5. NR-3
Product Information
Slipper valve rotary actuators

Products no longer available
Rotary-action control devices for applications involving water

5.NR-... Rotary actuators for slipper valves

- for slipper valves up to DN80
- for 3-point or modulating control

Suitable slipper valves:
ESBE, Termonix, Pommerening, Dumserwerk, Lovato, Landis & Staefa, Lazzari, Oventrop, Meibes, Wita, Holter, Satchwell, Centra... and others.

5.R-... Control ball valves, Open/Close ball valves and rotary actuators

Control ball valves DN15...DN50
- with equal-percentage characteristic
- for modulating control

Open/Close ball valves DN15...DN50
- for shutoff or changeover functions

Rotary actuators
- for Open/Close, 3-point or modulating control

Note

Using Belimo slipper valve actuators
The actuators listed in this catalogue are intended for the operation of slipper valves in HVAC systems.

Torque requirements
When calculating the torque required to operate slipper valves, it is essential to take into account all the data supplied by the slipper valve body manufacturer.

Danger

NR24-T, NR230-T / page 4:
If an auxiliary switch will be mounted it is important to remember that no more than 50 mm of insulation should be stripped back on the auxiliary switch lead.

NR24-S, NR230-S / pages 6, 7:
The motor lead cannot be replaced. If it becomes damaged a new length of cable must be fitted and attached through the cable gland. No more than 50 mm of insulation should be stripped back.
If the auxiliary switch lead needs to be replaced it is important to remember that no more than 50 mm of insulation should be stripped back.
### Selection table

<table>
<thead>
<tr>
<th>Types with control:</th>
<th>3-point</th>
<th>modulating</th>
</tr>
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<tr>
<td>Slipper valves actuators NR...:</td>
<td>NR24-T</td>
<td>NRL24-T</td>
</tr>
<tr>
<td>Torque</td>
<td>10 Nm</td>
<td>●</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>AC 24 V 50/60 Hz</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>DC 24 V</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>AC 230 V 50/60 Hz</td>
<td>●</td>
</tr>
<tr>
<td>Running time</td>
<td>140 s</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>280 s</td>
<td>●</td>
</tr>
<tr>
<td>1 Auxiliary switch adjustable, potential-free</td>
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<td></td>
</tr>
<tr>
<td>Position feedback</td>
<td>DC 2…10 V</td>
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</tr>
<tr>
<td>Manual operation</td>
<td>temporary</td>
<td>●</td>
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<tr>
<td></td>
<td>permanent</td>
<td>●</td>
</tr>
<tr>
<td>Connection</td>
<td>Screw terminals</td>
<td>●</td>
</tr>
<tr>
<td></td>
<td>Cable 1 m</td>
<td>●</td>
</tr>
</tbody>
</table>

Other types (3-point or modulating) available on request, with:
- Connection cables / plug
- 5 Nm torque
- 70 s running time
- Angle of rotation up to 180°

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**Slipper valve actuators, 3-point**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tr>
<td>NR24-T, NRL24-T</td>
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<tr>
<td>NR230-T, NRL230-T</td>
<td>5</td>
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<tr>
<td>NR24-S</td>
<td>6</td>
</tr>
<tr>
<td>NR230-S</td>
<td>7</td>
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**Slipper valve actuators, modulating**

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>NR24-SR-T, NRL24-SR-T</td>
<td>8</td>
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</table>

**Accessories / Mounting instruction**

<p>| | |</p>
<table>
<thead>
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<th></th>
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<tbody>
<tr>
<td>Accessories</td>
<td>9</td>
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<tr>
<td>Mounting instruction</td>
<td>10</td>
</tr>
</tbody>
</table>
NR24-T, NRL24-T  Slipper valve rotary actuators 10 Nm

For slipper valves up to DN80
Open/Close actuator (AC 24 V)
3-point control

Application
The NR(L)24-T is a compact actuator for motorising the most popular types of slipper valves in HVAC plants.

Operation
The actuator can be operated by any controller with a 3-point output.

Product features

Simple direct mounting to the slipper valve spindle by universal or customised spindle clamp. An anti-rotation bolt is supplied with the actuator. The mounting position can be chosen in steps of 90°.

Angle of rotation is limited to 90°. When the actuator reaches either end position, the voltage supply is interrupted by limit switches.

Manual operation by lever (press for temporary disengagement, permanent gearing disengagement by rotary switch on the housing cover to the manual position), for details see page 10.

