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INNOVATIVE MEMBER OF SWISTEC

NSVA – VAV smart damper actuator

5 Nm / 10 Nm MODULATING CONTROL – MODBUS



The appearance of the product may differ from the illustration. Technical specifications are subject to change.

NSVA-MOD-5/10 SERIES

NSVA VAV smart damper actuators provide with high performance DDC (direct digital control) of pressure-independent, VAV (variable-air-volume) function are designed and produced for extended functionalities in HVAC systems, VAV and laboratory applications.

- Torque 5 Nm / 10 Nm
- Damper size 1.0 m^2/2.0 m^2
- MODBUS interface for building automation system
- 128 binary values (BV), 128 analog values (AV)
- Compact actuator with controller, communication interface
- Actuator with pluggable terminal block and RJ12 connector
- Direction of rotation selectable by reversing actuator during installation.
- Adjustable angle of rotation (mechanical end stop).
- Direction of rotation selectable by software.

MODEL SELECTION TABLE

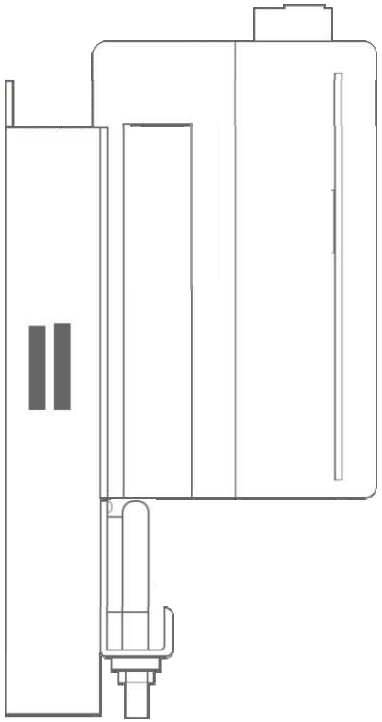
Model/type	Torque	Power supply	Differential pressure	Input/Output AI1, AI2	DO1, DO2	AO1, AO2
NSVA-MOD-5	5 Nm	24 V_{AC} ± 10%	0...500 Pa	0-10 V_{DC} / 0-5 V_{DC} / NTC, binary – pending / on request	2	2
NSVA-MOD-10	10 Nm	24 V_{AC} ± 10%	0...500 Pa	0-10 V_{DC} / 0-5 V_{DC} / NTC, binary – pending / on request	2	2

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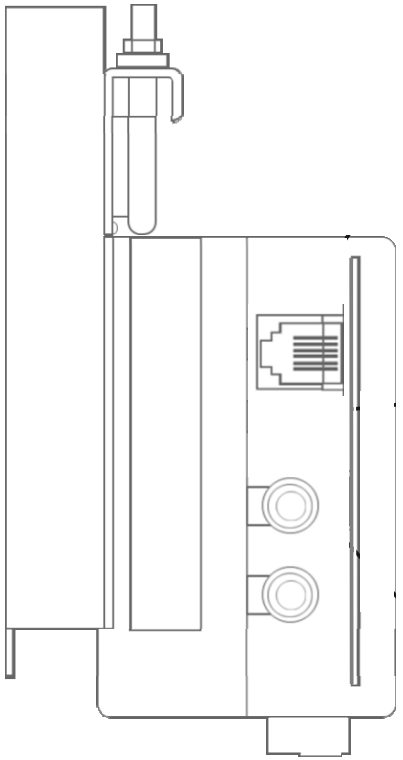
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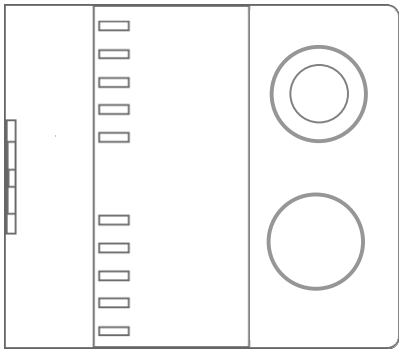
Gear release



Remote panel

High pressure

Low pressure



Cable

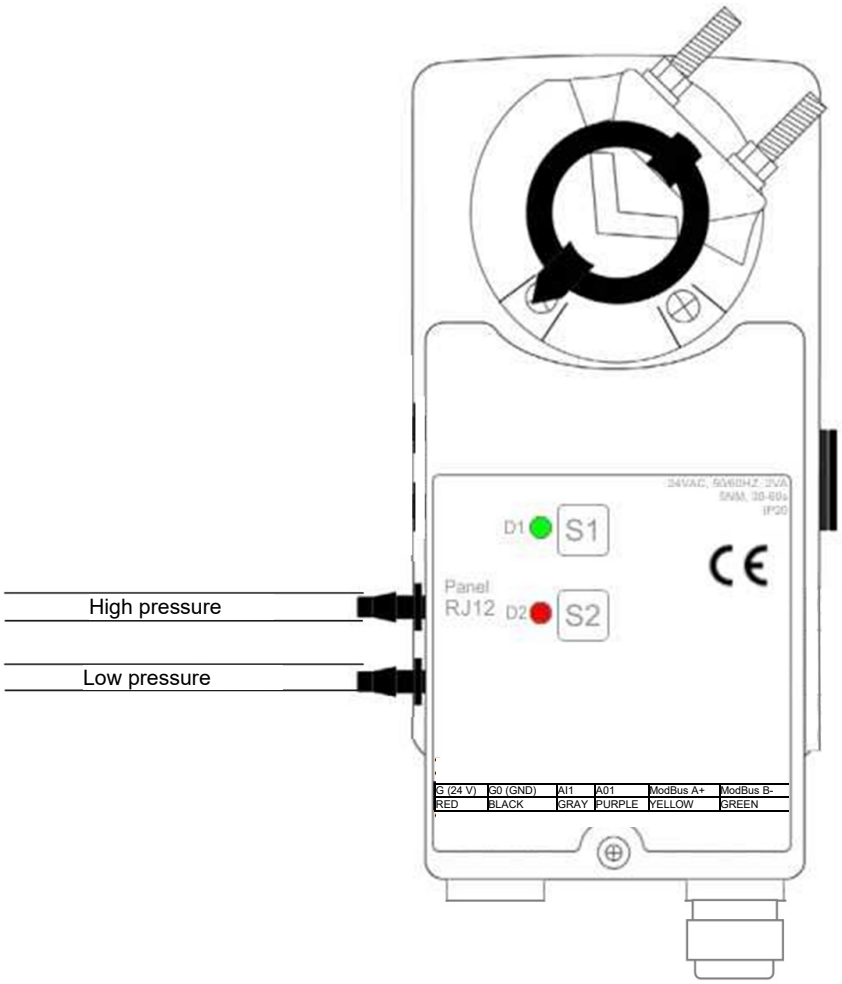
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MODBUS CONNECTEON



