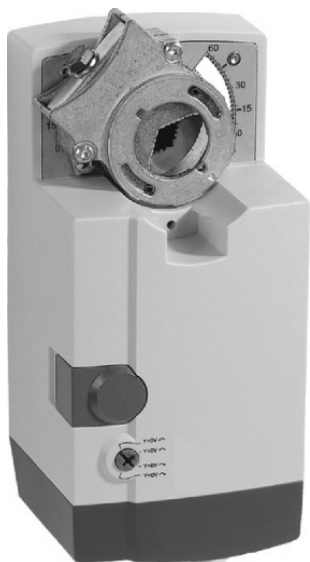# N20010, N34010
NON-SPRING RETURN DAMPER ACTUATOR
20/34 Nm (177/300 lb-in) FOR MODULATING CONTROL

PRODUCT DATA

GENERAL

These direct-coupled damper actuators provide modulating control for:
- air dampers,
- VAV units,
- air handling units,
- ventilation flaps,
- louvers, and
- reliable control for air damper applications with up to 4.6 m^2 (20 Nm) or 7.8 m^2 (34 Nm) (seal-less dampers; 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**
- **Rotation direction selectable by switch**
- **Mountable in any orientation (no IP54 if upside down)**
- **Mechanical position indicator**

SPECIFICATIONS

Supply voltage	24 Vac ±20%, 50/60 Hz; 24 Vdc -10...+20%
Nominal voltage	24 Vac, 50/60 Hz; 24 Vdc
Power consumption	see Table 1 on pg. 2

Ambient limits

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

Safety

Protection standard	IP54 as per EN 60529
Protection class	II as per EN 60730-1

Lifetime

Full strokes	60000
Repositions	1.5 million

Mounting

Round damper shaft	10...27 mm
Square damper shaft	10...18 mm; 45° steps
Shaft length	min. 22 mm

Control signal	0(2)...10 Vdc 0(4)...20 mA
Input impedance	100 kΩ [0...10 V] 500 Ω [0...20 mA]

Feedback signal

Limits	± 1 mA at 0...10 V

End switches (when included)

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

Torque rating	see Table 1 on pg. 2
Runtime	95 sec (60 Hz) / 110 sec (50 Hz)
Rotation stroke	95° ± 3°
Dimensions	see "Dimensions" on page 7
Weight (without cables)	1.35 kg
Software	Class A as per EN 60730-1

CE

MODELS

Table 1. Models

order number	supply voltage	end switches	control signal	feedback	power consumption	torque
N20010	24 Vac	--	0...10 Vdc / 0...20 mA	0...10 Vdc	6 VA / 6 W	20 Nm
N20010-SW2	24 Vac	2	0...10 Vdc / 0...20 mA	0...10 Vdc	6 VA / 6 W	20 Nm
N34010	24 Vac	--	0...10 Vdc / 0...20 mA	0...10 Vdc	6 VA / 8 W	34 Nm

