

## Frese OPTIMA Compact actuators DN10-DN32

### Application

Proportional 0-10 V, 4-20 mA or 3-position modulating or On/Off control of Frese OPTIMA Compact valves in heating, ventilating and air conditioning systems.

The actuator can be mounted on the valve by hand and without the need of a specific tool.

Due to the compact design of the actuator, it is particularly suitable for installations where space is limited.



### Features motoric actuators

- Nominal stroke on proportional 0-10 V or 4-20 mA actuator up to 5.5 mm. Presetting from factory 2.5 or 5.5 mm
- Auto calibration to all valve strokes for version with feedback signal (53-1184)
- 3-position, 0-10 V DC or 4-20 mA control signal. Other control signals can be selected by use of dip switches
- Direct assembly with union nut to the neck of the valve. No tools required
- Bi-color LED for status and diagnostic
- Linear or EQ % characterization available on the same actuator
- The actuator is short-circuit-proof and protected against polarity reversal
- Plug-in cable for supply voltage and control signal
- Small outer dimensions
- Removable cable
- Auto zero detection
- IP 43 for standard actuator versions. IP 54 protection for version with feedback signal (53-1184)
- Voltage and Current analog inputs

### Features thermic actuators

- Auto calibration to all valve strokes for proportional 0-10 V actuator
- On/Off or 0-10 V DC control signal
- Simple snap-on installation
- Small outer dimensions
- Cable included
- First-Open function
- IP 54 protection
- Power consumption 1-2 W
- 0-10 V feedback signal
- Auxiliary switch to control external devices

### Approval

- Conforms to: EMC directive 2004/108/EC
- Low voltage directive 2006/95/EC



## Frese OPTIMA Compact actuators DN10-DN32

### Technical data motoric actuators

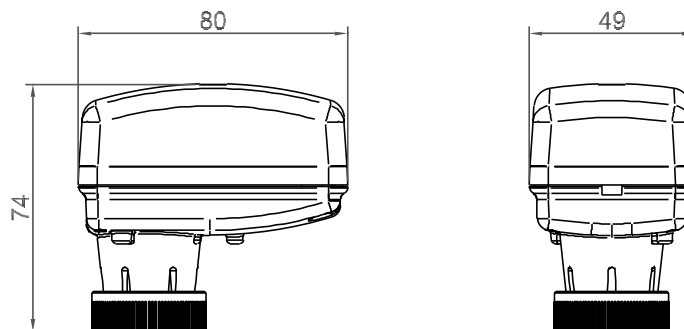
<b>Supply voltage:</b>	See "Types and Operation Data"
<b>Protection class:</b>	See "Types and Operation Data"
<b>Frequency:</b>	50/60 Hz
<b>Input impedance:</b>	> 100 k Ohm (DC 0-10 V)
<b>Parallel operation:</b>	Max 4 actuators
<b>Force:</b>	>120 N
<b>Stroke:</b>	See "Types and Operation Data"
<b>Ambient conditions:</b>	Temperature 0 °C-50 °C Humidity 10-90 % r.F.
<b>Cable length:</b>	1.5 m
<b>Weight:</b>	215 g



### Types and Operation Data

Types	Valve Dim.	Control signal	Feedback signal	Running time (50 Hz)	Supply voltage	Power Consumption	Protection Class (For valve stroke)
53-1180	DN10-DN32	DC 0-10 V 4-20 mA	-	8 s/mm	AC/DC 24 V +/- 15 %	2.5 VA	IP 43 (5.0 & 5.5 mm)
53-1181	DN10-DN32	3-position/ On/Off	-	13 s/mm	AC 24 V +/- 15 %	2.5 VA	IP 43 (All valve strokes)
53-1182	DN10-DN32	3-position/ On/Off	-	13 s/mm	AC 230 V +/- 10 %	6.5 VA	IP 43 (All valve strokes)
53-1183	DN10-DN32	DC 0-10 V 4-20 mA	-	8 s/mm	AC/DC 24 V +/- 15 %	2.5 VA	IP 43 (2.5 mm)
53-1184	DN10-DN32	DC 0-10 V 4-20 mA	0-10 V	8 s/mm	AC/DC 24 V +/- 15 %	2.5 VA	IP 54 (All valve strokes)

