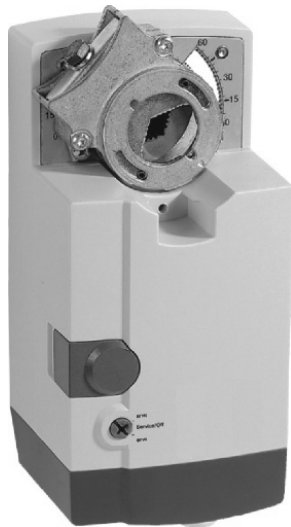


N2024 / N20230 N3424 / N34230

DAMPER ACTUATORS 20/34 Nm (177/300 lb-in)
FOR FLOATING / 2-POSITION CONTROL

PRODUCT DATA



GENERAL

These direct-coupled damper actuators provide two-position and floating control for:

- air dampers,
- VAV units,
- air handlers,
- ventilation flaps,
- louvers, and
- reliable control for air damper applications with up to 4.6 m² / 50 sq.ft. (20 Nm / 177 lb-in) or 7.8 m² / 85 sq. ft. (34 Nm / 300 lb-in) (seal-less damper blades; air friction-dependent).

FEATURES

- **New self-centering shaft adapter**
- **Access cover to facilitate connectivity**
- **Declutch for manual adjustment**
- **Mechanical end limits**
- **Field-installable auxiliary switches**
- **Pre-wired (non-U.S. models)**
- **Rotation direction selectable by switch**
- **Mountable in any orientation (no IP54 if upside down)**
- **Mechanical position indicator**
- **UL-approved (U.S. models, only)**

SPECIFICATIONS

Supply voltage

N2024 / N3424	24 Vac ±15%, 50/60 Hz
N20230/N34230	230 Vac ±15%, 50/60 Hz

Nominal voltage

N2024 / N3424	24 Vac, 50/60 Hz
N20230/N34230	230 Vac, 50/60 Hz

All values stated hereinafter apply to operation under nominal voltage conditions.

Power consumption

N2024	6 VA / 6 W
N20230	8 VA / 8 W
N3424	9 VA / 9 W
N34230	13 VA / 10 W

Ambient limits

Ambient operating limits	-20...+60 °C (-5...+140 °F)
Ambient storage limits	-40...+80 °C (-40...+175 °F)
Relative humidity	5...95%, non-condensing

Cables

Length	1 m (39")
Materials	silicone-free

Safety

Protection standard	IP54 (non-U.S. models) NEMA2 (U.S. models)
Protection class	II as per EN 60730-1
Overvoltage category	II

Lifetime

Full strokes	60000
Repositions	1.5 million

Mounting

Round damper shaft	10...27 mm (3/8...1-1/16")
Square damper shaft	10...18 mm (3/8...11/16"); 45° steps min. 22 mm (7/8")

Shaft length

Auxiliary switch (when included)

Rating	5 A (resistive) / 3 A (inductive)
Triggering points	5° / 85°

Torque rating

N2024 / N20230	20 Nm (177 lb-in)
N3424 / N34230	34 Nm (300 lb-in)

Runtime

	110 sec (50 Hz) / 95 sec (60 Hz)
--	----------------------------------

Rotation stroke

	95° ± 3°
--	----------

Dimensions

	see "Dimensions" on page 8
--	----------------------------

Weight (without cables)

	1.45 kg (3 lbs. 3 oz.)
--	------------------------

Noise rating

	40 dB(A) max. at 1 m
--	----------------------



MODELS

order number	supply voltage	auxiliary switches	feedback	power consumption	torque
N2024 / N2024-US / N2024-2POS	24 Vac	--	--	6 VA / 6 W	20 Nm (177 lb-in)
N2024-SW2 / N2024-SW2-US	24 Vac	2	--		
N2024-P10K	24 Vac	--	10 kΩ		
N20230 / N20230-2POS	230 Vac	--	--	8 VA / 8 W	
N20230-SW2	230 Vac	2	--		
N20230-P10K	230 Vac	--	10 kΩ		
N3424 / N3424-US	24 Vac	--	--	9 VA / 9 W	34 Nm (300 lb-in)
N34230	230 Vac	--	--	13 VA / 10 W	

