MANDÍK MEASUREMENT AND CONTROL SYSTEM

EUROVENT CERTIFIED PERFORMANCE
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TÜV SÜD EN 1886

RLT Raumlufttechnische Geräte Herstellerverband e.V.

MANDÍK®

MANDÍK MEASUREMENT AND CONTROL

Characteristics

Each variant of the MANDÍK air-conditioning unit can be supplied with a measurement and control system. Due to the large variants of the design and the possible ways of regulation, the MaR project is processed on the specific execution of the MANDÍK unit. Part of the project and the documentation provided for a particular order is the technological scheme of the connection of the MaR system, including the identification of the used wire types. All components of the MaR system are required to control the operation of the air-conditioning unit configuration.

The Mandík air conditioner is used by the freely programmable Climatix PLC controller from Siemens, which meets the new requirements of economic, environmental and social needs.

This controller is among the best-rated controllers to control air handling units. Provides comfortable regulation, safe and energy-saving operation of ventilation equipment and complete adaptability of the final solution to customer requirements. Unparalleled quality is the broad communication capabilities that allow easy control and collaboration with most superior systems and integration into building technology systems.

The power distributors with the implemented Climatix controller, including the fuse, are manufactured in different sizes in metal and plastic designs, depending on the configuration of the air handling unit, the operating environment and the total required power.

Control with Climatix provides

- Excellent price / performance ratio
- Simple installation
- Simple operation in several variants
- Comprehensive, accurate control of airflow operation
- Connection of all air-conditioning components to one control system
- Local and remote control
- Weekly and annual schedule
- Easy operation and full service settings via the display and buttons on the controller
- A text display with a clear view of all data
- Select display in any European language (default Czech)
- Option of visualization extensions
- Select multiple operating modes
- Control of temperature and humidity in the inlet or compartment
- It controls all standard heating and cooling components
- Automatic detection of heating or cooling needs
- A comprehensive listing of alarm messages including history
- Changes to important parameters up to entering a password (multiple levels)
- Control from a PC using a web browser (standard delivery) and then from anywhere on the Internet
- Wide communication capabilities – collaboration with most superior systems
- Power distributors in metal or plastic design, depending on the configuration of the air conditioner
- Uniform marking of connection terminals

SWITCHGEAR MAR

Control options

- Fan protection and control (constant flow control)
- Protection and control of external components (condensing units, external heaters, etc.)
- Control of heat exchangers (plate/rotary)
- Controlling the performance of water and electric heaters
- Control of mixing of fancy and exhaust air
- Control of heat pumps and cooling circuits
- Control of fire flaps (up to 6 pieces separately or 6 circuits) and smoke detectors
- Securing the unit with a wide range of protection features (frost thermostats, pressure sensors, temperature sensors, current protection, etc.)
- The possibility of control via external switched contacts or by means of spatial devices
- Possibility of regulation on supply, drainage and room temperature
- The unit can be visualized on the external touch panel
- Possibility to use external communication interfaces (MODBus, BaCNet) and connection to a local network (Ethernet)

Switchgear structure

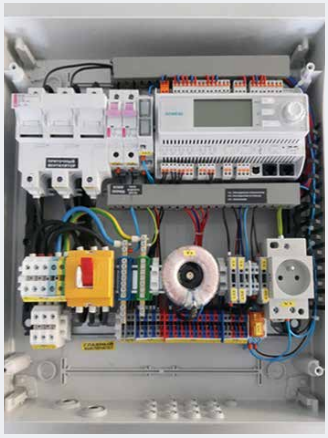
- Electrical component protection
- PLC control modules

Components

- Climatix controller
- Transformer 230/24 AC
- Electrical component protection (circuit breakers / disconnectors / fuses / current protectors)
- Connection terminals for used components
- Main switch / Deon
- Other options: Integrated electric heater controls, integrated frequency inverters, door display, door indicator lights

Design

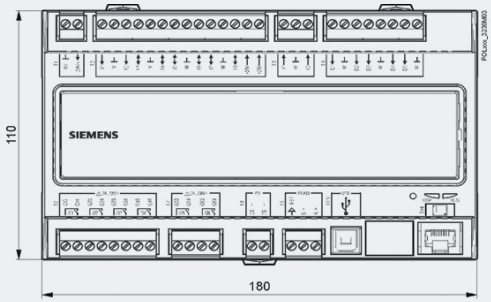
- Metal – IP 54/20
- Plastic – IP54
- Bushing Up / Down

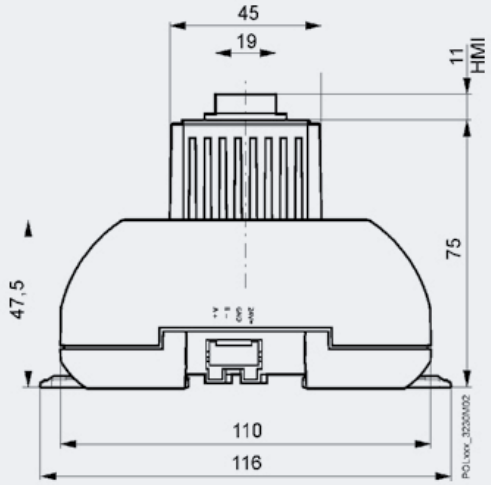


REGULATORS

POL638.XX – Control module PLC

Technical data	
Built-in HMI	
LCD displays with a backlight	144 × 64 points
Controls	rotary and press button, 3 function buttons
Operation	IEC 721-3-3
Temperature	-40 ... 70 °C
Air humidity	<90 % relative humidity (non-condensing)
Atmospheric pressure	min. 700 hPa, corresponding max. 3,000 m above sea level
Protection	
Enclosure	IP20 according to EN 60529
Protection class	suitable for use in Safety Class II
Standards	
Electric regulation	EN 60730-1
Electromagnetic compatibility	Suitable for residential and industrial EMC environments
Immunity	EN 60730-1 + A16
Emissions	EN 60730-1 + A16
CE conformities	
EMC directive	2004/108/EHS
Low voltage directive	2006/95/EEC
C-tick conformity	
In accordance with the AU EMC framework	radio communications from 1992 AS / NZS CISPR11
UL approval	UL916, UL873
General information	
Dimensions of the controller	180 × 110 × 75 mm
Weight without packaging	
Controller without HMI	487 g
Controller with HMI	422 g
Station	plastic, Pigeon-blue RAL 5014
Cover	Plastic, light gray RAL 7035





