PRODUAL

measure - be sure.

Catalogue
2018

m³/h

bar % rH m/s m³/h

voc lx CO₂ voc lx CO₂

Pa co m³/h Pa co

% rH m/s m³/h °C

Welcome to the next level of measurement for building automation

Our 31-year history has been filled with technical, operational and geographical development and expansion together with our customers. Building automation markets are evolving into the next stage of intelligent solutions, open technologies and faster speeds. With our latest evolution, Produal PUMP™ – the Produal Unified and Modular Platform, we are creating a movement from the traditional world of individual products to a unified and adaptable portfolio of measurement and control.

The Produal PUMP™ platform's smart design and new plug-and-play approach offer wider product variations and make the use of products remarkably easy. They provide customers with easy expansions, remote software updates, and future support for IoT and cloud architectures. The platform also brings easy-to-use Produal MyTool mobile application and MyCloud service for all the products.

The new platform forms the basis for the next generation of all the Produal products, benefitting all parties involved in the building automation lifecycle - designers, consultants, architects, system integrators, installers, maintenance personnel, building owners, and end users. All this is done keeping our common goal in mind: to achieve cost efficiency and time savings - and to ensure comfort, energy efficiency and return on investments for building owners and users.

Produal PUMP™ leads to a future of building automation that is open, unified, modular, and adaptable.

pd PRODUAL PUMP

BUILDING AUTOMATION MEASUREMENT EVOLVED

Control | Measurement combinations | Mobile commissioning | Cloud service

HARDWARE — **PRODUAL PUMP** — **SOFTWARE**

MESH

Bus, analogue, wireless, IoT

COMMUNICATION

IoT platform

BMS

SMART BUILDING APPLICATIONS

PROVEN AND UPDATABLE SOLUTIONS FOR DESIGNERS AND CONSULTANTS

EASINESS TO INTEGRATORS AND MAINTENANCE

SMART DESIGN TO BENEFIT ARCHITECTS AND END USERS

- Easy to use
- Elegant and timeless design
- Unified flexibility
- Customisable
- Pre-configurable
- Fast installation
- Wireless commissioning
- Remote updates
- Modular expansions
- Ready design components
- Compatible with IoT and smart buildings
- Next generation wireless

CONTENTS

Produal Oy reserves the right to change the specifications without prior notification.

PRODUAL – working with you for efficient building automation projects and services

As a high-quality one-stop-shop partner for building automation measurement and control, we work with you for effective BA projects and services. Versatile, precise and reliable measurements lay the foundation for the evolving building automation. Our wide product offering includes over 1000 products, a complete range of measurement products for any need from room, duct and structure to exterior, and from temperature, pressure, air velocity and quality to humidity – wired or wirelessly. The range is complemented with multifunctional room controllers enabling intelligent control in all types of building automation applications and covers both analog and bus products.

We provide 5 years' warranty for the products we manufacture, and our quality system is ISO 9001 certified. Our accurate, multifunctional and easy-to-install products, over 30 years of expertise and local service and passion for customer satisfaction provide you with reliable delivery, trust and advice. The ultimate result is cost efficiency and time savings during the whole lifecycle of the building automation system – and comfort, energy efficiency and return on investment for building owners and users.

Measure – be sure.

ENERGY EFFICIENCY

COMFORT

COST EFFICIENCY

ROI

TIME SAVINGS

DESIGN

BUILD

WORKING WITH YOU TO HELP

design proven building automation solutions efficiently

provide excellent BA projects and services

design and manufacture high quality HVAC equipment efficiently

MAINTAIN

WIDE PRODUCT OFFERING
One-stop-shop, Easy & compatible, Multimeasure

COMPETENT LOCAL SERVICE
Delivery, Trust, Advice

SOLID EXPERTISE IN BUILDING AUTOMATION MEASUREMENT AND CONTROL

31 years **100** cross-border experts **4 000** customers **50 000** buildings

PASSION FOR CUSTOMER SATISFACTION

Working together • Looking to the future • Being flexible and attentive • Operating professionally with high standards

measure - be sure.

bemsiq smarter buildings

We belong to the Bemsiq group of companies (www.bemsiq.se), active in building automation and energy management.

Harmony of the Seas cruise ship - Produal's measurement and control products are part of the air handling and conditioning solutions ensuring passenger comfort in the demanding sea environment on the world's largest cruise ship, five times as large as the Titanic. Produal deliveries will soon follow to several equally challenging cruise ships.

Clarion Hotel Helsinki - In this ultra-modern 16-storey hotel with 425 rooms in Jätkäsaari, room climate control is implemented using Produal controllers that are especially adapted to the Clarion Hotel chain's specific requirements for optimal control and energy efficiency.

One-stop-shop partner for measurement and control

We continuously develop our product portfolio to stay ahead of the evolving demands of building automation and to be a one-stop-shop partner for measurement and control for all our customers both today and in the future. We also want to support our customers in new opportunities enabled by digitalization, IoT and data analytics. Our aim is that the customer always finds a suitable set of products for its specific building automation application – whether it is new building or renovation, traditional HVAC application or something totally new. The current product range is illustrated in the picture below.

AIR
Temperature, Pressure, Air quality, Air velocity, Air flow, Humidity

LIQUID
Temperature, Pressure, Condensation, Leakage, Frost, Water, Glygol

LIGHT & WEATHER
Light intensity, Illuminance, Wind speed, Rain

PRESENCE
Movement, Occupancy

OTHER
Pulse counter, Gas temp., Smoke

ON
Duct
Structure
Room
Exterior

BY
Wireless/Wired
Modbus
BACnet
Analog

FOR
Heating & cooling
Ventilation and comfort
Energy efficiency
Risk control (leakage, frost, smoke)
Other

Build
Commissioning tools
System components

Actuate
Actuators
Valves

Measure
Transmitters, Sensors, Thermostats, Meters, Switches

Control
Controllers
Transmitters

Reliable measurements for building automation

5 year warranty

This product catalogue shows merely the foremost features of our products. We are engaged in constant development of our products and the current details and prices may be viewed on our website: www.produal.com

A competent and reliable local service providing delivery, trust and advice

Our customers need more than products – they need reliable delivery, trust and advice. We have developed our service range to support and assist our customers during all phases of the building automation lifecycle. Our competent and reliable local service provides them with rapid and flexible delivery, advice for product selection, configuration and problem solving, and training for maximum product performance. Product adaptation and pre-configurations are offered for special needs and fast commissioning. Our online services with versatile search functions, filtering options, product comparison tools and application descriptions support our local operations. You can find the summary of the services in the picture below.

Building automation lifecycle
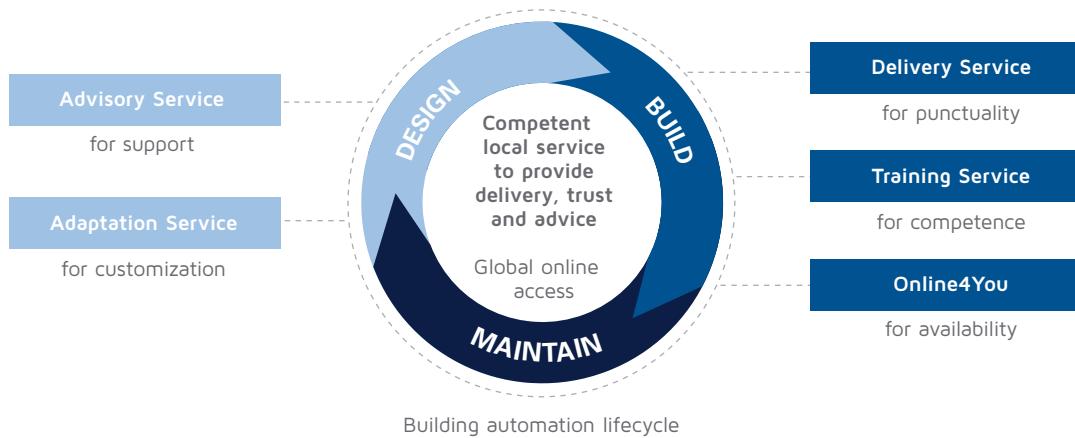
The Adaptation Service includes a wide range of services to speed up your building automation projects, to match the visual appearance of products to specific requirements, or to add additional logos or markings to products. The following Adaptation Services are available:

▶ Customer logo printed on the product, additional stickers and markings (e.g. position marking)

▶ Pre-configuration of controllers and bus products, pre-setting of valves

▶ Adjustment of cable or probe length

▶ Calibration certificates

▶ Modification of the software functionality

▶ Special colouring of the products - see examples in the picture

Adaptation Services are implemented at Produal's factory with high quality and efficiency. A separate service-specific fee is charged, which is typically on a price-per-product basis and includes a minimum order quantity.

In addition to standard classroom training dealing with applications, products, and technologies, our Training Services also offer an option for modified training modules to match your specific competence development needs. Training Services also offer certificates to support you in becoming a certified Produal distributor or solution provider.

NEW

PRODUAL PUMP

BUILDING AUTOMATION MEASUREMENT EVOLVED

Our new-generation measurement and control portfolio is based on **Produal PUMP™ - the Produal Unified and Modular Platform**. It has now been implemented in the first Produal Proxima™ products for ease of use, remote firmware updates, a wider range of product variations, easy expansions and future support for IoT and cloud architectures. This makes the products unified, modular, adaptable and future-proof.

The configurable and expandable **Produal Proxima™ CU control unit** is designed for hidden installation. All the wiring is done to the control unit easily with spring load terminals. Multifunctional inputs/outputs, modular expansion possibilities and wireless commissioning make the controller unique and extremely user-friendly.

The elegant **Produal Proxima™ RU room unit** combines ease of use with smart design. Modularity allows for a wide range of product variations and flexibility with multiple functions in a single room unit. Spring load connectors on the spacious base module enable quick and easy installation. Ask for options that will become available in 2018.
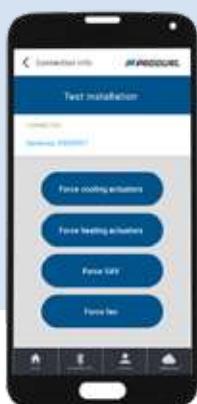
For ease of use and a unified user experience, Produal PUMP™ -based products are commissioned and managed wirelessly via Bluetooth with the **Produal MyTool™ Android application**, connected to Produal's MyCloud service. Download the free application on your smart phone or tablet and use your device as a single commissioning tool.

Your mobile phone or tablet, with a high-quality display and touch screen functionality, acts as a single commissioning tool after downloading the **free** application for your personal use.

NEW PRODUCTS

R402 is a versatile **room controller** for individual room temperature and VAV control applications. The controller supports 0...10 V controlled actuators, thermal actuators, 0...10 V controlled dampers, and the Modbus protocol, with galvanically isolated RS-485.

The modern **room unit ROU** has an user-friendly interface with a touch screen and is designed to be used with hidden control units. ROU can be used as a room unit, Modbus master or Modbus slave unit. Integrated CO_2 and PIR sensors are available as options, and a rH% option is available when used as a Modbus slave.

TEHR NTC 10-PU temperature sensor can be used as a **light room unit** together with such controllers that have inputs for passive NTC 10 temperature measurement and a 0...10 V set point.

The **CO_2 transmitter HDH-PIR** is designed for measuring and controlling CO_2 concentration, temperature and humidity in room spaces. PIR functionality is also included for room occupancy detection to reduce unnecessary air conditioning. Additionally, the transmitter supports basic control functions for cooling/heating systems. For example, there is an additional feature that allows you to set a fixed control output for a certain time period for easier VAV control commissioning.

TEKY4-M cable temperature sensor is now available also in Modbus version. Temperature is measured by a Pt1000 sensor element and the temperature and control settings are readable via Modbus. TEKY4-M has control functionality for simple heating or cooling applications.

To facilitate system designers' work, our **products are now available in 3D as BIM objects** on the world's largest online Building Information Modelling library for Mechanical, Electrical and Plumbing (MEP) design. Our BIM library at **MagiCloud** offers over 100 product families, with approximately 450 unique variants for MagiCAD and AutoCAD (www.magicloud.com). If you require Revit versions, please contact us at info@produal.fi.

MagiCloud

Renovation of historical churches, Trondheim area - In a large renovation project encompassing 25 churches, huge savings were achieved in Norway's harsh weather conditions by implementing energy-efficient and on-demand web-based heating systems, including Produal's wireless and wired temperature and humidity transmitters. A wireless solution fulfilled the strict aesthetical requirements, and by controlling the humidity level, it is possible to optimally preserve the valuable buildings and their contents.

St Petersburg Metro - Good air quality, comfort and the health of hundreds of thousands daily passengers are ensured with air conditioning and ventilation systems including Produal products at St Petersburg's classy and historical metro line stations, partly constructed under the banks of the River Neva.

New Children's hospital, Helsinki - An extensive range of Produal measurement and control products have been delivered to the hospital of 75 thousand square metres to ensure a comfortable room temperature and air quality for the small patients, who require specialized health care, and for their doctors and nurses. To secure optimal building performance, HVAC processes are detected and controlled with the help of Produal's wide range of sensors and transmitters. The hospital will open its doors in 2018.

Zaryadye Park, Moscow - Produal's controllers, sensors and transmitters, installed in the tea house, ice cave, media centre and underground car park with a capacity of 430 cars, ensure comfort and energy efficiency for Muscovites, tourists and facility owners in the vast landscape urban park located near the Red Square, Kremlin and Moskva river. The area of the park's facilities totals almost 78 thousand square metres and the scale and complexity of the ground-level and underground engineering solutions of this first large park in Moscow for almost 70 years are amazing.

CONTROLLERS

A wide range of multifunctional and reliable controllers is available for all types of building automation applications, from chilled beams, radiators and fan coils to VAV and beyond. Our range covers single-room or zone control, integration with intelligent building automation systems and interoperability with overall smart building management in larger or smaller scale applications. Our selection and designs cater for all budgets, covering both bus and analogue products.

The room controllers include all the intelligence and connections in the same unit, covering various controller types for different requirements, with add-on sensor or button capability for more functions.

Our control units cover controllers for false ceiling mounting or other hidden installation, minimizing the need for cables through the walls, and universal controllers for a wide range of applications in heating, ventilation, pressure, or humidity control.

The user-friendly room units are available for various needs and budgets, from high-class applications to simple yet stylish solutions. Add-on capabilities for the desired functions in one housing remove the need for separate sensors in the room and make the system flexible and future-proof.

Please note that most of our transmitters are equipped with control output and can be used as single-sequence controllers for heating/cooling or ventilation.

Controllers for hidden installation

Room controllers

Room units

Universal controllers

Transmitters with control output

ROOM CONTROLLERS

In conference rooms, HLS 44-CO2 can control chilled beams with cooling and a damper actuator for ventilation if the CO_2 values are too high, or if cooling is required. Heating is controlled with radiators.
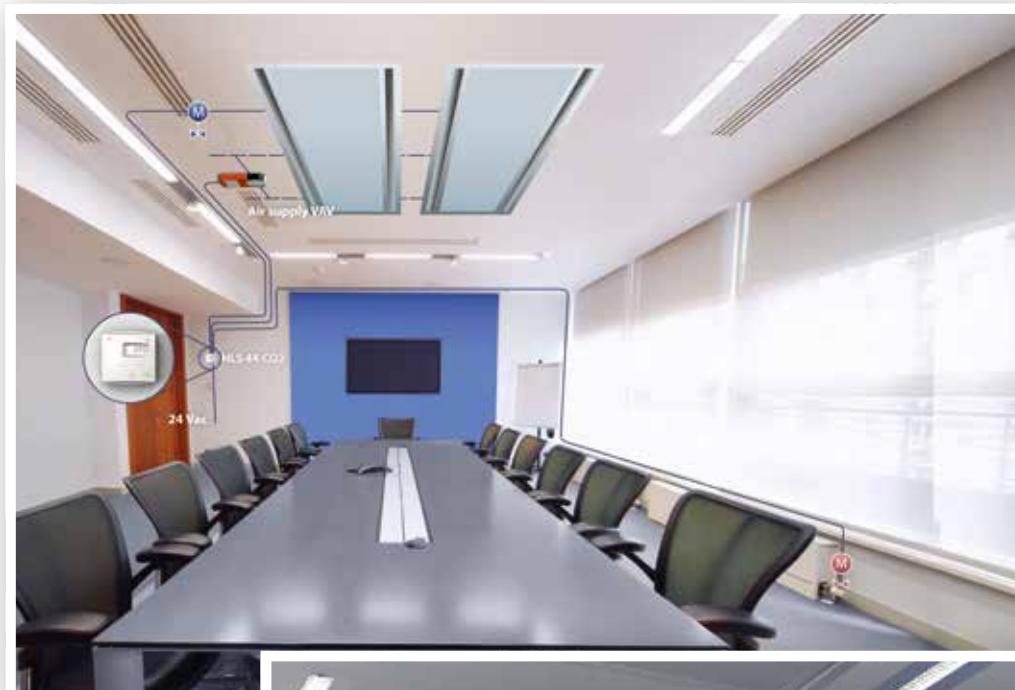
HLS 45 can be used to control fan coil units with 2-pipe systems with summer and winter change-over. It is also suitable for controlling heated floors with a return water temperature limit. HLS 45 can be connected to Modbus RTU.