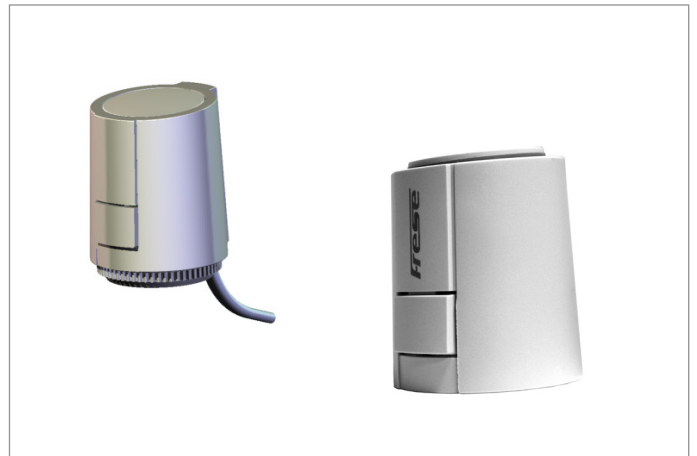
### Dimensions [mm]



## Frese OPTIMA Compact actuators DN10-DN32

### Technical data thermic actuators

<b>Characteristics:</b>	Thermic actuators, NC or NO
<b>Protection class:</b>	IP 54 to EN 60529
<b>Frequency:</b>	50/60 Hz or DC
<b>Control signal:</b>	0-10 V DC or On/Off
<b>Force:</b>	100 N
<b>Stroke:</b>	2.5 - 5.0 - 5.5 mm
<b>Running time:</b>	120 s 0-10V/180 s On/Off
<b>Ambient conditions:</b>	0 °C-60 °C
<b>Cable length:</b>	1.0 m
<b>Weight:</b>	100 g



### Types and Operation Data: Normally Closed (NC) versions

Types	Valve Dim.	Control signal	Feedback signal/ AUX-switch	Running time (50 Hz)	Supply voltage	Power Consumption	For valve stroke
48-5525	DN10-DN20	On/Off	-	180 s	AC/DC 24 V	1 W / 300 mA*	2.5 mm
48-5526	DN10-DN20	On/Off	-	180 s	AC 230 V	1 W / 300 mA*	2.5 mm
48-5527	DN10-DN32	On/Off	-	180 s	AC/DC 24 V	1.2 W / 300 mA*	5.0-5.5 mm
48-5528	DN10-DN32	On/Off	-	180 s	AC 230 V	1.2 W / 550 mA*	5.0-5.5 mm
48-5529	DN10-DN32	DC 0-10 V	-	30 s/mm	AC 24 V	1.2 W / 320 mA*	2.5-5.0-5.5 mm
48-5529-1	DN10-DN32	DC 0-10 V	-	30 s/mm	DC 24 V	1.2 W / 320 mA*	2.5-5.0-5.5 mm
48-5542	DN10-DN32	DC 0-10 V	DC 0-10 V	30 s/mm	AC/DC 24 V	1.2 W / 320 mA*	2.5-5.0-5.5 mm
48-5532	DN10-DN20	On/Off	-	180 s	AC/DC 24 V	2 W / 250 mA*	2.5 mm
48-5533	DN10-DN20	On/Off	-	180 s	AC 230 V	2 W / 350 mA*	2.5 mm
48-5539	DN10-DN32	On/Off	AUX-switch	240 s	AC 230 V	1 W / 300 mA*	2.5-5.0-5.5 mm**
48-5540	DN10-DN32	On/Off	AUX-switch	240 s	AC/DC 24 V	1 W / 300 mA*	2.5-5.0-5.5 mm**

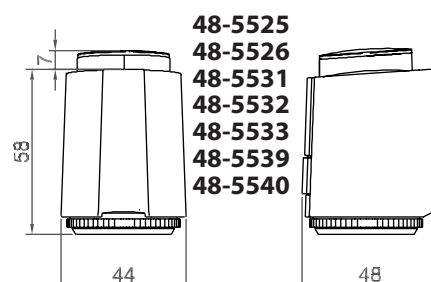
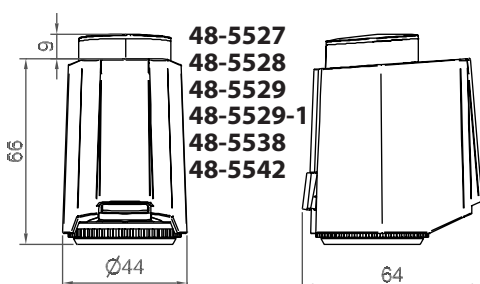
### Types and Operation Data: Normally Open (NO) versions

