LOGICA Digital

Energy-series, DN10-DN80 (DN100 Ultra)

Application

The LOGICA Digital Energy series is a digital actuator designed to optimize energy usage in Heating, Ventilation and Air Conditioning (HVAC) systems.

Paired with an OPTIMA Compact valve, it offers intelligent hydronic control and insight.

The actuator simplifies system integration from easy installation to direct communication with the Building Management system (BMS) to selectable control methods to suit different applications.

Built-in energy management algorithms and functions greatly reduce system integration hours.

Features

- BACnet MS/TP & Modbus RTU support
- Simple addressing via dip-switches
- 1 input supporting binary input, 0-10 V or Pt1000
- 1 universal input/output supporting binary, 0-10 V in, Pt1000, 0-10 V out or 0-10 V position feedback
- Complete built-in library of OPTIMA Compact valves.
- Selectable Linear or EQ% characteristic
- Flow indication
- Thermal Power indication (when combined with 2 temperature sensors)
- Thermal Energy consumption indication
- Selectable control modes:
  - Analogue 0-10 V
  - External BMS setpoint
  - Return temperature
  - Thermal power
  - Room temperature
- Energy management functionality
- Control of minimum delta-T
- Limitation of terminal unit power output
- Limitation of return temperature
- Nominal stroke up to 20 mm.
- Auto calibration to all valve strokes
- Position indicator for stem travel
- Short-circuit and reverse polarity protection
- Programmable scheduled valve flushing & exercising
- Compact design

Approvals

- Conforms to: EMC directive 2014/30/EU Low voltage directive 2014/35/EU
- Protection class IP54 (EN60529)
- Protection class III (EN 60730)
- Over voltage category III
- Level of contamination: 2
- RoHS 2011/65/EU

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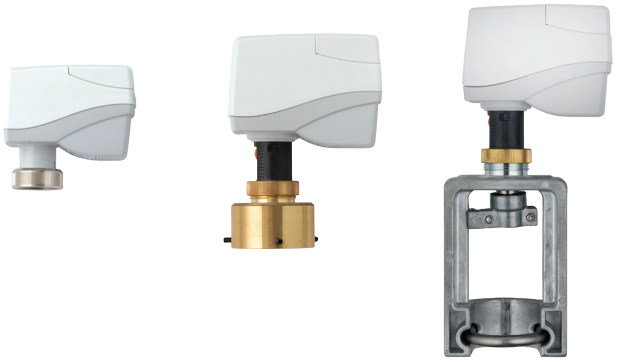
Technical data

Supply voltage: 24 V AC/DC ± 10 %
Control: Modbus RTU/BACnet MS/TP
Feedback signal: 0-10 V DC
Protection class: IP 54
Frequency: 50/60 Hz
Input impedance: > 100 k Ohm (DC 0-10 V)
Switch on current: DC - 5.0 A; AC 7.2 A
Force: 150 N (DN10-DN32)
500 N (DN40-DN80)
Noise level: Below 31 dBa
Ambient conditions: Temperature 0 °C-50 °C
Humidity 10-85 %RH
Cable power/bus: 1.5 m 2 x 2 x 0.5 mm² insulated
Cable input/output: 4 x 0.5 mm² (53-1976/53-1978/53-1972)
2 x 2 x 0.25 mm² (53-1973/53-1974/53-1971)



Types and Operation Data

Valve dim.	Weight [kg]	Stroke/ Running time**	Actuator force [N]	Power consumption AC/DC	Configuration	Cable length Input 1 / **In-output 2**	Frese no.
DN10-DN32	0.34	2.5-5.5 mm / 22 s/mm	150	(4,2*) 3.1 VA / (2,2*) 1.6 W	Actuator with 2 flying wires - 1 power/ bus, 1 for 2 external devices	1.5 m combined	53-1976
DN10-DN32	0.34	2.5 5.5 mm / 22 s/mm	150	(4,2*) 3.1 VA / (2,2*) 1.6 W	Actuator with flying power/bus wire and overmolded ΔT-kit containing 2 Pt1000 surface mounted sensors	1 m / **1.5 m**	53-1973
DN40-DN50 DN50 Ultra	0.60 (incl. adapter)	15 mm / 22 s/mm	500	(9.0*) 4.8 VA / (4.7*) 2.5 W	Actuator with 2 flying wires - 1 power/ bus, 1 for 2 external devices	1.5 m combined	53-1978
DN40-DN50 DN50 Ultra	0.60 (incl. adapter)	15 mm / 22 s/mm	500	(9.0*) 4.8 VA / (4.7*) 2.5 W	Actuator with flying power/bus wire and overmolded ΔT-kit containing 2 Pt1000 surface mounted sensors	1 m / **1.5 m**	53-1974
DN50-DN80 DN65-DN100 Ultra	1.40 (incl. fixture)	20 mm / 22 s/mm	500	(9.0*) 4.8 VA / (4.7*) 2.5 W	Actuator with 2 flying wires - 1 power/ bus, 1 for 2 external devices	1.5 m combined	53-1972
DN50-DN80 DN65-DN100 Ultra	1.40 (incl. fixture)	20 mm / 22 s/mm	500	(9.0*) 4.8 VA / (4.7*) 2.5 W	Actuator with flying power/bus wire and overmolded ΔT-kit containing 2 Pt1000 surface mounted sensors	1 m / **1.5 m**	53-1971