ROOM CONTROLLER INPUTS AND OUTPUTS

Product	Analogue inputs	Digital inputs	Analogue outputs	Digital outputs
HLS 44	1	2	4	2
HLS 44-V	1	2	2	4
HLS 44-EC	1	2	4	2
HLS 44-CO2	1	2	4	2
HLS 44-3P	1	2	2	4
HLS 44-6W	1	2	4	2
HLS 44-BAC	1	2	4	2
HLS 45	1	2	4	2
HLS 33	0	0	2	2
HLS 21	0	0	0	2
HLS 16	0	0	0	1
R402	0	1	2	2

ROOM CONTROLLERS

room °C

HLS 44 multifunctional controller family is specifically designed for individual room temperature and zone control applications. The controllers have a built-in, galvanic isolated RS-485 channel for communication via Modbus and they can be connected to any supervisory Modbus RTU software/system. There are several controller variations offered, such as HLS 44-CO2 with a built-in CO_2 sensor, HLS 44-EC with selectable voltages for fan speed control output, HLS 44-V for fan coil, VAV and light control, HLS 44-3P for 3-point actuator control, HLS 44-6W for 6-way valve control, HLS 44-BAC with BACnet communication and HLS 45 for both 2-pipe FCU and floor heating and cooling applications.

Supply	24 Vac/dc, < 1 VA NOTE: Only the 0...10 V outputs and Modbus work when using DC supply voltage.
Set point	18...26 °C, adjusted by push buttons or by bus communication
Accuracy	±0,5 °C
IP protection class	IP20
Material	ABS plastic
Ambient temperature	0...50 °C
Mounting	with screws on wall or on a junction box (hole distance 60 mm)
Materials	ABS plastic
Dimensions	87 x 86 x 32 mm

TYPE	ART NO.	
HLS 44	1150250	room temperature controller, Modbus communication
HLS 44-3P	1150280	room temperature controller, Modbus communication, 3-point actuator control
HLS 44-6W	1150300	room temperature controller, Modbus communication, 6-way valve control
HLS 44-CO2	1150370	room temperature controller, Modbus communication, built-in CO_2 sensor
HLS 44-EC	1150257	room temperature controller, Modbus communication, adjustable 3-speed fan voltages
HLS 44-V	1150260	room temperature controller, Modbus communication, fan coil, VAV and lighting control
HLS 44-BAC	1150310	room temperature controller, BACnet communication
HLS 45	1150270	room temperature controller, Modbus communication, floor heating and cooling control

TOOLS		
HLS 44-3P-SER	1150281	configuration tool for HLS 44-3P
HLS 44-6W-SER	1150301	configuration tool for HLS 44-6W
HLS 44-CO2-SER	1150371	configuration tool for HLS 44-CO2
HLS 44-SER	1150251	configuration tool for HLS 44 and HLS 44-V
HLS 45-SER	1150271	configuration tool for HLS 45

ROOM CONTROLLERS

HLS 33 is a room temperature controller with 2 or 3 stages.
One stage is for heating and up to two stages for cooling.
The controllers can be used with 0...10 V, 3-point or thermal
(PWM) actuators.

Supply	24 Vac, < 2 VA
Set point	18...24 °C, ±3 °C
Accuracy	±0,5 °C
Output	2 x 0...10 Vdc, 2 mA, for heating and cooling
Output	2 x 24 Vac, 0,6 A cont. / 1 A max, for heating and cooling
IP protection class	IP20
Material	ABS plastic
Ambient temperature	0...50 °C
Mounting	with screws on wall or on a junction box (hole distance 60 mm)
Dimensions	86 x 86 x 32 mm

TYPE	ART NO.	
HLS 33	1150090	controller with internal temperature sensor
HLS 33-EXT	1150092	controller for an external NTC10 temperature sensor
HLS 33-N	1150091	with display
HLS 33-N-EXT	1150093	for an external NTC10 temperature sensor with display
TH 5	1183090	driver for thermal actuators, 5 outputs

ROOM CONTROLLERS

HLS 21 is a 2-stage controller for room temperature control.
The controller has one thermal (PWM) actuator stage for both
heating and cooling.

Supply	24 Vac, < 2 VA
Set point	18...24 °C, ±3 °C
Accuracy	±0,5 °C
Output (cooling)	24 Vac, 1 A, for thermal actuator
Output (heating)	24 Vac, 1 A, for thermal actuator
IP protection class	IP20
Material	ABS plastic
Ambient temperature	0...50 °C
Mounting	with screws on wall or on a junction box (hole distance 60 mm)
Dimensions	86 x 86 x 32 mm

TYPE	ART NO.	
HLS 21	1150100	controller with internal temperature sensor
HLS 21-EXT	1150102	controller for an external NTC10 temperature sensor
HLS 21-N	1150101	with display
HLS 21-N-EXT	1150103	controller for an external NTC10 temperature sensor and display

ROOM CONTROLLERS

HLS 16 is a 1-stage controller for room temperature control. Both heating and cooling are controlled by using the same valve. The function of the valve can be changed by using external (summer/ winter) switch connected to the Z1 terminal.

room °C

Supply	24 Vac, < 1 VA
Set point	18...24 °C, ±3 °C
Accuracy	±0,5 °C
Output	24 Vac, 1 A, for thermal actuator (NC or NO)
IP protection class	IP20
Material	ABS plastic
Ambient temperature	0...50 °C
Mounting	with screws on wall or on a junction box (hole distance 60 mm)
Dimensions	86 x 86 x 32 mm

TYPE	ART NO.	
HLS 16	1150160	controller for floor heating/cooling
HLS 16-N	1150161	with display

ROOM CONTROLLERS

room °C

R402 is a versatile control unit specifically designed for individual room temperature and zone control applications. Controller has a built-in, galvanic isolated RS-485 channel for communication via Modbus and it can be connected to any supervisory Modbus RTU software / system.

Supply	24 Vac/dc, < 2 VA
Set point	19...25 °C
Input	condensation sensor
Input	external temperature sensor or DI (door/window contact or occupancy detector)
Accuracy	±0,5 °C
Output	2 x 0...10, 10 mA, for heating or cooling
Output	2 x 24 Vac, 2 A, for heating or cooling
IP protection class	IP20
Material	ABS plastic
Ambient temperature	0...50 °C
Mounting	with screws on wall or on a junction box (hole distance 60 mm)
Materials	ABS plastic
Dimensions	86 x 86 x 32 mm

TYPE	ART NO.	
R402	1155120	room temperature controller with Modbus communication

TOOLS		
H402	1155121	configuration tool for R402

CONTROL UNITS

The Produal Proxima™ CU control unit can be used to control heating, cooling and fan coil units with an EC motor. The keycard switch can be connected to the control unit for economy functions if the room is not used regularly. The window switch detects if the window is open and blocks the cooling outputs. The Proxima control unit can be connected to Modbus RTU/TCP or BACnet MS/TP and IP. The ROU room unit with touch-panel display is easy to operate in any room. It also has a screen saver if the lighting level is perceived as disturbing.
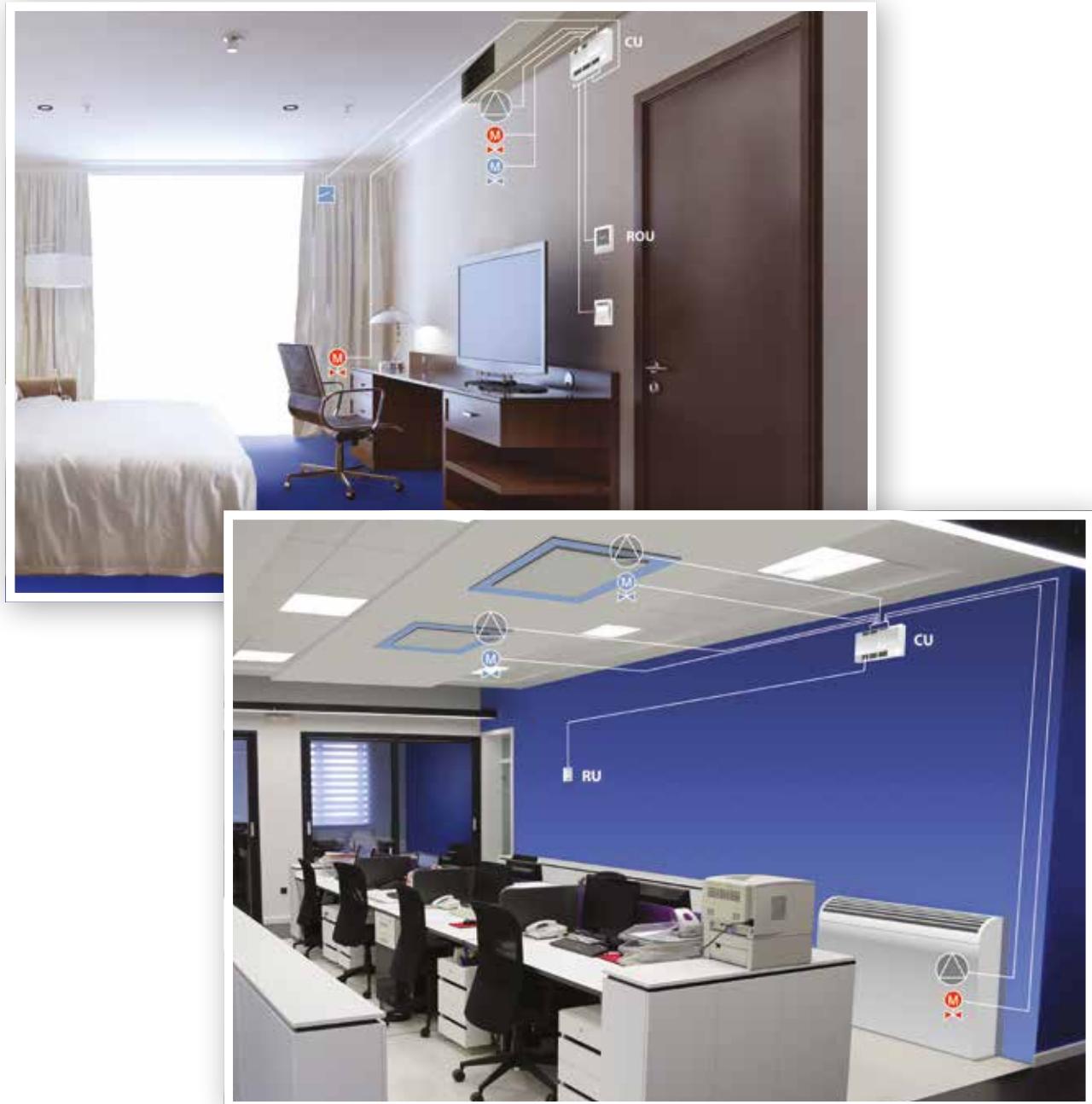
The Produal Proxima™ CU control unit can be used to control fan coil units with EC motors in sequence and individually in up to two different zones. The Produal Proxima™ RU room unit allows the user to adjust the set-point and fan speed of the fan coils. A room unit can be equipped with a PIR occupancy sensor option to set the control unit to economy mode and turn off the fan coils if the room is unused. The control unit can be connected to Modbus RTU/TCP or BACnet MS/TP and IP.

CONTROL UNIT INPUTS AND OUTPUTS

Product	Analogue inputs	Digital inputs	Analogue outputs	Digital outputs	Note
CU	6	6	6	4	Universal inputs (6 pcs) and outputs (6 pcs).
C230	4	4	2	2	Mixable inputs
C221	3	3	2	2	Mixable inputs
C222	3	3	2	2	Mixable inputs
PDS 2	4	0	4	4	
PDS 2.2	2	0	2	2	
HS 2.2-M	1	2	4	1	

CONTROL UNITS

Produal Proxima™ CU is a multifunctional control unit designed especially for room and zone control applications. The control unit supports the following communication protocols: Modbus RTU, Modbus TCP, BACnet MSTP and BACnet IP. The control unit can also be expanded with additional modules.

Supply	24 Vac/dc
Input	6 x universal input
Output	6 x universal output
IP protection class	IP22
Ambient temperature	-5...50 °C
Humidity	0...90 %rH
Dimensions	186 x 136 x 55 mm

TYPE	ART NO.	
CU	5201010000	multifunctional control unit
ROU-F	1150390	room unit with touch screen (flush mounting)
ROU-S	1150380	room unit with touch screen (surface mounting)
ROU-S-B	1150384	room unit with touch screen (surface mounting), black
RU	5201010100	room unit for Produal Proxima™ CU
RU-D	5202010101	room unit with display for Produal Proxima™ CU (Available in the autumn 2018)
RUB	5202010103	room unit for Produal Proxima™ CU, black
RUB-D	5202010104	room unit with display for Produal Proxima™ CU, black (Available in the autumn 2018)

TOOLS		
MYT-Andr	5100010000	Android application for configurating and commissioning of Produal PUMP™ devices.

CONTROL UNITS

C230 is a multifunctional controller designed especially for individual room temperature and zone control applications. C230 is supplied with 230 V and it controls fan coil units and actuators. Controller has a galvanically isolated RS-485 connection for Modbus RTU communication. The controller has a terminal with 24 Vac (10 VA) supply voltage for external equipment.

Supply	230 Vac, < 4 VA
Input	temperature sensor (NTC 10 or 0...10 Vdc)
Input	secondary temperature sensor (NTC 10 or 0...10 Vdc)
Input	occupancy or 0...10 Vdc setpoint
Output	2 x 0...230 Vac, heating / cooling
Output	2 x 0...10 Vdc, heating / cooling / VAV / EC fan control
Output	3 x 240 Vac, max motor load 2,4 A (570 W), max resistive load 4,0 A (960 W), relays for fan coil unit or damper control
IP protection class	IP20
Ambient temperature	5...50 °C
Dimensions	200 x 120 x 53 mm

TYPE	ART NO.	
C230	1155110	230V room temperature controller with Modbus communication
ROU-F	1150390	room unit with touch screen (flush mounting)
ROU-S	1150380	room unit with touch screen (surface mounting)
ROU-S-B	1150384	room unit with touch screen (surface mounting), black

TOOLS		
H203	1155051	configuration tool

CONTROL UNITS

C221 and C222 are versatile control units specifically designed for individual room temperature, VAV and zone control applications. Controllers have a galvanically isolated RS-485 connection for Modbus RTU Communication.

Supply	24 Vac, < 2 VA
Set point	19...25 °C
Input	3 x external sensor or 0...10 Vdc
Output	2 x 24 Vac, 2 A, for cooling and heating
Output	2 x 0...10 Vdc, 10 mA, for cooling and heating
Output	relay control port (C222)
IP protection class	IP44
Materials	ABS plastic
Dimensions	80 x 122 x 40 mm

TYPE	ART NO.	
C221-01	1155050	middle roof control unit
C222-01	1155060	middle roof control unit with relay control port
E121-01	1155080	room unit with set point potentiometer
E122-01	1155081	room unit with set point potentiometer and fan speed control switch
E123-01	1155082	room unit with set point potentiometer and timer
E201-01	1155090	room unit with display
E202-01	1155091	room unit with display and fan speed control
RL203	1155070	relay unit
ROU-F	1150390	room unit with touch screen (flush mounting)
ROU-S	1150380	room unit with touch screen (surface mounting)
ROU-S-B	1150384	room unit with touch screen (surface mounting), black

TOOLS		
H203	1155051	configuration tool

CONTROL UNITS

PDS 2 is a temperature controller for air handling unit, hot domestic water and heating applications. The controller supports Pt1000 temperature sensors. The thermal actuators can be either 0...10 V controlled or 3-point controlled. The controller has RS-485 connection for Modbus RTU communication.

°C

Supply	24 Vac/dc, < 2 VA NOTE: Only the 0...10 V outputs and Modbus work when using DC supply voltage.
Input	3 x Pt1000 or 2 x Pt1000 + 1 x potentiometer
Input	1 x 0...10 V / digital
Output	4 x 0...10 Vdc, 2 mA
Output	4 x 24 Vac, 1 A, triac
IP protection class	IP20
Mounting	For 35 mm DIN rail
Dimensions	53 x 90 x 58 mm

TYPE	ART NO.	
PDS 2	1150120	controller
TEAT PT 1000	1174070	immersion water sensor
TEHR PT 1000	1174190	room sensor
TEHR PT 1000-P/PDS 2	1174231	room sensor + set point for PDS 2
TEK PT 1000	1174040	duct sensor
TENA PT 1000	1174050	domestic water sensor
TEP PT 1000	1174080	pipe strap-on sensor
TEU PT 1000	1174090	outdoor sensor

CONTROL UNITS

PDS 2.2 universal controller can be used for controlling e.g. pressure, humidity or temperature. The controller supports 0...10 V controlled, 3-point controlled or thermal actuators. The controller has RS-485 connection for Modbus RTU communication.