Examples of extending climatix modules

POL945.00

POL955

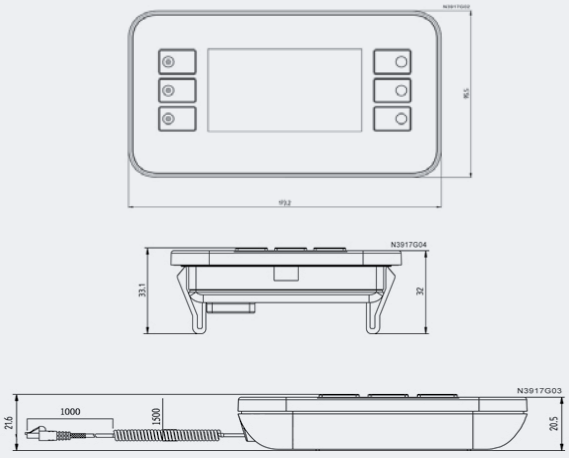
POL985

POL908.00

POL902

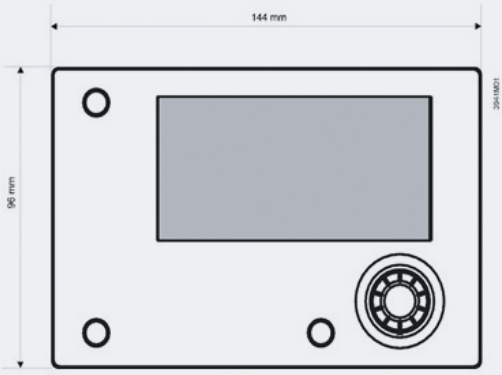
POL871.71 | POL871.72 – External PLC display

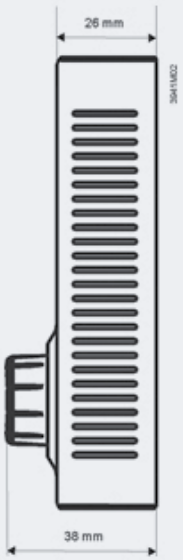
Technical data	
Powered by PLC	DC 24 V, 60 mA
LCD type	STN blue negative
Resolution	Matrix display 240 × 128
Backlighting	white LEDs
Contrast ratio	4
Size / LCD Size	
Visible area size	93 × 58 mm
Visibility angle × angle from the top	86.15 × 47.78 mm
Dimensions	173.2 × 95.5 × 21.6 mm for the manual and magnetic mounting versions
Weight without packaging	173.2 × 95.5 × 33.1 mm for the mounting versions
Weight inclusive of the packaging	221 g for the mounting versions 350 g for the manual and magnetic mounting versions
Keyboard	makrolon 2405, transparent
Mounting	silicone rubber, RAL7035
Front cover	
Back cover	makrolon 6485, RAL7035 makrolon 6485, RAL5014
Operation	IEC 721-3-3
LCD limitations	-20 … 60 °C
Air humidity	5 ... 95 % relative humidity (without condensation)
Air pressure	min. 700 hPa, corresponding
Transport and storage	max. 3,000 m above sea level
Temperature	IEC 721-3-2
Air humidity	-40 … 70 °C
Air pressure	5 … 95 % relative humidity (without condensation) min. 260 hPa, corresponding to max. 10,000 m above sea level 3.VI
HMI-TM for magnetic mounting and manual control HMI-TM for mounting into a panel	POL871.71 / STD POL871.72 / STD
Local cable HMI	
For the manual and magnetic mounting versions of POL871.71	3 m adjusted cable with a RJ45 connector 1 and 1 thin connector
For the mounting version	(4-wire twisted pair, in a box and connected to HMI-TM)
POL871.72	1.5 m Cat-5 Ethernet cable with 2 RJ45 connectors (8-wire twisted pair, included in the box)
Protection	
IP protection class	IP65 for all the hand-held and magnetic mounting versions and the front part of the mounting version's panel
Protection against UV radiation	IP20 on the rear side of the mounting version's panel
Protection class	the use of Makrolon 6485 f1 material
Degree of pollution	class 2 (SELV EN 60730-1) 2
Product safety	
Automatic electrical control	EN 60730-1
Electromagnetic compatibility	
Immunity in the industrial emissions of the sector in residential and commercial areas and light industry	EN 61000-6-2
Conformities of CE EMC with the FCC directive	EN 61000-6-3



POL895.50 – External PLC display

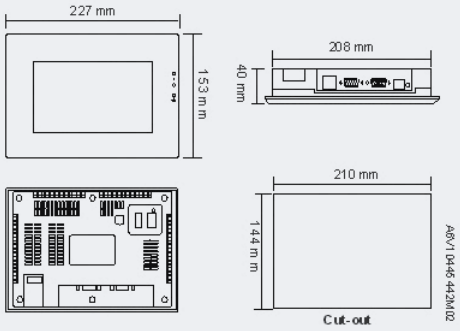
Technical data	
Power source	
Power supply	Powered by PLC or a separate DC 24 V power source
Consumption at 24 V DC	Max. 85 mA
Consumption via process bus	Max. 85 mA
Conditions	
Operation	IEC 721-3-3
Temperature	-40 … 70 °C
LCD limitations	-20 … 60 °C
Air humidity	<90 % relative humidity (non-condensing)
Atmospheric pressure	min. 700 hPa, corresponding to max. 3,000 m above sea level
Transport	IEC 721-3-2
Temperature	-40 … 70 °C
Air humidity	<90 % relative humidity (non-condensing)
Atmospheric pressure	min. 260 hPa, corresponding to max. 10,000 m above sea level
Protection	
Enclosure	IP31 (EN 60529)
Protection class	class II (SELV EN 60730)
Degree of pollution	2
Product safety	
Automatic electrical control	EN 60730-1
Electromagnetic compatibility	
Immunity in the industrial sector	EN 61000-6-2
Emissions in residential and commercial spaces and light industry	EN 61000-6-3
CE conformities	
EMC directive	2004/108/EC
FCC	FCC Part 15 (Emissions EMC FCC CFR 47, Part 15)





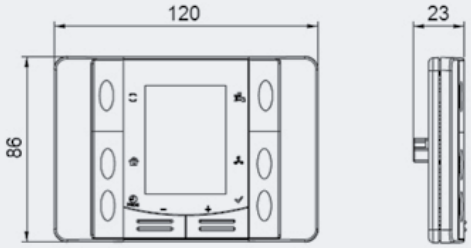
POL8T1.70 – Visualization (Touchpanel)

Technical data	
Power source	
Nominal voltage (range)	DC 24 V (± 15 %)
Consumption	12 W
Test voltage	1,000 V AC, 1 minute
Interface	
Connection to the IP service interface	RJ45, 10/100 Mbps
Ethernet port	YES
CAPABILITY	YES
USB port	YES
SD card	YES
Serial interface	COM1: RS485 COM2: RS485
Display	
Backlighting	LED
Type	LCD TFT
Resolution (pixels)	800 × 480
Colours	16,770,000
Contrast (type)	500:01:00
Brightness (type)	250 cd / m^2
Active display area	7" (16:9)
Ecological assumptions	
Temperature	-20 … +60 °C
Air humidity	10 … 90 % RH
Atmospheric pressure	795 … 1,080 hPa, corresponds to an altitude of 2,000 … -1,000 m
Conditions	
Temperature	-20 … +70 °C
Air humidity	10 … 90 % RH
Atmospheric pressure	795 … 1,080 hPa, corresponds to an altitude of 2,000 … -1,000 m
Protection	
Enclosure	In accordance with IEC 60529
Front	IP 65
Back panel	IP 20
Impact resistant	10 … 25 Hz (XYZ axis 2G / 30 minutes)
ESD	DIN EN 61000-6-2: 2005