Product Identification System

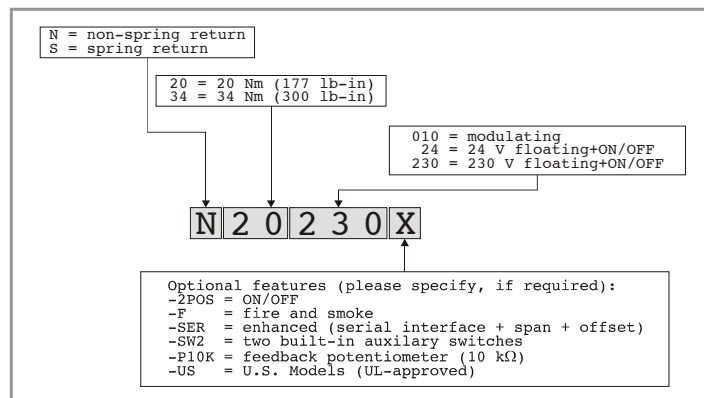


Fig. 1. Product Identification System

OPERATION / FUNCTIONS

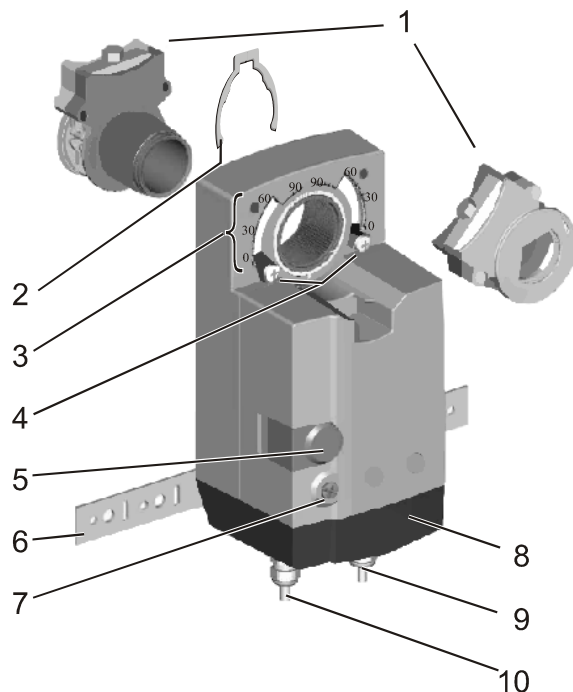


Fig. 2. Setting units and control elements

Legend for Fig. 2:

- 1 Self-centering shaft adapter
- 2 Retainer clip
- 3 Rotational angle scales (0...90° / 90...0°)
- 4 Mechanical end limits (20 Nm [177 lb-in] models, only)
- 5 Declutch button
- 6 Anti-rotation bracket
- 7 Rotation direction switch
- 8 Access cover
- 9 Internal auxiliary switch wire
- 10 Power and control switch wire

Contents of Package

The delivery package includes the actuator itself, parts 1 through 10 (see Fig. 2; in the case of U.S. models – e.g. N2024-US – parts 1 through 8), the anti-rotation bracket screws, and the SM mounting plate and screws.

Rotary Movement

The rotation direction (clockwise or counterclockwise) can be selected using the rotation direction switch (see part 7 in Fig. 2), thus eliminating the need to re-wire. To ensure tight closing of the dampers, the actuator has a total rotation stroke of 95°.

As soon as operating power is applied, the actuator may start to run. When power is removed, the actuator remains in position. For actuator-controller wiring instructions, see section "Wiring" on page 4.