Wire colour	Designation
Red	24 V
Black	GND
Yellow	ModBus A+
Green	ModBus B-

Deafault parameters:
ADDRESS - 1
BAUDRATE - 19200
PARITY - NONE
STOP BITS - 1 BIT

Modbus parameters

Address	Parameter	Description	Range (default)	Unit	Scale
300	Address	Modbus ID	1 ~ 247 (1)	-	-
301	Baudrate	RS485 baudrate	0: 2400 1: 4800 2: 9600 3: 19200 (def.) 4: 38400 5: 57600 6: 115200	-	-
302	Parity	RS485 parity	0: None (def.) 1: Even 2: Odd	-	-
303	Stopbits	RS485 number of stop bits	1: 1 stop bit (def.) 2: 2 stop bits	-	-

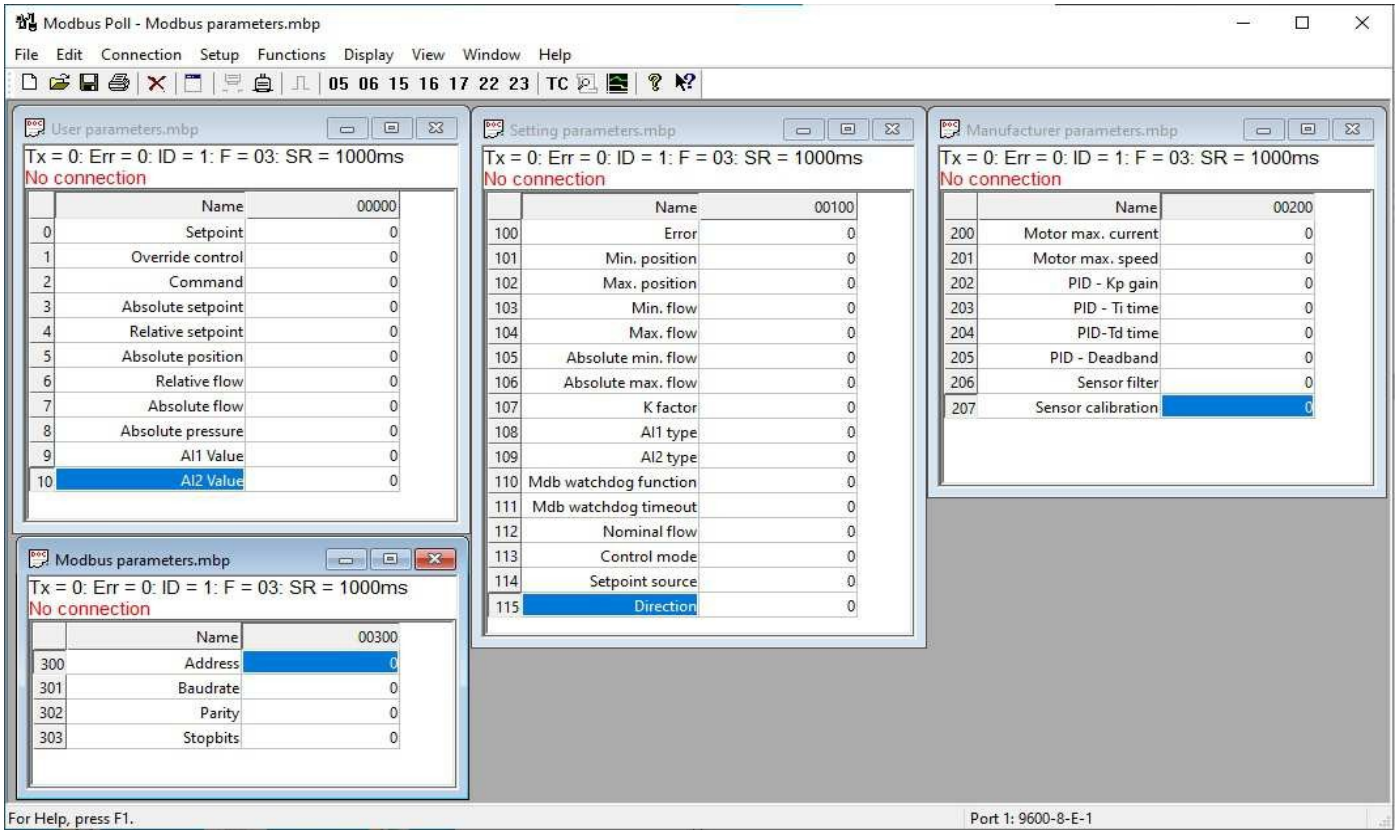
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Program for parameterizing the actuator via the ModBus RTU protocol