°C, %rH, Pa, bar, CO, CO_2, m/s, lx

Supply	24 Vac/dc, < 2 VA NOTE: Only the 0...10 V outputs and Modbus work when using DC supply voltage.
Input	0...10 V, measurement
Input	0...10 V, external set point setting
Output	0...10 Vdc, 2 mA
Output	2 x 24 Vac, 1 A, for thermal actuators or 3-point actuators
Output	10 Vdc, 2 mA, for 4,7...220 kΩ potentiometer
IP protection class	IP20
Mounting	For 35 mm DIN rail
Dimensions	53 x 90 x 58 mm

TYPE	ART NO.	
PDS 2.2	1150150	universal controller

CONTROL UNITS

HS 2.2-M is a universal controller designed for HVAC applications. It can be used for controlling e.g. pressure, differential pressure, temperature or illumination level. Display is possible to scale according to the measurement. Controller has a galvanically isolated RS-485 connection for Modbus RTU communication.

°C, %rH, Pa, bar, CO, CO$_2$, m/s, lx

Supply	24 Vac/dc, < 1 VA NOTE: Only the 0...10 V outputs and Modbus work when using DC supply voltage.
Input	0...10 V, 10 kΩ
Input	2 x DI, potential free contact
Output	3 x 0...10 Vdc, 2 mA
Output	24 Vac, 1 A, for thermal actuator or 3-point actuator
Output	10 Vdc, error signal
IP protection class	IP20
Material	ABS plastic
Ambient temperature	0...50 °C
Mounting	with screws on wall or on a junction box
Dimensions	87 x 86 x 30 mm

TYPE	ART NO.	
HS 2.2-M	1150290	universal controller, room housing

ROOM UNITS

Our selection of room units fulfils the requirements of various commercial and public facilities for setting up the best possible indoor environment. Versatile models with user-friendly interfaces make it possible to implement easy-to-use, premium-class applications or simple yet stylish solutions.

Add-on capabilities are offered for more functions, so a wide range of product variations are possible. The room units can be equipped with, for example, a CO_2 sensor for air quality detection, a PIR sensor for occupancy detection and a rH% sensor for humidity. Different button functions, such as a Fan button or Man-In-House button are also available. Produal Proxima™ RU and ROU models can be used as room units for the Proxima™ CU control unit, or as room units for other devices connected to a Modbus network, as a Modbus slave or master unit.

Produal Proxima™ RU is a simple room unit with set point knob. The set point knob has continuous rotation function and the LED lights indicate the current position on the set point scale.

Produal Proxima™ RU-D has the same functions as RU, but with a graphical display on the set point knob as a user interface. The display shows the room temperature, set point, fan speed, CO_2, rH% and operating mode values depending on the configuration with the add-on options.
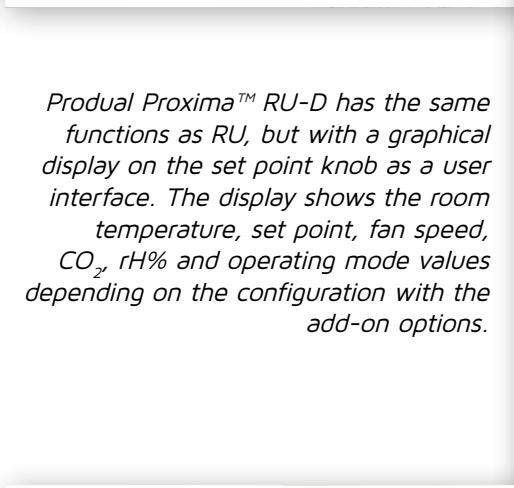
Produal ROU is a premium-style room unit with a 3.2" touch screen display for set point adjustments.

ROOM UNITS

Produal Proxima™ RU is a simple room unit designed to be used with the Proxima control units. It has a built-in temperature sensor and a set point knob. The unit is also available with fan control and man in house button. The indicator lights indicate the temperature set point and fan speed. Options will be available during 2018.

Supply	24 Vac/dc
IP protection class	IP20

TYPE	ART NO.	
RU	5201010100	room unit for Produal Proxima™ CU
RU-D	5202010101	room unit with display for Produal Proxima™ CU (Available in the autumn 2018)
RUB	5202010103	room unit for Produal Proxima™ CU, black
RUB-D	5202010104	room unit with display for Produal Proxima™ CU, black (Available in the autumn 2018)

ROOM UNITS

ROU is an advanced room unit with easy-to-use touch screen functionality. It is designed to be used with above-the-ceiling control units. The basic room unit includes temperature measurement. Other measurements like CO_2 or PIR are available as options. ROU can be used as a room unit, Modbus master or Modbus slave unit.

Supply	24 Vac
Set point	18...26 °C
IP protection class	IP20
Ambient temperature	5...40 °C
Humidity	0...85 %rH

TYPE	ART NO.	
ROU-S	1150380	room unit with touch screen (surface mounting)
ROU-S-B	1150384	room unit with touch screen (surface mounting), black
ROU-F	1150390	room unit with touch screen (flush mounting)

OPTIONS		
ROU-S-CO2-opt	1150382	CO_2 option
ROU-PIR-opt	1150381	PIR option
ROU-RH-opt	1150383	humidity option (for using with CU or for stand-alone room unit use)

ROOM UNITS

E12x room units are designed to be used with the C221/C222 control units. All units have a built in temperature sensor and a set point knob. Units with timer and fan speed buttons also available. The indicator light indicates the current function (red (heating), blue (cooling), off (dead zone)).

Supply	12 Vdc, < 1 W (supplied from C2xx)
Set point	19...25 °C
IP protection class	IP30
Material	ABS plastic
Ambient temperature	5...40 °C
Dimensions	87 x 86 x 30 mm

TYPE	ART NO.	
E121-01	1155080	room unit with set point potentiometer
E122-01	1155081	room unit with set point potentiometer and fan speed control switch
E123-01	1155082	room unit with set point potentiometer and timer

ROOM UNITS

E20x room units are designed to be used with the C221, C222 and C230 control units. Both units have a built in temperature sensor and a set point buttons. E202 room unit has a fan speed button also. The room unit can be used to access the control unit menus and parameters.

Supply	12 Vdc, < 1 W (supplied from C2xx)
Set point	19...25 °C
IP protection class	IP30
Material	ABS plastic
Ambient temperature	5...40 °C
Humidity	0...85 %rH
Dimensions	89 x 89 x 26 mm

TYPE	ART NO.	
E201-01	1155090	room unit with display
E202-01	1155091	room unit with display and fan speed control

TRANSMITTERS

Versatile high-quality transmitters for measuring a wide range of parameters in different demanding HVAC applications: accurate measurement of differential pressure, air quality, temperature, humidity, water pressure, air velocity, illuminance or wind speed etc. Several measured properties are also possible with one device. The devices are available with different measurement ranges and with or without a display.

▶ *Wide range of measured properties*
▶ *Several measurements with one device*
▶ *0...10 V, 4...20 mA*
▶ *Modbus, BACnet on selected products*
▶ *Control output on selected products*

Note: Temperature transmitters are found under the Temperature measurement section
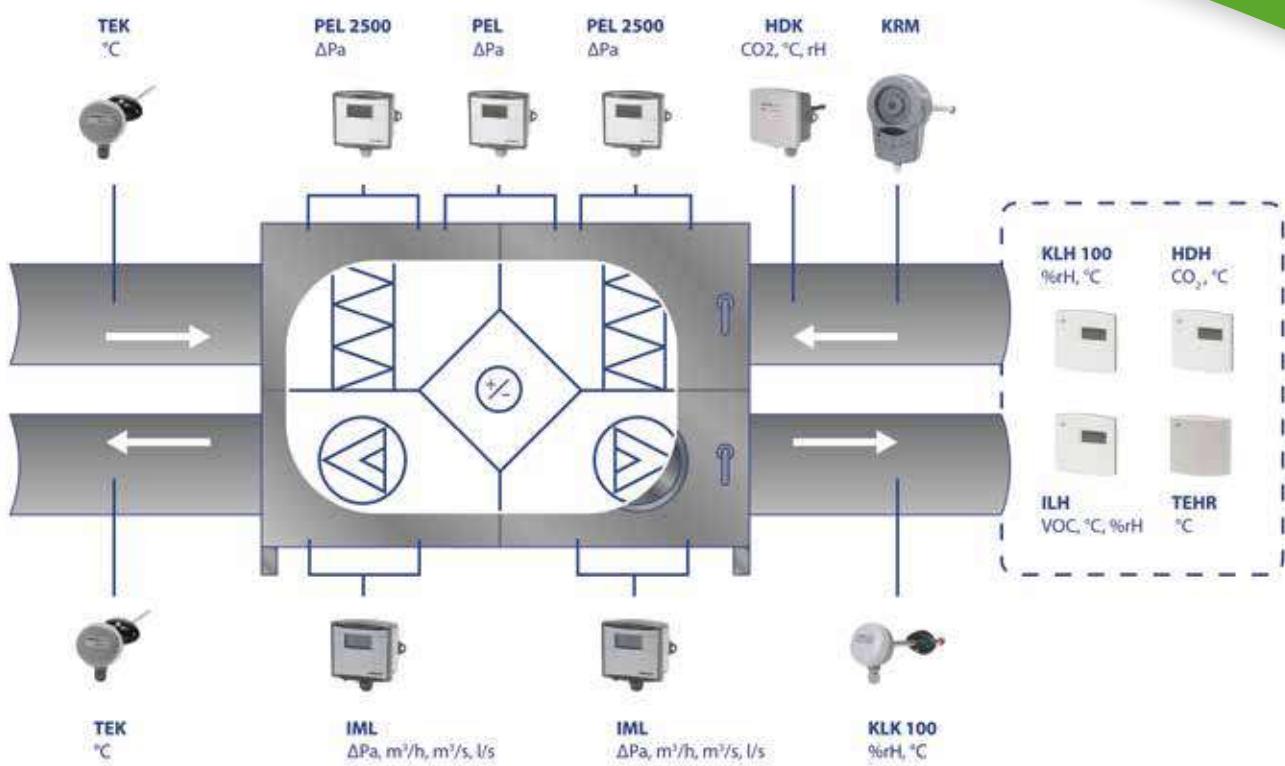
DIFFERENTIAL PRESSURE TRANSMITTERS FOR AIR

Produal offers several different differential pressure transmitters for air. The possible applications include clean / isolation room control, air handling unit control and filter monitoring, for example.

Product family	Measuring inlets	±50 Pa	±100 Pa	±250 Pa	±500 Pa	0...100 Pa	0...200 Pa	0...500 Pa	0...1000 Pa	0...1500 Pa	0...2000 Pa	0...2500 Pa	0...3000 Pa	0...4000 Pa	0...5000 Pa	0...6000 Pa	0...7000 Pa	0...8000 Pa	0...9000 Pa	Custom [1]	Accuracy	Automatic	Manual	0...10 V	4...20 mA	Modbus	Flow linear	Controller output	Analogue inputs	Display
PEL	1	•	•	•	•	•	•	•	•												•	±0,5 Pa +1 %	•		•	•	○				○
PEL 2500	1		•			•	•	•	•	•	•	•								•	±3 Pa +1 %	•		•	•	○	•			○
PEL 8K	1							•	•	•	•	•	•	•	•			•		•	±10 Pa +1 %	•		•	•	○	•			○
PEL 1000	1						•	•												•	±3 Pa +1 %		•	•		○		•		○
KPEL	2		•			•	•	•	•	•	•	•								•	±3 Pa +1,25 %	•	•	•	•	○		•	○	○
KPEL 9K	2									•		•	•	•	•	•	•	•	•	•	±10 Pa +1,25 %	•	•	•	•	○		•	○	○

- Standard   ○ Optional

[1] The custom pressure range can be adjusted with ML‑SER tool (or via Modbus) within the transmitter's normal pressure ranges.

PEL, PEL 2500, PEL 8K, PEL 1000

Supply	24 Vac/dc, < 2 VA (PEL 1000: 1 VA)
Outputs	0...10 Vdc / 2...10 Vdc / 0...5 Vdc < 2 mA or 0...20 mA / 4...20 mA < 700 Ω PEL 1000: 0...10 Vdc / 2...10 Vdc < 3 mA
Ambient temperature	0...+45 °C (PEL 1000: 0...50 °C)
Housing	IP54, cable gland downwards
Mounting	with screws, external lugs

KPEL, KPEL 9K

Supply	24 Vac/dc, < 2.5 VA
Outputs*	2 x 0...10 Vdc < 2 mA or 2 x 4...20 mA < 700 Ω
Inputs (M models)*	2 x 0...10 Vdc / DI / temperature
Ambient temperature	0...+50 °C
Housing	IP54, cable downwards
Mounting	with screws, external lugs
	* = Two terminals for outputs/inputs

ORDERING INFORMATION

Options	Basic version	Display	Modbus	Modbus & Display
PEL	1131110 (PEL)	1131111 (PEL-N)	1131360 (PEL-M)	1131361 (PEL-M-N)
PEL 2500	1131210 (PEL 2500)	1131211 (PEL 2500-N)	1131370 (PEL 2500-M)	1131371 (PEL 2500-M-N)
PEL 8K	1131350 (PEL 8K)	1131351 (PEL 8K-N)	1131400 (PEL 8K-M)	1131401 (PEL 8K-M-N)
PEL 1000	1131140 (PEL 1000)	1131141 (PEL 1000-N)	1131380 (PEL 1000-M)	1131381 (PEL 1000-M-N)
KPEL	1131310 (KPEL)	1131311 (KPEL-N)	1131260 (KPEL-M)	1131261 (KPEL-M-N)
KPEL 9K	1131330 (KPEL 9K)	1131331 (KPEL 9K-N)	1131340 (KPEL 9K-M)	1131341 (KPEL 9K-M-N)

AIR FLOW TRANSMITTERS

IML is designed for measuring and controlling air flow in air handling units and rooms. IML-M has RS-485 connection for Modbus RTU communication.

m³/s, m³/h, l/s, Pa

Supply	24 Vac/dc, < 1.5 VA
Input	0...10 Vdc, < 2 mA (external set point)
Range	0...1000, 0...2000, 0...5000 or 0...7000 Pa
Time constant	1...20 s (factory setting is 8 s)
Output (air volume)	0...10 Vdc, 2 mA
Output (diff. pressure or control)	0...10 Vdc, 2 mA
Zeroing	automatic; regularly eliminates the possible zero point drifting
IP protection class	IP54, cable downwards
Ambient temperature	0...45 °C
Cable gland	M16
Mounting	with screws, external lugs

TYPE	ART NO.	
IML	1131600	air volume transmitter
IML-M	1131610	IML for Modbus

OPTIONS		
PEK-AS	1240300	accessory kit for differential pressure products

AIR FLOW PROBES

PP air flow probes are designed for measuring air flow in the air handling systems. Different models with fixed Kv values are available for circular and rectangular ducts.

l/s

TYPE	ART NO.	
PP-PK R100	1250010	air flow volume probe for a circular 100 mm duct
PP-PK R125	1250020	air flow volume probe for a circular 125 mm duct
PP-PK R160	1250030	air flow volume probe for a circular 160 mm duct
PP-PK R200	1250040	air flow volume probe for a circular 200 mm duct
PP-PK R250	1250050	air flow volume probe for a circular 250 mm duct
PP-PK R300	1250059	air flow volume probe for a circular 300 mm duct
PP-PK R315	1250060	air flow volume probe for a circular 315 mm duct
PP-PK R355	1250065	air flow volume probe for a circular 355 mm duct
PP-PK R400	1250070	air flow volume probe for a circular 400 mm duct
PP-PK R450	1250073	air flow volume probe for a circular 450 mm duct
PP-PK R500	1250075	air flow volume probe for a circular 500 mm duct
PP-PK R550	1250076	air flow volume probe for a circular 550 mm duct
PP-PK R600	1250008	air flow volume probe for a circular 600 mm duct
PP-PK R630	1250078	air flow volume probe for a circular 630 mm duct
PP-PK R700	1250077	air flow volume probe for a circular 700 mm duct
PP-PK R800	1250079	air flow volume probe for a circular 800 mm duct
PP-PK R1000	1250009	air flow volume probe for a circular 1000 mm duct
PP-SK L200	1250080	air flow volume probe for a 200 mm rectangular duct
PP-SK L250	1250090	air flow volume probe for a 250 mm rectangular duct
PP-SK L300	1250100	air flow volume probe for a 300 mm rectangular duct
PP-SK L350	1250110	air flow volume probe for a 350 mm rectangular duct
PP-SK L400	1250120	air flow volume probe for a 400 mm rectangular duct
PP-SK L450	1250130	air flow volume probe for a 450 mm rectangular duct
PP-SK L500	1250140	air flow volume probe for a 500 mm rectangular duct
PP-SK L550	1250150	air flow volume probe for a 550 mm rectangular duct
PP-SK L600	1250160	air flow volume probe for a 600 mm rectangular duct
PP-SK L650	1250170	air flow volume probe for a 650 mm rectangular duct
PP-SK L700	1250180	air flow volume probe for a 700 mm rectangular duct
PP-SK L750	1250190	air flow volume probe for a 750 mm rectangular duct
PP-SK L800	1250200	air flow volume probe for a 800 mm rectangular duct
PP-SK L850	1250210	air flow volume probe for a 850 mm rectangular duct
PP-SK L900	1250220	air flow volume probe for a 900 mm rectangular duct
PP-SK L950	1250230	air flow volume probe for a 950 mm rectangular duct
PP-SK L1000	1250240	air flow volume probe for a 1000 mm rectangular duct
PP-SK L1050	1250250	air flow volume probe for a 1050 mm rectangular duct
PP-SK L1100	1250260	air flow volume probe for a 1100 mm rectangular duct
PP-SK L1150	1250270	air flow volume probe for a 1150 mm rectangular duct
PP-SK L1200	1250280	air flow volume probe for a 1200 mm rectangular duct

Other lengths also available on request.

