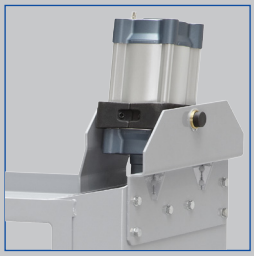
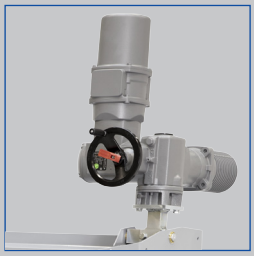
Shut-off devices
Type NAK



Pneumatic actuator



Electric actuator

Hand wheel

For the gas-tight shut-off of ducts

Gas-tight shut-off dampers are designed to ensure the level of tightness required by KTA Guideline 3601 (German Nuclear Safety Standards Commission, KTA) and by DIN 25414 even when the power supply or compressed air supply fails.

- Compact design and robust actuator mechanism allow for any installation orientation
- Maximum air leakage rate is 0.0028 (l/s)/m^2 or 0.01 (m^3/h)/m^2 at a differential pressure of 2000 Pa
- Gas-tight closure, even when there is no power, due to special over centre locking mechanism
- Variants with hand wheel, pneumatic actuator or electric actuator
- Brass and stainless steel bearings
- Powder-coated casing and blades
- Maximum pressure loading of 5000 Pa, in closing direction
- Available in standard sizes and many intermediate sizes

Optional equipment and accessories

- Flange holes
- Limit switch
- Double acting pneumatic actuator, with optional solenoid valve
- Electric actuator 3 × 230 V AC (400 V AC) or 230 V AC

Type		Page
NAK	General information	NAK – 2
	Function	NAK – 3
	Technical data	NAK – 6
	Quick sizing	NAK – 7
	Specification text	NAK – 8
	Order code	NAK – 9
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	Dimensions and weight	NAK – 11
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	Installation details	NAK – 17

Application

Application
- Shut-off dampers of Type NAK for shutting off ducts in air conditioning systems with the most critical safety requirements for tightness (gas-tight)
- Gas-tight shut-off dampers ensure the level of tightness required by KTA Guideline 3601 (German Nuclear Safety Standards Commission, KTA) and by DIN 25414 even when the power supply or compressed air supply fails

Special characteristics
- Compact design and robust actuator mechanism allow for any installation orientation
- Gas-tight closure, even when there is no power, due to special over centre locking mechanism
- Maximum closed blade leakage rate is 0.0028 (l/s)/m^2 or 0.01 (m^3/h)/m^2 at a differential pressure of 2000 Pa
- Maximum pressure loading of 5000 Pa, in closing direction

Nominal sizes
- B: 400, 600, 800, 1000 mm (intermediate sizes: 401 – 999 mm, in increments of 1 mm)
- H: 270, 510, 755, 1000 mm
- Any combination of B × H

Description

Variants
- NAK-H: Gas-tight shut-off damper with hand wheel
- NAK-P: Gas-tight shut-off damper with pneumatic actuator
- NAK-E: Gas-tight shut-off damper with electric actuator (400 V AC, 50 Hz)
- NAK-E1: Gas-tight shut-off damper with electric actuator (230 V AC, 50 Hz)

Construction
- Duct connection without flange holes
- G: Flange holes on both sides

Attachments
- Attachments: For opening and closing, and for capturing the blade end positions

Construction features
- Casing made of welded U-channel sections, material thickness 3 mm
- Blades and special sealing frame, material thickness 2 mm
- External blade mechanism (over centre locking)
- OPEN blades rest against the travel stops
- CLOSED blades are pressed against the seal
- Special sealing frame fitted with glued-in seals, welded into the casing

Materials and surfaces
- Casing made of sheet steel, material no. EN 10142-DX51D+Z150-200
- Blades and sealing frame made of sheet steel, material no. EN 10327-DX51D+Z150-200-NAC
- Linkage, travel stops and further attachments made of galvanised steel
- Brass or stainless steel bearings
- Seals made of neoprene rubber foam, temperature resistant up to 80 °C
- Powder-coated casing and blades, grey (RAL 7001)

Standards and guidelines
- Closed blade air leakage to KTA 3601 Guideline (German Nuclear Safety Standards Commission, KTA) and DIN 25414
- Casing air leakage to EN 1751, class C

Maintenance
- Contamination should be removed as it may lead to corrosion
- Lubricate friction points and bearings
- NAK-H, NAK-E, NAK-E1: Lubricate threaded spindle
- Lubricating intervals depend on the application: every six to twelve months or after a maximum of 2000 switching cycles
- Use only oil or grease that is free of resins or acids.

NAK-H

Functional description

The shut-off damper is opened and closed manually, by turning a hand wheel. Turning the hand wheel approx. 30 times moves the blades into the corresponding end position. Turning the hand wheel clockwise closes the damper.

NAK-E

Functional description

The shut-off damper is opened and closed with an electric actuator.
The control input signal is provided by others.