Product Identification System


```
N = non-spring return
S = spring return
                                  010 = modulating
       20 = 20 Nm                  24 = 24 V floating+ON/OFF
       34 = 34 Nm                 230 = 230 V floating+ON/OFF

SmartAct  N 2 0 2 3 0 X

                  Optional feature (please specify, if required):
                  -SW2  = two built-in end switches
```
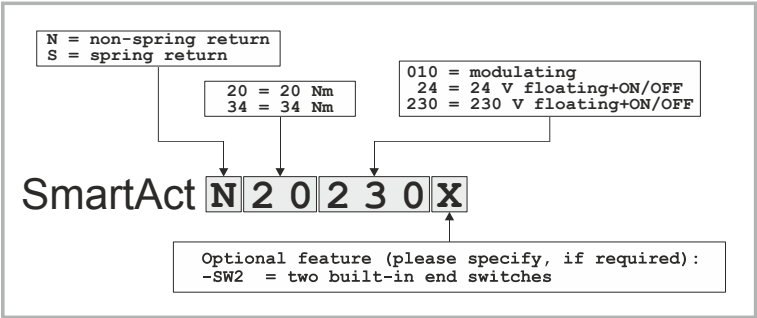
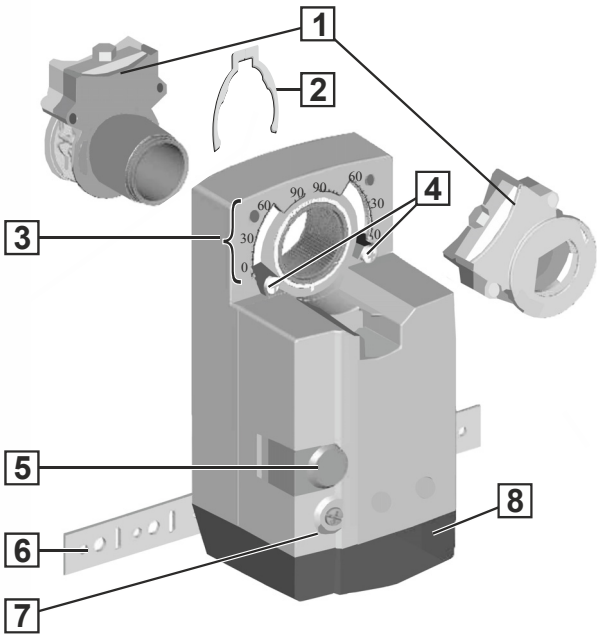**Fig. 1. Product Identification System**

OPERATION / FUNCTIONS

Fig. 2. Features

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 models, only)
5 Declutch button
6 Anti-rotation bracket
7 Rotation direction switch
8 Access cover

Contents of Package

The delivery package includes the actuator itself, parts 1 through 8 (see Fig. 2), the anti-rotation bracket, and bracket screws.

Modulating Control

The actuator is capable of being operated by several controllers providing Vdc or mA output.

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 5.
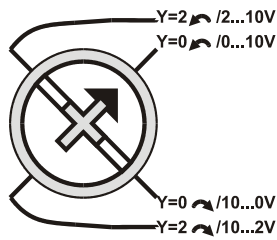
Rotation Direction Switch

Y=2 ↰ /2...10V
Y=0 ↰ /0...10V
Y=0 ↱ /10...0V
Y=2 ↱ /10...2V

Fig. 3. Rotation Direction Switch

Table 2. Feedback/control signal values

rotation direction switch position	feedback/control signal when actuator is	
	totally ↰	totally ↱
Y=2 ↰/2...10V	U = 2 V	U = 10 V
Y=0 ↰/0...10V*	U = 0 V	U = 10 V
Y=0 ↱/10...0V	U = 10 V	U = 0 V
Y=2 ↱/10...2V	U = 10 V	U = 2 V
* Default shipping position.		

Feedback Signal and Manual Adjustment

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.

Power OFF/ON Behavior

In case the power to the actuator fails, after re-applying power, the actuator aknowledges its present position and follows the signal from the controller. This makes it unnecessary for the actuator to employ autoadaption in order to re-map the control signal settings.

Dip Switches

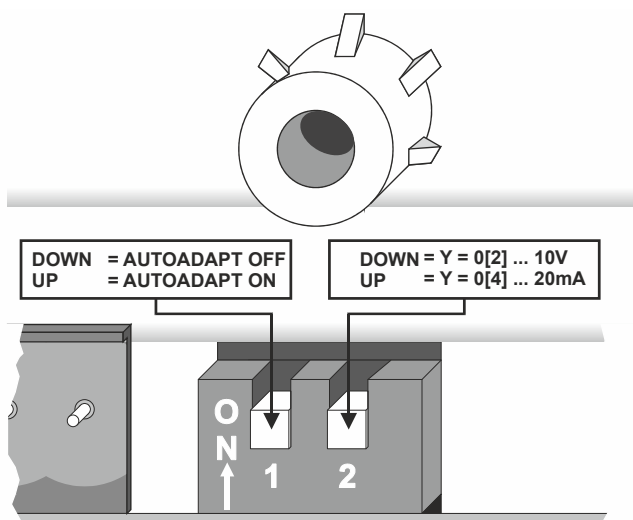The actuators are equipped with two dip switches accessible after removing the access cover (see Fig. 4).