AIR VELOCITY TRANSMITTERS

IVL air velocity transmitters are designed for measuring air velocity and temperature inside the duct.

Supply	24 Vac/dc, < 1.5 VA
Range (temperature)	0...50 °C
Probe	10 x 200 mm (probe depth 50...190 mm), versions with 100 mm and 400 mm probes are also available, e.g. IVL 10-400.
Output (velocity)	0...10 Vdc, 2 mA / 4...20 mA, 600 Ω
Output (temperature)	0...10 Vdc, 2 mA / 4...20 mA, 600 Ω
IP protection class	IP54, cable or probe downwards
Ambient temperature	0...50 °C
Mounting	with flange, adjustable probe depth

TYPE	ART NO.	
IVL 10	1130010	air velocity transmitter 0...10 m/s
IVL 10-N	1130012	air velocity transmitter with display, 0...10 m/s
IVL 02	1130030	air velocity transmitter 0...2 m/s
IVL 02-N	1130032	air velocity transmitter with display, 0...2 m/s
IVL 20	1130050	air velocity transmitter 0...20 m/s
IVL 20-N	1130053	air velocity transmitter with display, 0...20 m/s

AIR VELOCITY TRANSMITTERS

IVLJ air velocity transmitters are designed for measuring air velocity and temperature inside the duct.

Supply	24 Vac/dc, < 1.5 VA
Range (temperature)	0...50 °C
Probe	10 x 200 mm (probe depth 50...190 mm), versions with 100 mm and 400 mm probes are also available, e.g. IVLJ 10-400.
Output (velocity)	0...10 Vdc, 2 mA / 4...20 mA, 600 Ω
Output (temperature)	0...10 Vdc, 2 mA / 4...20 mA, 600 Ω
IP protection class	IP54, cable downwards (transmitter)
Ambient temperature	0...50 °C
Cable	2 m
Mounting	probe: by a flange, adjustable depth; transmitter: with screws, external lugs
Materials	PBT, PC, PA and stainless steel

TYPE	ART NO.	
IVLJ 10	1130090	air velocity transmitter 0...10 m/s
IVLJ 02	1130040	air velocity transmitter 0...2 m/s
IVLJ 20	1130100	air velocity transmitter 0...20 m/s

HUMIDITY TRANSMITTERS

Modbus

room %rH, °C

KLH room humidity transmitters are designed for measuring and controlling indoor relative humidity and temperature.

Supply	24 Vac/dc, < 1 VA
Range (humidity)	0...100 %rH
Range (temperature)	0...50 °C
Accuracy (humidity)	±2 %rH
Accuracy (temperature)	±0,5 °C
Output	3 x 0...10 Vdc, 2 mA
IP protection class	IP20
Material	ABS plastic
Ambient temperature	0...50 °C
Mounting	with screws on wall or on junction box (hole distance 60 mm)
Dimensions	87 x 86 x 30 mm

TYPE	ART NO.	
KLH 100	1132210	room humidity transmitter
KLH 100-N	1132211	room transmitter with display (humidity and/or temperature display)
KLH-M	1132600	room humidity transmitter for Modbus RTU gateway
KLH-M-N	1132601	room transmitter with display for Modbus RTU gateway (humidity and/or temperature display)

OPTIONS		
HD-P	1135001	passive potentiometer (not available for Modbus models)
HD-PU	1135002	0...10 V potentiometer
HD-R	1135003	relay, 24 Vac 1 A

TOOLS		
ML-SER	1139010	transmitter commissioning tool

HUMIDITY TRANSMITTERS

room %rH

KLH 420 is a 2-wire humidity transmitter designed for measuring indoor relative humidity.

Supply	24 Vdc (12...35 Vdc)
Range	0...100 %rH
Accuracy	±3 %rH (25 °C)
Output	4...20 mA, 500 Ω (24 Vdc)
IP protection class	IP20
Material	ABS plastic
Mounting	with screws on wall or on junction box (hole distance 60 mm)

TYPE	ART NO.	
KLH 420	1132280	room humidity transmitter
KLH 420-N	1132281	room humidity transmitter with display

HUMIDITY TRANSMITTERS

KLHJ 100 transmitters are designed for measuring relative humidity and temperature. The probe cable length is 2 m.

Supply	24 Vac/dc, < 1 VA
Range (humidity)	0...100 %rH
Range (temperature)	-50...50 °C
Output (humidity)	0...10 Vdc, 2 mA / 4...20 mA < 600 Ω
Output (temperature)	0...10 Vdc, 1 mA / 4...20 mA < 600 Ω
IP protection class	IP54, cable downwards
Ambient temperature	-50...50 °C
Cable	2 m
Cable gland	M16
Mounting	transmitter with screws (external lugs), sensor with flange, adjustable probe depth < 150 mm

TYPE	ART NO.	
KLHJ 100	1132260	humidity and temperature transmitter
KLHJ 100-N	1132261	humidity and temperature transmitter with display

HUMIDITY TRANSMITTERS

KLU 100 humidity and temperature transmitters are designed for outdoor applications.

Supply	24 Vac/dc, < 1 VA
Range (humidity)	0...100 %rH
Range (temperature)	-50...50 °C
Output (humidity)	0...10 Vdc, 2 mA / 4...20 mA < 600 Ω
Output (temperature)	0...10 Vdc, 1 mA / 4...20 mA < 600 Ω
IP protection class	IP54, cable downwards
Ambient temperature	-50...50 °C
Cable gland	M16
Mounting	with screws, external lugs

TYPE	ART NO.	
KLU 100	1132250	outdoor humidity transmitter
KLU 100-N	1132251	outdoor humidity transmitter with display

HUMIDITY TRANSMITTERS

KLK duct humidity transmitters are designed for measuring relative humidity and temperature inside ventilation ducts.

duct %rH, °C

Supply	24 Vac/dc, < 1 VA
Range (humidity)	0...100 %rH
Range (temperature)	-50...50 °C
Output (humidity)	0...10 Vdc, 2 mA / 4...20 mA < 600 Ω
Output (temperature)	0...10 Vdc, 2 mA / 4...20 mA < 600 Ω
IP protection class	IP54, cable or probe downwards
Ambient temperature	-50...50 °C
Cable gland	M16
Mounting	with flange, probe depth adjustable < 150 mm

TYPE	ART NO.	
KLK 100	1132240	duct humidity transmitter
KLK 100-N	1132241	duct humidity transmitter with display
KLK-M	1132610	Modbus duct humidity transmitter
KLK-M-N	1132611	Modbus duct humidity transmitter with display

OPTIONS		
KL-R	1132001	relay, 24 Vac 1 A

TOOLS		
ML-SER	1139010	transmitter commissioning tool

CO$_2$ TRANSMITTERS

Modbus

ASHRAE BACnet™

HDH transmitters are designed for measuring and controlling CO$_2$, temperature and humidity in dry room spaces. ABCLogic™ self-calibration method eliminates the possible long term drift.

room ppm CO$_2$, °C, %rH

Supply	24 Vac/dc, < 2 VA
Range (temperature)	0...50 °C
Time constant	< 2 min
Accuracy (temperature)	±0,5 °C
Output	3 x 0...10 Vdc, 2 mA
IP protection class	IP20
Material	ABS plastic
Ambient temperature	0...50 °C
Mounting	with screws on wall or on junction box
Dimensions	87 x 86 x 30 mm

TYPE	ART NO.	
HDH	1135040	room transmitter, CO$_2$ and °C measurement, range 0...2000 ppm
HDH-PIR	1135240	room transmitter, CO$_2$ and °C measurement, PIR, range 0...2000 ppm
HDH-PIR-N	1135241	room transmitter with display, CO$_2$ and °C measurement, PIR, range 0...2000 ppm
HDH-N	1135041	room transmitter with display, CO$_2$ and °C measurement, range 0...2000 ppm
HDH-RH	1135044	room transmitter, CO$_2$, °C and %rH measurement, range 0...2000 ppm
HDH-RH-PIR	1135250	room transmitter, CO$_2$, °C and %rH measurement, PIR, range 0...2000 ppm
HDH-RH-PIR-N	1135251	room transmitter with display, CO$_2$, °C and %rH measurement, PIR, range 0...2000 ppm
HDH-RH-N	1135045	room transmitter with display, CO$_2$, °C and %rH measurement, range 0...2000 ppm
HDH-M	1135100	Modbus room transmitter, CO$_2$ and °C measurement, range 0...2000 ppm
HDH-M-PIR	1135260	Modbus room transmitter, CO$_2$ and °C measurement, PIR, range 0...2000 ppm
HDH-M-PIR-N	1135261	Modbus room transmitter with display, CO$_2$ and °C measurement, PIR, range 0...2000 ppm
HDH-M-N	1135101	Modbus room transmitter with display, CO$_2$ and °C measurement, range 0...2000 ppm
HDH-M-RH	1135102	Modbus room transmitter, CO$_2$, °C and %rH measurement, range 0...2000 ppm
HDH-M-RH-PIR	1135270	Modbus room transmitter, CO$_2$, °C and %rH measurement, PIR, range 0...2000 ppm
HDH-M-RH-PIR-N	1135271	Modbus room transmitter with display, CO$_2$, °C and %rH measurement, PIR, range 0...2000 ppm
HDH-M-RH-N	1135103	Modbus room transmitter with display, CO$_2$, °C and %rH measurement, range 0...2000 ppm
HDH 10K	1135110	room transmitter, CO$_2$ and °C measurement, range 0...10000 ppm
HDH 10K-N	1135111	room transmitter with display, CO$_2$ and °C measurement, range 0...10000 ppm
HDH-BAC	1135200	BACnet room transmitter, CO$_2$ and °C measurement, range 0...2000 ppm
HDH-BAC-N	1135201	BACnet room transmitter with display, CO$_2$ and °C measurement, range 0...2000 ppm

OPTIONS		
HD-AL3	1135048	3 leds indicating different concentration levels (not available for N models)
HD-P	1135001	passive potentiometer (not available for Modbus models)
HD-PU	1135002	0...10 V potentiometer
HD-R	1135003	relay, 24 Vac 1 A

TOOLS		
ML-SER	1139010	transmitter commissioning tool

CO$_2$ TRANSMITTERS

HDK transmitters are designed for measuring and controlling CO$_2$, temperature and humidity inside ventilation ducts. ABCLogic™ self-calibration method eliminates the possible long term drift.

Supply	24 Vac/dc, < 2 VA
Range (temperature)	0...50 °C
Time constant	< 2 min
Accuracy (temperature)	±0,5 °C
Output	3 x 0...10 Vdc, 2 mA
IP protection class	IP54, cable downwards
Ambient temperature	0...50 °C
Cable gland	M16
Mounting	in a Ø 10 mm hole, with screws, external lugs
Dimensions	105 x 104 x 155 mm

TYPE	ART NO.	
HDK	1135050	duct transmitter, range 0...2000 ppm
HDK-N	1135051	duct transmitter with display, range 0...2000 ppm
HDK-RH	1135054	duct transmitter with humidity measurement, range 0...2000 ppm
HDK-RH-N	1135055	duct transmitter with humidity measurement and display, range 0...2000 ppm
HDK-M	1135120	Modbus duct transmitter, range 0...2000 ppm
HDK-M-N	1135121	Modbus duct transmitter with display, range 0...2000 ppm
HDK-M-RH	1135122	Modbus duct transmitter with humidity measurement, range 0...2000 ppm
HDK-M-RH-N	1135123	Modbus duct transmitter with humidity measurement and display, range 0...2000 ppm
HDK 10K	1135130	duct transmitter, range 0...10000 ppm
HDK 10K-N	1135131	duct transmitter with display, range 0...10000 ppm
HDK 10K-RH	1135132	duct transmitter with humidity measurement, range 0...10000 ppm
HDK 10K-RH-N	1135133	duct transmitter with humidity measurement and display, range 0...10000 ppm
HDK 10K-M	1135140	Modbus duct transmitter, range 0...10000 ppm
HDK 10K-M-N	1135141	Modbus duct transmitter with display, range 0...10000 ppm
HDK 10K-M-RH	1135142	Modbus duct transmitter with humidity measurement, range 0...10000 ppm
HDK 10K-M-RH-N	1135143	Modbus duct transmitter with humidity measurement and display, range 0...10000 ppm

OPTIONS		
HD-R	1135003	relay, 24 Vac 1 A

TOOLS		
ML-SER	1139010	transmitter commissioning tool

CO$_2$ TRANSMITTERS

HDU transmitters are designed for measuring CO$_2$ concentration and temperature in underground parking garages and parking halls (NOTE: limited UV resistance in outdoor environment). ABCLogic™ self-calibration method eliminates the possible long term drift.

Supply	24 Vac/dc, < 10 VA
Range (temperature)	-50...50 °C
Accuracy (temperature)	±0,5 °C
Output	3 x 0...10 Vdc, 2 mA
IP protection class	IP54, cable downwards
Ambient temperature	-30...50 °C
Humidity	0...85 %rH
Cable gland	M16
Mounting	with screws, external lugs
Dimensions	105 x 110 x 46 mm

TYPE	ART NO.	
HDU	1135090	CO$_2$ transmitter for cold spaces, range 0...2000 ppm
HDU-N	1135091	CO$_2$ transmitter with display, range 0...2000 ppm
HDU-M	1135150	Modbus CO$_2$ transmitter for cold spaces, range 0...2000 ppm
HDU-M-N	1135151	Modbus CO$_2$ transmitter with display, range 0...2000 ppm
HDU 5K	1135160	CO$_2$ transmitter for cold spaces, range 0...5000 ppm
HDU 5K-N	1135161	CO$_2$ transmitter with display, range 0...5000 ppm
HDU 5K-M	1135170	Modbus CO$_2$ transmitter for cold spaces, range 0...5000 ppm
HDU 5K-M-N	1135171	Modbus CO$_2$ transmitter with display, range 0...5000 ppm
OPTIONS		
HD-R	1135003	relay, 24 Vac 1 A
TOOLS		
ML-SER	1139010	transmitter commissioning tool

AIR QUALITY TRANSMITTERS

ILH transmitters are designed for measuring and controlling VOC (Volatile Organic Compound) level, temperature and humidity in dry room spaces. MEMS sensing technology ensures accurate and durable VOC measurement that is related to the CO_2 level.

Supply	24 Vac/dc, < 2 VA
Range (VOC)	450...2000 ppm (CO_2 equivalent)
Range (temperature)	0...50 °C
Accuracy (temperature)	±0,5 °C
Output	3 x 0...10 Vdc, 2 mA
IP protection class	IP20
Material	ABS plastic
Ambient temperature	0...50 °C
Mounting	with screws on wall or on junction box

TYPE	ART NO.	
ILH	1135610	room transmitter, VOC and temperature measurement
ILH-N	1135611	room transmitter with display
ILH-RH	1135612	room transmitter, VOC, temperature and humidity measurement
ILH-RH-N	1135613	room transmitter with display
ILH-M	1135620	Modbus room transmitter, VOC and temperature measurement
ILH-M-N	1135621	Modbus room transmitter with display
ILH-M-RH	1135622	Modbus room transmitter, VOC, temperature and humidity measurement
ILH-M-RH-N	1135623	Modbus room transmitter with display

OPTIONS		
HD-AL3	1135048	3 leds indicating different concentration levels (not available for N models)
HD-P	1135001	passive potentiometer (not available for Modbus models)
HD-PU	1135002	0...10 V potentiometer
HD-R	1135003	relay, 24 Vac 1 A

TOOLS		
ML-SER	1139010	transmitter commissioning tool

AIR QUALITY TRANSMITTERS

ILK transmitters are designed for measuring and controlling VOC (Volatile Organic Compound) level, temperature and humidity inside ventilation ducts. MEMS sensing technology ensures accurate and durable VOC measurement that is related to the CO_2 level.