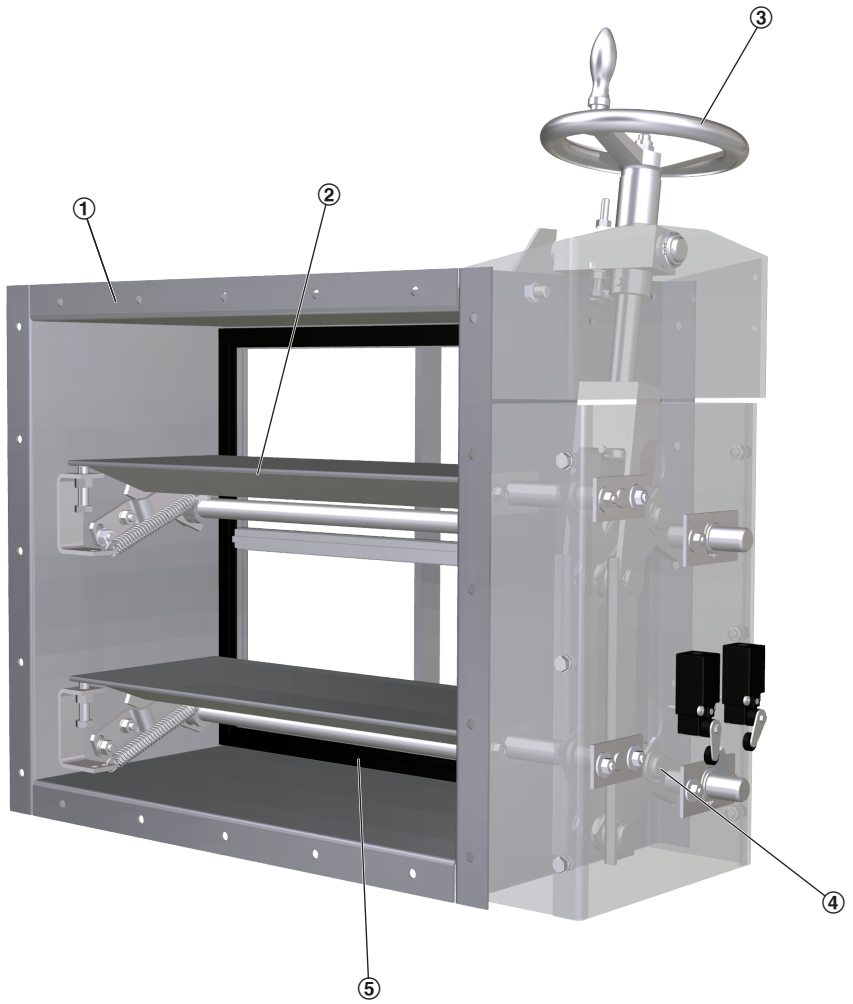
In case of a power failure the shut-off damper can be opened or closed manually by turning the hand wheel.

NAK-P

Functional description

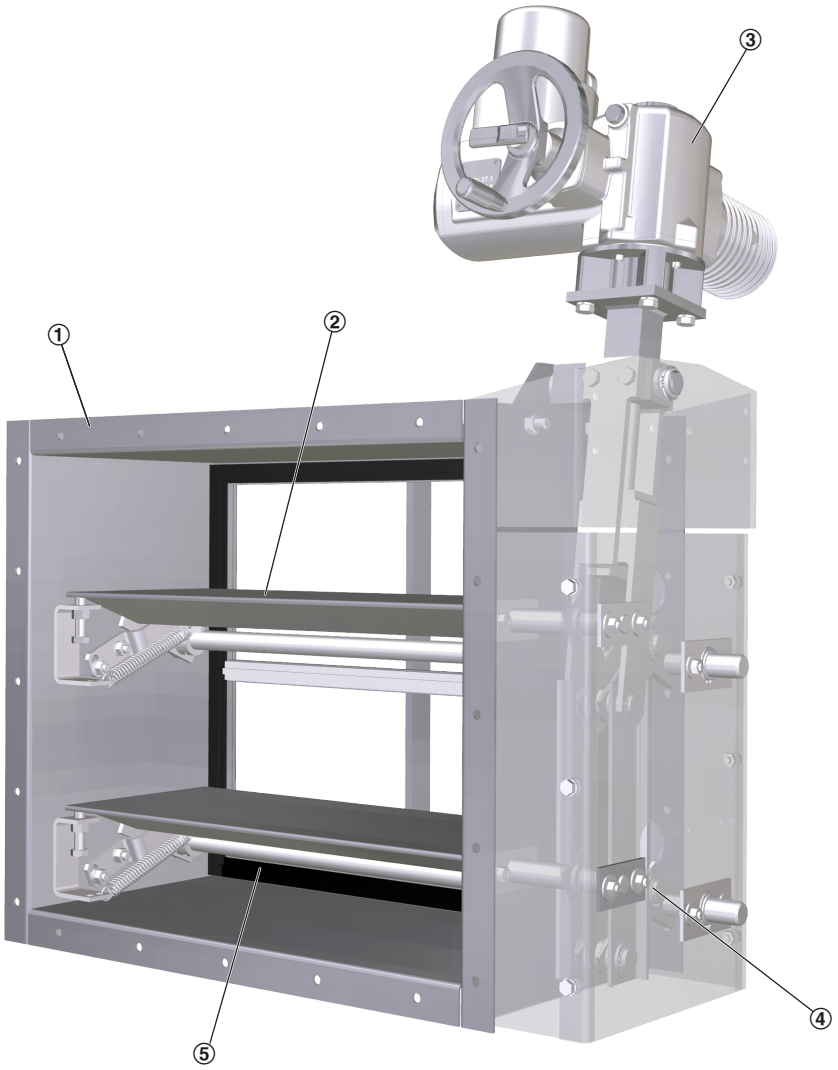
The shut-off damper is opened and closed with a double acting pneumatic actuator.
The easiest way to generate the control input signal is electrically, using solenoid valves.
Different opening and closing times can be set using throttle valves.
The running time is at least 2 seconds.