example

Modbus Slave version 9.4.2 Build 2242



Attached files to be loaded into the program,

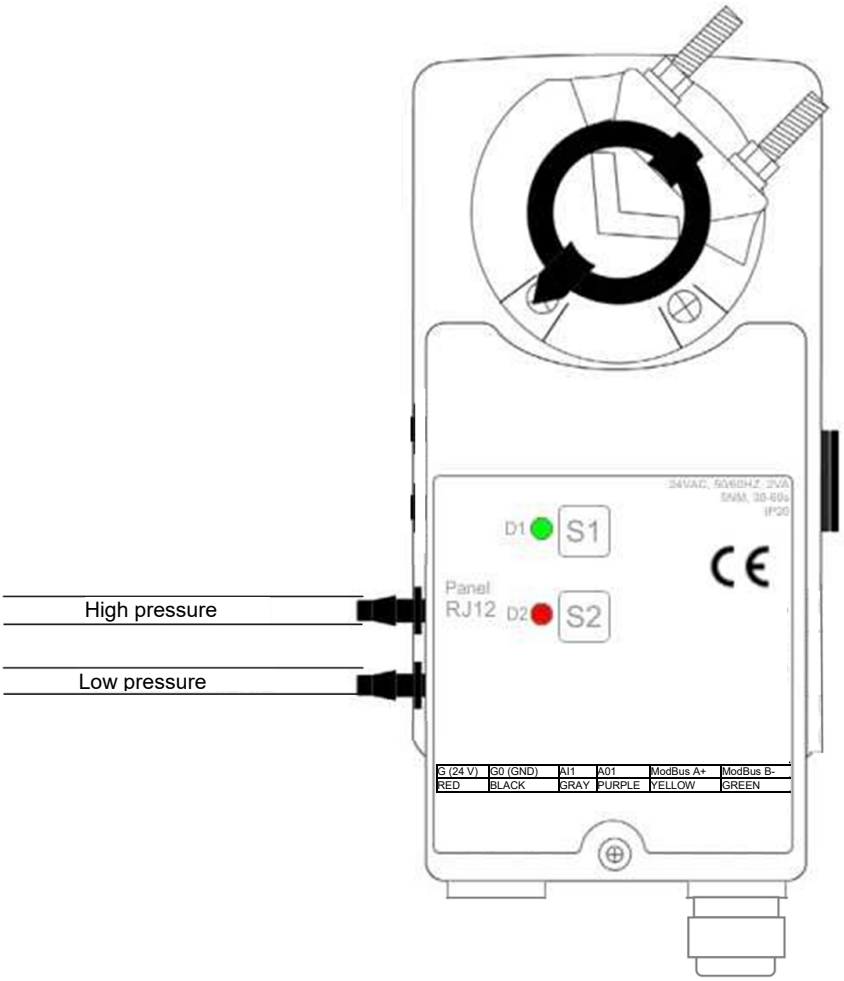
Modbus Slave version 9.4.2 Build 2242

1. Manufacturer parameters.mbp
2. Modbus parameters.mbp
3. Setting parameters.mbp
4. User parameters.mbp
5. VAV.mbw

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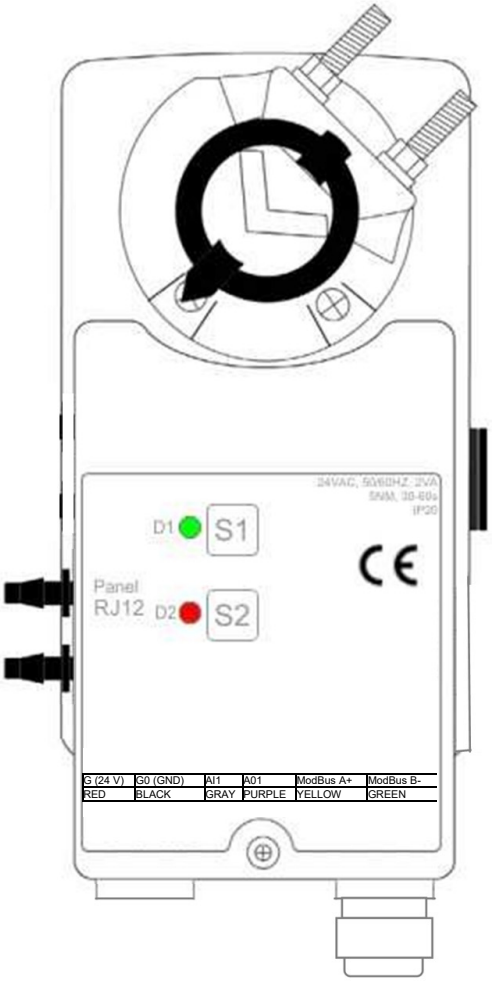
5 Nm / 10 Nm MODULATING CONTROL – MODBUS