Supply	24 Vac/dc, < 2 VA
Range (VOC)	450...2000 ppm (CO_2 equivalent)
Range (temperature)	0...50 °C
Accuracy (temperature)	±0,5 °C
Output	3 x 0...10 Vdc, 2 mA
IP protection class	IP54, cable downwards
Ambient temperature	0...50 °C
Humidity	0...85 %rH
Cable gland	M16
Mounting	in a Ø 10 mm hole, with screws, external lugs
Dimensions	105 x 104 x 155 mm

TYPE	ART NO.	
ILK	1135630	duct transmitter
ILK-N	1135631	duct transmitter with display
ILK-RH	1135632	duct transmitter with humidity measurement
ILK-RH-N	1135633	duct transmitter with humidity measurement and display
ILK-M	1135640	Modbus duct transmitter
ILK-M-N	1135641	Modbus duct transmitter with display
ILK-M-RH	1135642	Modbus duct transmitter with humidity measurement
ILK-M-RH-N	1135643	Modbus duct transmitter with humidity measurement and display

OPTIONS		
HD-R	1135003	relay, 24 Vac 1 A

TOOLS		
ML-SER	1139010	transmitter commissioning tool

CARBON MONOXIDE TRANSMITTERS

HML transmitters are designed for measuring carbon monoxide concentration in underground parking garages and parking halls. The measuring is based on electro-chemical cell. The transmitter measuring range is 0...100 or 0...300 ppm.

Supply	24 Vac/dc, < 2 VA
Range	0...100 ppm / 0...300 ppm
Time constant	1,5 min
Accuracy	± 10 ppm for < 70 ppm value; ± 15 % of value for > 70 ppm value
Output	0...10 Vdc, 1 mA / 4...20 mA, < 500 Ω
IP protection class	IP54, cable downwards
Cable gland	M16
Mounting	with screws, external lugs
Dimensions	100 x 113 x 46 mm

TYPE	ART NO.	
HML	1135520	CO transmitter
HML-N	1135521	CO transmitter with display
HMV	1135510	exchange kit for HML

LIGHT LEVEL TRANSMITTERS

LUX 24 is designed for measuring room light level.

Supply	24 Vac, < 1 VA
Range	0...2000 lx
Output	0...10 Vdc, 5 mA / 4...20 mA, 500 Ω
IP protection class	IP20
Ambient temperature	0...50 °C
Mounting	with screws on wall or on junction box

TYPE	ART NO.	
LUX 24	1133320	light level transmitter

LIGHT LEVEL TRANSMITTERS

LUX 34 is designed for measuring outdoor light level and temperature. Measured values can be used for controlling lighting and heating.

Supply	24 Vac/dc, < 0.1 VA
Range (temperature)	-50...50 °C
Output (illuminance)	0...10 Vdc, 1 mA
Output (temperature)	0...10 Vdc, 1 mA
IP protection class	IP54, cable downwards
Ambient temperature	-40...40 °C
Cable gland	M16
Mounting	with screws, external lugs

TYPE	ART NO.	
LUX 34	1133310	light level transmitter, selectable range 0...1000 lx or 0...10000 lx
LUX 34-100	1133311	light level transmitter, selectable range 0...100 lx or 0...500 lx

LIGHT INTENSITY TRANSMITTER

MMSP1 is designed for measuring sun light intensity.

Supply	24 Vdc, < 0.03 W (5...30 Vdc)
Range (light intensity)	0...1500 W/m2
Accuracy	±5 % (annual mean)
Output	0...10 Vdc / 4...20 mA, the supply voltage must be at least 12 V
Output	0...3.125 Vdc / 0...150 mVdc
IP protection class	IP65
Cable gland	M16
Dimensions	80 x 150 x 60 mm

TYPE	ART NO.	
MMSP1	1133360	sun light intensity transmitter

DIFFERENTIAL PRESSURE TRANSMITTERS FOR WATER

bar

VPEL differential pressure transmitter is designed for measuring water/glycol pressures in heating and cooling systems.

Supply	24 Vac/dc, < 1 VA
Output	0...10 Vdc, 5 mA / 4...20 mA < 500 Ω
Zeroing	manually by using the push button
Process connection	8 mm compression fittings for copper pipes
IP protection class	IP54
Ambient temperature	-20...70 °C
Cable gland	M16
Mounting	with screws, external lugs, position allowed only process connectors downwards

TYPE	ART NO.	
VPEL 1.0/2.5	1134060	range selectable 0...1.0 or 0...2.5 bar
VPEL 1.0/2.5-N	1134061	with display
VPEL 4.0/6.0	1134070	range selectable 0...4.0 or 0...6.0 bar
VPEL 4.0/6.0-N	1134071	with display

PRESSURE TRANSMITTERS FOR WATER

bar

VPL pressure transmitter (3-wire) is designed for measuring fluid pressures in heating and cooling systems.

Supply	24 Vac/dc, < 1 VA
Output	0...10 Vdc, 2 mA / 4...20 mA, 800 Ω
IP protection class	IP54, cable or probe downwards
Ambient temperature	0...60 °C
Cable gland	M16

TYPE	ART NO.	
VPL 16	1134050	pressure transmitter, range selectable 0...2.5, 0...6, 0...10 or 0...16 bar
VPL 60	1134030	pressure transmitter, range selectable 0...16, 0...25, 0...40 or 0...60 bar
VPL 16-N	1134051	pressure transmitter with display
VPL 60-N	1134031	pressure transmitter with display

WIND SPEED DETECTOR

TUNA 20 is designed for measuring wind speed and outside air temperature.

m/s, °C

Supply	24 Vac/dc, < 1.5 VA
Range (velocity)	0...20 m/s
Range (temperature)	-50...50 °C
Output	0...10 Vdc, 2 mA / 4...20 mA, 600 Ω
IP protection class	IP54 (transmitter)
Ambient temperature	-50...50 °C
Cable gland	M16
Mounting	with screws on wall
Materials	PBT, PC, PA, painted steel

TYPE	ART NO.	
TUNA 20	1136010	wind speed detector

WIND SENSORS

UV7+UV7-VV ultrasonic wind transmitter is designed for measuring wind speed and direction in HVAC applications. The sensor is robust and stable.

m/s, °

Modbus

Supply	24 Vac/dc, < 0.75 VA
Range (direction)	0...359 °
Range (speed)	0...15 m/s / 0...30 m/s
Time constant	1, 2, 4, 8, 16 s
Accuracy (direction)	±1°
Accuracy (speed)	±0.05 m/s
Output	3 x 0...10 Vdc
Output	RS232 NMEA0183®
IP protection class	IP65
Ambient temperature	-15...55 °C
Cable	25 m

TYPE	ART NO.	
UV7+UV7-VV	1136033	wind sensor and transmitter module
UV7	1136033	wind sensor
UV7-VV	1136032	transmitter module for wind sensor
UV7-M	1136034	wind sensor and transmitter module, Modbus

WIND SENSORS

VS 3000 wind sensor is designed for measuring wind speed and direction in HVAC applications.

Supply	24 Vac/dc, < 2 VA
Range (direction)	0...359 °
Range (speed)	0...35 m/s
Accuracy (direction)	±1°
Accuracy (speed)	±1 m/s
Output (direction)	0...10 Vdc
Output (speed)	0...10 Vdc
IP protection class	IP65
Ambient temperature	-35...70 °C
Cable	10 m
Mounting	< Ø 50 mm

TYPE	ART NO.	
VS 3000	1136040	wind speed and direction sensor
VH 1000	1136050	wind speed sensor
VR 1000	1136060	wind direction sensor

SMOKE DETECTORS

KRM-1 duct smoke detector is designed for smoke detection in ventilation ducts. The detector is a combination of a smoke detector and an adapter system. The adapter system has been specially designed for optimal air flow through the smoke detector.

Supply	230 Vac
Probe	160 mm
Sensor	Optical RM3.3 (ALK-E)
Output (alarm)	250 Vac / 24 Vdc, 8 A, change-over contact
Output (alarm)	250 Vac / 24 Vdc, 8 A, NC contact
Output (contamination)	250 Vac / 24 Vdc, 6 A, NC contact
IP protection class	IP54
Ambient temperature	-20...50 °C
Cable gland	M16
Materials	ABS plastic, aluminium
Dimensions	166 x 257 x 77 mm

TYPE	ART NO.	
KRM-1	1137040	duct smoke detector
KRM-RM3.3	1137016	smoke sensor (spare part)
KS	1137011	mounting plate for round or insulated ducts
KS-WDG	1137013	mounting plate for round or insulated ducts (with WDG)
RDP 300	1137014	test gas
WDG	1137012	IP65 housing for KRM

SMOKE DETECTORS

KRM-2 duct smoke detector is designed for smoke detection in ventilation ducts. The detector is a combination of a smoke detector and an adapter system. The adapter system has been specially designed for optimal air flow through the smoke detector.

Supply	24 Vac/dc
Probe	160 mm
Sensor	Optical RM3.3 (ALK-E)
Output (alarm)	250 Vac / 24 Vdc, 8 A, change-over contact
Output (alarm)	250 Vac / 24 Vdc, 8 A, NC contact
Output (contamination)	250 Vac / 24 Vdc, 6 A, NC contact
IP protection class	IP54
Ambient temperature	-20...50 °C
Cable gland	M16
Materials	ABS plastic, aluminium
Dimensions	166 x 257 x 77 mm

TYPE	ART NO.	
KRM-2	1137010	duct smoke detector
KRM-2-BAC	1137030	BACnet duct smoke detector
KRM-2-MOD	1137020	Modbus duct smoke detector
KRM-RM3.3	1137016	smoke sensor (spare part)
KS	1137011	mounting plate for round or insulated ducts
KS-WDG	1137013	mounting plate for round or insulated ducts (with WDG)
RDP 300	1137014	test gas
WDG	1137012	IP65 housing for KRM

WIRELESS TRANSMITTERS

Our wireless transmitters have a proven and field tested coverage in various references around Europe. Effective bi-directional communication with good diagnostics through Modbus communication or analogue signal makes the network reliable and functional. The system includes transmitters for both indoor and outdoor use with repeaters, configuration tool and network functionality monitoring tool. Ideal for monitoring temperature, humidity, air quality, light level, occupancy or pulse counting.

▶ *Proven coverage*
▶ *Reliable and functional network*
▶ *868 MHz frequency*
▶ *Modbus*

HDHFL
CO_2
°C

KLUFL
%rH
°C

LAFL
PIR

FLREP-U   FLREP

TEFL-RH-P
°C,
%rH
sp

TEFL-P
°C
sp

TEFL-P
°C
sp

TEFL-P
°C
sp

TEUFL
°C

FLTA + FLAN
📶 868 MHz
Modbus
8 x 0...10 V

RYFL-XS
10A Relay
DI/0-10V in
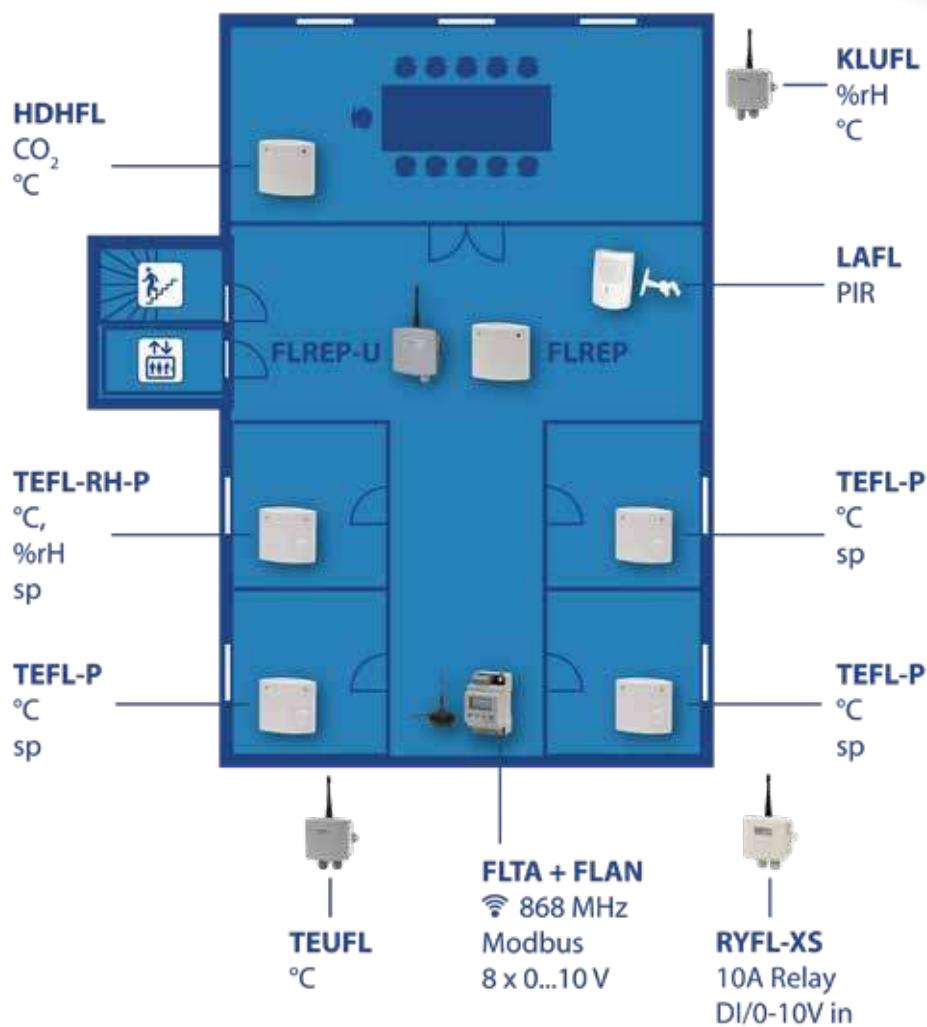
WIRELESS BASE STATION

FLTA is a base station for wireless network transmitters and I/O modules. From FLTA, the controls and measurements can be read via Modbus RTU and through the 8 analogue outputs. Respectively the control signals that come to base station via Modbus can be directed to I/O modules. FLTA base station needs a FLAN antenna.

Supply	24 Vac/dc, < 2 VA
Frequency	868.30 MHz Class 1
Range	up to 500 m in the line of sight, 20...100 m in buildings
Output	8 x 0...10 Vdc, Modbus RTU
IP protection class	IP20
Mounting	For 35 mm DIN rail

TYPE	ART NO.	
FLTA	1191030	base station for wireless sensors
FLAN	1191040	antenna

TOOLS		
FLSER	1191070	configuration tool for wireless devices

WIRELESS CONFIGURATION TOOL

FLSER is a wireless configuration tool for setting the addresses of the sensors and the wireless repeaters. The tool can also be used for testing the communication signal strength.

Supply	3,6 V lithium battery
Frequency	868.30 MHz Class 1
IP protection class	IP20
Materials	ABS plastic
Dimensions	86 x 86 x 32 mm

TYPE	ART NO.	
FLSER	1191070	configuration tool for wireless devices

WIRELESS REPEATERS

FLREP repeaters can be used to extend the range of wireless sensors in difficult environments. It is possible to use up to 8 repeaters for one FLTA base station.

Supply	24 Vac/dc, < 0.1 VA / 12 Vac/dc
Frequency	868.30 MHz Class 1
Dimensions	86 x 86 x 32 mm

TYPE	ART NO.	
FLREP	1191080	wireless repeater with internal antenna, for indoor use (IP20)
FLREP-U	1191081	wireless repeater with external antenna, for outdoor use (IP54)
M230/12-4	1184080	230 Vac/12 Vdc 4 VA power supply
TOOLS		
FLSER	1191070	configuration tool for wireless devices

WIRELESS TRANSMITTERS

TEFL wireless room temperature sensors are designed for temperature measurement of indoor spaces. The communication between the TEFL room units and the FLTA base station is two-way. Commissioning is done by using the wireless FLSER configuration tool.

room °C, %rH

Supply	3,6 V lithium battery
Frequency	868.30 MHz Class 1
Range	0...50 °C
Accuracy	±0,5 °C (25 °C)
IP protection class	IP20
Material	ABS plastic
Mounting	with screws on wall or on junction box (hole distance 60 mm)
Dimensions	86 x 86 x 32 mm

TYPE	ART NO.	
TEFL	1191010	wireless room sensor
TEFL-P	1191011	wireless room sensor with set point adjustment
TEFL-RH	1191020	wireless room sensor with %rH
TEFL-RH-P	1191021	wireless room sensor with %rH and set point setting
OPTIONS		
FL-DI	1191051	DI option for TEFL
FL-S5	1191050	5-position switch
FL-N	1191060	display option for TEFL
TOOLS		
FLSER	1191070	configuration tool for wireless devices

WIRELESS TRANSMITTERS

TEUFL is a wireless sensor for measuring outdoor temperatures. Communication between the sensors and the FLTA base station is two-way. In addition to temperature information, TEUFL sensor can send also one 0...10 V signal or one contact (DI) information (TEUFL-DI). Commissioning is done by using the wireless FLSER configuration tool.