Schematic illustration of NAK-H



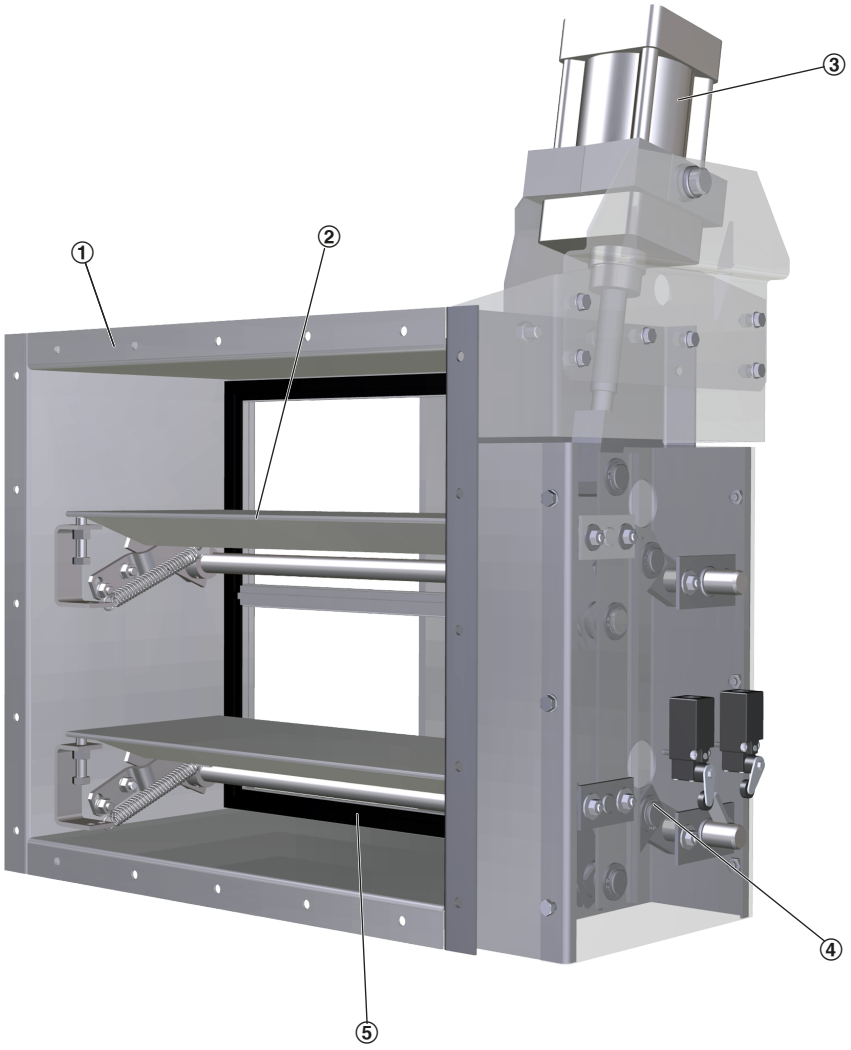
① Casing
② Blade
③ Rotary knob
④ Linkage (over centre locking)
⑤ Seal

Schematic illustration of NAK-E



① Casing
② Blade
③ Electric actuator with hand wheel
④ Linkage (over centre locking)
⑤ Seal

Schematic illustration of NAK-P



① Casing
② Blade
③ Pneumatic actuator
④ Linkage (over centre locking)
⑤ Seal

Nominal sizes	400 × 270 to 1000 × 1000 mm
Maximum differential pressure	5000 Pa, in closing direction
Closed blade air leakage	< 0.0028 (l/s)/m² or 0.01 (m³/h)/m²
Operating temperature	80 °C

NAK-E

Supply voltage	3 × 230 V AC (400 V AC), 50 Hz
Nominal current	0.7 A
Current at maximum torque	1.0 A
Switch-on current	3.0 A
Torque	60 Nm
Actuator speed	22 1/min
Motor rating	0.12 kW S2-15 min
Heating	230 V AC
Running time required to fully close or fully open the damper	Approx. 60 s
Protection level of actuator	IP 68
EC conformity	EMC to 2004/108/EU, low voltage to 2006/95/EU
Operating temperature	–25 to 80 °C
Weight	20 kg

NAK-E1

Supply voltage	220 – 240 V AC, 50 Hz
Nominal current	1.8 A
Current at maximum torque	2.7 A
Switch-on current	7.5 A
Torque	60 Nm
Actuator speed	22 1/min
Motor rating	0.12 kW S2-15 min
Heating	230 V AC
Running time required to fully close or fully open the damper	Approx. 60 s
Protection level of actuator	IP 68
EC conformity	EMC to 2004/108/EU, low voltage to 2006/95/EU
Operating temperature	–25 to 80 °C
Weight	25 kg