ANALOGUE SETPOINT CONNECTEON



Wire colour	Designation
Red	24 V
Black	GND
Gray	AI1

OPERATING CONTROLS AND INDICATORS



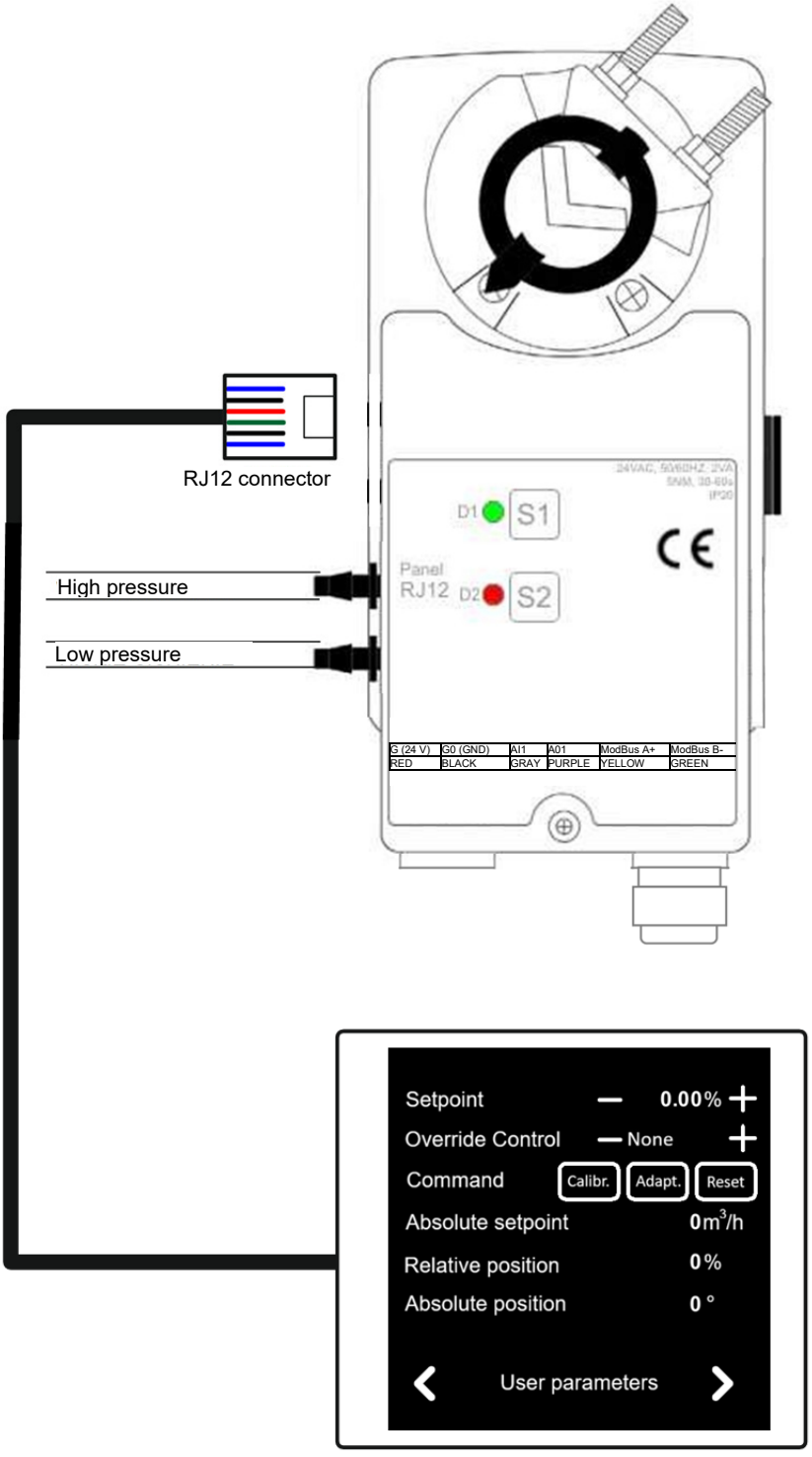
Trigger	Function
Hold down the S1 key for 3 seconds	Calibration of the pressure sensor
Hold down the S2 key for 3 seconds	Reset alarm and PED regulator
Hold down the S1 and S2 key simultaneously	Starting the actuator adaptation process

Indicators	Function
D1 - Flashing 5Hl D2 - Flashing 5Hl	Initialisation
D1 - ON D2 - OFF	Normal process
D1 - Flashing 0,5Hl D2 - OFF	Calibration
D1 - ON D2 - Flashing 0,5Hl	Modbus watchdog
D1 - Flashing 1Hl D2 - OFF	Adaptation
D1 - ON D2 - ON	Alarm - check Modbus register no.100 (Error)