POL822 – Spatial device

Technical data	
Power supply	
Operating voltage	DC 21 … 30 V
Electricity consumption	max. 0.31 VA (from the control unit)
The room unit is supplied with electric energy from the connected control unit via a 2-core interface	
Measuring element	NTC resistance sensor
Measuring range	0 … 40 °C
Operating temperature	0 … 40 °C
Wired connection	
Connection terminals	for a wire or cable equipped with protective sleeves of 0.8 ... 2.5 mm^2
Cable type	2-core, twisted, unshielded
Max. distance from the control unit 700 m (when using a cross-section of 2.5 mm^2)	
Dimensions	120 × 86 × 23 mm
Weight	108 g
Degree of protection according to EN 60529	IP30

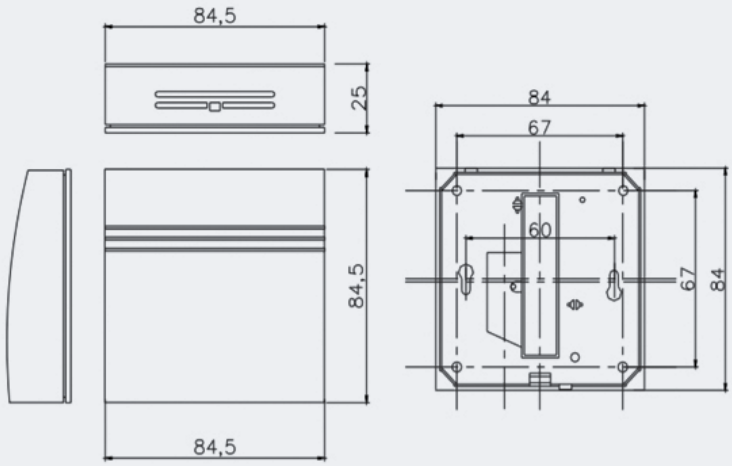


Driver **HMI/RO1**

Technical data	
Switches	Off/On Switching the comfort/attenuation modes
Indication	Operation indicator light Filter clogging indicator light Fault indicator light
Power supply	Power for 230 V AC indicator lights
Enclosure	IP67
Dimensions	140 × 67 × 55 mm (without switches)

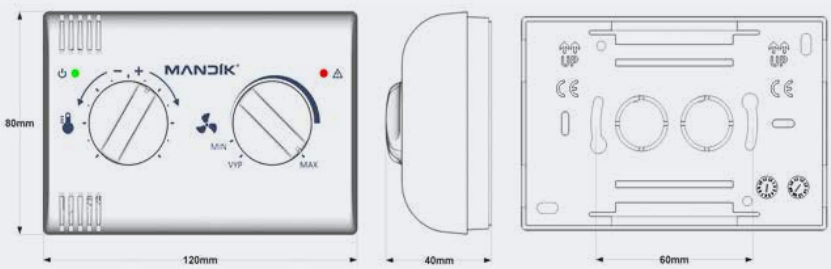
Thermokon WRF04

Technical data	
Power supply	
Operating voltage	15–24 V DC (±10 %) or 24 V AC (±10 %)
Protection by EN 60529	IP20



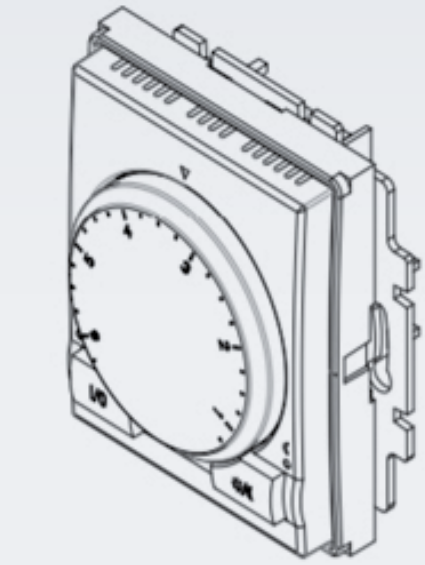
Protronix CP_M_B

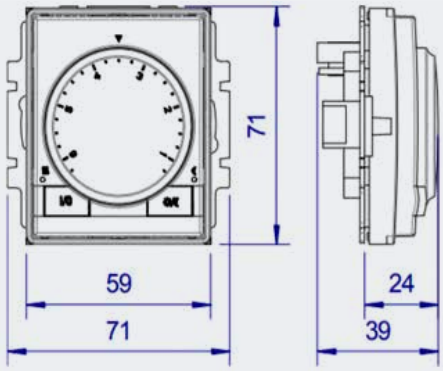
Technical data	
Power supply	
Operating voltage	14–24 V DC
Energy consumption	max. 0.4 W
LED power supply	14–24 V DC
Load capacity of inputs	min. 100 kΩ
Wire cross section	0.6 to 0.8 mm^2
Recommended cable	J-Y(ST)Y 4×2×0,8
Working humidity	0–90 % RH
Working temperature	0 to +50 °C
Stock temperature	-20 to +60 °C
Protection	IP20
Dimensions	120×80×40 mm



Amit AMR OP41

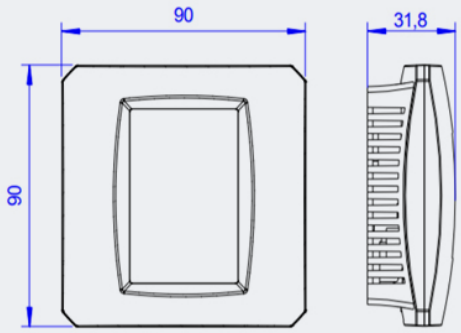
Technical data	
Temperature measurement	Electronic
Measurement range	-55 °C to +125 °C
Temp. measurement accuracy	±0,5 °C (0 °C to 50 °C)
Settling time	< 20 s
Control	1 × rotative controler 2 × button
Communication	1 × RS485
Galvanic isolation	No
Number of segment units	256
Power source	10 V DC to 30 V DC
Maximal energy consumption	40 mA by 24 V DC
Other	
Protection	IP20
Working temperature range	-10 °C to 50 °C
Maximal humidity	<95 % without condensation
Mountage	To the KU68 junction box with frame
Freight design	ABB Time / Time Arbo / Element
Weight	0.054 kg
Dimensions	(71 × 71 × 39) mm²

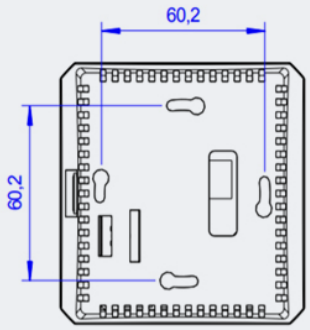




Amit AMR OP70

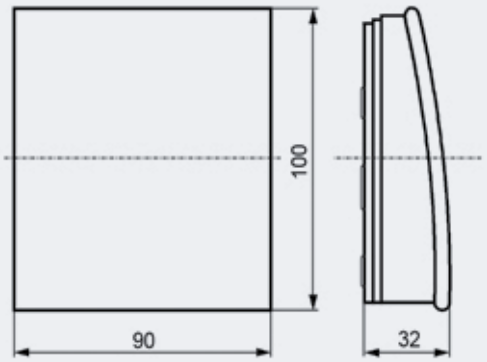
Technical data	
Display	Graphic black and white LCD
Distinction	(64 × 132) pixels (unbalanced dot)
Display area	(58 × 38) mm
Backlight / durability	LED / min. 50,000 hours
Temperature measurement	Electronic
Measurement range	-10 °C to 50 °C
Temp. measurement accuracy	±0.5 °C
Settling time	45 min
Touch panel	Resistive
Communication	RS485
Galvanic isolation	No
Number of RS485 segment units	256
Power source	10 V ss. to 30 V ss.
Maximal energy consumption	40 mA by 24 V ss.
Other	
Protection	IP20
Working temperature range	-10 °C to 50 °C
Maximal humidity	< 95 %, without condensation
Mountage	On wall
Weight	105 g
Dimensions	(90 × 90 × 32) mm

