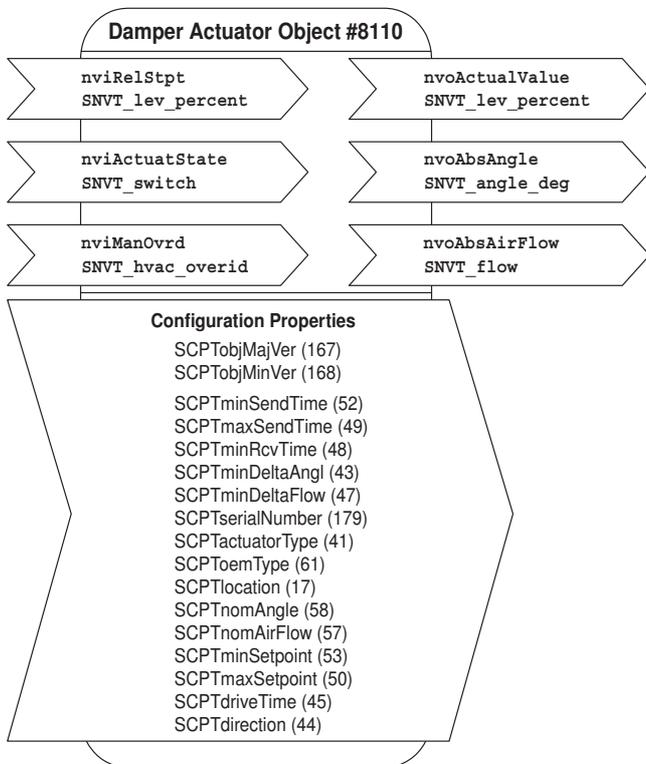
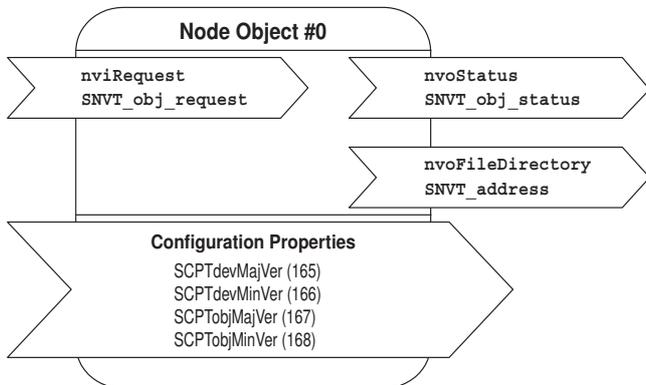
Mode of operation	The actuator is equipped with an integrated interface for LONWORKS®. The actuator can be directly connected and controlled with LONWORKS® via a FTT-10A transceiver.
Converter for sensors	Connection option for a sensor (passive or active sensor or switching contact). In this way, the analog sensor signal can be easily digitised and transferred to LONWORKS®.
Parameterisable actuators	The factory settings cover the most common applications. As desired, individual parameters can be adapted for specific systems or servicing with an MFT parameterisation device (e.g. PC-Tool MFT-P).
Simple direct mounting	Simple direct mounting on the damper spindle with a universal spindle clamp, supplied with an anti-rotation strap to prevent the actuator from rotating.
Manual override	Manual override with self-resetting pushbutton possible (the gear is disengaged for as long as the button is pressed).
Adjustable angle of rotation	Adjustable angle of rotation with mechanical end stops.
High functional reliability	The actuator is overload-proof, requires no limit switches and automatically stops when the end stop is reached.
Home position	When the supply voltage is switched on for the first time, i.e. at commissioning or after pressing the „gear disengagement“ switch, the actuator travels to the home position.

Pos. direction of rotation switch	Home position
 Y = 0  Y = 1 	ccw  Left stop  cw Right stop

The actuator then moves to the position defined by LONWORKS®.

Functional profile according to LONMARK®

The LON-capable damper actuator is certified by LONMARK®. The actuator functions are supplied with the LonWorks® network as standardised network variables according to LONMARK®. The node object #0, the damper actuator object #8110 and the open loop sensor object #1 are implemented in the actuator.



Notes

Detailed information on the functional profiles can be found on the website of LONMARK® (www.lonmark.org).