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REMOTE PANEL CONNECTEON

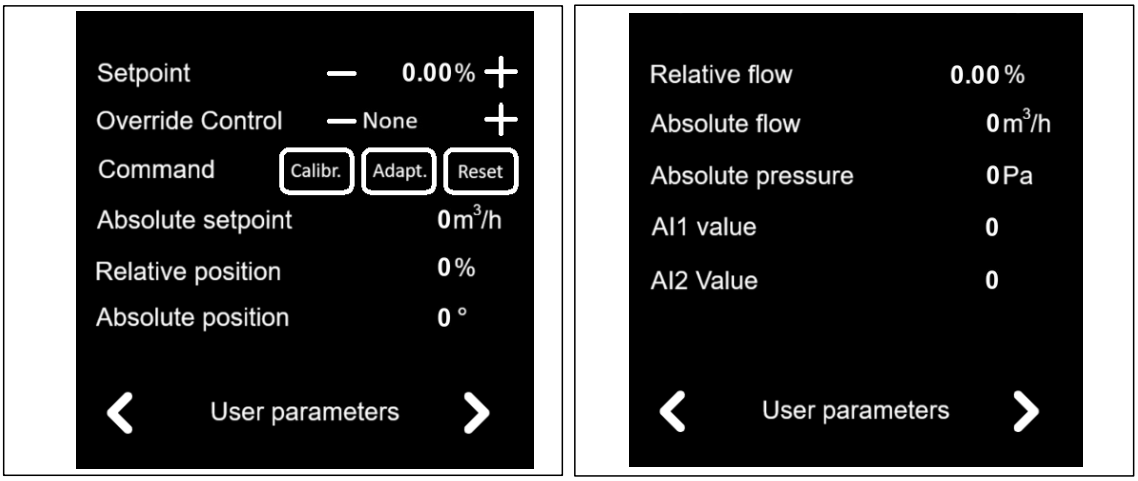


REMOTE PANEL

NSVA – VAV smart damper actuator

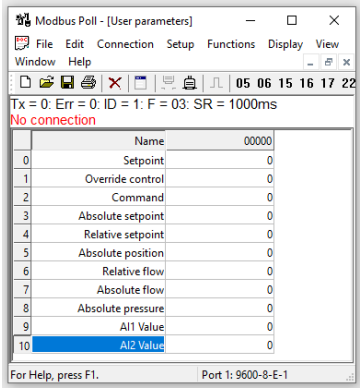
5 Nm / 10 Nm MODULATING CONTROL – MODBUS

USER PARAMETERS



User parameters

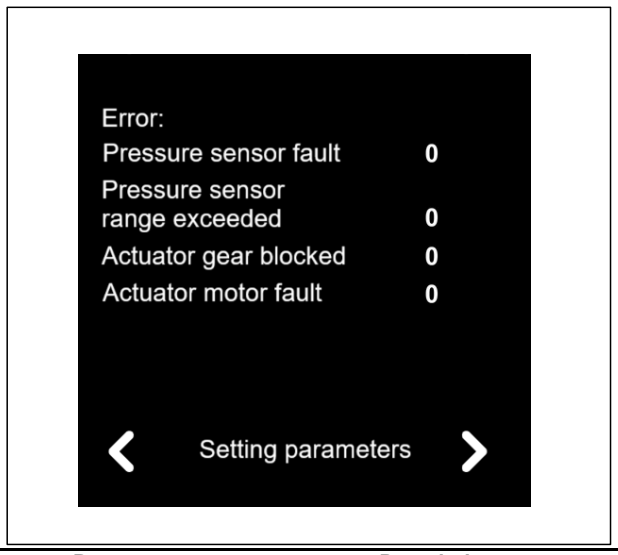
Address	Parameter	Description	Range (default)	Unit	Scale
0	Setpoint	Setpoint for actuator between Vmin and Vmax	0 ~ 10000 (0)	%	0.01
1	Override control	Overrides setpoint with defined values	0: None (def.) 1: Open 2: Close 3: Set min. flow 4: Set mid. flow 5: Set max. flow 6: Fast open 7: Fast close 8: Stop	-	-
2	Command	Initiation of actuator functions for service and test. Register returns to None(0) after performing the requested function . With Reset(3), all function and alarms can be reset.	0: None (def.) 1: Sensor calibration 2: Adaptation 3: Reset	-	-
3	Absolute setpoint	Setpoint for actuator calculated to m3/h	0 ~ Vnom	m3/h	-
4	Relative position	Relative position of actuator	0 ~ 10000	%	0.01
5	Absolute position	Absolute position of actuator	0 ~ 900	°	0.1
6	Relative flow	Relative volumetric flow of Vnom(reg.112)	0 ~ 10000	%	0.01
7	Absolute flow	Absolute volumetric flow in m3/h	0 ~ Vnom	m3/h	-
8	Absolute pressure	Measured pressure	-500 ~ 500	Pa	-
9	AI1 Value	Value measured by AI1 input	Depending on reg.108 0: 0 ~ 1000 1: 0 ~ 500 2: -30.0 ~ 90.0 3: 0 ~ 1	0: V 1: V 2: °C 3: binary	-
10	AI2 Value	Value measured by AI2 input	Depending on reg.109 0: 0 ~ 1000 1: 0 ~ 500 2: -30.0 ~ 90.0 3: 0 ~ 1	0: V 1: V 2: °C 3: binary	-

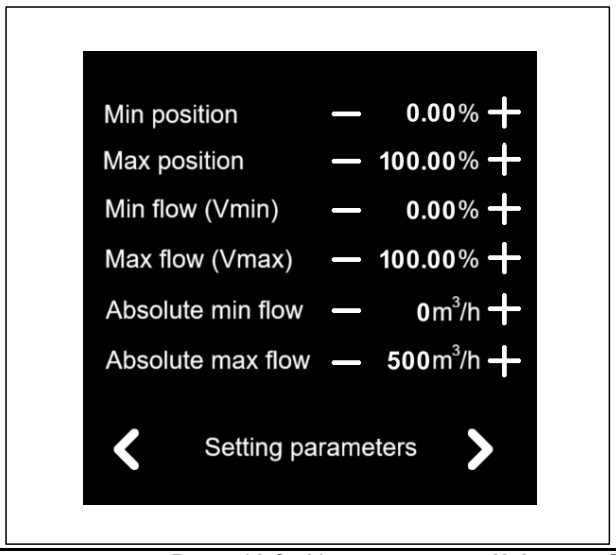


NSVA – VAV smart damper actuator

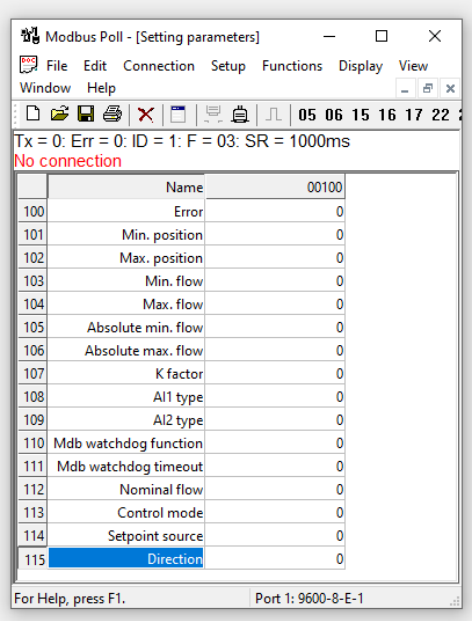
5 Nm / 10 Nm MODULATING CONTROL – MODBUS