NAK-P

Function	Pneumatic, double acting
Operating pressure	6 bar
Running time required to fully close or fully open the damper	At least 2 s
Air consumption	4.4 nl/stroke
Compressed air	Filtered
Weight	5 kg

Free area – NAK

H	**B [mm]**			
	400	**600**	**800**	**1000**
mm	**m²**			
270	0.06	0.096	0.13	0.16
510	0.12	0.19	0.26	0.33
755	0.18	0.29	0.39	0.5
1000	0.24	0.38	0.52	0.66

Differential pressure

v	Δp_{st}
m/s	Pa
2	4
4	10
6	30
8	60
10	70

This specification text describes the general properties of the product. Texts for variants can be generated with our Easy Product Finder design programme.

Rectangular shut-off dampers for shutting off ducts (gas-tight).
Level of tightness required by KTA Guideline 3601 (German Nuclear Safety Standards Commission, KTA) and by DIN 25414 even when the power supply or compressed air supply fails.
Ready-to-operate unit which consists of the casing, blades and the blade mechanism (over centre locking).
Flanges on both sides, suitable for duct connection.
Suitable for duct pressures up to 5000 Pa.

Special characteristics
- Compact design and robust actuator mechanism allow for any installation orientation
- Gas-tight closure, even when there is no power, due to special over centre locking mechanism
- Maximum closed blade leakage rate is 0.0028 (l/s)/m^2 or 0.01 (m^3/h)/m^2 at a differential pressure of 2000 Pa
- Maximum pressure loading of 5000 Pa, in closing direction

Materials and surfaces
- Casing made of sheet steel, material no. EN 10142-DX51D+Z150-200
- Blades and sealing frame made of sheet steel, material no. EN 10327-DX51D+Z150-200-NAC
- Linkage, travel stops and further attachments made of galvanised steel
- Brass or stainless steel bearings
- Seals made of neoprene rubber foam, temperature resistant up to 80 °C
- Powder-coated casing and blades, grey (RAL 7001)

Construction
- Duct connection without flange holes
- G: Flange holes on both sides

Technical data
- Nominal sizes: 400 × 270 to 1000 × 1000 mm
- Maximum differential pressure: 5000 Pa, in closing direction
- Closed blade air leakage: < 0.0028 (l/s)/m^2 or 0.01 (m^3/h)/m^2

NAK

NAK – P – G – R / 800×755 / Z05

1 2 3 4 5 6

1 Type
NAK Shut-off damper, gas-tight

2 Function
H Hand wheel
P Pneumatic actuator
E Electric actuator 400 V
E1 Electric actuator 230 V

3 Construction
No entry: duct connection without flange holes
G Duct connection with flange holes

4 Operating side
R Right side
L Left side

5 Nominal size [mm]
B × H

6 Attachments
No entry: none
Z01 – Z07

Order example: NAK–E–G–R/600×755/Z03

Function	Electric actuator 3 x 230 V AC
Construction	Duct connection with flange holes
Operating side	Right side
Nominal size	600 × 755 mm
Attachments	Limit switches, indicating blade OPEN and CLOSED

Gas-tight shut-off damper, variant NAK-H

Gas-tight shut-off damper with hand wheel

Gas-tight shut-off damper, variant NAK-E/-E1

Gas-tight shut-off damper with electric actuator

Gas-tight shut-off damper, variant NAK-P

Gas-tight shut-off damper with pneumatic actuator

NAK-H

Variant
- Gas-tight shut-off damper with hand wheel

Parts and characteristics
- Ready-to-install shut-off damper
- Blades with linkage (over centre locking)
- Sealing frame with seal
- Hand wheel

NAK-E

Variant
- NAK-E: Gas-tight shut-off damper with electric actuator (3 x 230 (400 V AC), 50 Hz)

Parts and characteristics
- Ready-to-install shut-off damper
- Blades with linkage (over centre locking)
- Sealing frame with seal
- Electric actuator (3 × 230 (400 V AC), 50 Hz)

NAK-E1

Variant
- Gas-tight shut-off damper with electric actuator (230 V AC, 50 Hz)

Parts and characteristics
- Ready-to-install shut-off damper
- Blades with linkage (over centre locking)
- Sealing frame with seal
- Electric actuator 230 V AC

NAK-P

Variant
- Gas-tight shut-off damper with pneumatic actuator (operating pressure 6 bar)

Parts and characteristics
- Ready-to-install shut-off damper
- Blades with linkage (over centre locking)
- Sealing frame with seal
- Double acting pneumatic actuator with adjustable throttle valves