Node object #0

The node object contains the object status and object request functions.

nviRequest SNVT_obj_request

Input variable for requesting the status of a particular object in the node.

nvoStatus SNVT_obj_status

Output variable that outputs the current status of a particular object in the node.

nvoFileDirectory SNVT_address

Output variable that shows information in the address range of the Neuron chip.

Damper actuator object #8110

The actuator object is used to transmit the functions of the actuator to the LONWORKS® network.

nviRelStpt SNVT_lev_percent

The nominal position is assigned to the actuator via this input variable. This variable is normally linked to the output variable of an HVAC controller.

nviActuateState SNVT_switch

A preset position is assigned to the actuator via this input variable. Note on priority: The last variable that was active, either nviActuatorState or nviRelStpt, has priority.

nviManOvr SNVT_hvac_overid

These input variables can be used to manually override the actuator into a particular position.

nvoActualValue SNVT_lev_percent

This output variable shows the current actual position of the actuator and can be used for control circuit feedback or for displaying positions.

nvoAbsAngle SNVT_angle_deg

This output variable shows the current angle of rotation of the actuator or the damper blade and can be used to display the position or for service purposes.

nvoAbsAirFlow SNVT_flow

This output variable is inactive with the NM24ALON damper actuator and shows a constant value of 65535 (this variable is only active in conjunction with LON-capable VAV controllers).

Open loop sensor object #1

A sensor can be connected to the damper actuator. A passive resistance sensor (e.g. Ni1000), an active sensor (output 0 ... 32 V) or a switch (on/off) can be connected. In the case of the open loop sensor object, the measured sensor values are transferred to the LONWORKS® network.

nvoSensorValue SNVT_xxx

This output variable shows the current sensor value.

Depending on the connected sensor, the output variable can be configured via the sensor plug-in and specifically adapted to the system.

The SNVT .. can be configured as:

SNVT_temp_p	SNVT_lev_percent	SNVT_lux
SNVT_temp	SNVT_abs_humid	SNVT_press_p
SNVT_switch	SNVT_enthalpy	SNVT_smo_obscur
SNVT_flow	SNVT_ppm	SNVT_power
SNVT_flow_p	SNVT_rpm	SNVT_elec_kwh

Electrical installation

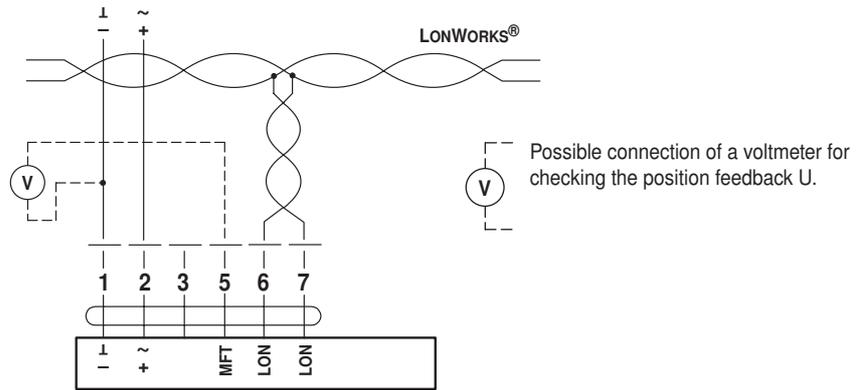
Wiring diagrams

Note

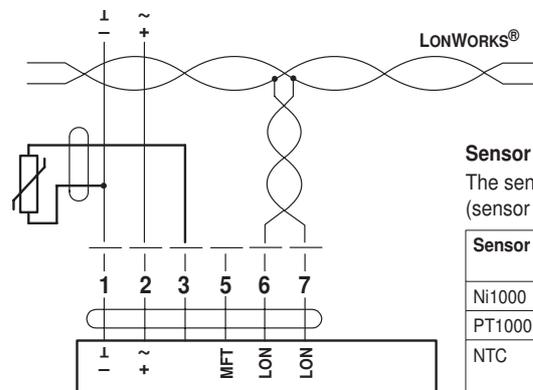
Connect via safety isolation transformer.