*) Max consumption - for transformer sizing
**) Default value - selectable in firmware, see integration guide

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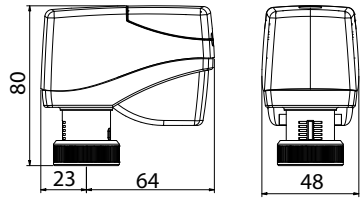
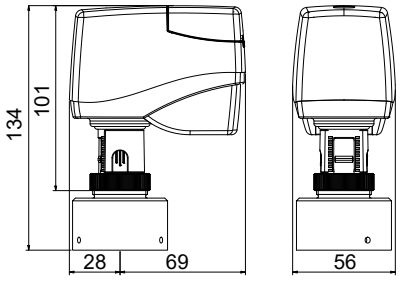
Dimensions [mm]

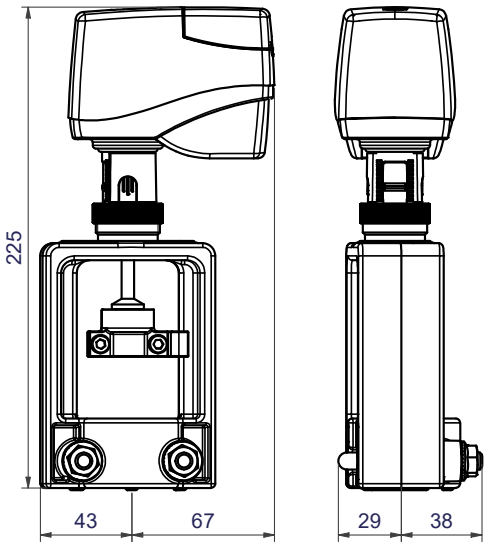
53-1976
53-1973



53-1978
53-1974

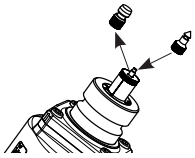


53-1972
53-1971

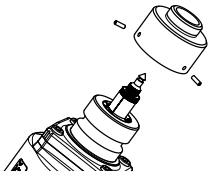


Mounting actuators on OPTIMA Compact DN40-50 & Ultra DN50

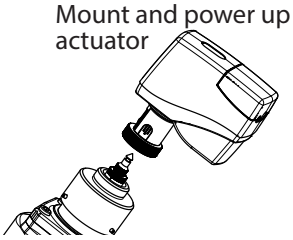
Replace the spindle on the valve with the spindle supplied with the actuator
Preset the flow before tightening the spindle



Mount the adapter on the valve neck and tighten the 3 screws

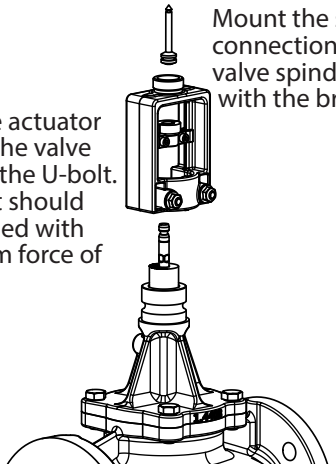


Mount and power up the actuator

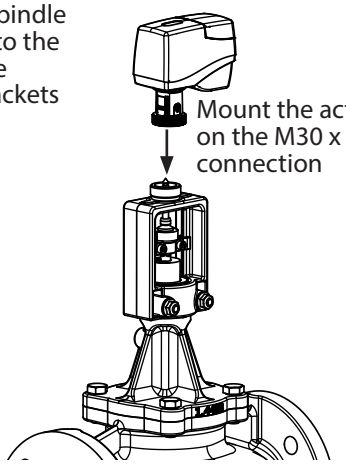


Mounting actuators on OPTIMA Compact DN50-80 & Ultra DN65-DN100 Ultra

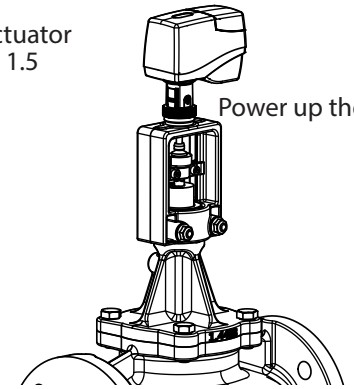
Mount the actuator frame on the valve neck with the U-bolt. The U-bolt should be tightened with a minimum force of 30 Nm