Rotation Direction Switch

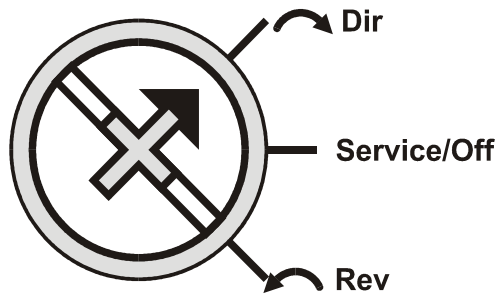


Fig. 3. Rotation Direction Switch

- **Dir** ("↻"): is the default shipping position. When the rotation direction switch is set to this position, the actuator internally switches the rotation direction control signals as stated in section "Wiring Diagrams" on pages 5 and 6.
- **"Service/Off"**: When the rotation direction switch is set to this position, all actuator rotary movement is cancelled and all control signals are ignored, thus enabling the actuator to be manually operated (see section "Manual Adjustment"). The user can then perform maintenance / commissioning without having to remove power from the actuator. To return to the control mode, simply move the rotation direction switch to its former setting.
- **Rev** ("↺"): When the rotation direction switch is set to this position, the actuator follows signals as stated in section "Wiring Diagrams" on pages 5 and 6.

Two-Position or Floating Control

The actuator is capable of being operated by either a two-position (open/close) or a floating (three-wire) controller. Refer to wiring diagrams for correct connection.

Feedback Signal

Actuators equipped with a feedback potentiometer provide position feedback via the potentiometer resistance value (see Fig. 4).

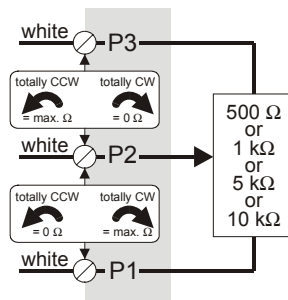


Fig. 4. Feedback signal settings

If, while the actuator is not rotating, the user declutches it and manually repositions the shaft adapter, the feedback signal will then follow the new position at which the shaft adapter has been left.

Position Indication

The hub adapter indicates the rotation angle position by means of the rotational angle scales (0...90° / 90...0°) provided in the actuator plate (see Fig. 5).

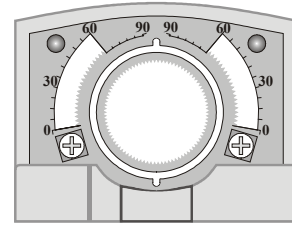


Fig. 5. Position indication

Manual Adjustment

IMPORTANT

To prevent equipment damage, you must remove power or set the rotation direction switch to the "Service/Off" position before manual adjustment.

After removing power or setting the rotation direction switch to the "Service/Off" position, the gear train can be disengaged using the declutch button, permitting the actuator shaft to be manually rotated to any position. The feedback signal will then follow the new position.

Limitation of Rotation Stroke

Two adjustable mechanical end limits (20 Nm [177 lb-in] models, only) are provided to limit the angle of rotation as desired (see Fig. 6).

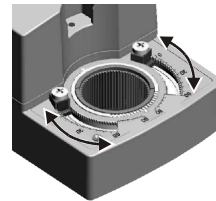


Fig. 6. Mechanical end limits

The mechanical end limits must be securely fastened in place as shown in Fig. 7. Specifically, it is important that they properly mesh with the rotational angle scales when the screws are tightened.

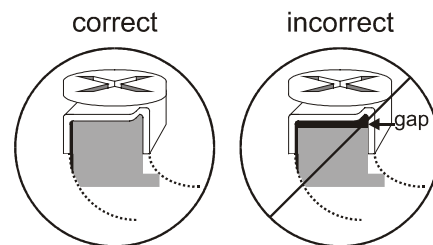


Fig. 7. Correct / incorrect tightening of end limits

Internal Auxiliary Switches

NOTE: Only those actuators for which "-SW2" has been specified when ordering (e.g.: "N2024-SW2") feature internal auxiliary switches.

The internal auxiliary switches are set to switch from "common" to "normally open" at angles of 5° and 85°, respectively, from the totally counterclockwise position.