Connection without sensor



Connection with passive sensor
e.g. Pt1000, Ni1000, NTC

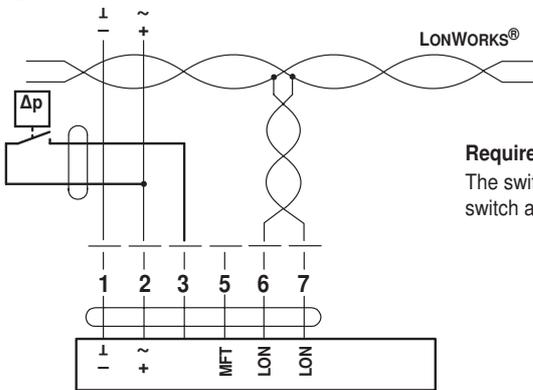


Sensor scaling:

The sensors can be scaled with the sensor plug-in (sensor table).

Sensor	Temperature range	Resistance range	Resolution
Ni1000	-28 ... +98 °C	850 ... 1600 Ω	1 Ω
PT1000	-35 ... +155 °C	850 ... 1600 Ω	1 Ω
NTC	-10 ... +160 °C (depending on type)	200 ... 60 kΩ	1 Ω

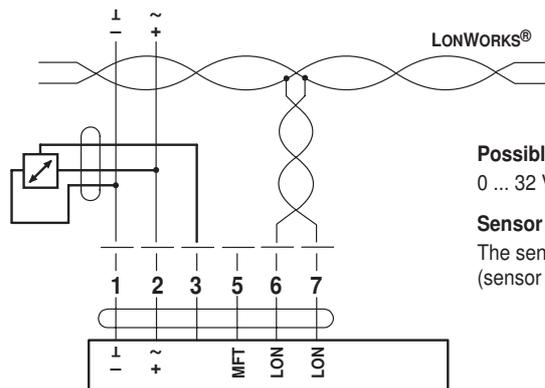
Connection with switching contact,
e.g. Δp-monitor



Requirements for switching contact:

The switching contact must be able to accurately switch a current of 16 mA @ 24 V.

Connection with active sensor,
e.g. 0 ... 10 V @ 0 ... 50 °C



Possible input voltage range:

0 ... 32 V (resolution 30 mV)

Sensor scaling:

The sensors can be scaled with the sensor plug-in (sensor table)

Parameterisation

Connection of the MFT parameterisation devices, e.g. Belimo PC-Tool MFT-P

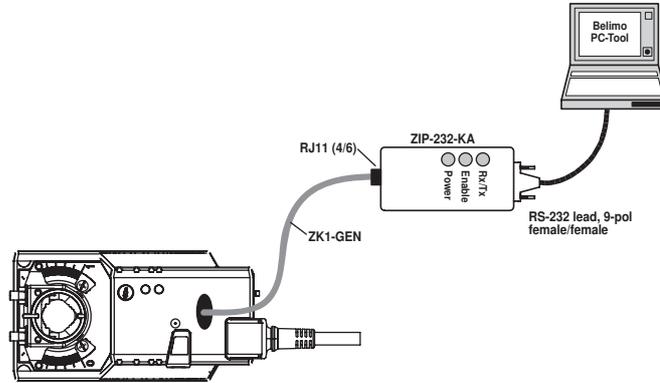
The actuator can be parameterised as follows:

- Electronic angle of rotation limitation
- Torque reduction
- Direction of operation reversible
- Running time
- Function test or adaption can be triggered
- Position feedback (measuring voltage U)

Parameterisation of the actuator when it has already been integrated in the complete system and is supplied with AC 24 V

Notes

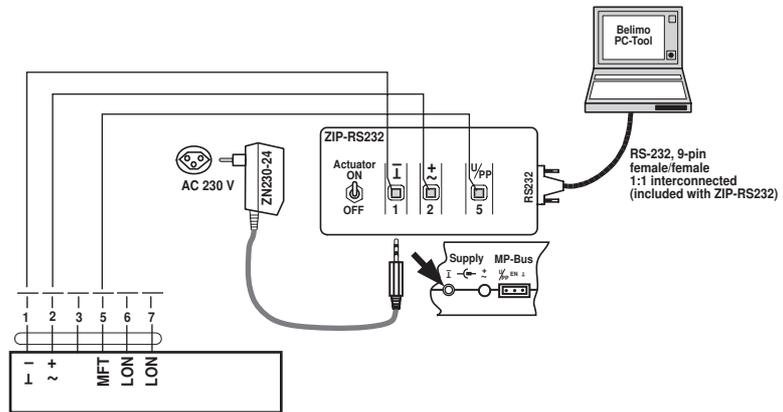
- The actuator can be triggered with the PC-Tool under „PP“.
- The scope of delivery of ZIP-232-KA includes the RS232 cable.
- The connection cable ZK1-GEN has to be ordered separately.