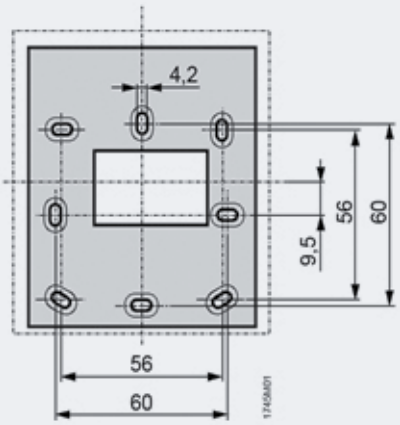




QAA2030 – ROOM TEMPERATURE SENSOR

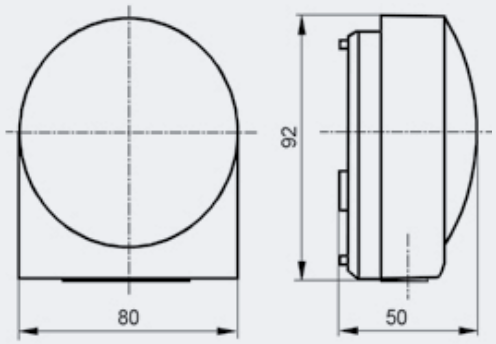
Technical data	
Sensor type and output	passive
Protection class	III according to EN 60730-1
Degree of protection of the housing	IP 54 according to EN 60529
Connection terminals for conductors	2 × 1.5 mm² or 1 × 2.5 mm²
Operation	Class 3K5 according to IEC 60721-3-3
Climate conditions	
Temperature	0 … 50 °C
Humidity	<85 % RH
Product standards	EN 60730-1 automatic electronic control device for the household and similar purposes
EU conformity (CE)	8000073890
Protective connection Environmental conditions Transport	according to IEC 60721-3-2
Climate conditions	class 2K3
Temperature	-25 … +65 °C
Humidity	<95 % RH
Packaging	corrugated cardboard box
Sensor (complete)	without silicone
Including packaging	approx. 0.1 kg

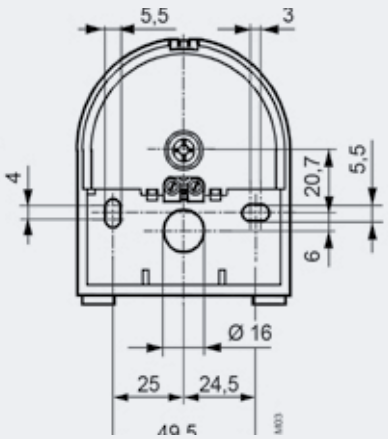




QAC2030 – Outdoor temperature sensor

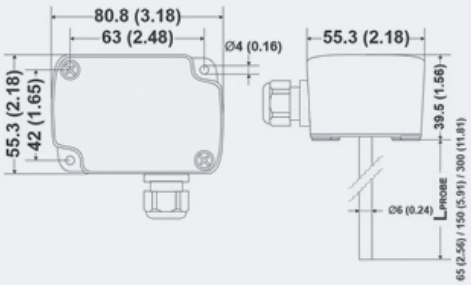
Technical data	
Time constant	14 min.
Measurement accuracy	±0.5 K
Type of measurement and output	passive
Protection class	III according to EN 60730
Degree of protection of the housing	IP54 according to EN 60529
Connection terminals	2 × 1.5 mm² or 1 × 2.5 mm²
Cable entry	Cable bushing (e.g. M 16 × 1.5)
Climate conditions	
Temperature	-40 … +70 ° C
Humidity	0 … 100 % RH
Storage	IEC 721-3-2
Climate conditions	class 2K3
Temperature	-25 … +65 °C
Humidity	<95 % RH
Mechanical conditions	class 2M2
Product standards	EN 60730-1 automatic electronic control device for the household and similar purposes





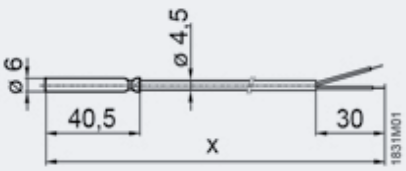
LF00-1B54 – Channel temperature sensor

Technical data	
Nominal value	
Pt 1000	1,000 Ω at 0 °C (32 °F)
Precision	
Pt 1000 (IEC751 Class B)	± 0.3 C at 0 °C (32 °F)
Sensitivity	
Pt 100	≈ 3.85 Ω / K
Pt 1000	≈ 3.85 Ω / K
NTC 10k	≈ -440 Ω / K at 25 °C (nonlinear)
NTC 20k	≈ -934.5 Ω / K at 25 °C (nonlinear)
Time constant	< 30 s
Sensor sleeve material	stainless steel (1.4571)
Cable sheath material	PVC
Electrical connection	2 m or 5 m cable, 2 × 0.22 mm²
Ambient limits	
Storage temperature	-30 … +70 °C (-22 … +155 °F)
Humidity	0 % to 95 %, non-condensing
Protection class	IP65 as per EN 60529



QAZ21.5120 – Temperature sensor for sump

Technical data	
Ambient temperature (PVC cable)	max. 95 °C
Ambient temperature (PE cable)	max. 125 °C
Ambient temperature (silicone cable)	max. 180 °C (short term 220 °C)
Ambient temperature (Teflon cable)	max. 250 °C
Insulation resistance	500 V
Electrical connection	varied
Climate and mechanical requirements	according to IEC 721-3
Protection class	III according to EN 60 730

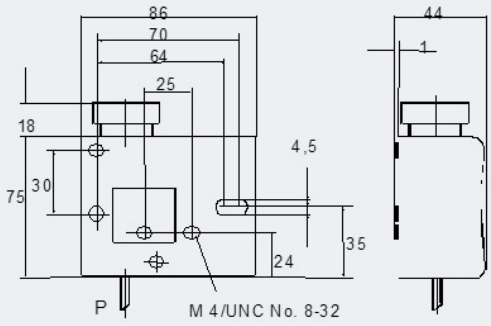


VDK-10 – Pipeline smoke sensor

Technical data	
Power supply	12 V DC
Max. consumption	50 mA
Enclosure	IP 54
Detector sensitivity	y = 0.7 (EN 54-7:2000)
Detection method	ionization chamber, Am 241
Emitter activity	33.3 kBq, 0.9 µCi
Range of operating temperatures	-20 ° C to +60 ° C
Relative humidity	0 % to 95 % non-condensing
Storage temperature	-30 ° C to +80 ° C
Standard length of diversion tubes	300 mm