Electrical accessories
Auxiliary switch SNR, SNR2

Mechanical accessories
Linkage kits for ESBE, Termomix, Pomerening, Dumberwerk, Lovato, Landis & Staefa, Lazzari, Overtrup, Meibes, Wita, Holter, Satchwell and Centra slipper valves.

Technical data

<table>
<thead>
<tr>
<th></th>
<th>NR24-T</th>
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<tbody>
<tr>
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<td>AC 24 V 50/60 Hz</td>
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<tr>
<td>Nominal voltage range</td>
<td>AC 19.2...28.8 V</td>
<td>AC 19.2...28.8 V</td>
</tr>
<tr>
<td>For wire sizing</td>
<td>1.5 VA</td>
<td>1.5 VA</td>
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<tr>
<td>Power consumption</td>
<td>1.5 W</td>
<td>1.5 W</td>
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<td>Connection</td>
<td>screw type terminals</td>
<td>screw type terminals</td>
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<tr>
<td>Direction of rotation</td>
<td>selectable by wiring</td>
<td>selectable by wiring</td>
</tr>
<tr>
<td>Manual operating</td>
<td>Temporary and permanent gearing disengagement by rotary switch on housing</td>
<td>Temporary and permanent gearing disengagement by rotary switch on housing</td>
</tr>
<tr>
<td>Torque</td>
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<td>min. 10 Nm (at rated voltage)</td>
</tr>
<tr>
<td>Angle of rotation</td>
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<td>electrically limited to 90°</td>
</tr>
<tr>
<td>Running time</td>
<td>140 s</td>
<td>280 s</td>
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<tr>
<td>Sound power level</td>
<td>max. 35 dB(A)</td>
<td>max. 35 dB(A)</td>
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<tr>
<td>Position indication</td>
<td>reversible scale 0...1</td>
<td>reversible scale 0...1</td>
</tr>
<tr>
<td>Mounting position</td>
<td>any, except actuator hanging beneath valve</td>
<td>any, except actuator hanging beneath valve</td>
</tr>
<tr>
<td>Protection class</td>
<td>⬤ (safety low voltage)</td>
<td>⬤ (safety low voltage)</td>
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<tr>
<td>Degree of protection</td>
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<td>IP 40</td>
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<tr>
<td>Ambient temperature range</td>
<td>0 °C...+50 °C</td>
<td>0 °C...+50 °C</td>
</tr>
<tr>
<td>Temperature of medium</td>
<td>+5°...+120 °C (slipper valve body)</td>
<td>+5°...+120 °C (slipper valve body)</td>
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<tr>
<td>Non-operating temperature</td>
<td>-30 °C...+80 °C</td>
<td>-30 °C...+80 °C</td>
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<tr>
<td>Humidity test</td>
<td>to EN 60730-1</td>
<td>to EN 60730-1</td>
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<tr>
<td>EMC</td>
<td>CE according to 89/336/EEC</td>
<td>CE according to 89/336/EEC</td>
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<tr>
<td>Mode of operation</td>
<td>Type 1</td>
<td>Type 1</td>
</tr>
<tr>
<td>Maintenance</td>
<td>maintenance-free</td>
<td>maintenance-free</td>
</tr>
<tr>
<td>Weight</td>
<td>0.4 kg</td>
<td>0.4 kg</td>
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Dimensions

Products no longer available
NR230-T, NRL230-T  Slipper valve rotary actuators 10 Nm

For slipper valves up to DN80
Open/Close actuator (AC 230 V)
3-point control

Application
The NR(L)230-T is a compact actuator for motorising the most popular types of slipper valves in HVAC plants.

Operation
The actuator can be operated by any controller with a 3-point output.

Product features
Simple direct mounting to the slipper valve spindle by universal or customised spindle clamp. An anti-rotation bolt is supplied with the actuator. The mounting position can be chosen in steps of 90°.

Angle of rotation is limited to 90°. When the actuator reaches either end position, the voltage supply is interrupted by limit switches.

Manual operation by lever (press for temporary disengagement, permanent gearing disengagement by rotary switch on the housing cover to the manual position), for details see page 10.