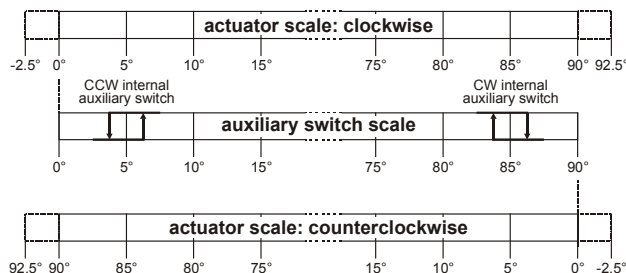


Fig. 8. Internal auxiliary switch triggering points

INSTALLATION

These actuators are designed for single-point mounting.

IMPORTANT

In order to prevent equipment damage, you must remove power or set the rotation direction switch to the "Service/Off" position before manual operation.

Mounting Instructions

All information and steps are included in the Installation Instructions supplied with the actuator.

Mounting Position

The actuators can be mounted in any position (no IP54 if mounted upside down; see Fig. 9). Choose a mounting position permitting easy access to the actuator's cables and controls.

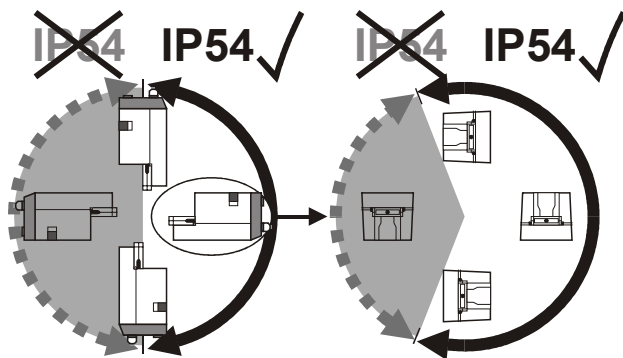


Fig. 9. Mounting for IP54

Mounting Bracket and Screws

If the actuator is to be mounted directly on a damper shaft, use the mounting bracket and screws included in the delivery package.

Self-Centering Shaft Adapter

The self-centering shaft adapter can be used for shafts having various diameters (10...27 mm [3/8...1-1/16"]) and shapes (square or round).

In the case of short shafts, the shaft adapter may be reversed and mounted on the duct side.

Stroke Limitation with Mechanical End Limits

The mechanical end limits (20 Nm [177 lb-in] models, only) enable the stroke to be limited from 0...90° in increments of 3°.

Wiring

Connecting to the Power Supply

In order to comply with protection class II, the power source of 24 V actuators must be reliably separated from the network power supply circuits as per DIN VDE 0106, part 101.

Access Cover

To facilitate wiring the actuator to the controller, the access cover can be detached from the actuator.

IMPORTANT

Remove power before detaching the access cover. Once the access cover has been removed, please take care to avoid damaging any of the parts now accessible.

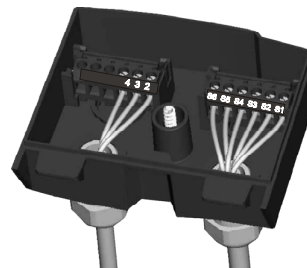


Fig. 10. Access cover (N2024-SW2)

Depending upon the model, the access cover may have one or two terminal strips, including a layout with a description for each of the terminals.

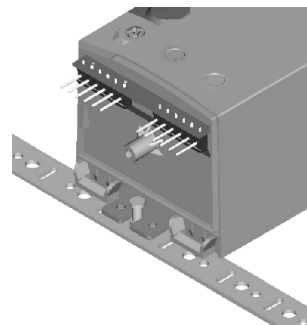
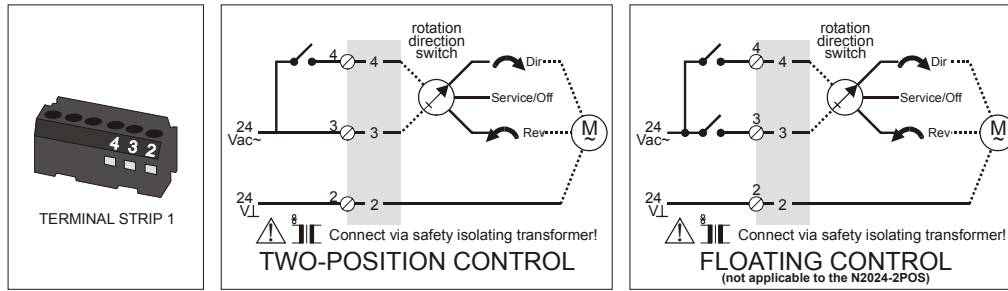