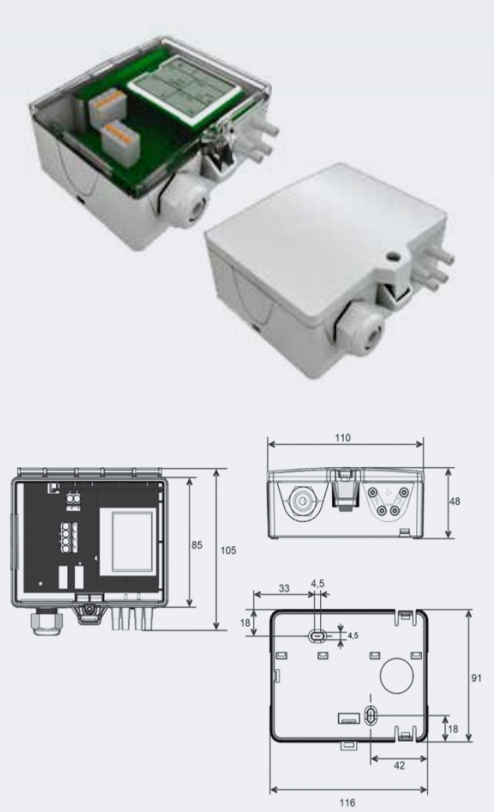
TS1-C0P – Antifreeze thermostat

Technical data	
Capillary filling	steam
Ambient temperature	-50 °C to 70 °C
Maximum sensing bulb temperature	+150 °C
Vibration resistance	4 g @ 10 … 1,000 Hz
Enclosure EN60529 / IEC 529	IP44
SPDT contact material	$CuAg_3$
Cover material	polycarbonate (PC)
Baseboard material	steel, yellow chromate
Thermal load (AC1)	24 A / 230 V st.
Inductive load (AC15)	10 A / 230 V st.
Inductive load (DC13)	0.1 A / 230 V ss 3 A / 24 V ss 6 A / 12 V ss
UL motor current (FLA)	24 V st
Short-circuit motor UL (LRA) / start (AC3)	144 A / 230 A st
Cabling	1.5 mm^2



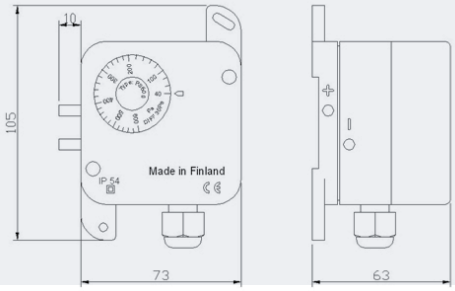
DPA2500 – Differential pressure manometer

Technical data		
Differential sensor for measuring air pressure or other non-flammable and non-aggressive gases		
8 measuring ranges, optional using DIP switch	-100 to +100 Pa 0 to 100 Pa 0 to 250 Pa 0 to 500 Pa	0 to 1,000 Pa 0 to 1,500 Pa 0 to 2,000 Pa 0 to 2,500 Pa
With display (adjustable backlight yes/no)		
Output signal	0–10 V DC or 4–20 mA	
Supply of energy	24 V AC/DC	
Accuracy	±5 Pa in range <500 Pa, ±10 Pa in range >500 Pa	
Maximum overpressure	400 kPa	
Possibility of automatic calibration		
Workin temperature	-10 až +50 °C	
Response time	0.8 / 4 s (adjustable)	
Material	box PA6, ABS pressure bushings, PVC hoses	
Accessories included	2 fixing screws, 2 plastic bushings, 2 m hose	
Connection	electrical: 4 screw terminals, max. 1.5 mm^2 cable entry: M20 for cable max. ø 8 mm sockets: ø 5 mm and 6.3 mm	
DIN rail mounting or screwing		
Dimensions	90 × 88 × 52 mm	
Weight	150 g	
Protection	IP54, IP65 with screw-on cover	



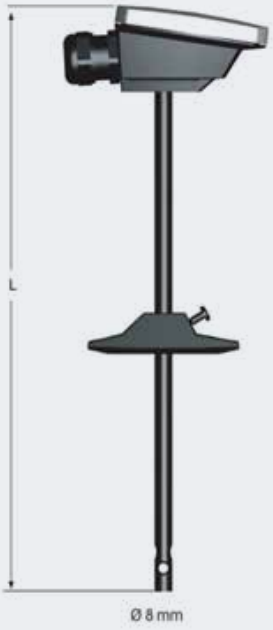
PS 500 – Differential pressure switch

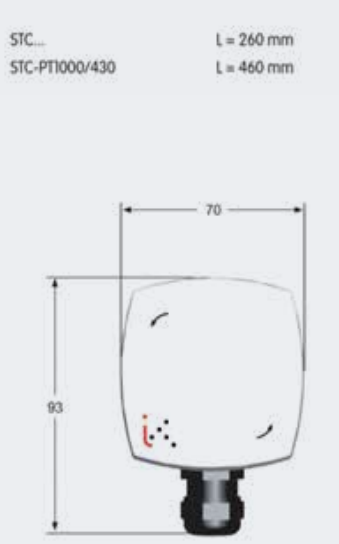
Technical data	
Box material	ABS
Lid material	PC
Enclosure	IP54
Membrane	silicone
Operating overpressure	50 kPa
Operating temperature range	-20 … +60 °C
Storage temperature	-20 … +85 °C
Media	air non-aggressive gases
Bushing	M16
Dimensions	105 × 73 × 63 mm



STC-NTC10-01 – Duct temperature sensor

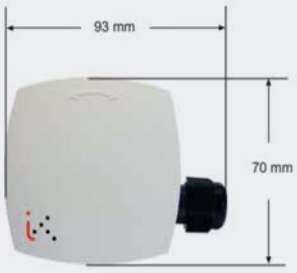
Technical data	
Cable gland	M16
Material	stainless steel, SUS304
Diameter	8 mm
Protection class	IP65
Dimensions	93 × 70 × 260 mm / ...430 model: 93 × 70 × 460 mm





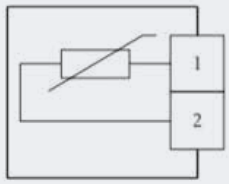
SC-NTC10-01 – Attached temperature sensor

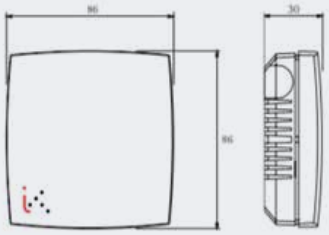
Technical data	
Cable gland	M16
Protection class	IP42
Dimensions (W × H × L)	93 × 70 × 35 mm



SA-NTC10-01 – Room temperature sensor

Technical data	
Dimensions (W × H × L)	86 × 86 × 30 mm
Protection class	IP30
Mountage	wall
Range	0 ... +50 °C