Supply	3,6 V lithium battery
Frequency	868.30 MHz Class 1
Input	0...10 Vdc
Range (temperature)	-50...150 °C
Range (voltage)	0...10 Vdc
Accuracy (temperature)	±0,5 °C (25 °C)
IP protection class	IP54, cable downwards
Material	PC plastic
Ambient temperature	-40...50 °C
Cable gland	M16
Mounting	with screws, external lugs
Dimensions	105 x 194 x 46 mm

TYPE	ART NO.	
TEUFL	1191100	wireless outdoor temperature sensor
TEUFL-24	1191101	wireless outdoor temperature sensor, 24 Vac/dc supply
TEUFL-DI	1191102	wireless outdoor temperature sensor, with a contact (DI) input

TOOLS		
FLSER	1191070	configuration tool for wireless devices

WIRELESS TRANSMITTERS

KLUFL is a wireless transmitter for measuring outdoor temperatures and humidity. The communication between the sensors and the FLTA base station is two-way. Commissioning is done by using the wireless FLSER configuration tool.

Supply	3,6 V lithium battery
Frequency	868.30 MHz Class 1
Range (humidity)	0...100 %rH
Range (temperature)	-50...150 °C
IP protection class	IP54, cable downwards
Material	PC plastic
Cable gland	M16
Mounting	with screws, external lugs

TYPE	ART NO.	
KLUFL	1191110	wireless outdoor humidity and temperature transmitter

TOOLS		
FLSER	1191070	configuration tool for wireless devices

WIRELESS TRANSMITTERS

HDHFL transmitters are designed for measuring carbon dioxide concentration and temperature in the room spaces. HDHFL-RH transmitters have also a humidity output. Commissioning is done by using the wireless FLSER configuration tool.

Supply	24 Vac/dc, < 2 VA
Frequency	868.30 MHz Class 1
Range (CO$_2$)	0...2000 ppm
Range (temperature)	0...50 °C
Time constant	< 1,5 min
Accuracy (CO$_2$)	typ. ±40 ppm ±3 % of value
Accuracy (temperature)	±0,5 °C (25 °C)
Output	3 x 0...10 Vdc, 2 mA
IP protection class	IP20
Ambient temperature	0...50 °C
Mounting	with screws on wall or on junction box (hole distance 60 mm)
Materials	ABS plastic
Dimensions	87 x 86 x 30 mm

TYPE	ART NO.	
HDHFL	1191150	CO$_2$ and °C transmitter with wireless communication
HDHFL-N	1191151	CO$_2$ and °C transmitter with wireless communication and with display
HDHFL-RH	1191160	CO$_2$, °C and %rH transmitter with wireless communication
HDHFL-RH-N	1191161	CO$_2$, °C and % rH transmitter with wireless communication and with display

TOOLS		
FLSER	1191070	configuration tool for wireless devices
ML-SER	1139010	transmitter commissioning tool

WIRELESS OCCUPANCY SENSOR

LAFL is a wireless detector for occupancy monitoring movement. The detector is passive infrared (PIR) which reacts to temperature changes. The communication between the sensors and the FLTA base station is two-way. Commissioning is done by using the wireless FLSER configuration tool. Mounting bracket and screws are included to the delivery.

Supply	3,6 V lithium battery
Frequency	868.30 MHz Class 1
Range	monitoring area 140°
IP protection class	IP40
Ambient temperature	0...50 °C

TYPE	ART NO.	
LAFL	1191120	wireless PIR detector
LAFL-LX	1191121	wireless PIR detector with illumination (0...2000 lx)

TOOLS		
FLSER	1191070	configuration tool for wireless devices

WIRELESS PULSE COUNTER

PAFL is a wireless pulse counter. The counter can be used to measure pulses from electricity consumption meters, gas flow meters and water consumption meters. Commissioning is done by using the wireless FLSER configuration tool.

Supply	3,6 V lithium battery or 24 Vac/dc
Frequency	868.30 MHz Class 1
IP protection class	IP54, cable downwards
Material	PC plastic
Pulse frequency	max. 20 Hz
Minimum pulse duration	25 ms
Ambient temperature	-40...50 °C
Cable gland	M16
Mounting	with screws, external lugs

TYPE	ART NO.	
PAFL	1191170	wireless pulse counter

TOOLS		
FLSER	1191070	configuration tool for wireless devices

WIRELESS I/O MODULE

RYFL-XS is a wireless I/O module which can be used to transfer measurements and control information. Communicating between the control system and I/O module is done through FLTA base station Modbus connection. Two input signals can be forwarded and one relay output with changeover contacts can be controlled.

Supply	24 Vac/dc
Frequency	868.30 MHz Class 1
Input	2 x 0...10 Vdc or potential free contact
Output	230 Vac relay, 10 A res.
Material	PC plastic
Ambient temperature	-40...50 °C
Cable gland	2 X M16
Mounting	with screws, external lugs
Dimensions	105 x 194 x 46 mm

TYPE	ART NO.	
RYFL-XS	1191200	wireless I/O module, 24 Vac

TOOLS		
FLSER	1191070	configuration tool for wireless devices

TOOL FOR MONITORING WIRELESS NETWORK

FLSNIF is a tool for monitoring the functionality of the wireless network. By using this tool you may follow one by one the signals between the wireless field equipment and the base station. Monitoring is possible only for signals which are available at the very moment. A PC with installed monitoring software is needed with the tool. The software is delivered with the tool.

TYPE	ART NO.	
FLSNIF	1191140	tool for monitoring the wireless network

TEMPERATURE MEASUREMENT

Comprehensive range of temperature sensors for different applications in buildings' control and heating, cooling and air-conditioning systems. Thanks to the unique housing design, the sensors are easy to install, which offers major advantages during commissioning. Our sensor range covers the most commonly used passive temperature sensor elements and transmitters. Versatile installation options covering ducts, pipes, construction, ground, room and exterior.

▶ *Wide range of HVAC temperature measurements*

▶ *Sensor element options include PT, NTC and NI series*

▶ *On transmitters 0...10 V, 4...20 mA*

▶ *Heating / cooling control*

▶ *Modbus communication*
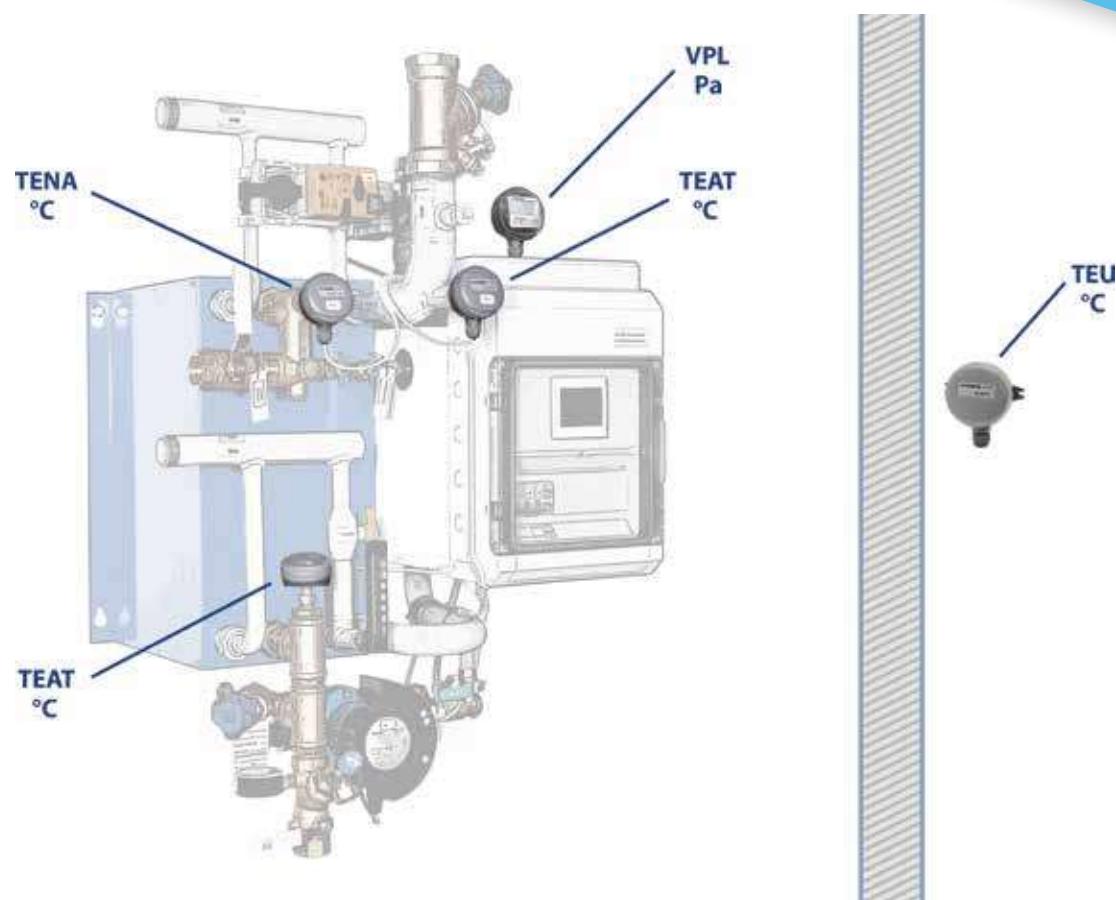
HEATING/COOLING WATER SENSORS

°C

TEAT temperature sensors are designed for measuring heating and cooling water temperatures in HVAC automation systems. The sensors can also be used for air temperature measurements from ventilation ducts, for example.

Range	-50...120 °C
Time constant	5 s
Probe	Ø 6 x 85 mm
IP protection class	IP54, cable or probe downwards
Cable gland	M16
Mounting	water applications: with Produal pocket (R½"), air applications: with MT4270 flange
Materials	PBT, PC, PA, acid proof steel
Mounting depth	80 mm; 50, 100, 150, 200, 250, 300, 350 and 450 mm mounting depths also available. To order these sensors, add the depth to the product type (e.g. TEAT PT 100-300)

TYPE	ART NO.	
TEAT PT 100	1173070	100 Ω / 0 °C, accuracy ±0,3 °C / 0 °C, EN 60751/B
TEAT PT 1000	1174070	1000 Ω / 0 °C, accuracy ±0,3 °C / 0 °C (Honeywell, Danfoss equivalent)
TEAT NTC 1.8	117E070	1800 Ω / 25 °C, accuracy ±0,3 °C / 25 °C (TAC equivalent)
TEAT NTC 2.2	1172070	2252 Ω / 25 °C, accuracy ±0,25 °C / 25 °C (Johnson equivalent)
TEAT NTC 10	1175070	10 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Trend equivalent)
TEAT NTC 10-AN	117H070	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Andover equivalent)
TEAT NTC 10-C	117M070	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Carel equivalent)
TEAT NTC 10-KB	117B070	5025 Ω / 25 °C, accuracy ±0,5 °C / 25 °C (Satchwell equivalent)
TEAT NTC 20	1176070	20 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Honeywell equivalent)
TEAT NI 1000	117C070	1000 Ω / 0 °C, accuracy ±0,4 °C / 0 °C (Sauter equivalent)
TEAT NI 1000-LG	1178070	1000 Ω / 0 °C, accuracy ±0,5 °C / 0 °C (Siemens equivalent)
TEAT KP 10	117J070	LM235Z, 10 mV/K, 2,98 V / 25 °C
TEAT T1	117V070	2226 Ω / 0 °C, accuracy ±0,4 °C / 0 °C
TEAT LL	1177070	2-wire transmitter/controller, supply 22...35 Vdc, output 4...20 mA, accuracy ±0,5 °C
TEAT LU	1179070	3-wire transmitter/controller, supply 24 Vac/dc, output 0...10 V < 2 mA, accuracy ±0,5 °C
TEAT-M	117Z070	Modbus transmitter/controller, supply 24 Vac/dc, accuracy ±0,5 °C
MT4270	MT4270	duct flange (6 mm)
TE-N V2	1170250	display option for the transmitters

TOOLS

ML-SER	1139010	transmitter commissioning tool

POCKETS (PRESSURE RATING = PN16)

Pocket material	TEAT mounting depth								
	50	80	100	150	200	250	300	350	450
Stainless steel AISI 300	AT 50 1170011	AT 80 1170010							
Brass MS 362	ATM 50 1170031	ATM 80 1170030	ATM 100 1170037	ATM 150 1170032	ATM 200 1170033	ATM 250 1170034	ATM 300 1170038	ATM 350 1170035	ATM 450 1170036
Acid proof steel AISI 316L		ATH 80 1170020	ATH 100 1170027	ATH 150 1170022	ATH 200 1170023	ATH 250 1170024	ATH 300 1170021	ATH 350 1170025	ATH 450 1170026

HOT DOMESTIC WATER SENSORS

TENA sensors are designed for measuring hot domestic water temperatures with fast response.

°C

Range	-50...120 °C
Time constant	2,5 s
IP protection class	IP54, cable or probe downwards
Cable gland	M16
Mounting	R ½"
Materials	PBT, PC, PA, stainless steel
Mounting depth	80 mm; 50 and 210 mm mounting depths also available. To order these sensors, add the depth to the product type (e.g. TENA PT 100-210).
Pressure rating	PN16

TYPE	ART NO.	
TENA PT 100	1173050	100 Ω / 0 °C, accuracy ±0,3 °C / 0 °C, EN 60751/B
TENA PT 1000	1174050	1000 Ω / 0 °C, accuracy ±0,3 °C / 0 °C (Honeywell, Danfoss equivalent)
TENA NTC 1.8	117E050	1800 Ω / 25 °C, accuracy ±0,3 °C / 25 °C (TAC equivalent)
TENA NTC 2.2	1172050	2252 Ω / 25 °C, accuracy ±0,25 °C / 25 °C (Johnson equivalent)
TENA NTC 10	1175050	10 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Trend equivalent)
TENA NTC 10-AN	117H050	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Andover equivalent)
TENA NTC 10-C	117M050	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Carel equivalent)
TENA NTC 10-KB	117B050	5025 Ω / 25 °C, accuracy ±0,5 °C / 25 °C (Satchwell equivalent)
TENA NTC 20	1176050	20 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Honeywell equivalent)
TENA NI 1000	117C050	1000 Ω / 0 °C, accuracy ±0,4 °C / 0 °C (Sauter equivalent)
TENA NI 1000-LG	1178050	1000 Ω / 0 °C, accuracy ±0,5 °C / 0 °C (Siemens equivalent)
TENA T1	117V050	2226 Ω / 0 °C, accuracy ±0,4 °C / 0 °C
TENA LL	1177050	2-wire transmitter/controller, supply 22...35 Vdc, output 4...20 mA, accuracy ±0,5 °C
TENA LU	1179050	3-wire transmitter/controller, supply 24 Vac/dc, output 0...10 V < 2 mA, accuracy ±0,5 °C
TENA-M	117Z050	Modbus transmitter/controller, supply 24 Vac/dc, accuracy ±0,5 °C
TE-N V2	1170250	display option for the transmitters
TOOLS		
ML-SER	1139010	transmitter commissioning tool

FROST GUARD SENSORS

TEKV sensors are designed for frost protection and for applications with fast response.