SETTING PARAMETERS





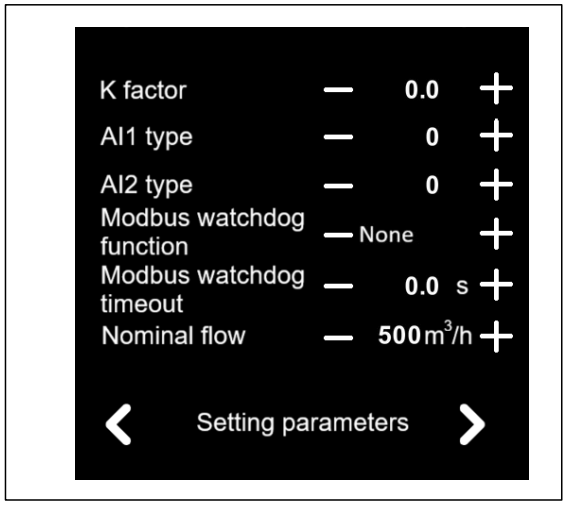
Address	Parameter	Description	Range (default)	Unit	Scale
100	Error	Malfunction and service information Value is bit-coded. More than one bit can be set to 1. Not all bits mentioned in the enumeration are used for this actuator range.	bit 0: Pressure sensor fault bit 1: Pressure sensor range exceeded bit 2: Actuator gear blocked bit 3: Actuator motor fault	-	-
101	Min. position	Minimum actuator position	0 ~ 10000 (0)	%	0.01
102	Max. position	Maximum actuator position	0 ~ 10000 (10000)	%	0.01
103	Min. flow (Vmin)	Minimum setpoint value	0 ~ 10000 (0)	%	0.01
104	Max. flow (Vmax)	Maximum setpoint value	0 ~ 10000 (10000)	%	0.01
105	Absolute min. flow (Vmin)	Minimum setpoint value in m3/h	0 ~ Vnom (0)	m3/h	-
106	Absolute max. flow (Vmax)	Maximum setpoint value in m3/h	0 ~ Vnom (Vnom)	m3/h	-

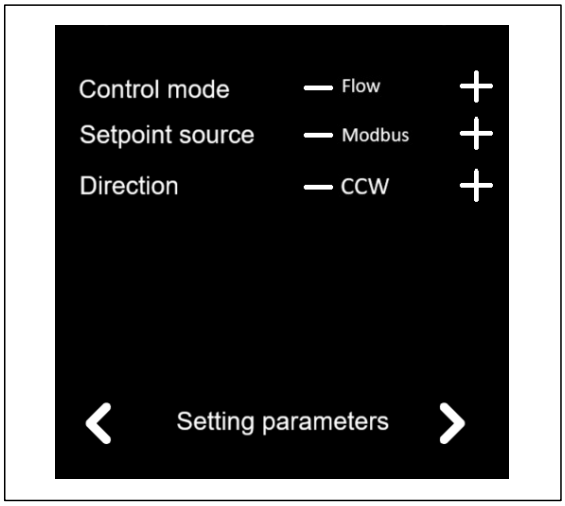


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SETTING PARAMETERS





Address	Parameter	Description	Range (default)	Unit	Scale
107	K factor	K factor to calculate volumetric flow value	0 ~ 10000 (648)	-	0.1
108	AI1 type	Analog input no.1 type	0: 0-10V (def.) 1: 0-5V 2: NTC (B=3435) 3: Digital input	-	-
109	AI2 type	Analog input no.2 type	0: 0-10V (def.) 1: 0-5V 2: NTC (B=3435) 3: Digital input	-	-
110	Modbus watchdog function	Modbus communication is not monitored by default. In the event of a breakdown in communication, the actuator retains the current setpoint. The bus implementation tracks the Modbus communication. If any register wasn't read or wrote before the timeout for Modbus watchdog timeout (Register No. 111) expires, the actuator moves to the Modbus watchdog function. If Setpoint source (Register No. 114) = Analog) or register is set to 0, bus monitoring is not activated.	0: None (def.) 1: Open 2: Close 3: Set min. flow 4: Set mid. flow 5: Set max. flow 6: Fast open 7: Fast close 8: Stop	-	-
111	Modbus watchdog timeout	Time until Modbus watchdog will be detected	0 ~ 3600 (10)	s	-
112	Nominal flow	Nominal flow in m3/h	0 ~ 30000 (794)	m3/h	-
113	Control mode	Type of position control	0: Position control 1: Flow control (def.)	-	-
114	Setpoint source	Analog: Setpoint from analog signal 0...10 V Modbus: Setpoint from Modbus (Register No. 1)	0: AI1 1: AI2 2: Modbus (def.)	-	-
115	Direction	Direction of actuator rotation	0: CCW (def.) 1: CW	-	-
118	Unit selection	Flow unit selection	0: m3/h 1: l/s		