Parameterisation of the actuator before it is integrated in the complete system

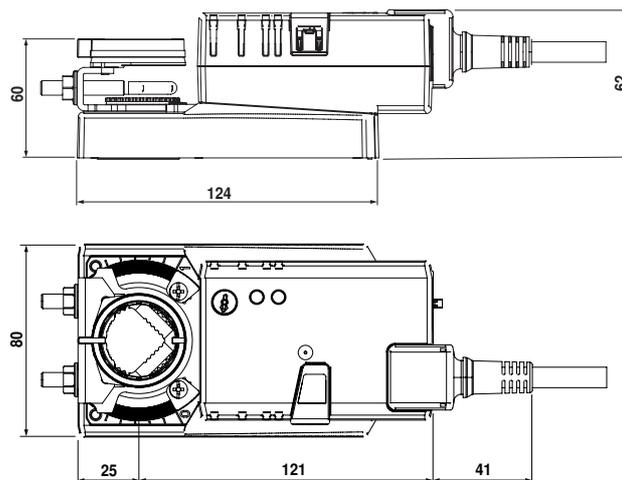
Notes

- The actuator can be triggered with the PC-Tool under „PP“.
- The RS232 cable is included in the scope of delivery of ZIP-232.
- The power supply unit ZN230-24 has to be ordered separately.



Dimensions [mm]

Dimensional diagrams



Klappenachse	Länge	⊙ I ◊
Klemmbock oben	min. 40	8 ... 26,7
Klemmbock unten *	min. 20	8 ... 20