DOWN = AUTOADAPT OFF
UP = AUTOADAPT ON

DOWN = Y = 0[2] ... 10V
UP = Y = 0[4] ... 20mA

ON 1 2

Fig. 4. Dip switches (view with PCB at bottom) (default)

Autoadapt Dip Switch for Normal Operation

In its default shipping position, the autoadapt dip switch for normal operation is set to **OFF** as shown in Fig. 4; in this case, no autoadapting is performed, and the control signal map remains constant.

If the autoadapt switch is set to ON, the SmartAct actuator will automatically trigger the autoadapt functionality when the min. and max. control signals are provided (see Fig. 5); the feedback signal is likewise autoadapted.
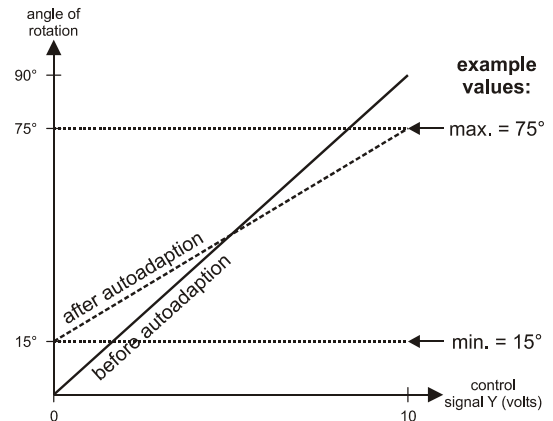

angle of rotation

example values:

max. = 75°

after autoadaption

before autoadaption

min. = 15°

control signal Y (volts)

Fig. 5. Actuator positioning curve

Adjusting the Actuator for Autoadapt

In order to make use of the autoadapt functionality, proceed as follows:

1. If the autoadapt dip switch is not already set to the ON position (default), set it to ON position.
2. If necessary, limit the stroke to the desired range using the mechanical end limits.
3. Drive the actuator to the left end limit (totally CCW) by setting the control signal as specified in Table 2.
4. Drive the actuator to the right end limit (totally CW) by setting the control signal as specified in Table 2. The stroke has now been limited to 0...100% of the control signal range.

Voltage/Current Control Signal Selection Dip Switch

In its default shipping position, the voltage/current control signal dip switch (see Fig. 4) is set to **OFF** (= voltage control). as shown in Fig. 4. Setting it to ON results in current control.

Position Indication

When the shaft adapter is inserted in front of the actuator plate (see Fig. 6), its left/right edges indicate its position with respect to the rotational angle scales (0...90° / 90...0°).
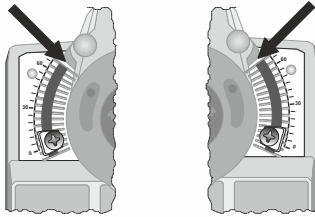

Fig. 6. Position indication

Manual Adjustment

The gear train can be disengaged using the declutch button, permitting the actuator shaft to be manually rotated to any position.

Limitation of Rotation Stroke

Two mechanical end limits (20 Nm models, only) are provided to limit the angle of rotation as desired (see Fig. 7).

ENSURE PROPER MESHING OF TEETH
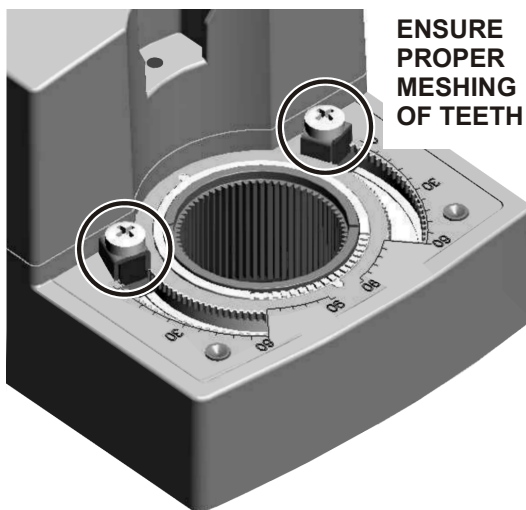
Fig. 7. Mechanical end limits