Electrical accessories
Auxiliary switch SNR, SNR2

Mechanical accessories

Technical data

<table>
<thead>
<tr>
<th></th>
<th>NR230-T</th>
<th>NRL230-T</th>
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<tbody>
<tr>
<td>Nominal voltage</td>
<td>AC 230 V</td>
<td>AC 198...264 V</td>
</tr>
<tr>
<td>Nominal voltage range</td>
<td>AC 230 V</td>
<td>AC 198...264 V</td>
</tr>
<tr>
<td>For wire sizing</td>
<td>3.5 VA</td>
<td>3.5 VA</td>
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<tr>
<td>Power consumption</td>
<td>3.5 W</td>
<td>3.5 W</td>
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<tr>
<td>Connection</td>
<td>screw type terminals</td>
<td>screw type terminals</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>selectable by wiring</td>
<td>selectable by wiring</td>
</tr>
<tr>
<td>Manual operation</td>
<td>Temporary and permanent gearing disengagement by rotary switch on housing</td>
<td>Temporary and permanent gearing disengagement by rotary switch on housing</td>
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<tr>
<td>Torque</td>
<td>min. 10 Nm (at rated voltage)</td>
<td>min. 10 Nm (at rated voltage)</td>
</tr>
<tr>
<td>Angle of rotation</td>
<td>electrically limited to 90°</td>
<td>electrically limited to 90°</td>
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<tr>
<td>Running time</td>
<td>140 s</td>
<td>280 s</td>
</tr>
<tr>
<td>Sound power level</td>
<td>max. 35 dB(A)</td>
<td>max. 35 dB(A)</td>
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<tr>
<td>Position indication</td>
<td>reversible scale 0...1</td>
<td>reversible scale 0...1</td>
</tr>
<tr>
<td>Mounting position</td>
<td>any, except actuator hanging beneath valve</td>
<td>any, except actuator hanging beneath valve</td>
</tr>
<tr>
<td>Protection class</td>
<td>II (all insulated)</td>
<td>II (all insulated)</td>
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<tr>
<td>Degree of protection</td>
<td>IP 40</td>
<td>IP 40</td>
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<tr>
<td>Ambient temperature range</td>
<td>0 °C...+50 °C (duty cycle 140/35s)</td>
<td>0 °C...+50 °C (duty cycle 140/35s)</td>
</tr>
<tr>
<td>Temperature of medium</td>
<td>+5 °C...+120 °C (slipper valve body)</td>
<td>+5 °C...+120 °C (slipper valve body)</td>
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<tr>
<td>Non-operating temperature</td>
<td>-30 °C...+80 °C</td>
<td>-30 °C...+80 °C</td>
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<tr>
<td>Humidity test</td>
<td>to EN 60730-1</td>
<td>to EN 60730-1</td>
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<td>EMC</td>
<td>CE according to 89/336/EEC</td>
<td>CE according to 89/336/EEC</td>
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<td>Low Voltage Directive</td>
<td>CE according to 73/23/EEC</td>
<td>CE according to 73/23/EEC</td>
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<tr>
<td>Mode of operation</td>
<td>Type 1</td>
<td>Type 1</td>
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<tr>
<td>Maintenance</td>
<td>maintenance-free</td>
<td>maintenance-free</td>
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<tr>
<td>Weight</td>
<td>0.4 kg</td>
<td>0.4 kg</td>
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</table>

Dimensions
NR24-S  Slipper valve rotary actuator 10 Nm

For slipper valves up to DN80
Open/Close actuator (AC 24 V)
3-point control
Voltage free auxiliary switch

Application
The NR24-S is a compact actuator for motorising the most popular types of slipper valves in HVAC plants.

Operation
The actuator can be operated by any controller with a 3-point output.

Product features
Simple direct mounting to the slipper valve spindle by universal or customised spindle clamp. An anti-rotation bolt is supplied with the actuator. The mounting position can be chosen in steps of 90°.

Angle of rotation is limited to 90°. When the actuator reaches either end position the voltage supply is interrupted by limit switches.

Manual operation by lever (press for temporary disengagement, permanent gearing disengagement by rotary switch on the housing cover to the manual position), for details see page 10.

Flexible signalling 0...100 %, with adjustable auxiliary switch.

Mechanical accessories

Technical data NR24-S
Nominal voltage AC 24 V  50/60 Hz
Nominal voltage range AC 19.2...28.8 V
For wire sizing 1.5 VA
Power consumption 1.5 W
Connecting cable – motor 1 m long, 3 x 0.5 mm²
– auxiliary switch 1 m long, 3 x 0.75 mm²
Auxiliary switch 1 x SPDT 5(1)A, AC 250 V
– Switching point adjustable 0...100 %
Direction of rotation selectable by wiring
Manual operating Temporary and permanent gearing disengagement by rotary switch on housing
Torque min. 10 Nm (at rated voltage)
Angle of rotation electrically limited to 90°
Running time 140 s
Sound power level max. 35 dB (A)
Position indication reversible scale 0...1
Mounting position any, except actuator hanging beneath valve
Protection class (safety low voltage)
Degree of protection IP 40
Ambient temperature range 0 °C...+ 50 °C
Temperature of medium + 5°...+ 120 °C (slipper valve body)
Non-operating temperature – 30 °C...+ 80 °C
Humidity test to EN 60730-1
EMC CE according to 89/336/EEC
Low Voltage Directive CE according to 73/23/EEC
Mode of operation Type 1.B
Maintenance maintenance-free
Weight 0.4 kg
NR230-S Slipper valve rotary actuator 10 Nm