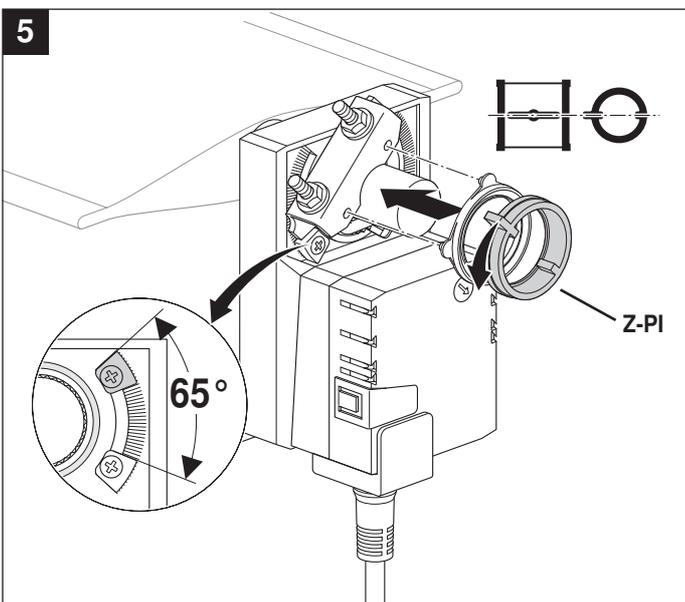
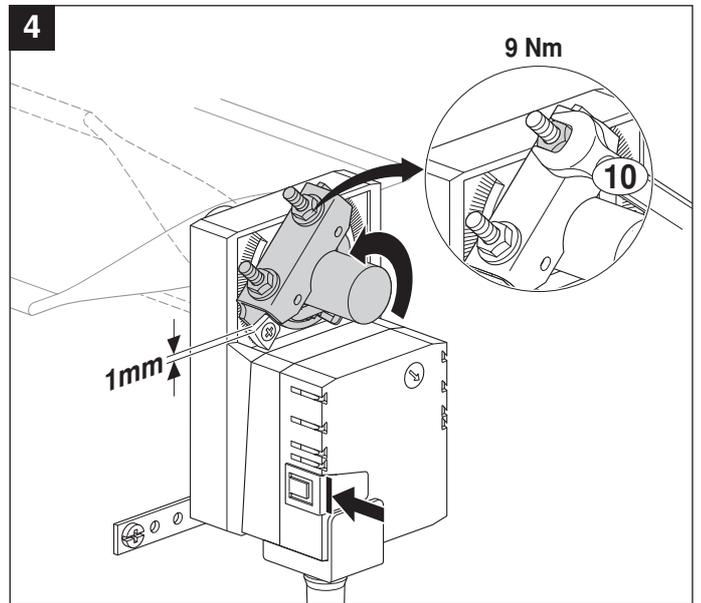
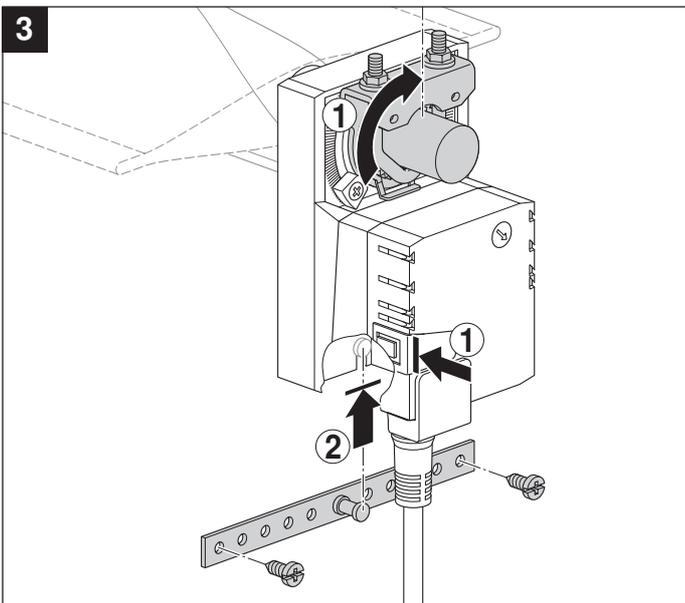
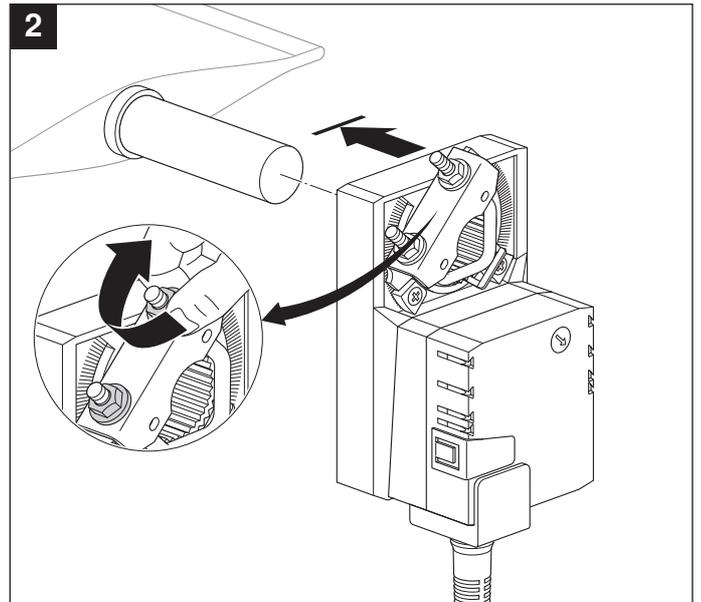
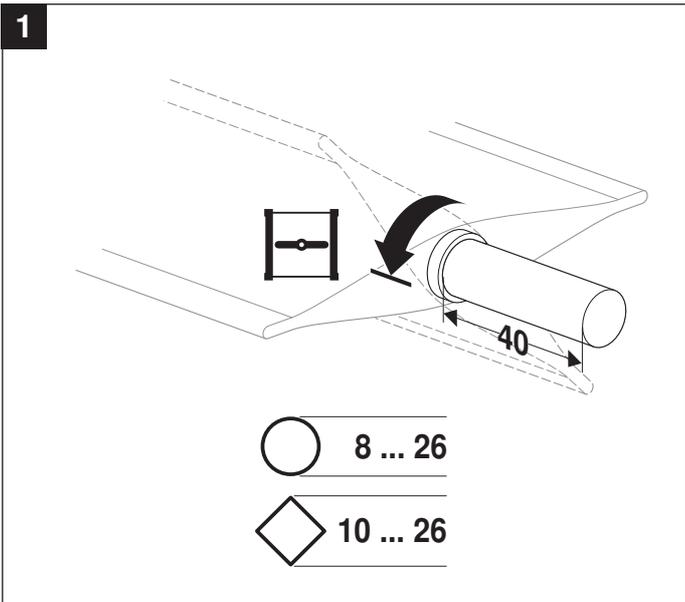
* Option (Zubehör K-NA)