NAK-H

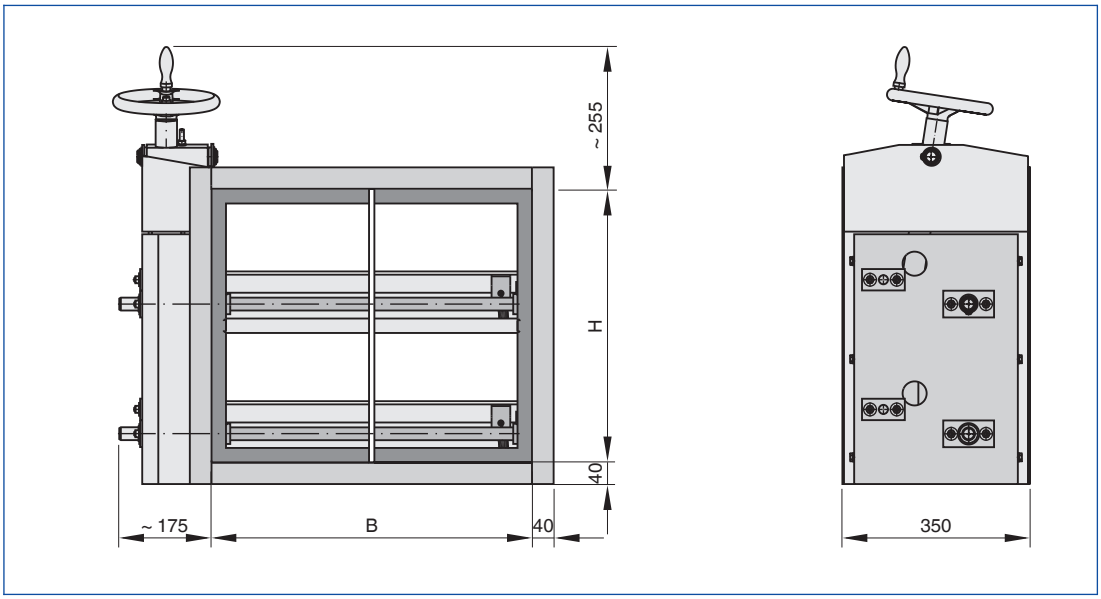


Illustration shows operating side on the right

NAK-H, weights

H	B [mm]			
	400	600	800	1000
mm	kg			
270	34	45	56	67
510	57	70	82.5	95
755	81	95	109	123
1000	103.5	120	136	153

NAK-E

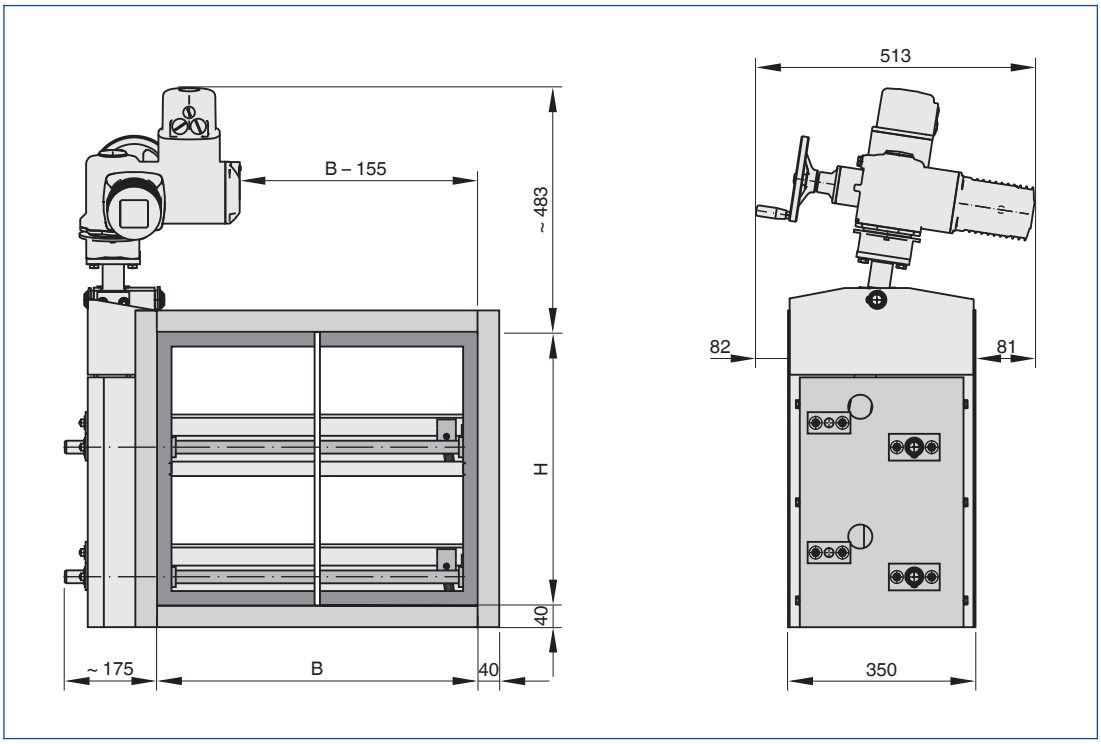


Illustration shows operating side on the right

NAK-E, weights

H	B [mm]			
	400	600	800	1000
mm	kg			
270	57	68	79	90
510	80	93	106	118
755	104	118	132	146
1000	127	143	159	176