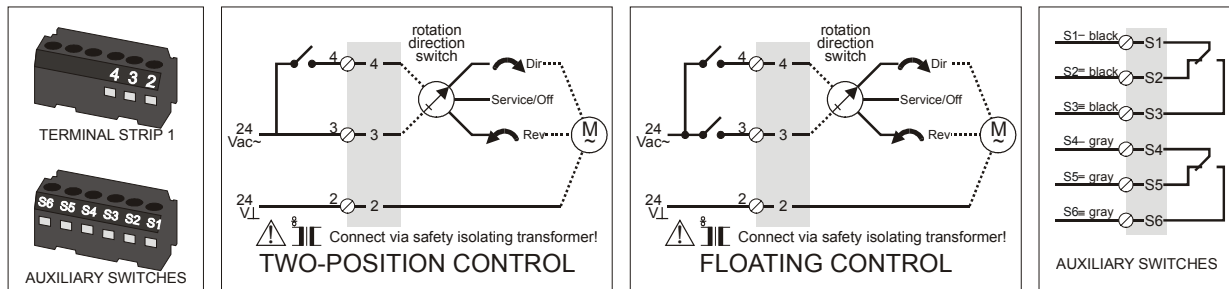
Fig. 11. N2024-SW2 with access cover removed

Wiring Diagrams

N2024 / N2024-US / N2024-2POS / N3424 / N3424-US

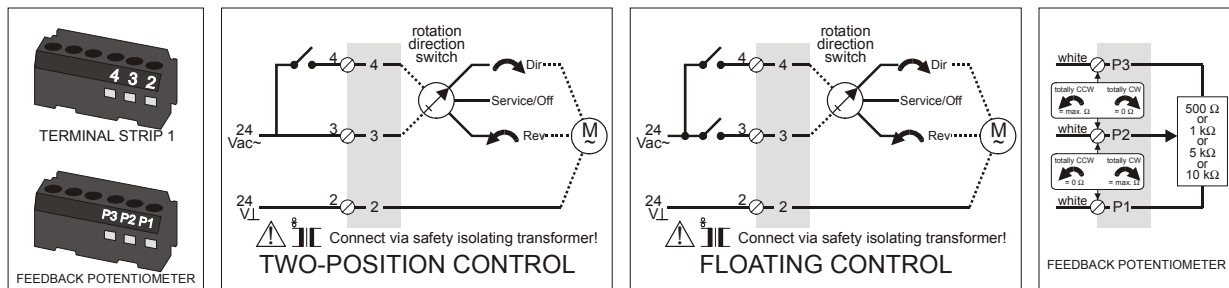


N2024-SW2 / N2024-SW2-US



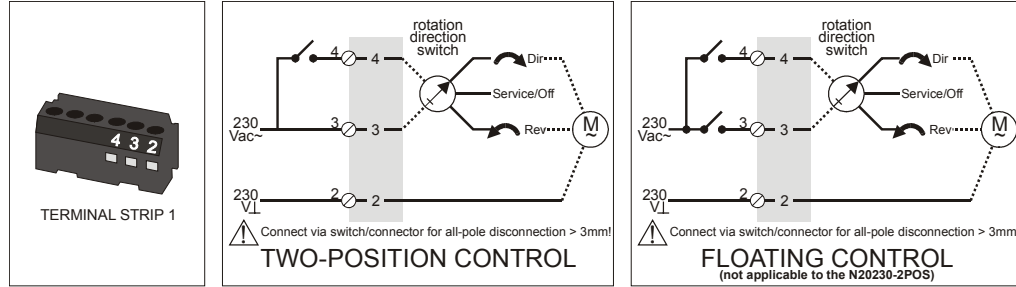
NOTE: Internal auxiliary switches S1 and S4 must be connected to the same power source.