Types	Valve Dim.	Control signal	Feedback signal	Running time (50 Hz)	Supply voltage	Power Consumption	For valve stroke
48-5531	DN10-DN20	On/Off	-	180 s	AC/DC 24 V	1 W / 300 mA*	2.5 mm
48-5538	DN10-DN32	On/Off	-	180 s	AC/DC 24 V	1.2 W / 300 mA*	5.0-5.5 mm

\*) Inrush current

\*\*\*) When mounted on valves with 5.0 and 5.5 mm stroke, the flow will be reduced by 20%

### Dimensions [mm]



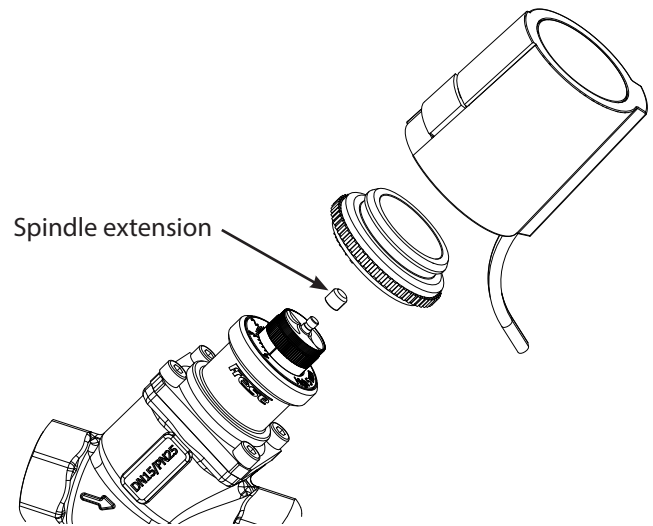
## Frese OPTIMA Compact actuators DN10-DN32

### Mounting of thermic actuators with AUX-switch

When actuators with AUX-switch are mounted on valves with 5.0 and 5.5 mm stroke, the spindle extension delivered with the actuator must be mounted (clicked on) to the spindle of the OPTIMA Compact valve.

**Please note:** The flow will be reduced by 20 %

Valves with 2.5 mm stroke shall not be mounted with the spindle extension and the flow will remain unchanged.



### Combination matrix: Frese OPTIMA Compact DN10-32 / Actuators

Frese OPTIMA Compact can be combined with both thermic actuators and motoric actuators.

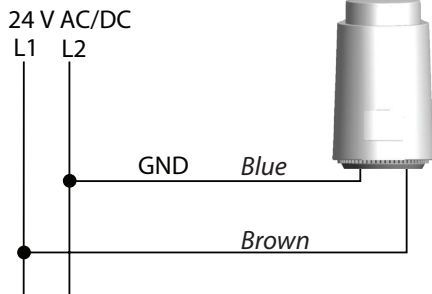
The design of the valve, combined with the Frese actuator, produces a perfect control characteristic that utilises the full control range of the system.

					Thermic Actuators					Motoric Actuators			
					On/Off		0-10V			0-10V, 4-20 mA		3-pos	
Male/Male ISO 228	Type	Stroke mm	Flow l/h	Dim	24V 2.5 mm	230V 2.5 mm	24V 5.0 - 5.5 mm	230V 5.0 - 5.5 mm	24V 2.5 - 5.0 - 5.5 mm	24V 2.5 mm	24V 5.0 - 5.5 mm	24V	230V
	DN10 M/M LOW 2.5	2.5	30-200	DN10	●	●			●	●		●	●
	DN10 M/M LOW 5.0	5.0	65-370	DN10			●	●	●		●	●	●
	DN15 M/M LOW 2.5	2.5	30-200	DN15	●	●			●	●		●	●
	DN15 M/M LOW 5.0	5.0	65-370	DN15			●	●	●		●	●	●
	DN15 M/M HIGH 2.5	2.5	100-575	DN15	●	●			●	●		●	●
	DN20 M/M HIGH 2.5	2.5	100-575	DN20	●	●			●	●		●	●
	DN20 M/M HIGH 5.0	5.0	220-1330	DN20			●	●	●		●	●	●
	DN25 M/M 5.5	5.5	600-3609	DN25			●	●	●		●	●	●
DN32 M/M 5.5	5.5	550-4001	DN32			●	●	●		●	●	●	
Female/Female ISO 7/1	Type	Stroke mm	Flow l/h	Dim									
	DN15 F/F LOW 2.5	2.5	30-200	DN15	●	●			●	●		●	●
	DN15 F/F LOW 5.0	5.0	65-370	DN15			●	●	●		●	●	●
	DN15 F/F HIGH 2.5	2.5	100-575	DN15	●	●			●	●		●	●
	DN20 F/F HIGH 2.5	2.5	100-575	DN20	●	●			●	●		●	●
	DN20 F/F HIGH 5.0	5.0	220-1330	DN20			●	●	●		●	●	●
	DN25 F/F 5.5	5.5	600-3609	DN25			●	●	●		●	●	●
	DN32 F/F 5.5	5.5	550-4001	DN32			●	●	●		●	●	●