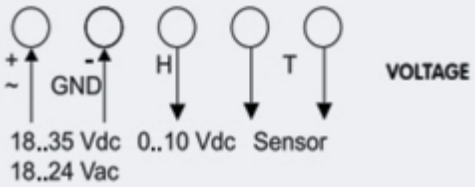


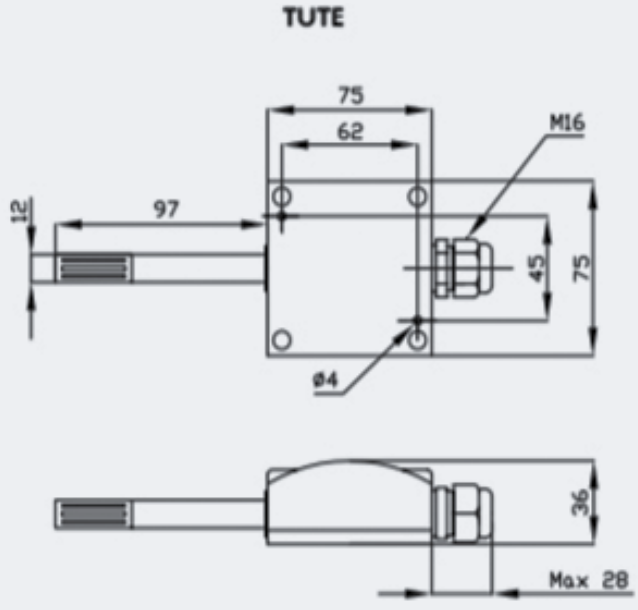
NT0420-NI1000-01 – Well temperature sensor

Technical data	
Material, head	Stainless steel AISI 304
Material, cable	Thermoplastic rubber
Bulb length	40 mm
Cable length	2 m
Diameter	4 mm
Protection class	IP67
Range	-50 ... +110 °C

TUTE1401 – Outdoor humidity and temperature sensor

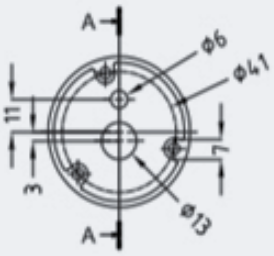
Technical data	
Power voltage	18 … 24 V AC / 18 … 35 V DC
Temperature range	-5 … +50 °C
Output, temperature	NTC 10K-01
Output, humidity	0 … 10 V DC
Temperature accuracy	± 0.2 °C
Energy consumption	< 1 W
Ambient humidity	10 … 95 % RH (without condensation)
Ambient temperature	°C
Storage temperature	-20 … +70 °C
Storage temperature	± 3% RH at 20 °C
Material, case cover	White polycarbonate
Material of case	Gray polycarbonate
Weight	170 g
Dimensions	75 × 172 × 36 mm
Protection class	IP65
Insulation class	III

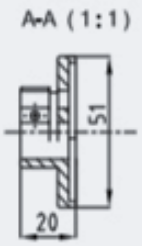


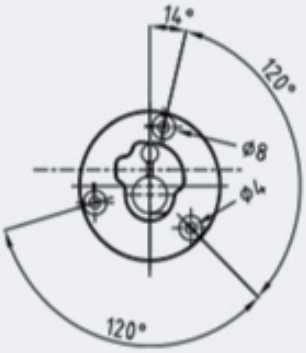


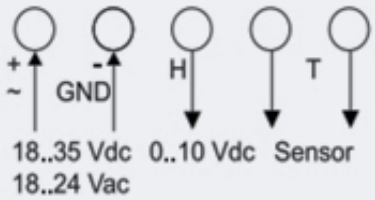
TUTC1401 – Humidity and temperature channel sensor

Technical data	
Power voltage	18 … 24 V AC / 18 … 35 V DC
Temperature range	-5 … +50 °C
Output, temperature	NTC 10K-01
Output, humidity	0 … 10 V DC
Energy consumption	< 1 W
Sensor	Temperature: resistive; humidity: capacitive
Ambient humidity	10 … 95 % RH (without condensation)
Humidity range	0 … 100 % RH (without condensation)
Storage temperature	-20 … +70 ° C
Accuracy	Humidity: ±3 % relative humidity at 20 °C Temperature: Maximum error 1 °C (range 0 … 50 °C) Max. error 1.5 °C (range -30 … +50 °C) Maximum error 2 °C (range 0 … 100 °C)
Cover	Cover: white polycarbonate Base: gray polycarbonate
Weight	260
Dimensions	75 × 103 × 266 mm
Protection class	IP65
Insulation class	III

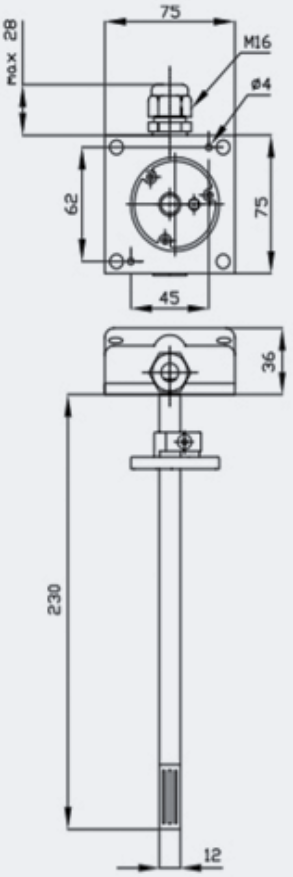






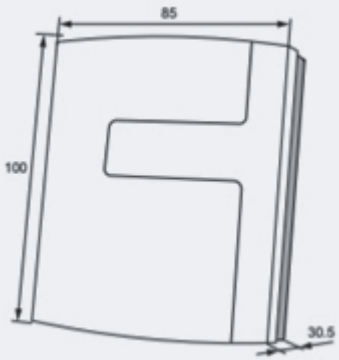


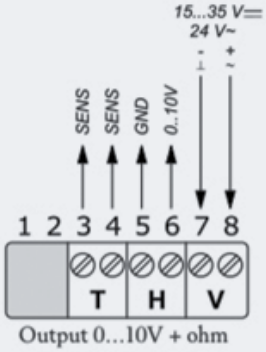
VOLTAGE



TTUA-NTC10-01 – Room humidity and temperature sensor

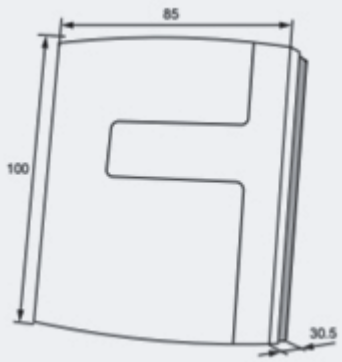
Technical data	
Display	–
Output signal	0 … 10 V + ohm
Accuracy, temperature	± 0.2 °C
RH + NTC 10, 10 kOhm / 25 °C	
Power voltage	24 V AC ±10 % / 15 … 35 V DC
Energy consumption	< 1 W
Transformer power	≥ 2 VA
Working range, temperature	0 … 50 °C
Working range, humidity	0 … 100 % RH
Accuracy, humidity	±3 % RH at 20 °C
Mountage	Room
Dimensions	100 × 85 × 30,5 mm
Protection class	IP30