N2024-P10K

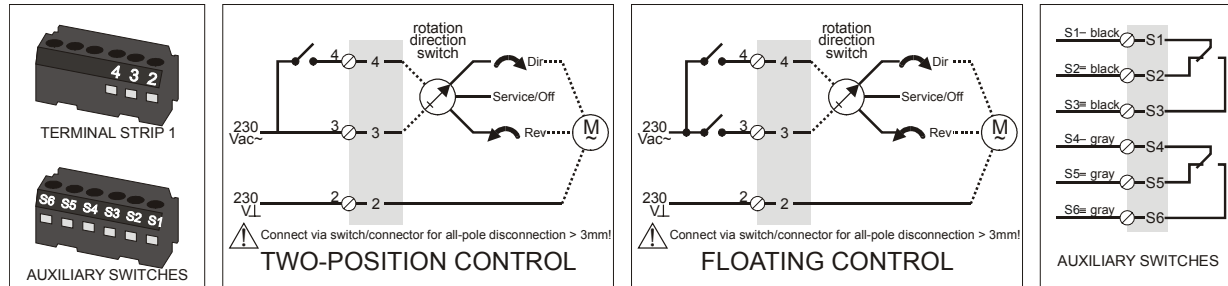


connecting cable		wire print	terminal	name	
				floating	two-position
supply and signal lines (must be equipped with spark suppressors)		2	2	24 Vac ⊥	24 Vac ⊥
		3	3	24 Vac (clockwise)	24 Vac ~
		4	4	24 Vac (counterclockwise)	24 Vac control signal
auxiliary switches (when included)	CCW (left) 5°	S1-	S1	common	
		S2=	S2	normally closed	
		S3≡	S3	normally open	
	CW (right) 85°	S4-	S4	common	
		S5=	S5	normally closed	
		S6≡	S6	normally open	
feedback potentiometer		P1	P1	full clockwise	
		P2	P2	signal	
		P3	P3	full counterclockwise	