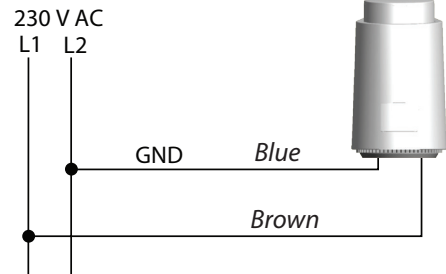
## Frese OPTIMA Compact actuators DN10-DN32

### Connection diagrams thermic actuators

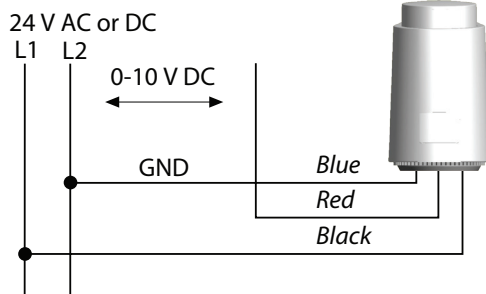
**48-5525**  
**48-5527**  
**48-5531**  
**48-5532**  
**48-5538**  
On/Off 24V



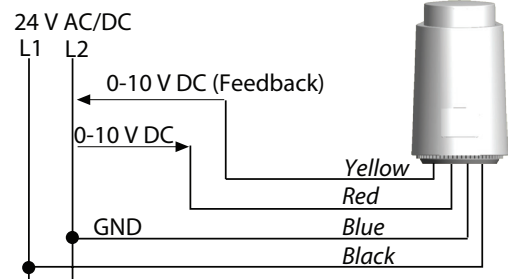
**48-5526**  
**48-5528**  
**48-5533**  
On/Off  
230V



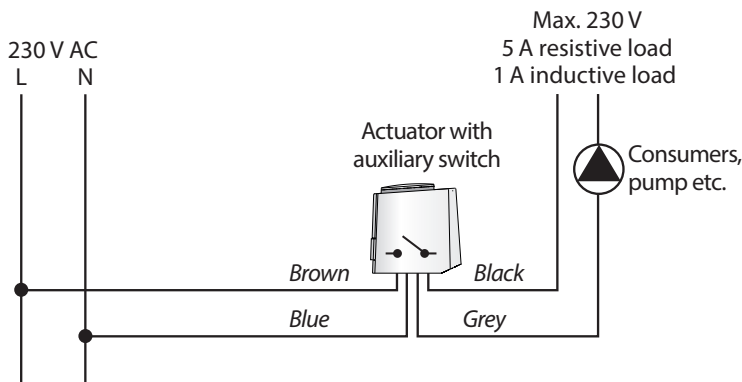
**48-5529**  
**48-5529-1**  
0-10 V 24V