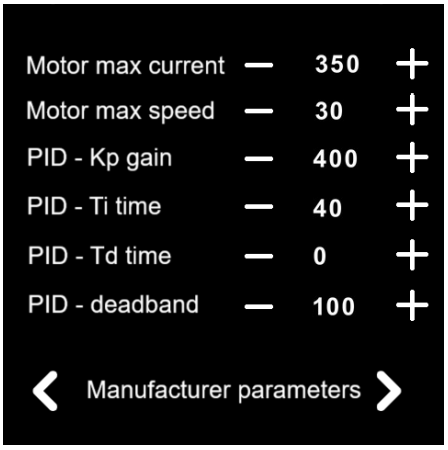
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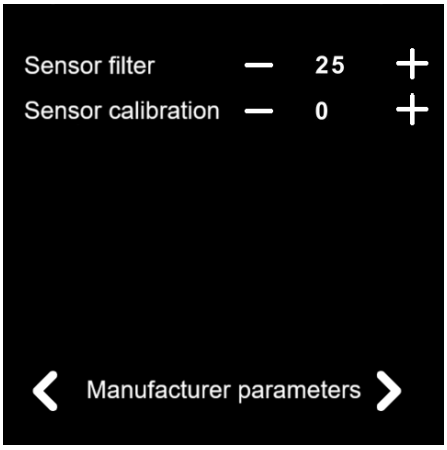
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MANUFACTURER PARAMETERS

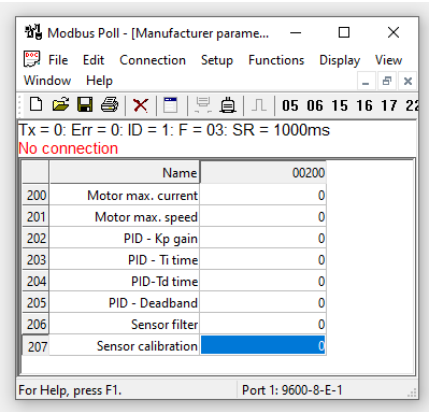
Access to the manufacturer parameters is password-protected. To obtain the password, contact the manufacturer.







Address	Parameter	Description	Range (default)	Unit	Scale
200	Motor max. current	Definition of motor max. current to adjust the actuator max. torque	300 ~ 1000 (375)	mA	-
201	Motor max. speed	Definition of motor max. speed during normal operation	0 ~ 100 (35)	%	-
202	PID - Kp gain	Kp gain of flow PID regulator	1 ~ 5000 (70)	-	-
203	PID - Ti time	Integration time of flow PID regulator	0 ~ 5000 (450)	s	-
204	PID - Td time	Derivation time of flow PID regulator	0 ~ 5000 (0)	s	-
205	PID - Deadband	Deadband of flow PID regulator	1 ~ 5000 (100)	%	0.01
206	Sensor filter	Pressure sensor filtering time	1 ~ 60 (15)	s	-
207	Sensor calibration	Value used to calibrate the pressure sensor measured value	-10000 ~ 10000 (0)	Pa	0.1



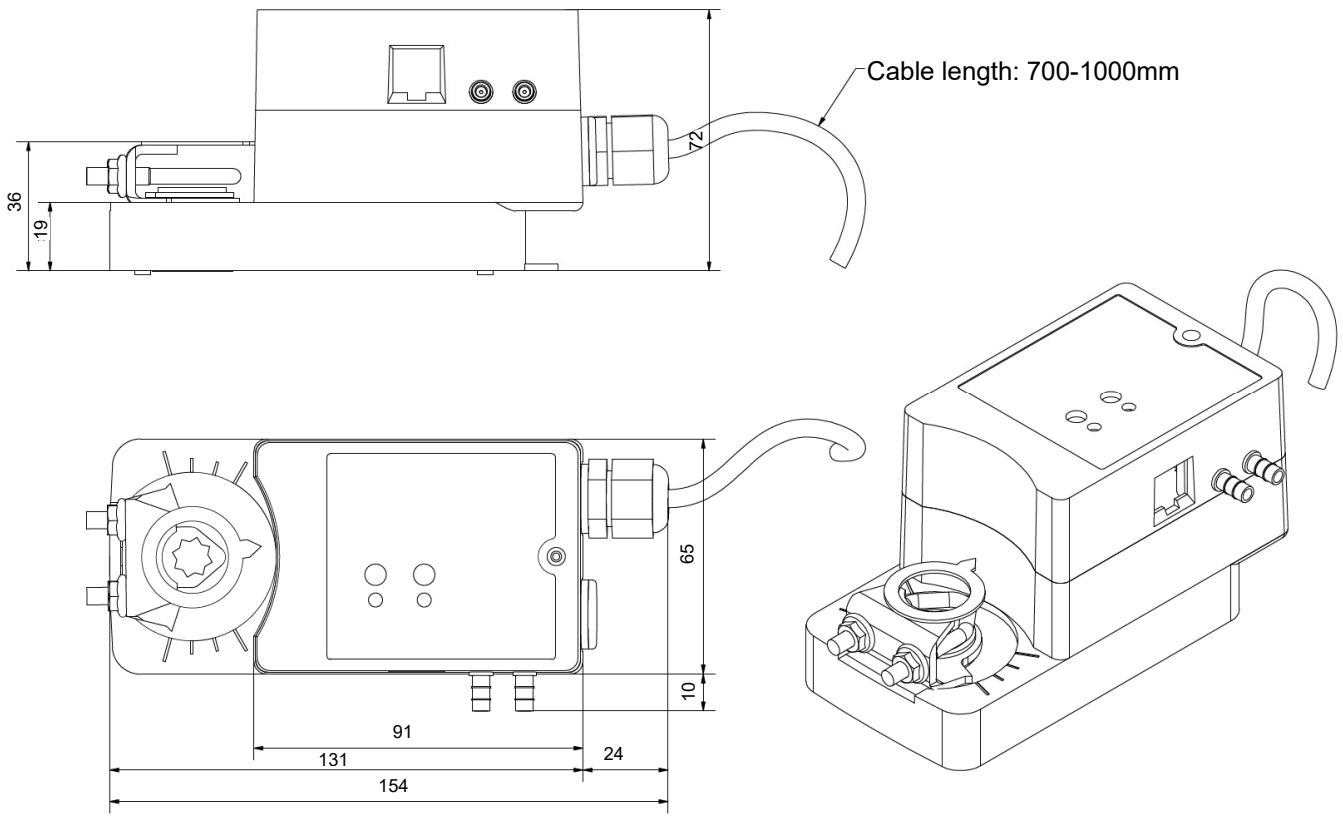
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ACTUATOR DIMENSIONS [mm]