Mount the spindle connection to the valve spindle with the brackets

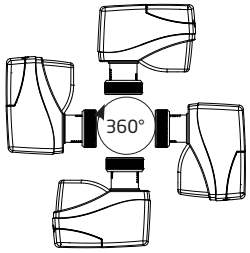


Mount the actuator on the M30 x 1.5 connection



Power up the actuator

Mounting positions



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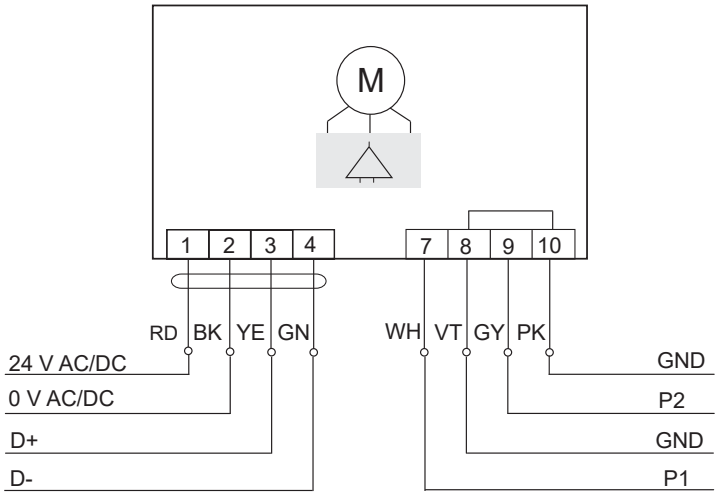
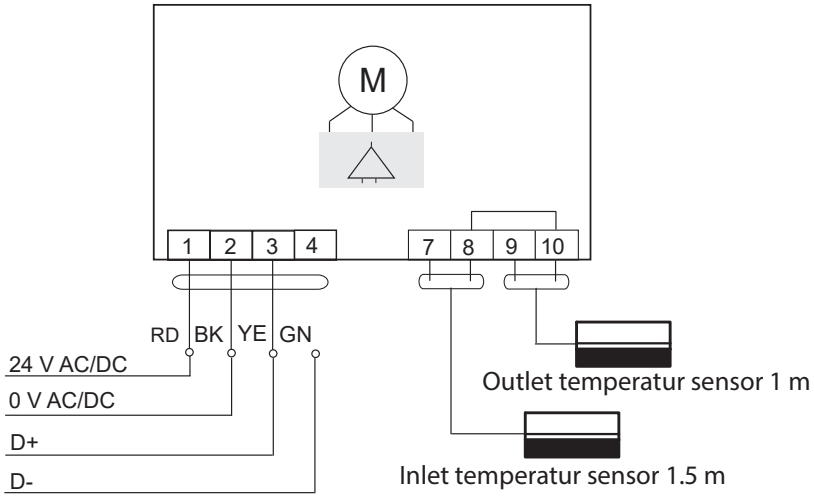
Connection diagram

53-1972
53-1976
53-1978



Connection diagram

53-1971
53-1973
53-1974



General installation guidelines:

- If two power supplies are used, they must have the same polarity and a common ground.
- A common ground must be used for all devices on the same sub-network, including routers and gateways.
- Galvanic separation shall be provided for segments crossing buildings.

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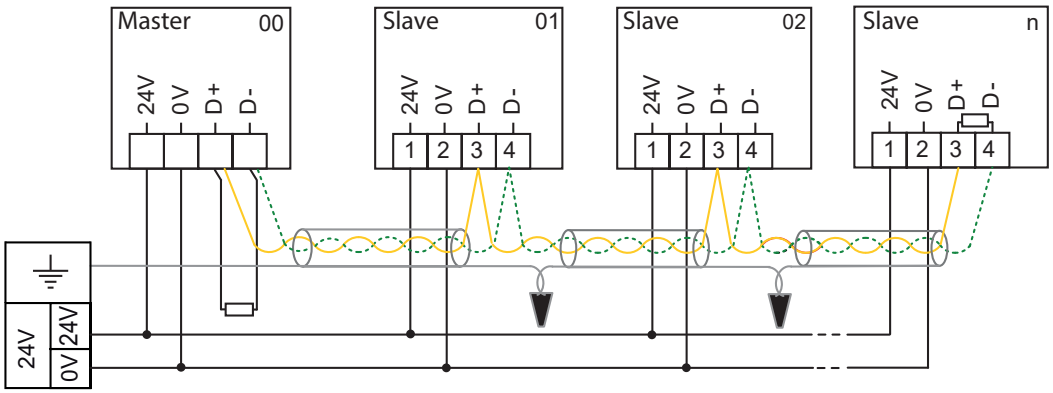
RS485 bus topology