For slipper valves up to DN80
Open/Close actuator (AC 230 V)
3-point control
Voltage free auxiliary switch

Application
The NR230-S is a compact actuator for motorising the most popular types of slipper valves in HVAC plants.

Operation
The actuator can be operated by any controller with a 3-point output.

Product features
Simple direct mounting to the slipper valve spindle by universal or customised spindle clamp. An anti-rotation bolt is supplied with the actuator. The mounting position can be chosen in steps of 90°.

Angle of rotation is limited to 90°. When the actuator reaches either end position, the voltage supply is interrupted by limit switches.

Manual operation by lever (press for temporary disengagement, permanent gearing disengagement by rotary switch on the housing cover to the manual position), for details see page 10.

Flexible signalling 0...100 %, with adjustable auxiliary switch.

Mechanical accessories

Technical data NR230-S
Nominal voltage AC 24 V 50/60 Hz
Nominal voltage range AC 198...264 V
For wire sizing 3.5 VA
Power consumption 3.5 W
Connecting cable – motor 1 m long, 3 x 0.75 mm²
– auxiliary switch 1 m long, 3 x 0.75 mm²
Auxiliary switch 1 x SPDT 5(1)A, AC 250 V
– Switching point adjustable 0...100% <
Direction of rotation selectable by wiring
Manual operating Temporary and permanent gearing disengagement by rotary switch on housing
Torque min. 10 Nm (at rated voltage)
Angle of rotation electrically limited to 90°
Running time 140 s
Sound power level max. 35 dB (A)
Position indication reversible scale 0...1
Mounting position any, except actuator hanging beneath valve
Protection class II (all insulated)
Degree of protection IP 40
Ambient temperature range 0 °C... + 50 °C (duty cycle 140/35s)
Temperature of medium + 5°... + 120 °C (slipper valve body)
Non-operating temperature – 30 °C... + 80 °C
Humidity test to EN 60730-1
EMC CE according to 89/336/EEC
Low Voltage Directive CE according to 73/23/EEC
Mode of operation Type 1.B
Maintenance maintenance-free
Weight 0.4 kg

Dimensions
NR24-SR-T, NRL24-SR-T  Slipper valve rotary actuators 10 Nm

For slipper valves up to DN80
Modulating rotary actuator (AC/DC 24 V)
Modulating control DC 0...10 V

Application
The NR(L)24-SR-T is a compact actuator for motorising the most popular types of slipper valves in HVAC plants.

Mode of operation
Modulating control is effected by means of a standard DC 0...10 V control signal. As soon as the power supply has been energised a synchronising function is initiated. The actuator runs to the closed position (CLOSED limit switch) at high speed and synchronises itself.

Product features
Simple direct mounting to the slipper valve spindle by universal or customised spindle clamp. An anti-rotation bolt is supplied with the actuator. The mounting position can be chosen in steps of 90°.

Functional reliability
The actuator is overload-proof and stops automatically at the end-stop.

Manual operation
by lever (press for temporary disengagement, permanent gearing disengagement by rotary switch on the housing cover to the manual position), for details see page 10.