NAK-E1

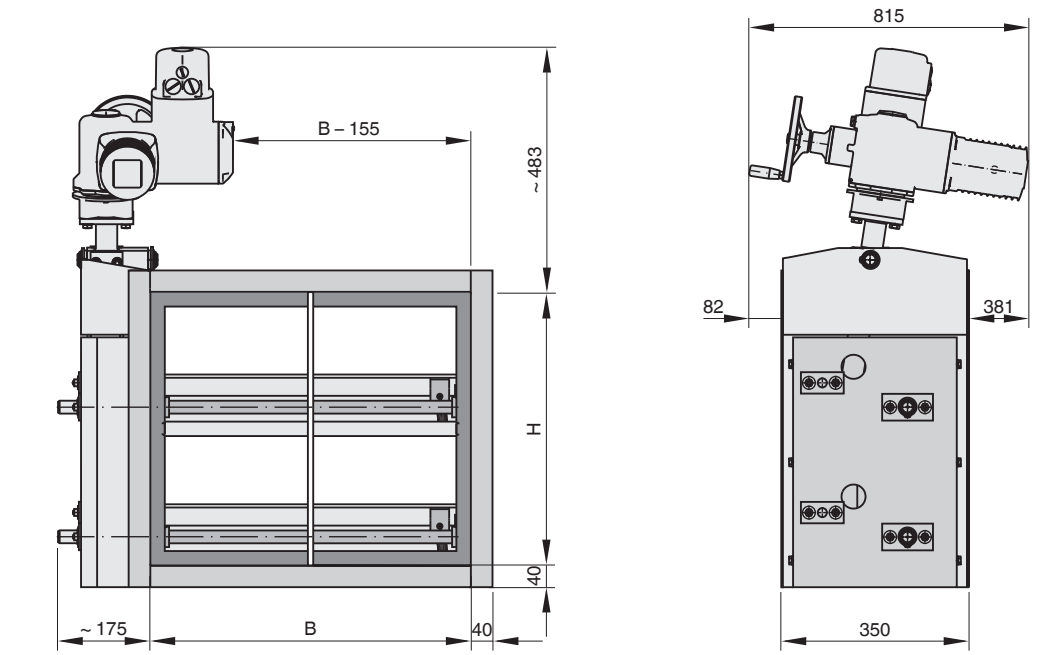


Illustration shows operating side on the right

NAK-E1, weights

H	B [mm]			
	400	600	800	1000
mm	kg			
270	59	70	81	92
510	82	95	107.5	120
755	106	120	134	148
1000	128.5	145	161	178

NAK-P

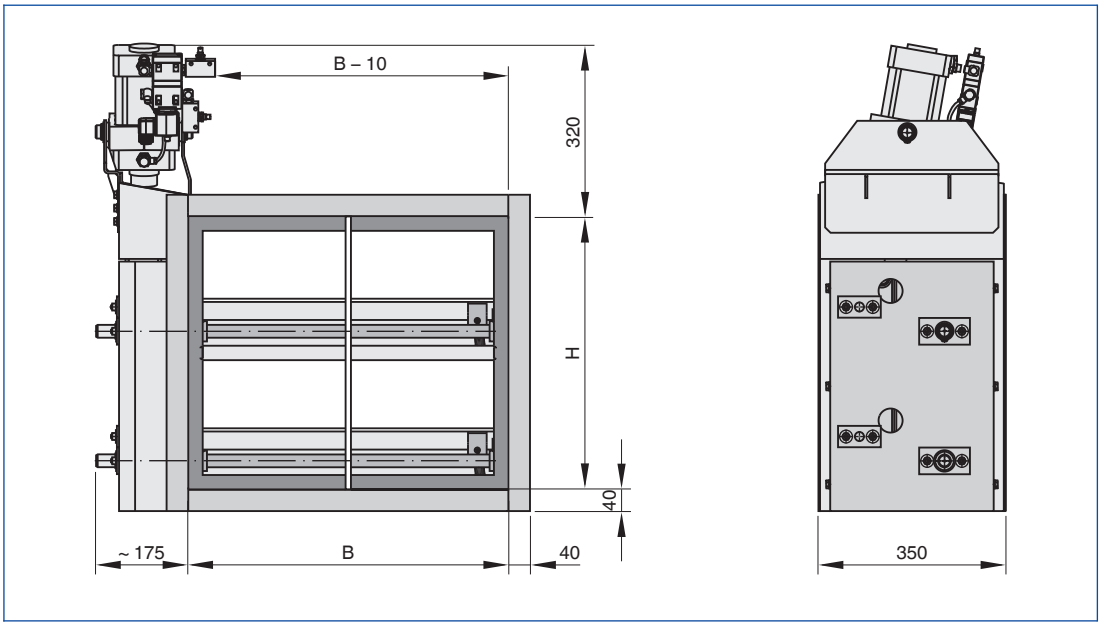
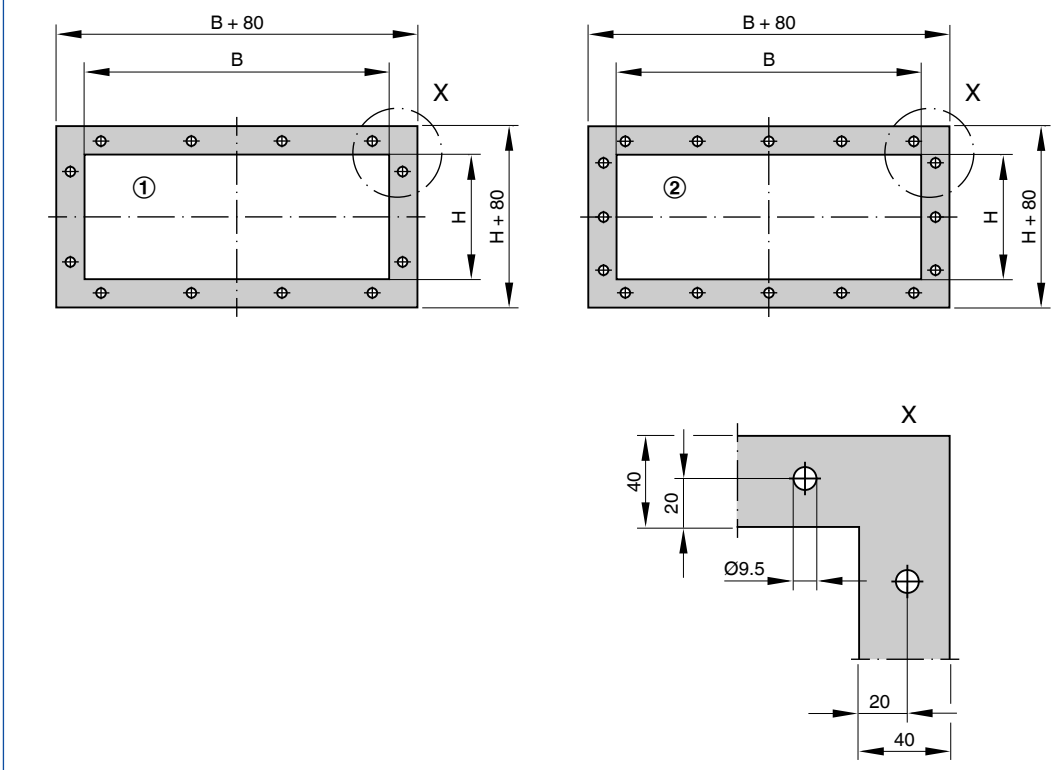