The mechanical end limits must be securely fastened in place as shown in Fig. 8. Specifically, it is important that they properly mesh with the rotational angle scales when the screws are tightened.
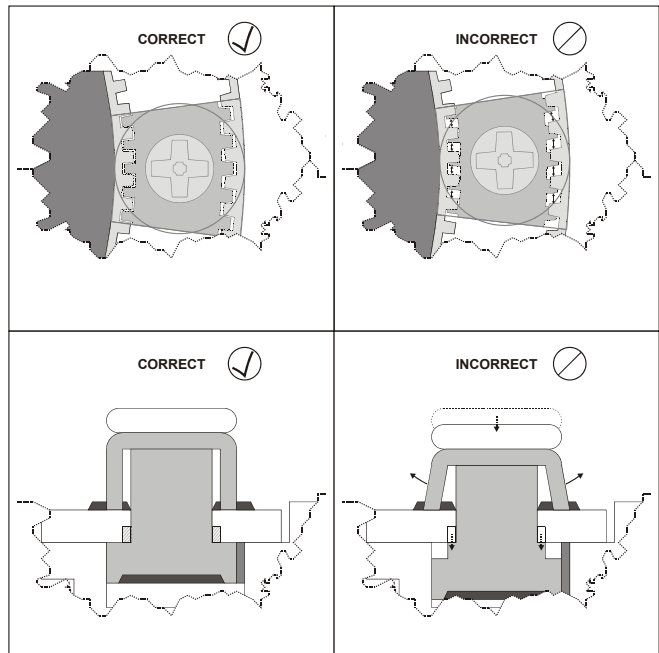
Fig. 8. Correct / incorrect tightening of end limits

Internal End Switches

NOTE: Only those actuators for which the option "-SW2" has been specified when ordering (e.g.: "N20010-SW2") feature internal end switches.

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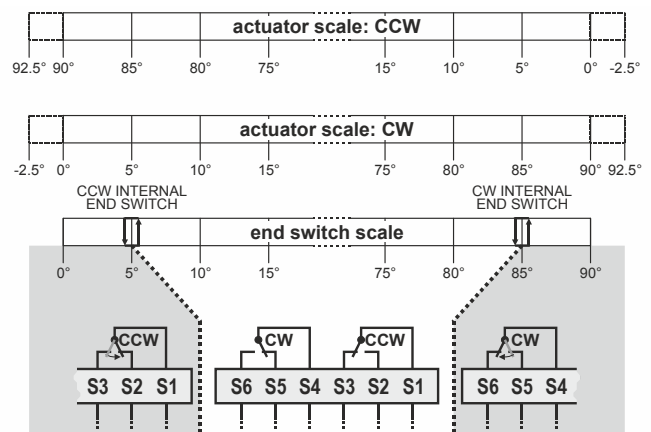

Fig. 9. Internal end switch triggering points

Override

- If terminal Y of the terminal strip (see section "Wiring Diagrams" on page 6) is unplugged, the stroke will be 0%; reversing the rotation direction using the rotation direction switch will result in a max. stroke of 100%.
- If terminal Y is jumped with terminal 1 (24 Vac), the stroke will be 50%.

INSTALLATION

These actuators are designed for single-point mounting and indoor use.