Mechanical accessories

Technical data

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<th>NRL24-SR-T</th>
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<tr>
<td>Nominal voltage</td>
<td>AC 24 V</td>
<td>DC 24 V</td>
</tr>
<tr>
<td>Nominal voltage range</td>
<td>AC 19.2...28.8 V</td>
<td>DC 21.6...28.8 V</td>
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<td>For wire sizing</td>
<td>3 VA</td>
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<td>Power consumption</td>
<td>1.5 W</td>
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<tr>
<td>Connection</td>
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<td>Control signal Y</td>
<td>DC 0...10 V @ input resistance = 100 kΩ</td>
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<td>Operating range</td>
<td>DC 2...10 V for 0...100% &lt; (0...90°)</td>
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<td>Measuring voltage U</td>
<td>DC 2...10 V (max. 1 mA) for 0...100% &lt; (0...90°)</td>
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<td>Synchronism tolerance</td>
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<td>R ( \neq ) (at Y = 0 V)</td>
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<tr>
<td>Torque</td>
<td>min. 10 Nm (at rated voltage)</td>
<td></td>
</tr>
<tr>
<td>Running time</td>
<td>140 s</td>
<td>280 s</td>
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<tr>
<td>Sound power level</td>
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<tr>
<td>Position indication</td>
<td>reversible scale 0...1</td>
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</tr>
<tr>
<td>Mounting position</td>
<td>any, except actuator hanging beneath valve</td>
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<tr>
<td>Protection class</td>
<td>( \text{safety low voltage} )</td>
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<td>Degree of protection</td>
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<td>Non-operating temperature</td>
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<td>Weight</td>
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Dimensions

![Diagram of actuator dimensions](image-url)
Linkage kits for slipper valves

<table>
<thead>
<tr>
<th>Type</th>
<th>Sipper valve type / Description</th>
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<tbody>
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<td>MS-NRC</td>
<td>CENTRA Series DR &amp; ZR</td>
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<td>MS-NRE</td>
<td>Universal all ESBE, TERMOMIX, POMMERENING</td>
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<td>MS-NRE1</td>
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<td>VCI 31 DN 20..40</td>
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<td>VBG 31 DN 20..40</td>
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<td>VBF 21 DN 40..50</td>
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<td>MS-NRL1</td>
<td>LANDIS &amp; STAFA (Series 1)</td>
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<td>B3F...DN20..40</td>
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<td>B3G...DN20..40</td>
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<td>LAZZARI</td>
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<td>MS-NRO</td>
<td>OVENTROP 3W, 4W, H</td>
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<td>MEIBES 3W, 4W, H</td>
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<td>WITA 3W, 4W, H</td>
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<tr>
<td>MS-NRS</td>
<td>SATCHWELL MB</td>
</tr>
</tbody>
</table>

Auxiliary switches for NR... rotary actuators with 3-point control

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNR</td>
<td>For 3-point NR... actuators with connecting cable, 1 x SPDT screw terminals, cable gland for 1 cable, switching point adjustable 0...100%</td>
</tr>
<tr>
<td>SNR2</td>
<td>For 3-point NR... actuators with screw terminals, 1 x SPDT screw terminals, cable gland for 2 cables, switching point adjustable 0...100%</td>
</tr>
</tbody>
</table>

Note: No auxiliary switches are available for NR(L)24-SR-T modulating actuators.

How to fit the auxiliary switches

1. Remove the cover of the housing.
2. Remove the knockout and fit cable gland A.
3. Fit the printed-circuit board with its auxiliary switch B and secure with two 2.2 x 12 screws.
4. Press the manual release D on the actuator and use its manual operating handle to rotate it to the position where the auxiliary switch is to operate.
5. Insert the cam ring C as shown in Fig. 1 so that the arrow mark is at the top and so that the switch just operates at the switching point.
6. Connect the cable as shown in the wiring diagram.
7. Replace the housing cover.
Mounting instruction NR...

Mounting actuator on slipper valve body

1. Turn the spindle of the slipper valve A counter-clockwise to the end position (OPEN or CLOSED). Remove the handle supplied with the slipper valve body from the spindle.

2. Screw the anti-rotation stop B in to a convenient hole on the slipper valve (if necessary remove an existing screw first).

3. Slide linkage C over the slipper valve spindle.

4. Place the actuator D on to linkage C and if necessary rotate slightly clockwise until the anti-rotation stop B engages in to the relevant slot of the actuator.

5. Turn the scale E in to the position relevant to the requested function (OPEN/CLOSED) and place it onto the actuator.

6. Place the handle F onto the actuator ensuring that the arrow points to the left end position of the scale (see fig.). Tighten the whole unit by means of the screw G.

7. Using a screwdriver (No. 3) to turn the disengage button H on the housing cover from “A” to the “manual” position and rotate the slipper valve with the handle F from one end position to the other.

   **It is important that the actuator can be moved from one end stop to the other (90°).**

8. Connect the actuator to the controller or power supply.

9. Turn the disengaging button H back to “A” position, then the actuator will turn to the required position.

**Manual operation**

In case of failure by the controller, the actuator can be put in to a manual mode by turning the button on the housing cover, which will disengage the gears. The actuator can then be put in any position by turning the handle and this position is indicated by means of a reversible scale.

**Note:** Parts B, C and G are parts from the MS... linkage kits.
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