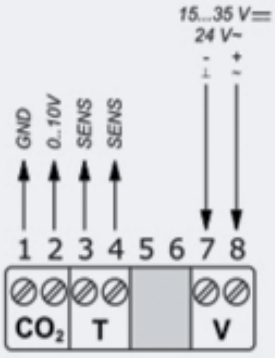




TCO2A-NTC10-01 – CO_2 and temperature room sensor

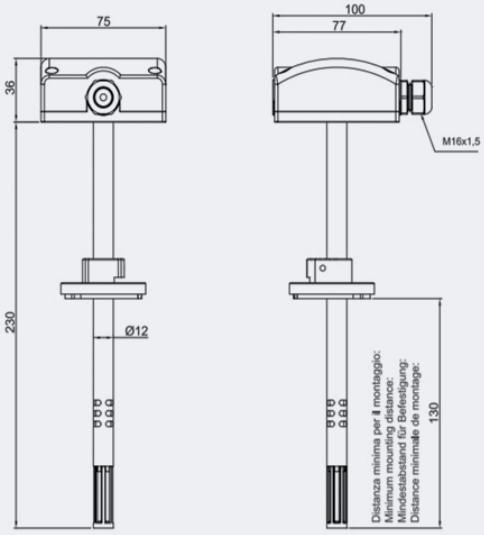
Technical data	
Display	–
Output signal	0 … 10 V + ohm
Accuracy, temperature	± 0.2 °C
CO_2 + NTC 10, 10 kOhm (25 °C)	
Power voltage	24 V AC ±10 %, 50 … 60 Hz / 15 … 35 V DC
Working range, CO_2	0 … 2000 ppm
Working range, temperature	0 … 50 °C
Working range, humidity	10 … 90 % RH
Energy consumption	< 2.5 W
Energy consumption	< 0.5 Wh
Transformer power	≥ 5 VA
Accuracy, CO_2	<± (50 ppm + 2 % of measured value) (25 °C)
Accuracy, humidity	± 3 % RV (20 °C)
Mountage	Room
Dimensions	100 × 85 × 30,5 mm
Protection class	IP30
CO_2	0 … 10 V DC based on 0 … 2,000 ppm
Temperature	0 … 10 V DC, based on 0 … 50 °C
Humidity	0 … 10 V DC based on 0 … 100 % RH

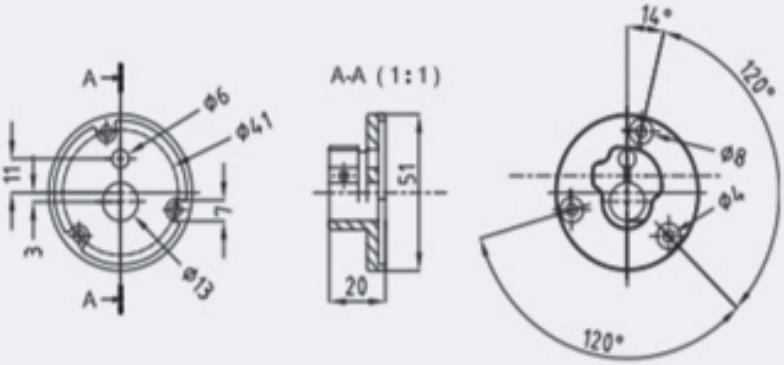


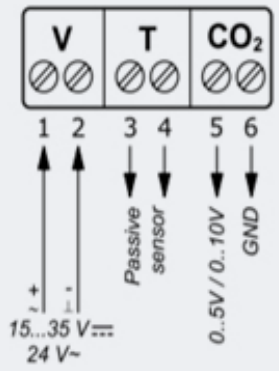


TCO2C-NTC10-01 – Channel sensor CO_2 and temperature

Technical data	
Output signal	0 … 10 V + Ohm
Accuracy, temperature	±0,2
CO_2 + NTC 10, 10 kOhm (25 °C)	
Power voltage	15 … 35 V DC / 24 V AC ± 10 % 50–60 Hz
CO_2 senzor	NDIR (non-dispersive infrared technology)
Output	0 … 10 V DC or 0 … 5 V DC, RL > 10 kOhm
Working range, CO_2	0 … 2,000 ppm
Working range, temperature	0 … +50 °C
Working range, humidity	10 … 90 % RH
Storage temperature	-20 … +70 °C
Storage humidity	<95 % RH
Accuracy, CO_2	± (50 ppm + 2 % measured values)
Energy consumption	<2.5 W
Energy consumption	<0.5 Wh
Transformer power	> = 5 VA
Max. air velocity	10 m/s
Mountage	Duct
Material, case cover	White polycarbonate
Material, case base	Gray polycarbonate
Insertion length	60 … 230 mm
Weight	160 g
Dimensions	75 × 77 × 36 mm
Protection class	IP65
Insulation class	III
CO_2	0 … 10 V DC based on 0 … 2,000 ppm
Temperature	passive sensor °C

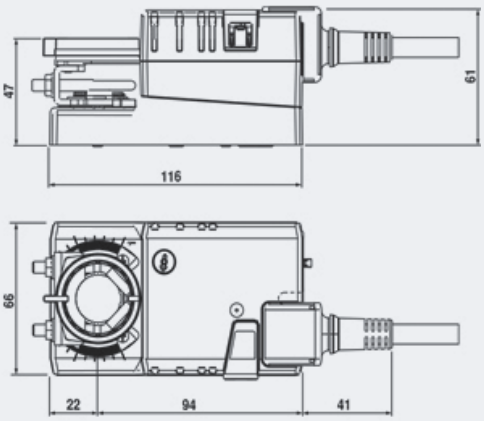






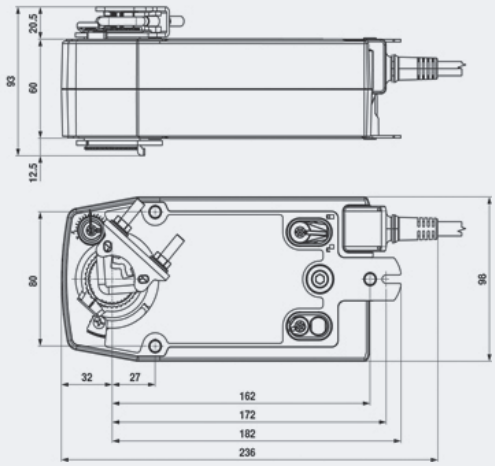
Damper drive LM (NM, SM, GM) 24A-SR

Technical data	
Supply voltage	AC 24 V, 50/60 Hz DC 24 V
Functional range	AC/DC 19.2 … 28.8 V
Operation power consumption	1 W @ nominal torque
Rest position of the sizing	0.4 W 2 VA
Connection	cable 1 m, 4 × 0.75 mm^2
Torque (nominal torque)	min. 5 Nm @ nominal voltage
Control, Y control signal	DC 0 … 10 V, typical input resistance 100 kΩ DC 2 … 10 V
Working range	
Position feedback (measuring voltage U)	DC 2 … 10 V, max. 1 mA
Race condition	±5 %
Direction of rotation	Selectable with the 0/1 switch
Repositioning time	150 s
Noise level	max. 35 dB (A)
Position indicator	mechanical, deployable
Protection class	III low voltage
Enclosure	IP54 in all mounting positions
EMV	CE according to 89/336/EWG
Function	type 1 (according to EN 60730-1)
Ambient temperature	-30 … +50 °C
Storage temperature	-40 … +80 °C
Ambient humidity	95 % RH, non-condensing (EN 60730-1)
Maintenance	maintenance-free
Dimensions	see Dimensions on page 2
Weight	approx. 500 g