BUS communication

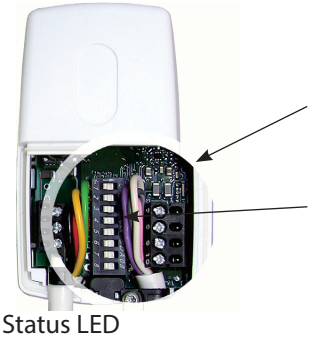
Interface	EIA-485 / RS-485*
Transmission type	Modbus RTU & **BACnet MS/TP****
Supported baud rates	9600, **19200****, 38400, 57600, 115200 bps
Start/stop bits	8N1(default BACnet), 8E1 (default Modbus), 8N2, 8E2, 8O1, 8O2
Number of bus participants	Up to 32 recommended, max. 64
Bus load	1/8 unit load
Termination	Switchable in the device, 120 Ohm
Bias network	To be set in the master
Recommended cable	Twisted-pair cable with shielding (characteristic impedance approx. 120 ohm)
For bus topology with 115,200 baud	Recommended maximum cable length 500 m
For bus topology with 38,400/57,600 baud	Recommended maximum cable length 750 m
For bus topology with 9,600/19,200 baud	Recommended maximum cable length 1000 m
Stub lines	Max. line length 2 m

Supported modbus function codes	**Code**	**Function**
	0x03	Read Holding Register
	0x06	Write Holding Register
	0x10	Write Holding Multiple

*) The wiring of BACnet MS/TP or Modbus RTU (RS-485) must be carried out in accordance with applicable standard ANSI/TIA/EIA-485-A-1998.

**) Default setting

LED status indicators



The status LED is located below the inspection cover under the terminal and indicates the operating state of the actuator.
The status LED is still visible when the inspection cover is closed.

DIP switches
PLEASE NOTE: Delivery state:
The actuators are delivered from the factory in the assembly position (spindle fully retracted, valve open) and switches 1 to 8 in switch position OFF.

Status LED	Description
Steady green	Normal operation
Flashing green - fast	All switches 1 to 6 are set to OFF
Flashing green - slow	Initialization run
Flickering green (When data is sent)	Modbus/BACnet communication
Flashing yellow	Manual adjustment of valve/actuator required
Flashing red	Valve adaptation error
Off	Power supply interupted

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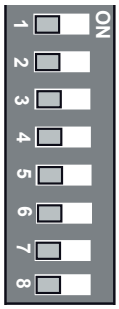
DIP switch settings



DIP switch number	Function Off position	Function On position
1	BIT 0 = 0	BIT 0 = 1
2	BIT 1 = 0	BIT 1 = 1
3	BIT 2 = 0	BIT 2 = 1
4	BIT 3 = 0	BIT 3 = 1
5	BIT 4 = 0	BIT 4 = 1
6	BIT 5 = 0	BIT 5 = 1
7 *	BACnet	Modbus
8	Terminating resistor inactive	Terminating resistor active

*) Toggling switch 7 for 1 second resets the baud rate to the defaults:

- 19200 8-N-1 for BACnet, DSW7 = OFF
- 19200 8-E-1 for Modbus, DSW7 = ON

Switches 1 to 6: Modbus address setting

The six switches are used to set the address in binary form.

The valid address range is 1 to 63.

BIT 5 [32]	BIT 4 [16]	BIT 3 [8]	BIT 2 [4]	BIT 1 [2]	BIT 0 [1]	Address
0	0	0	0	0	1	1
0	0	0	0	1	0	2
0	0	0	0	1	1	3
0	0	0	1	0	0	4
0	0	0	1	0	1	5
0	0	0	1	1	0	6
0	0	0	1	1	1	7
0	0	1	0	0	0	8
0	0	1	0	0	1	9
0	0	1	0	1	0	10
0	0	1	0	1	1	11
0	0	1	1	0	0	12
:	:	:	:	:	:	:
1	1	1	1	1	1	63

For information on Modbus commissioning see the **Modbus Integration Guide**

For information on BACnet commissioning see the **BACnet Integration Guide**

Vexve Denmark | Frese A/S
Tel: +45 58 56 00 00