Illustration shows operating side on the right

NAK-P, weights

H	B [mm]			
	400	600	800	1000
mm	kg			
270	40	51	62	73
510	63	76	89	101
755	87	101	115	129
1000	110	126	142	159

Flange holes – NAK



① Even number of holes (hole pitch = 125 mm)

② Uneven number of holes (hole pitch = 125 mm)

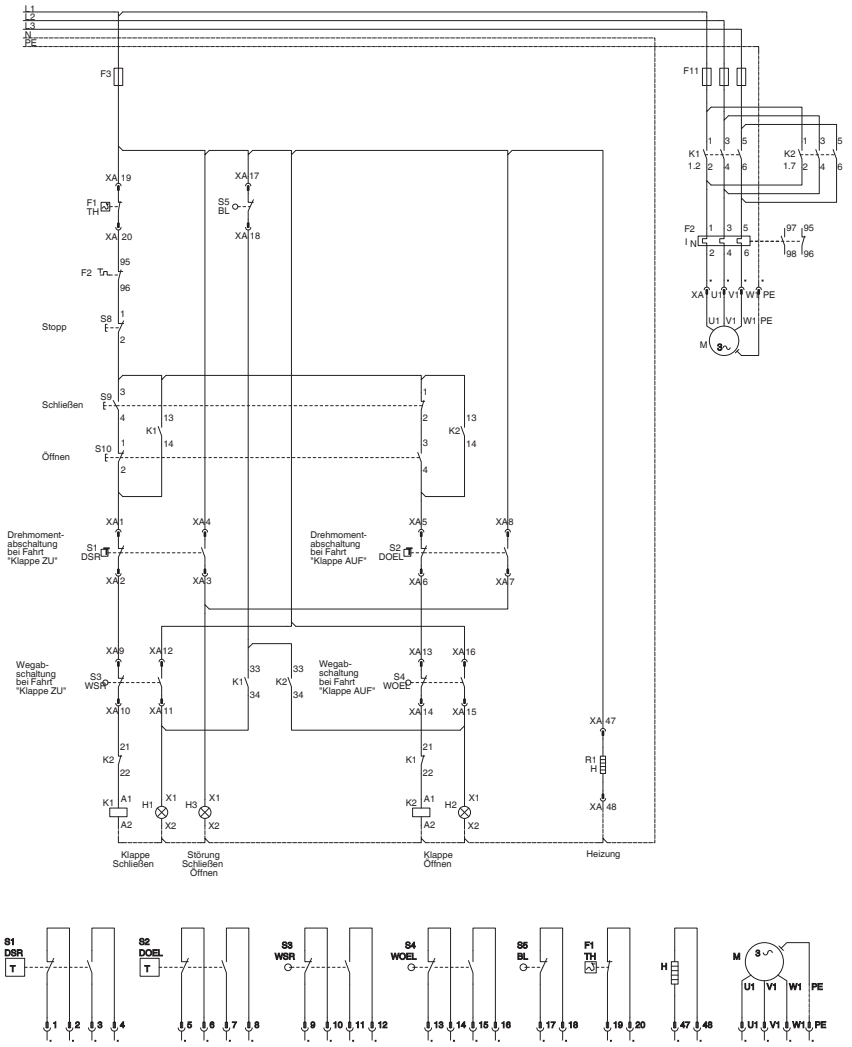
NAK: Width, no. of flange holes

B	No. of holes
	n
mm	–
400 – 524	4
525 – 649	5
650 – 774	6
775 – 899	7
900 – 1000	8