°C

Range	-50...120 °C
Time constant	2,5 s
IP protection class	IP54, cable or probe downwards
Cable gland	M16
Mounting	R ¼"
Materials	PBT, PC, PA, stainless steel, brass
Mounting depth	< 200 mm (also available < 400 mm)
Pressure rating	PN16

TYPE	ART NO.	
TEKV PT 100	1173120	100 Ω / 0 °C, accuracy ±0,3 °C / 0 °C, EN 60751/B
TEKV PT 1000	1174120	1000 Ω / 0 °C, accuracy ±0,3 °C / 0 °C (Honeywell, Danfoss equivalent)
TEKV NTC 1.8	117E120	1800 Ω / 25 °C, accuracy ±0,3 °C / 25 °C (TAC equivalent)
TEKV NTC 2.2	1172120	2252 Ω / 25 °C, accuracy ±0,25 °C / 25 °C (Johnson equivalent)
TEKV NTC 10	1175120	10 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Trend equivalent)
TEKV NTC 10-AN	117H120	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Andover equivalent)
TEKV NTC 10-C	117M120	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Carel equivalent)
TEKV NTC 10-KB	117B120	5025 Ω / 25 °C, accuracy ±0,5 °C / 25 °C (Satchwell equivalent)
TEKV NTC 20	1176120	20 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Honeywell equivalent)
TEKV NI 1000	117C120	1000 Ω / 0 °C, accuracy ±0,4 °C / 0 °C (Sauter equivalent)
TEKV NI 1000-LG	1178120	1000 Ω / 0 °C, accuracy ±0,5 °C / 0 °C (Siemens equivalent)
TEKV LL	1177120	2-wire transmitter/controller, supply 22...35 Vdc, output 4...20 mA, accuracy ±0,5 °C
TEKV LU	1179120	3-wire transmitter/controller, supply 24 Vac/dc, output 0...10 V < 2 mA, accuracy ±0,5 °C
TEKV-M	117Z120	Modbus transmitter/controller, supply 24 Vac/dc, accuracy ±0,5 °C
TE-N V2	1170250	display option for the transmitters
TOOLS		
ML-SER	1139010	transmitter commissioning tool

FROST GUARD SENSORS

TEV sensors are designed for frost protection and for applications with fast response.

°C

Range	-50...120 °C
Time constant	2,5 s
Cable	2 m LIYY 2 x 0,14
Mounting	R ¼"
Materials	acid proof steel, brass
Mounting depth	< 200 mm (also available < 400 mm)
Pressure rating	PN16

TYPE	ART NO.	
TEV PT 100	1173020	100 Ω / 0 °C, accuracy ±0,3 °C / 0 °C, EN 60751/B
TEV PT 1000	1174020	1000 Ω / 0 °C, accuracy ±0,3 °C / 0 °C (Honeywell, Danfoss equivalent)
TEV NTC 1.8	117E020	1800 Ω / 25 °C, accuracy ±0,3 °C / 25 °C (TAC equivalent)
TEV NTC 2.2	1172020	2252 Ω / 25 °C, accuracy ±0,25 °C / 25 °C (Johnson equivalent)
TEV NTC 10	1175020	10 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Trend equivalent)
TEV NTC 10-AN	117H020	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Andover equivalent)
TEV NTC 10-C	117M020	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Carel equivalent)
TEV NTC 10-KB	117B020	5025 Ω / 25 °C, accuracy ±0,5 °C / 25 °C (Satchwell equivalent)
TEV NTC 20	1176020	20 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Honeywell equivalent)
TEV NI 1000	117C020	1000 Ω / 0 °C, accuracy ±0,4 °C / 0 °C (Sauter equivalent)
TEV NI 1000-LG	1178020	1000 Ω / 0 °C, accuracy ±0,5 °C / 0 °C (Siemens equivalent)
TEV LL	1177020	2-wire transmitter/controller, supply 22...35 Vdc, output 4...20 mA, accuracy ±0,5 °C
TEV LU	1179020	3-wire transmitter/controller, supply 24 Vac/dc, output 0...10 V < 2 mA, accuracy ±0,5 °C
TEU-N V2	1170270	display option for the transmitters
TOOLS		
ML-SER	1139010	transmitter commissioning tool

STRAP-ON SENSORS

TEP sensors are designed for pipe strap-on installations in heating and cooling applications.

°C

Range	-50...120 °C
Time constant	approx. 5 s
IP protection class	IP54, cable or probe downwards
Cable gland	M16
Mounting	by a band on the pipe (diam.< 90 mm)
Materials	PBT, PC, PA, zink casting

TYPE	ART NO.	
TEP PT 100	1173080	100 Ω / 0 °C, accuracy ±0,3 °C / 0 °C, EN 60751/B
TEP PT 1000	1174080	1000 Ω / 0 °C, accuracy ±0,3 °C / 0 °C (Honeywell, Danfoss equivalent)
TEP NTC 1.8	117E080	1800 Ω / 25 °C, accuracy ±0,3 °C / 25 °C (TAC equivalent)
TEP NTC 2.2	1172080	2252 Ω / 25 °C, accuracy ±0,25 °C / 25 °C (Johnson equivalent)
TEP NTC 10	1175080	10 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Trend equivalent)
TEP NTC 10-AN	117H080	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Andover equivalent)
TEP NTC 10-C	117M080	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Carel equivalent)
TEP NTC 10-KB	117B080	5025 Ω / 25 °C, accuracy ±0,5 °C / 25 °C (Satchwell equivalent)
TEP NTC 20	1176080	20 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Honeywell equivalent)
TEP NI 1000	117C080	1000 Ω / 0 °C, accuracy ±0,4 °C / 0 °C (Sauter equivalent)
TEP NI 1000-LG	1178080	1000 Ω / 0 °C, accuracy ±0,5 °C / 0 °C (Siemens equivalent)
TEP KP 10	117J080	LM235Z, 10 mV/K, 2,98 V / 25 °C
TEP T1	117V080	2226 Ω / 0 °C, accuracy ±0,4 °C / 0 °C
TEP LL	1177080	2-wire transmitter/controller, supply 22...35 Vdc, output 4...20 mA, accuracy ±0,5 °C
TEP LU	1179080	3-wire transmitter/controller, supply 24 Vac/dc, output 0...10 V < 2 mA, accuracy ±0,5 °C
TEP-M	117Z080	Modbus transmitter/controller, supply 24 Vac/dc, accuracy ±0,5 °C
TE-N V2	1170250	display option for the transmitters
TOOLS		
ML-SER	1139010	transmitter commissioning tool

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STRAP-ON SENSORS

TEPK sensors are designed for pipe strap-on installations in heating and cooling applications.

Range	-20...80 °C
Time constant	approx. 5 s
Cable	2 m (LIYY 2 x 0,14), PVC
Mounting	by a plastic band on the pipe (Ø10...100 mm)
Materials	probe: zinc casting

TYPE	ART NO.	
TEPK PT 100	1173240	100 Ω / 0 °C, accuracy ±0,3 °C / 0 °C, EN 60751/B
TEPK PT 1000	1174240	1000 Ω / 0 °C, accuracy ±0,3 °C / 0 °C (Honeywell, Danfoss equivalent)
TEPK NTC 1.8	117E240	1800 Ω / 25 °C, accuracy ±0,3 °C / 25 °C (TAC equivalent)
TEPK NTC 2.2	1172240	2252 Ω / 25 °C, accuracy ±0,25 °C / 25 °C (Johnson equivalent)
TEPK NTC 10	1175240	10 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Trend equivalent)
TEPK NTC 10-AN	117H240	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Andover equivalent)
TEPK NTC 10-C	117M240	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Carel equivalent)
TEPK NTC 10-KB	117B240	5025 kΩ / 25 °C, accuracy ±0,5 °C / 25 °C (Satchwell equivalent)
TEPK NTC 20	1176240	20 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Honeywell equivalent)
TEPK NI 1000	117C240	1000 Ω / 0 °C, accuracy ±0,4 °C / 0 °C (Sauter equivalent)
TEPK NI 1000-LG	1178240	1000 Ω / 0 °C, accuracy ±0,5 °C / 0 °C (Siemens equivalent)
TEPK T1	117V240	2226 Ω / 0 °C, accuracy ±0,4 °C / 0 °C
TEPK LL	1177240	2-wire transmitter/controller, supply 22...35 Vdc, output 4...20 mA, accuracy ±0,5 °C
TEPK LU	1179240	3-wire transmitter/controller, supply 24 Vac/dc, output 0...10 V < 2 mA, accuracy ±0,5 °C
TEU-N V2	1170270	display option for the transmitters
TOOLS		
ML-SER	1139010	transmitter commissioning tool

DUCT SENSORS

TEKHA sensors are designed for measuring temperatures inside small ventilation ducts.

Range	-50...70 °C
Probe	Ø6 mm x 100 mm, acid proof steel
Cable	2 m (LIYY 2 x 0,14), PVC, other leghts also available
Mounting	with flange, adjustable < 90 mm

TYPE	ART NO.	
TEKHA PT 100	1173290	100 Ω / 0 °C, accuracy ±0,3 °C / 0 °C, EN 60751/B
TEKHA PT 1000	1174290	1000 Ω / 0 °C, accuracy ±0,3 °C / 0 °C (Honeywell, Danfoss equivalent)
TEKHA NTC 1.8	117E290	1800 Ω / 25 °C, accuracy ±0,3 °C / 25 °C (TAC equivalent)
TEKHA NTC 2.2	1172290	2252 Ω / 25 °C, accuracy ±0,25 °C / 25 °C (Johnson equivalent)
TEKHA NTC 10	1175290	10 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Trend equivalent)
TEKHA NTC 10-AN	117H290	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Andover equivalent)
TEKHA NTC 10-C	117M290	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Carel equivalent)
TEKHA NTC 20	1176290	20 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Honeywell equivalent)
TEKHA NI 1000	117C290	1000 Ω / 0 °C, accuracy ±0,4 °C / 0 °C (Sauter equivalent)
TEKHA NI 1000-LG	1178290	1000 Ω / 0 °C, accuracy ±0,5 °C / 0 °C (Siemens equivalent)
TEKHA KP 10	117J290	LM235Z, 10 mV/K, 2,98 V / 25 °C

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DUCT SENSORS

TEK sensors are designed for measuring temperatures inside ventilation ducts.

°C

Range	-50...70 °C
IP protection class	IP54, cable or probe downwards
Cable gland	M16
Mounting	with flange, adjustable < 200 mm
Materials	PBT, PC, PA, stainless steel

TYPE	ART NO.	
TEK PT 100	1173040	100 Ω / 0 °C, accuracy ±0,3 °C / 0 °C, EN 60751/B
TEK PT 1000	1174040	1000 Ω / 0 °C, accuracy ±0,3 °C / 0 °C (Honeywell, Danfoss equivalent)
TEK NTC 1.8	117E040	1800 Ω / 25 °C, accuracy ±0,3 °C / 25 °C (TAC equivalent)
TEK NTC 2.2	1172040	2252 Ω / 25 °C, accuracy ±0,25 °C / 25 °C (Johnson equivalent)
TEK NTC 10	1175040	10 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Trend equivalent)
TEK NTC 10-AN	117H040	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Andover equivalent)
TEK NTC 10-C	117M040	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Carel equivalent)
TEK NTC 10-KB	117B040	5025 Ω / 25 °C, accuracy ±0,5 °C / 25 °C (Satchwell equivalent)
TEK NTC 20	1176040	20 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Honeywell equivalent)
TEK NI 1000	117C040	1000 Ω / 0 °C, accuracy ±0,4 °C / 0 °C (Sauter equivalent)
TEK NI 1000-LG	1178040	1000 Ω / 0 °C, accuracy ±0,5 °C / 0 °C (Siemens equivalent)
TEK KP 10	117J040	LM235Z, 10 mV/K, 2,98 V / 25 °C
TEK T1	117V040	2226 Ω / 0 °C, accuracy ±0,4 °C / 0 °C
TEK LL	1177040	2-wire transmitter/controller, supply 22...35 Vdc, output 4...20 mA, accuracy ±0,5 °C
TEK LU	1179040	3-wire transmitter/controller, supply 24 Vac/dc, output 0...10 V < 2 mA, accuracy ±0,5 °C
TEK-M	117Z040	Modbus transmitter/controller, supply 24 Vac/dc, accuracy ±0,5 °C
TE-N V2	1170250	display option for the transmitters

TOOLS		
ML-SER	1139010	transmitter commissioning tool

DUCT SENSORS

TEKA sensors are designed for measuring temperatures inside large ducts. Sensor's mechanical construction ensures accurate average temperature measurement.

°C

Range	-50...70 °C
IP protection class	IP54, cable or probe downwards
Length	3 m
Cable gland	M16
Mounting	with flange and springs
Materials	PBT, PC, PA, stainless steel

TYPE	ART NO.	
TEKA PT 100	1173130	100 Ω / 0 °C, accuracy ±0,3 °C / 0 °C, EN 60751/B
TEKA PT 1000	1174130	1000 Ω / 0 °C, accuracy ±0,3 °C / 0 °C (Honeywell, Danfoss equivalent)
TEKA NTC 1.8	117E130	1800 Ω / 25 °C, accuracy ±0,3 °C / 25 °C (TAC equivalent)
TEKA NTC 2.2	1172130	2252 Ω / 25 °C, accuracy ±0,25 °C / 25 °C (Johnson equivalent)
TEKA NTC 10	1175130	10 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Trend equivalent)
TEKA NTC 10-AN	117H130	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Andover equivalent)
TEKA NTC 10-C	117M130	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Carel equivalent)
TEKA NTC 10-KB	117B130	5025 Ω / 25 °C, accuracy ±0,5 °C / 25 °C (Satchwell equivalent)
TEKA NTC 20	1176130	20 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Honeywell equivalent)
TEKA NI 1000	117C130	1000 Ω / 0 °C, accuracy ±0,4 °C / 0 °C (Sauter equivalent)
TEKA NI 1000-LG	1178130	1000 Ω / 0 °C, accuracy ±0,5 °C / 0 °C (Siemens equivalent)
TEKA LL	1177130	2-wire transmitter/controller, supply 22...35 Vdc, output 4...20 mA, accuracy ±0,5 °C
TEKA LU	1179130	3-wire transmitter/controller, supply 24 Vac/dc, output 0...10 V < 2 mA, accuracy ±0,5 °C
TEKA-M	117Z130	Modbus transmitter/controller, supply 24 Vac/dc, accuracy ±0,5 °C
TE-N V2	1170250	display option for the transmitters
TOOLS		
ML-SER	1139010	transmitter commissioning tool

DUCT SENSORS

TEKA-500 sensors are designed for measuring temperatures inside ventilation ducts. Sensor measures the average temperature with 4 sensor elements.

°C

Range	-50...70 °C
IP protection class	IP54, cable or probe downwards
Length	500 mm
Cable gland	M16
Mounting	with flange
Materials	PBT, PC, PA, stainless steel

TYPE	ART NO.	
TEKA PT 100-500	1173170	100 Ω / 0 °C, accuracy ±0,3 °C / 0 °C, EN 60751/B
TEKA PT 1000-500	1174170	1000 Ω / 0 °C, accuracy ±0,3 °C / 0 °C (Honeywell, Danfoss equivalent)
TEKA NTC 1.8-500	117E170	1800 Ω / 25 °C, accuracy ±0,3 °C / 25 °C (TAC equivalent)
TEKA NTC 2.2-500	1172170	2252 Ω / 25 °C, accuracy ±0,25 °C / 25 °C (Johnson equivalent)
TEKA NTC 10-500	1175170	10 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Trend equivalent)
TEKA NTC 10-AN-500	117H170	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Andover equivalent)
TEKA NTC 10-C-500	117M170	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Carel equivalent)
TEKA NTC 10-KB-500	117B170	5025 Ω / 25 °C, accuracy ±0,5 °C / 25 °C (Satchwell equivalent)
TEKA NTC 20-500	1176170	20 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Honeywell equivalent)
TEKA NI 1000-500	117C170	1000 Ω / 0 °C, accuracy ±0,4 °C / 0 °C (Sauter equivalent)
TEKA NI 1000-LG-500	1178170	1000 Ω / 0 °C, accuracy ±0,5 °C / 0 °C (Siemens equivalent)
TEKA LL-500	1177170	2-wire transmitter/controller, supply 22...35 Vdc, output 4...20 mA, accuracy ±0,5 °C
TEKA LU-500	1179170	3-wire transmitter/controller, supply 24 Vac/dc, output 0...10 V < 2 mA, accuracy ±0,5 °C
TEKA-M-500	117Z170	Modbus transmitter/controller, supply 24 Vac/dc, accuracy ±0,5 °C
TE-N V2	1170250	display option for the transmitters
TOOLS		
ML-SER	1139010	transmitter commissioning tool

COMBUSTION GAS SENSORS

TESK sensors are designed for measuring combustion gas temperatures.

Range	0...400 °C
IP protection class	IP54, cable or probe downwards
Material	Silumin cast
Cable gland	PG16
Mounting	R ½" or with flange on order
Pressure rating	PN16

TYPE	ART NO.	
TESK PT 100	1173160	100 Ω / 0 °C, accuracy ±0,3 °C / 0 °C, EN 60751/B
TESK PT 1000	1174160	1000 Ω / 0 °C, accuracy ±0,3 °C / 0 °C (Honeywell, Danfoss equivalent)
TESK LL 0/400	1177160	2-wire transmitter, supply 22...35 Vdc, output 4...20 mA, accuracy ±0,5 °C
TESK LU 0/400	1179160	3-wire transmitter, supply 24 Vac/dc, output 0...10 V < 2 mA, accuracy ±0,5 °C

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CABLE TEMPERATURE SENSORS

TEKY4 temperature sensors are designed for measuring temperatures in automatic HVAC systems. The rolled stainless steel sleeve provides good protection against water and dust.