N20230 / N20230-2POS / N34230

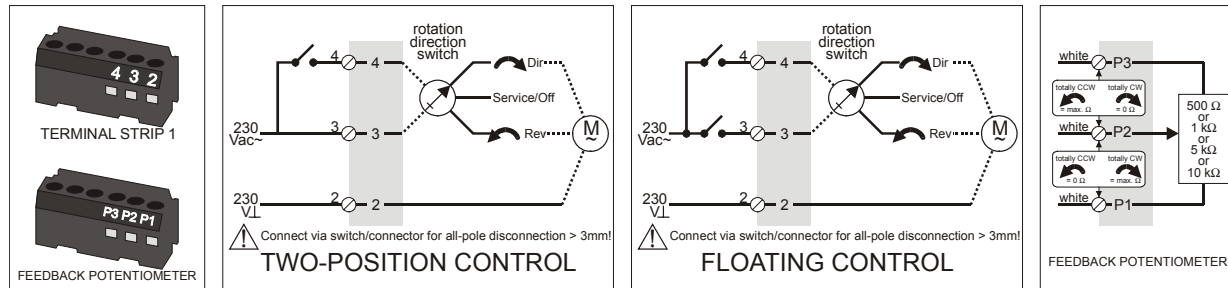


N20230-SW2



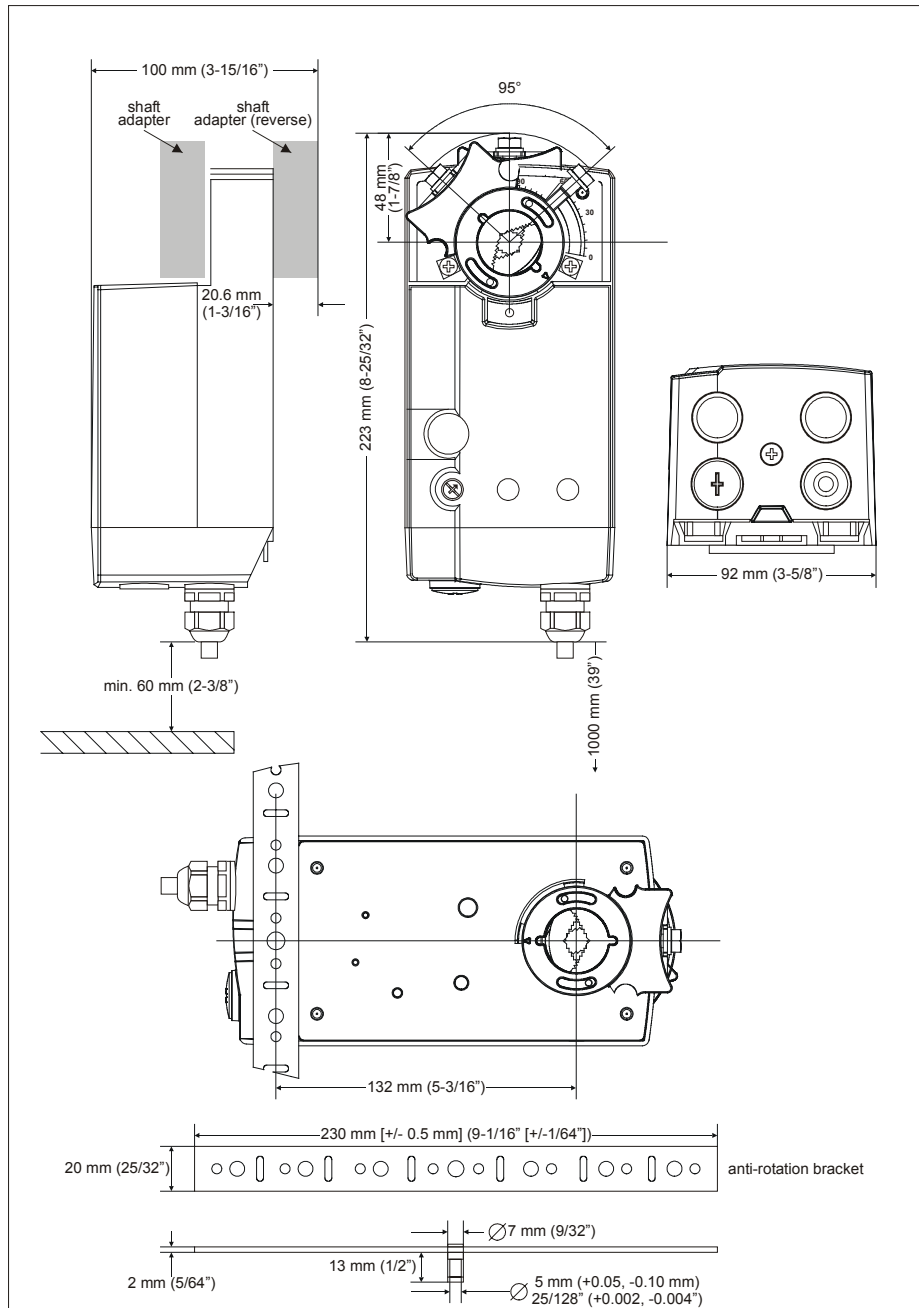
NOTE: Internal auxiliary switches S1 and S4 must be connected to the same power source.

N20230-P10K



connecting cable		wire print	terminal	name	
				floating	two-position
supply and signal lines (must be equipped with spark suppressors)		2	2	230 Vac ⊥	230 Vac ⊥
		3	3	230 Vac (clockwise)	230 Vac ~
		4	4	230 Vac (counterclockwise)	230 Vac control signal
auxiliary switches (when included)	CCW (left) 5°	S1-	S1	common	
		S2=	S2	normally closed	
		S3≡	S3	normally open	
	CW (right) 85°	S4-	S4	common	
		S5=	S5	normally closed	
		S6≡	S6	normally open	
feedback potentiometer		P1	P1	full clockwise	
		P2	P2	signal	
		P3	P3	full counterclockwise	

DIMENSIONS



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