NAK: Height, no. of flange holes

H	No. of holes
	n
mm	–
270	3
510	5
755	7
1000	9

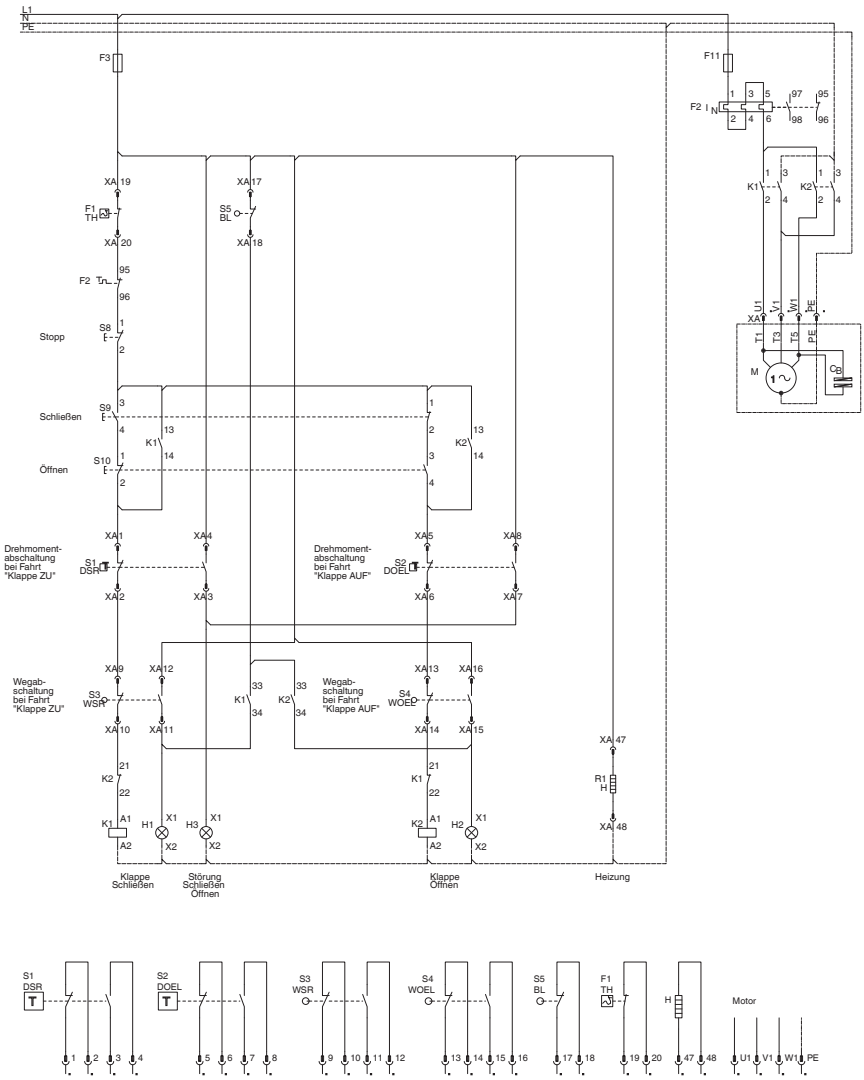
Variant NAK-E – wiring diagram for actuator 3 x 400 V AC



S1 Torque switch, clockwise (DSR) – CLOSE damper
S2 Torque switch, anticlockwise (DOEL) – OPEN damper
S3 Limit switch, clockwise (WSR) – CLOSE damper
S4 Limit switch, anticlockwise (WSR) – OPEN damper
S5 Flasher (BL)
F1 Motor protection switch (TH)
F2 Thermal switch (TH)
R1 Heating (TH)

External control
S8 Push button – Stop
S9 Push button – Close damper
S10 Push button – Open damper
K1 Contactor – Close damper
K2 Contactor – Open damper
H1 Message – Close damper
H2 Message – Open damper
H3 Message – Error

Variant NAK-E1 – wiring diagram for actuator 230 V AC



S1 Torque switch, clockwise (DSR) – CLOSE damper
S2 Torque switch, anticlockwise (DOEL) – OPEN damper
S3 Limit switch, clockwise (WSR) – CLOSE damper
S4 Limit switch, anticlockwise (WSR) – OPEN damper
S5 Flasher (BL)
F1 Motor protection switch (TH)
F2 Thermal switch (TH)
R1 Heating (TH)
C Operating capacitor (CB)

External control
S8 Push button – Stop
S9 Push button – Close damper
S10 Push button – Open damper
K1 Contactor – Close damper
K2 Contactor – Open damper
H1 Message – Close damper
H2 Message – Open damper
H3 Message – Error

Installation and commissioning

- Any installation orientation
- System pressure must act into the direction of blade closure

NAK-P:

- Operation requires filtered compressed air, operating pressure 6 bar

NAK-E/NAK-E1:

- Connect linear and torque switches before commissioning as otherwise the blade mechanism may become damaged
- Make electrical connections according to wiring diagrams