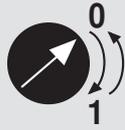
Operating controls and indicators



- ① **Direction of rotation switch**
 Switching over: Direction of rotation changes
- ② **Pushbutton and green LED display**
 Off: No voltage supply or fault
 Green, on: Operation
 Press button: Switches on angle of rotation adaption followed by standard operation
- ③ **Service button for commissioning for LonWorks® and yellow LED display for the LON status**
 Off: The damper actuator NM24ALON is ready for operation in the LONWORKS® network.
 Yellow, on: No application software is loaded in the NM24ALON.
 Yellow, flashing: The NM24ALON is ready for operation but not integrated in the LONWORKS® network (unconfigured).
 Other flashing codes: A fault is present in the NM24ALON.
 Press button: Service pin message is sent to the LONWORKS® network.
- ④ **Gear disengagement switch**
 Press button: Gear disengaged, motor stops, manual override possible
 Release button: Gear engaged, synchronisation starts, followed by standard operation
- ⑤ **Service plug**
 For connecting MFT parameterising and service tools (see page 5)

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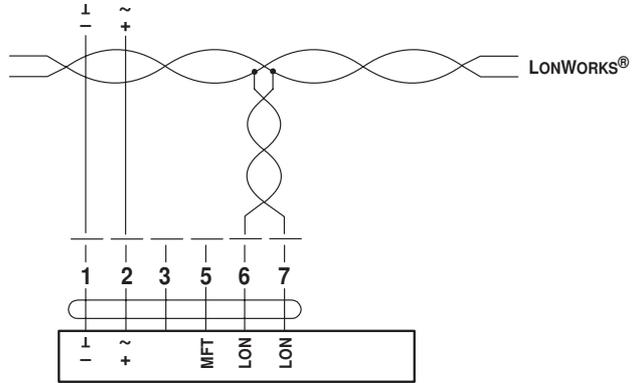
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ccw

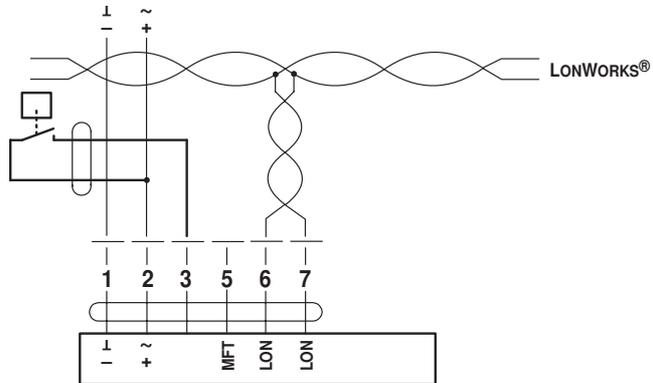
Y = 0

cw

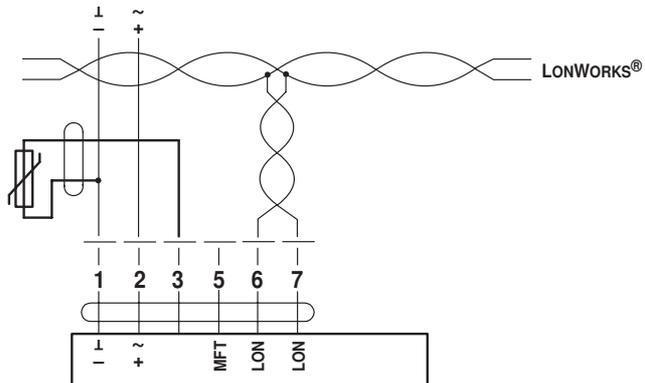
AC 24 V / DC 24 V



AC 24 V / DC 24 V



AC 24 V / DC 24 V



AC 24 V / DC 24 V