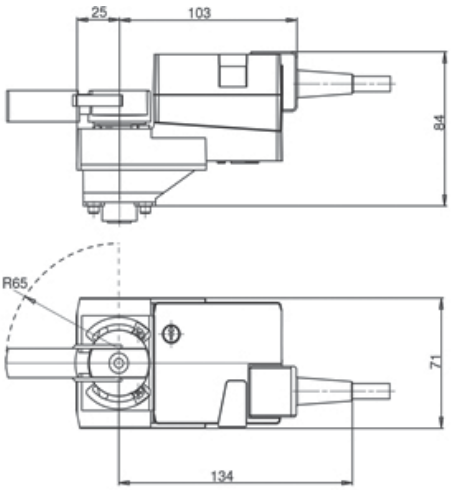
Damper drive NF (LF, SF, GF) 24A-SR

Technical data	
Supply voltage	AC 24 V, 50/60 Hz / DC 24 V
Functional range	AC 19.2 … 28.8 V / DC 21.6 … 28.8 V
Operation power consumption	3.5 W @ nominal torque
Rest position of the sizing	2.5 W 5.5 VA
Connection	cable 1 m, 4 × 0.75 mm^2
Torque motor return spring torque	min. 10 Nm @ power voltage min. 10 Nm
Control signal Y operating range	DC 0 … 10 V, input resistance 100 k DC 2 … 10 V
Position feedback (measuring voltage U)	DC 2 … 10 V, max. 0.5 mA
Race condition	±5 %
Position indicator	mechanical
Protection class	III extra low voltage / UL Class 2 Supply
Enclosure	IP54 NEMA2, UL Enclosure Type 2
EMV cancellation	CE according to 2004/108/EG
Certification	cULus according to UL 60730-1A and UL 60730-2-14 and CAN/CSA E60730-1:02 tested according to IEC / EN 60730-1 and IEC / EN 60730-2-14
Function	type 1.AA
Surge voltage measurement	0.8 kV
Degree of environmental pollution	3
Ambient temperature	-30 … +50 °C
Storage temperature	-40 … +80 °C
Ambient humidity	95 % RH, non-condensing
Maintenance	maintenance-free
Dimensions	see Dimensions on page 3
Weight	approx. 1.8 kg



Rotary drive for the valves LR (TR, NR, SR) 24A-SR

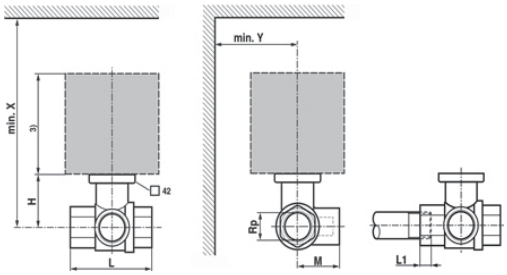
Technical data	
Supply voltage	AC 24 V, 50/60 Hz DC 24 V
Functional range	AC/DC 19.2 … 28.8 V
Power consumption	1 W @ nominal torque
Rest position of the sizing	0.4 W 2 VA
Connection	1 m cable, 3 × 0.75 mm^2
Parallel operation	possible, observe the power consumption data
Torque (nominal torque)	min. 5 Nm @ nominal voltage
Control Y control signal	DC 0 ... 10 V, input resistance typically 100 kΩ DC 2 ... 10 V
Working range	
Position feedback	DC 2 … 10 V, max. 1 mA (measuring voltage U)
Race condition	±5 %
Manual adjustment	disabling transfer using the button (temporary-permanent)
Noise level	max. 35 dB (A) (without valve)
Position indicator	mechanical, deployable
Protection class	III low voltage
Enclosure	IP54 in all mounting positions
EMV	CE according to 89/336/EWG
Function	type 1 (according to EN 60730-1)
Surge voltage measurement	0.8 kV (according to EN 60730-1)
Degree of environmental pollution	3 (according to EN 60730-1)
Ambient temperature	0 … +50 °C
Medium temperature	+5 … +120 °C -10 °C with shaft heating on request
Storage temperature	-40 … +80 °C
Ambient humidity	95 % RH, non-condensing (EN 60730-1)
Maintenance	maintenance-free
Dimensions	See Dimensions on page 2
Weight	approx. 550 g



Regulating ball valves, 3-way, internal thread

Technical data

Medium	Cold and hot water, water with Glycol added up to max. 50 %
Medium temperature	-10 °C … 120 °C
Warnings concerning the temperature of the medium	The permissible medium temperature may be limited depending on the drive type. The corresponding value can be found in the respective drive sheet.
Shut-off pressure Δps	1,400 kPa
Differential pressure Δpmax	350 kPa
Warnings concerning the differential pressure	200 kPa for quiet operation
Flow characteristic	control branch A – AB: equal percentage (according to VDI/VDE 2178)
Tightness	control branch A – AB
	A, airtight (EN 12266-1)
Leakage class	bypass B – AB leakage class I (DIN EN 1349 and DIN EN 60534-4) 1 … 2 % of kvs, depending on the highest value in a given DN
Pipe connection	Inner thread according to ISO 7/1
Working angle with a limitation	90 ° (working range of the control branch A – AB 15
	... 90 °, bypass B – AB 15 … 70 °)
Mounting position	vertical to horizontal (in relation to the shaft)
Maintenance	maintenance-free



DN	Type	Weight approx. [kg]	Rp	L [mm]	L1 [mm]	H [mm]	M [mm]	X [mm]	Y [mm]
15	R3015-P25-S1	0.27	1/2	67	13	35	36	230	90
15	R3015-P4-S1	0.27	1/2	67	13	35	36	230	90
15	R3015-P63-S1	0.27	1/2	67	13	35	36	230	90
15	R3015-1-S1	0.27	1/2	67	13	35	36	230	90
15	R3015-1P6-S1	0.37	1/2	67	13	44	36	230	90
15	R3015-2P5-S1	0.37	1/2	67	13	44	36	230	90
15	R3015-4-S1	0.37	1/2	67	13	44	36	230	90
20	R3020-4-S2	0.46	3/4	78	14	46	41.5	220	90
20	R3020-6P3-S2	0.46	3/4	78	14	46	41.5	220	90
25	R3025-6P3-S2	0.65	1	87	16	46	45	235	90
25	R3025-10-S2	0.65	1	87	16	46	45	235	90
32	R3032-16-S3	0.95	1 1/4	105	19	50.5	55.5	240	90
40	R3040-16-S3	1.15	1 1/2	111	19	50.5	56	240	90
40	R3040-25-S4	1.15	1 1/2	122	19	62	66.5	250	90
50	R3050-25-S4	1.19	2	125	22	56	68	245	90
50	R3050-40-S4	1.8	2	142	22	68	79	262	90
50	R3050-58-S4	1.8	2	142	22	68	79	262	90

L1: Maximum thread depth
X/Y: Minimum distance in relation to the valve centre

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