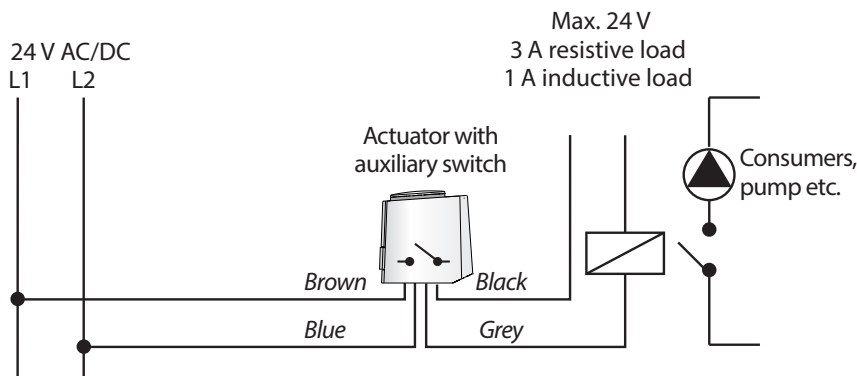
**48-5542**  
0-10 V 24V  
Feedback



**48-5539**  
On/Off 230V  
AUX-switch



**48-5540**  
On/Off 24V  
AUX-switch

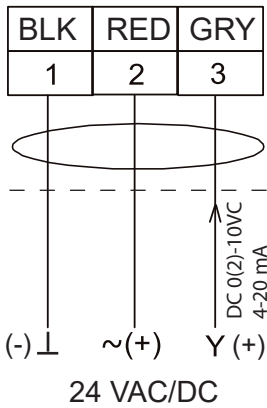


## Frese OPTIMA Compact actuators DN10-DN32

### Connection diagrams motoric actuators

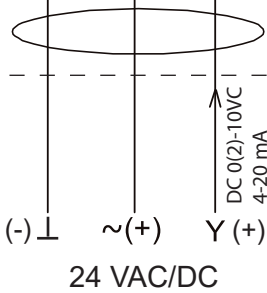
**53-1180**

0-10 V & 4-20 mA,  
24 V, 5.5 mm



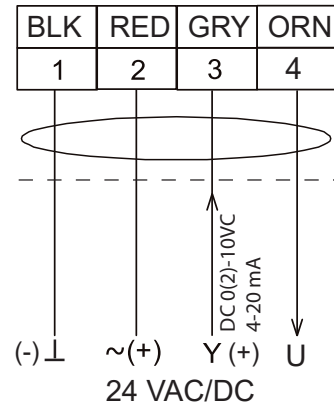
**53-1183**

0-10 V & 4-20 mA,  
24 V, 2.5 mm



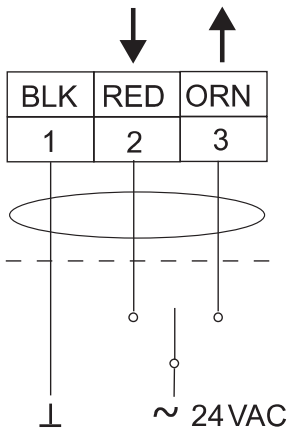
**53-1184**

0-10 V & 4-20 mA  
All valve strokes  
Feedback signal



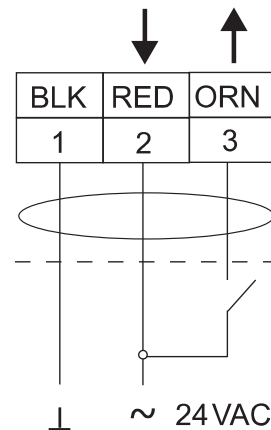
**53-1181**

3-position 24 V\*



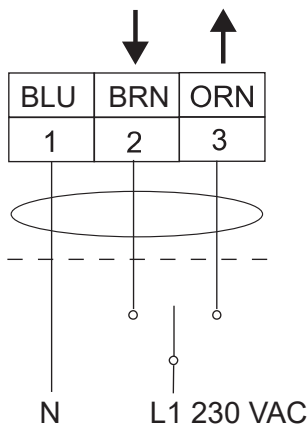
**53-1181**

On/Off 24 V



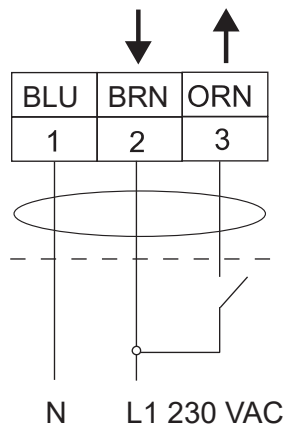
**53-1182**

3-position 230 V\*



**53-1182**

On/Off 230 V



\*The 3-position actuator can be used on Frese OPTIMA Compact with the stroke of: 2.5, 5.0 and 5.5 mm.  
A controller chosen to operate the 3-position actuator should be programmed to match the stroke of each of the valves based on the running time of the actuator's stem which is 13.0 s/mm.