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 desired orientation (no IP54 if mounted upside down; see Fig. 10). Choose an orientation permitting easy access to the actuator's cables and controls.
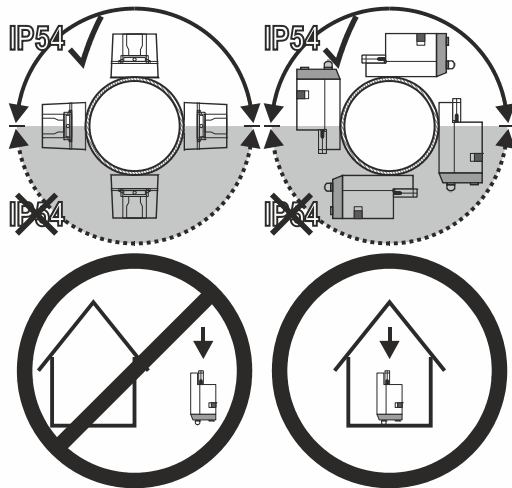

Fig. 10. Mounting for IP54

Mounting Bracket and Screws

If the actuator is to be mounted directly on a damper shaft, use the mounting bracket and bracket 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) 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 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.
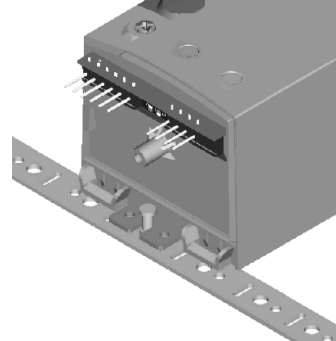

Fig. 11. N20010-SW2 with access cover removed

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.
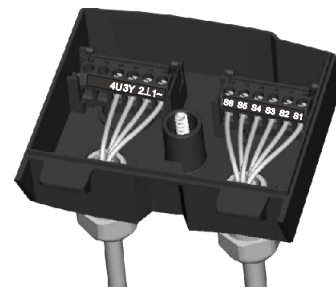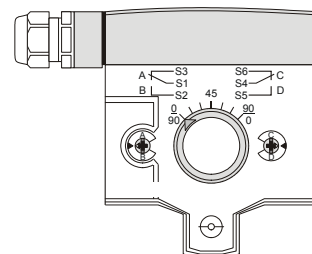

Fig. 12. Access cover (N20010-SW2)

OPTIONAL ACCESSORIES

The following optional accessories can be ordered separately.

Auxiliary Switch Kit

The internal auxiliary switches are field-installable parts providing two SPDT freely-adjustable switches.
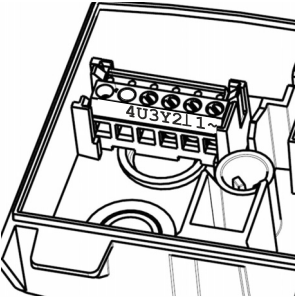Order no.: SW2

SPARE PARTS

There are no spare parts available.

　　　　EN0B-0341GE51 R0713

WIRING DIAGRAMS

Nxx010 Wired for MODULATING CONTROL	Internal end switches (Nxxxxx-SW2)

Nxx010 — Wired for MODULATING CONTROL
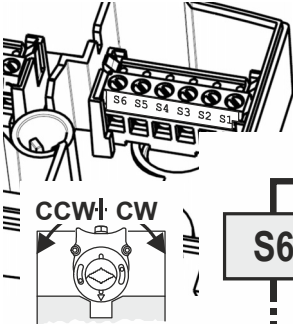
4U 3Y 2⊥ 1~

- 4U → 0[2] ... 10 VDC
- 3Y → 0[2] ... 10 VDC / 0[4] ... 20 mA
- 2⊥ → ⊥ 24 VAC / -24 VDC
- 1~ → ~24 VAC / +24 VDC

Internal end switches (Nxxxxx-SW2)

S6 S5 S4 S3 S2 S1

MAX. 5 (3) A

S1 / CCW		S4 / CW	
230V	+	230V	⊘
24V	+	24V	⊘
230V	+	24V SELV	⊘
24V SELV	+	230V	⊘

DIMENSIONS

103 mm
SHAFT ADAPTER
SHAFT ADAPTER (REAR)
22.6 mm
95°
48 mm
223 mm
92 mm
min. 60 mm
1000 mm
132 mm
230 mm (+/- 0.5 mm)
20 mm
ANTI-ROTATION BRACKET
∅ 7 mm
13 mm
2 mm
∅ 5 mm (+0.05, -0.10 mm)

Honeywell