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TECHNICAL SPECIFICATION

	NSVA-MOD-5/10
Torque	5 Nm
Damper size	1.0 m^2
Shaft dimensions	Ø 10 to 16 mm round / □ 10 to 12 mm square
Control signal	Modulating control
Running time	75...85 s
Power supply	AC 24V - 50/60Hz ± 10%
DC power supply	24V ±15% DC
AC power supply	24V ±15% AC
Power consumption	
• In operation	1.5 W
• End position	0.5 W
Connection	
• actuator	Screw treminals, threated, 300V; 15A; 28-12AWG
• HMI (positioner)	RJ12
• flow	Outside diameter 5 mm
Protection class	Class II
Angle of rotation	90° (95° mechanical limitation)
Direction of rotation	Selectable via software
Manual operation	Manual of rotation by push button in the side
Angle of rotation limiting max. 95°	Can be limited at both ends with adjustable mechanical end stops
Sound level – motor / EFS	42 dB (A)
IP protection class	IP 20
Maintenance	Maintenance-free

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WEIGHT	600 g		
Life cycle actuator	100'000 full cycles		
Rated power	14 VA		
MCU	32 bit MCU		
Memory	384K Flash, 8K FRAM & 1M Flash memory		
Communikcation	RS485, Modbus RTU		
Flow sensor			
• type	Differential sensor, I2C, 16BIT		
• Pressure range	0...500 Pa		
• Measurement range	(0 to 23 m/s)		
• Accuracy	± 5% reading		
Analogue inputs – universal AI1, AI2 / active only 0-10V / / NTC, binary pending / o request			
Measurement range	0-10VDC, 2mA	NTC10k (B=3435)	binary
Resolution	10 bit	10 bit	1 bit
Input impednance	200kΩ	10kΩ	10kΩ
Analogue outputs AO1 feedback signal, AO2 / reserved – binary pending / o request ie			
Output range	0-10VDC, max.10mA		
Resolution	0,01V		
Digital outputs DO1, DO2 / reserved – pending / o request ie			
Output type	SSR		
Max. output current	maks. 500mA – limited by power source output power		
Rated voltage	24V AC/DC – indentical with power supply voltage		
LED indicators			
• HMI	Red & green LED – type (upper)		
Working conditions	0...50°C, 20...90% rH, non condensing		
SHIPPING AND STORAGE	-4°F to 158°F (-20°C to 70°C), 5% to 95% RH non-condensing		
Electromagnetic compatibility	CE according to 2004/108/EC		

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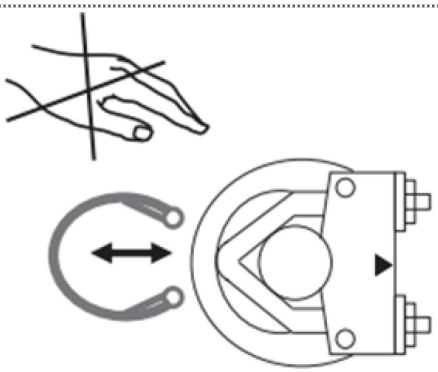
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Installation instruction

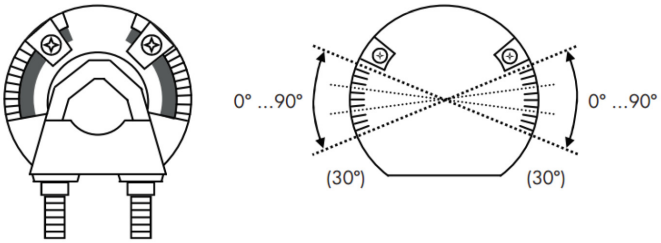
Releasing the adapter is not required.



Mechanical angle of rotation limitation

Adjustment of mechanical limiter
1. Loosen the screw of mechanical limiter
2. Move the limiter to appropriate position *
3. Tighten the screw.

* Working range of 90° can be reduced up to 30° from each end position.



IMPORTANT REMARKS

This actuator includes electrical and electronic components and may not be disposed as household garbage. Please consider the local valid legislation.

24 $V_{AC/DC}$:	Connect via safety isolating transformer.
AC 230 V:	To isolate from the main power supply, the system must incorporate a device which disconnects the phase conductor (with at least a 3mm contact gap.)

Consult NENUTEC representatives for specific requirements and material selections for your intended application.
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The performance specifications are nominal and conform to acceptable industry standards. Nenutec shall not be liable for damages resulting from misapplication or misuse of its products.

CUSTOMISED VERSION

NENUTEC offers you actuators in customised versions, e.g. with your own brand name, with colour-coordinated applications and with your particular demand on request.

For further information please contact us or our local representative.

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