## Frese OPTIMA Compact actuators DN10-DN32

### Operating status indication

The actuators are equipped with a LED which provides the information about the operating status as follow:



**53-1180 & 53-1183**  
0-10 V & 4-20 mA,

<b>OFF</b>	○	No power supply
<b>Green blinking</b>	◐	Moving to position
<b>Green blinking</b>	◑	End stroke confirmation
<b>Green steady ON</b>	●	Position reached
<b>Red blinking</b>	◐	Auto-zero calibration (Duration 30 - 60 sec)
<b>Red steady ON</b>	●	Control signal lost

**53-1184**  
0-10 V & 4-20 mA  
Feedback signal

<b>OFF</b>	○	No power supply
<b>Green blinking</b>	◐	Moving to position
<b>Green steady ON</b>	●	Position reached
<b>Red blinking SLOW</b>	◐	Auto-stroke calibration (Duration 60 - 120 sec)
<b>Red blinking FAST</b>	◐	Sticking Error
<b>Red steady ON</b>	●	Control signal lost

**53-1181 & 53-1182**  
3-position

<b>OFF</b>	○	No power supply
<b>Green blinking</b>	◐	Moving to position
<b>Green blinking</b>	◑	End stroke confirmation
<b>Green steady ON</b>	●	End Stroke reached

# Frese OPTIMA Compact actuators DN10-DN32

## Configuration motoric actuators

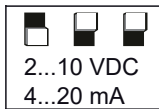
### 53-1180, 53-1183 and 53-1184

#### Dip switch 1-2-3

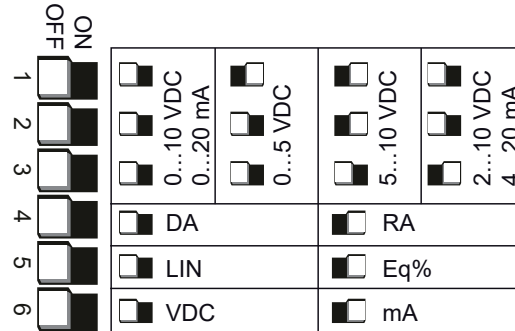
Control signal: Factory setting 0-10 V

4-20 mA control signal:

- Set dip switch 6 to mA
- Set dip switch 1-2-3 as below



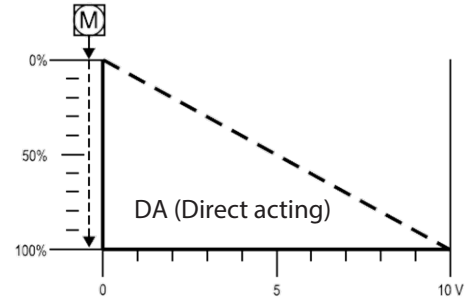
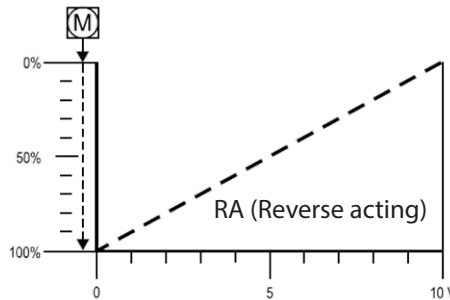
\*On 53-1184 dip switches 7 and 8 are not used



#### Dip switch 4

Stem action

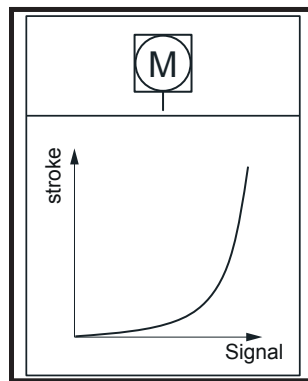
Factory setting RA (Reverse acting)



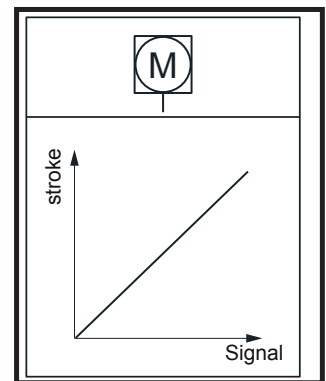
#### Dip switch 5

Actuator characterization

Factory setting EQ%



EQ % characterization



Linear characterization

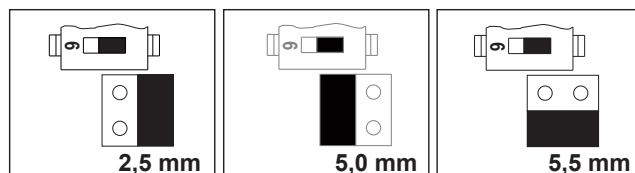
### 53-1180, 53-1183

The actuator stroke can be selected via the Jumper and can be set to 2.5 mm - 5.0 mm or 5.5 mm

**53-1180:** Factory setting 5.5 mm

**53-1183:** Factory setting 2.5 mm

**\*53-1184:** Selfcalibrating with no Jumper



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