°C

Range	-30...80 °C
Sensor	Ø 4 mm x 30 mm, stainless steel
IP protection class	IP67
Cable	Ø 3,2 mm x 2,3 m, PVC, other lengths also available

TYPE	ART NO.	
TEKY4 PT 100	1173330	100 Ω / 0 °C, accuracy ±0,3 °C / 0 °C, EN 60751/B
TEKY4 PT 1000	1174330	1000 Ω / 0 °C, accuracy ±0,3 °C / 0 °C (Honeywell, Danfoss equivalent)
TEKY4 NTC 1.8	117E330	1800 Ω / 25 °C, accuracy ±0,3 °C / 25 °C (TAC equivalent)
TEKY4 NTC 2.2	1172330	2252 Ω / 25 °C, accuracy ±0,25 °C / 25 °C (Johnson equivalent)
TEKY4 NTC 10	1175330	10 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Trend equivalent)
TEKY4 NTC 10-AN	117H330	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Andover equivalent)
TEKY4 NTC 10-C	117M330	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Carel equivalent)
TEKY4 NTC 10-KB	117B330	5025 Ω / 25 °C, accuracy ±0,5 °C / 25 °C (Satchwell equivalent)
TEKY4 NTC 20	1176330	20 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Honeywell equivalent)
TEKY4 NI 1000	117C330	1000 Ω / 0 °C, accuracy ±0,4 °C / 0 °C (Sauter equivalent)
TEKY4 NI 1000-LG	1178330	1000 Ω / 0 °C, accuracy ±0,5 °C / 0 °C (Siemens equivalent)
TEKY4 T1	117V330	2226 Ω / 0 °C, accuracy ±0,4 °C / 0 °C
TEKY4 LL	1177330	2-wire transmitter/controller, supply 22...35 Vdc, output 4...20 mA, accuracy ±0,5 °C
TEKY4 LU	1179330	3-wire transmitter/controller, supply 24 Vac/dc, output 0...10 V < 2 mA, accuracy ±0,5 °C
TEKY4-M	117Z330	Modbus transmitter/controller, supply 24 Vac/dc, output 0...10 V < 2 mA, accuracy ±0,5 °C
TEU-N V2	1170270	display option for the transmitters
TOOLS		
ML-SER	1139010	transmitter commissioning tool

CABLE TEMPERATURE SENSORS

°C

TEKY6S temperature sensors are designed for measuring temperatures in automatic HVAC systems. The rolled stainless steel sleeve provides good protection against water and dust.

Range	-50...150 °C
Sensor	Ø 6 mm x 45 mm, stainless steel
IP protection class	IP67
Cable	Ø 5 mm x 2,3 m, silicone, other lengths also available

TYPE	ART NO.	
TEKY6S PT 100	1173340	100 Ω / 0 °C, accuracy ±0,3 °C / 0 °C, EN 60751/B
TEKY6S PT 1000	1174340	1000 Ω / 0 °C, accuracy ±0,3 °C / 0 °C (Honeywell, Danfoss equivalent)
TEKY6S NTC 1.8	117E340	1800 Ω / 25 °C, accuracy ±0,3 °C / 25 °C (TAC equivalent)
TEKY6S NTC 2.2	1172340	2252 Ω / 25 °C, accuracy ±0,25 °C / 25 °C (Johnson equivalent)
TEKY6S NTC 10	1175340	10 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Trend equivalent)
TEKY6S NTC 10-AN	117H340	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Andover equivalent)
TEKY6S NTC 10-C	117M340	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Carel equivalent)
TEKY6S NTC 10-KB	117B340	5025 Ω / 25 °C, accuracy ±0,5 °C / 25 °C (Satchwell equivalent)
TEKY6S NTC 20	1176340	20 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Honeywell equivalent)
TEKY6S NI 1000	117C340	1000 Ω / 0 °C, accuracy ±0,4 °C / 0 °C (Sauter equivalent)
TEKY6S NI 1000-LG	1178340	1000 Ω / 0 °C, accuracy ±0,5 °C / 0 °C (Siemens equivalent)
TEKY6S LL	1177340	2-wire transmitter/controller, supply 22...35 Vdc, output 4...20 mA, accuracy ±0,5 °C
TEKY6S LU	1179340	3-wire transmitter/controller, supply 24 Vac/dc, output 0...10 V < 2 mA, accuracy ±0,5 °C
TEU-N V2	1170270	display option for the transmitters
TOOLS		
ML-SER	1139010	transmitter commissioning tool

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CABLE TEMPERATURE SENSORS

TEKY6 temperature sensors are designed for measuring temperatures in automatic HVAC systems. The rolled stainless steel sleeve provides good protection against water and dust.

°C

Range	-30...80 °C
Sensor	Ø 6 mm x 45 mm, stainless steel
IP protection class	IP67
Cable	Ø 5 mm x 2,3 m, PVC, other lengths also available

TYPE	ART NO.	
TEKY6 PT 100	1173320	100 Ω / 0 °C, accuracy ±0,3 °C / 0 °C, EN 60751/B
TEKY6 PT 1000	1174320	1000 Ω / 0 °C, accuracy ±0,3 °C / 0 °C (Honeywell, Danfoss equivalent)
TEKY6 NTC 1.8	117E320	1800 Ω / 25 °C, accuracy ±0,3 °C / 25 °C (TAC equivalent)
TEKY6 NTC 2.2	1172320	2252 Ω / 25 °C, accuracy ±0,25 °C / 25 °C (Johnson equivalent)
TEKY6 NTC 10	1175320	10 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Trend equivalent)
TEKY6 NTC 10-AN	117H320	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Andover equivalent)
TEKY6 NTC 10-C	117M320	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Carel equivalent)
TEKY6 NTC 10-KB	117B320	5025 Ω / 25 °C, accuracy ±0,5 °C / 25 °C (Satchwell equivalent)
TEKY6 NTC 20	1176320	20 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Honeywell equivalent)
TEKY6 NI 1000	117C320	1000 Ω / 0 °C, accuracy ±0,4 °C / 0 °C (Sauter equivalent)
TEKY6 NI 1000-LG	1178320	1000 Ω / 0 °C, accuracy ±0,5 °C / 0 °C (Siemens equivalent)
TEKY6 KP 10	117J320	LM335Z, 2,98 V / 25 °C, 10 mV/K, accuracy ±0,5 °C / 25 °C
TEKY6 LL	1177320	2-wire transmitter/controller, supply 22...35 Vdc, output 4...20 mA, accuracy ±0,5 °C
TEKY6 LU	1179320	3-wire transmitter/controller, supply 24 Vac/dc, output 0...10 V < 2 mA, accuracy ±0,5 °C
TEU-N V2	1170270	display option for the transmitters
TOOLS		
ML-SER	1139010	transmitter commissioning tool

CABLE TEMPERATURE SENSORS, FLOOR

TEL sensors are designed for measuring floor temperatures. The sensor is installed in the cable duct inside the floor construction.

°C

Range	-30...80 °C
Sensor	Ø 7 mm
Cable	3 m (LIYY 2 x 0,5), PVC, other lengths also available

TYPE	ART NO.	
TEL PT 100	1173280	100 Ω / 0 °C, accuracy ±0,3 °C / 0 °C, EN 60751/B
TEL PT 1000	1174280	1000 Ω / 0 °C, accuracy ±0,3 °C / 0 °C (Honeywell, Danfoss equivalent)
TEL NTC 1.8	117E280	1800 Ω / 25 °C, accuracy ±0,3 °C / 25 °C (TAC equivalent)
TEL NTC 2.2	1172280	2252 Ω / 25 °C, accuracy ±0,25 °C / 25 °C (Johnson equivalent)
TEL NTC 10-AN	117H280	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Andover equivalent)
TEL NTC 10-C	117M280	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Carel equivalent)
TEL NI 1000	117C280	1000 Ω / 0 °C, accuracy ±0,4 °C / 0 °C (Sauter equivalent)
TEL NI 1000-LG	1178280	1000 Ω / 0 °C, accuracy ±0,5 °C / 0 °C (Siemens equivalent)

CABLE TEMPERATURE SENSORS, FLOOR

TEL 5M sensors are designed for measuring floor temperatures. The sensor is installed in the cable duct inside the floor construction.

°C

Range	-50...105 °C
Sensor	Ø 5 mm x 20 mm
IP protection class	IP68
Length	5 m
Cable	Ø 3 mm x 5 m, 2 x AWG24 (rigid, double insulation)

TYPE	ART NO.	
TEL NTC 10-5M	1175281	10 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Trend equivalent)
TEL NTC 20-5M	1176281	20 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Honeywell equivalent)

CABLE TEMPERATURE SENSORS, SOIL INSTALLATION

TEM sensors are designed for measuring temperatures in road ramps and street constructions. The sensor must be installed in a cable duct.

°C

Range	-30...80 °C
Sensor	Ø 9 mm
Cable	5 m (PUR 2 x 0,75), other lengths also available

TYPE	ART NO.	
TEM PT 100	1173310	100 Ω / 0 °C, accuracy ±0,3 °C / 0 °C, EN 60751/B
TEM PT 1000	1174310	1000 Ω / 0 °C, accuracy ±0,3 °C / 0 °C (Honeywell, Danfoss equivalent)
TEM NTC 1.8	117E310	1800 Ω / 25 °C, accuracy ±0,3 °C / 25 °C (TAC equivalent)
TEM NTC 2.2	1172310	2252 Ω / 25 °C, accuracy ±0,25 °C / 25 °C (Johnson equivalent)
TEM NTC 10	1175310	10 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Trend equivalent)
TEM NTC 10-AN	117H310	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Andover equivalent)
TEM NTC 10-C	117M310	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Carel equivalent)
TEM NTC 20	1176310	20 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Honeywell equivalent)
TEM NI 1000	117C310	1000 Ω / 0 °C, accuracy ±0,4 °C / 0 °C (Sauter equivalent)
TEM NI 1000-LG	1178310	1000 Ω / 0 °C, accuracy ±0,5 °C / 0 °C (Siemens equivalent)

ROOM TEMPERATURE SENSORS

TEHR sensors are designed for measuring room temperatures.

°C

Range	0...50 °C
IP protection class	IP20
Material	ABS plastic
Mounting	with screws on wall or on junction box (hole distance 60 mm)
Dimensions	86 x 86 x 32 mm

TYPE	ART NO.	
TEHR PT 100	1173190	100 Ω / 0 °C, accuracy ±0,3 °C / 0 °C, EN 60751/B
TEHR PT 1000	1174190	1000 Ω / 0 °C, accuracy ±0,3 °C / 0 °C (Honeywell, Danfoss equivalent)
TEHR NTC 1.8	117E190	1800 Ω / 25 °C, accuracy ±0,3 °C / 25 °C (TAC equivalent)
TEHR NTC 2.2	1172190	2252 Ω / 25 °C, accuracy ±0,25 °C / 25 °C (Johnson equivalent)
TEHR NTC 10	1175190	10 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Trend equivalent)
TEHR NTC 10-AN	117H190	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Andover equivalent)
TEHR NTC 10-C	117M190	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Carel equivalent)
TEHR NTC 10-KB	117B190	5025 Ω / 25 °C, accuracy ±0,5 °C / 25 °C (Satchwell equivalent)
TEHR NTC 20	1176190	20 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Honeywell equivalent)
TEHR NI 1000	117C190	1000 Ω / 0 °C, accuracy ±0,4 °C / 0 °C (Sauter equivalent)
TEHR NI 1000-LG	1178190	1000 Ω / 0 °C, accuracy ±0,5 °C / 0 °C (Siemens equivalent)
TEHR KP 10	117J190	LM235Z, 10 mV/K, 2,98 V / 25 °C
TEHR T1	117V190	2226 Ω / 0 °C, accuracy ±0,4 °C / 0 °C

OPTIONS		
TEHR-K5	1170240	5-position rotary switch (1, 2 ,3, 0, A) 24 Vac/dc
TEHR-L	1170100	LED 24 V
TEHR-S	1170080	push button (no / nc) 24 Vac/dc
TEHR-N	1170140	digital display, input 0...10 V = 0...50 °C

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ROOM TEMPERATURE SENSORS

TEHR-P sensors are designed for measuring room temperatures and adjusting the temperature set point. The potentiometer value and the fitting resistor values can be defined in the order.

Range	0...50 °C
IP protection class	IP20
Material	ABS plastic
Mounting	with screws on wall or on junction box (hole distance 60 mm)
Dimensions	86 x 86 x 32 mm

TYPE	ART NO.	
TEHR PT 100-P	1173230	100 Ω / 0 °C, accuracy ±0,3 °C / 0 °C, EN 60751/B
TEHR PT 1000-P	1174230	1000 Ω / 0 °C, accuracy ±0,3 °C / 0 °C (Honeywell, Danfoss equivalent)
TEHR NTC 1.8-P	117E230	1800 Ω / 25 °C, accuracy ±0,3 °C / 25 °C (TAC equivalent)
TEHR NTC 2.2-P	1172230	2252 Ω / 25 °C, accuracy ±0,25 °C / 25 °C (Johnson equivalent)
TEHR NTC 10-AN-P	117H230	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Andover equivalent)
TEHR NTC 10-C-P	117M230	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Carel equivalent)
TEHR NTC 10-P	1175230	10 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Trend equivalent)
TEHR NTC 10-PU	1175350	10 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C, 0...10 V potentiometer
TEHR NTC 20-P	1176230	20 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Honeywell equivalent)
TEHR NI 1000-LG-P	1178230	1000 Ω / 0 °C, accuracy ±0,5 °C / 0 °C (Siemens equivalent)
TEHR NI 1000-P	117C230	1000 Ω / 0 °C, accuracy ±0,4 °C / 0 °C (Sauter equivalent)
TEHR KP 10-P	117J230	LM235Z, 10 mV/K, 2,98 V / 25 °C

OPTIONS		
TEHR-K5	1170240	5-position rotary switch (1, 2 ,3, 0, A) 24 Vac/dc
TEHR-L	1170100	LED 24 V
TEHR-S	1170080	push button (no / nc) 24 Vac/dc
TEHR-N	1170140	digital display, input 0...10 V = 0...50 °C

ROOM TEMPERATURE TRANSMITTERS

TEHR LL (2-wire, 4...20 mA) and TEHR LU (3-wire, 0...10 V) are temperature transmitters for dry room spaces. The output range is selectable. TEHR-M output is available via Modbus and as a 0...10 V signal.

°C

Supply	24 Vdc
Range	-50...50, -50...150, 0...50, 0...100 °C
Accuracy	±0,5 °C at 25 °C
Sensor	Pt1000 EN 60751/B
Output	4...20 mA, temperature/controller
IP protection class	IP20
Material	ABS plastic
Ambient temperature	0...50 °C
Mounting	with screws on wall or on a junction box (hole distance 60 mm)
Dimensions	86 x 86 x 32 mm

TYPE	ART NO.	
TEHR LL	1177190	2-wire transmitter/controller, supply 22...35 Vdc, output 4...20 mA
TEHR LL-N	1177191	with display
TEHR LU	1179190	3-wire transmitter/controller, supply 24 Vac/dc, output 0...10 V < 2 mA
TEHR LU-PU	1179350	3-wire transmitter/controller, supply 24 Vac/dc, output 0...10 V < 2 mA, 0...10 V potentiometer
TEHR LU-PU-N	1179351	with display, 0...10 V potentiometer
TEHR LU-N	1179191	with display
TEHR-M	117Z190	Modbus transmitter/controller, supply 24 Vac/dc, output 0...10 V < 2 mA
TEHR-M-PU	117Z350	Modbus transmitter/controller, supply 24 Vac/dc, output 0...10 V < 2 mA, 0...10 V potentiometer
TEHR-M-PU-N	117Z351	with display, Modbus, 0...10 V potentiometer
TEHR-M-N	117Z191	with display, Modbus

OPTIONS		
TEHR-K5	1170240	5-position rotary switch (1, 2 ,3, 0, A) 24 Vac/dc
TEHR-K5R	1170241	5-position rotary switch with resistance output
TEHR-P	1170120	passive potentiometer (not available for M models)

TOOLS		
ML-SER	1139010	transmitter commissioning tool

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ROOM TEMPERATURE SENSORS

TEHU sensors are designed for measuring room temperatures. Flush mounting.

Range	0...50 °C
IP protection class	IP20
Material	ABS plastic
Mounting	on a junction box

TYPE	ART NO.	
TEHU PT 100	1173150	100 Ω / 0 °C, accuracy ±0,3 °C / 0 °C EN 60751/B
TEHU PT 1000	1174150	1000 Ω / 0 °C, accuracy ±0,3 °C / 0 °C (Honeywell, Danfoss equivalent)
TEHU NTC 1.8	117E150	1800 Ω / 25 °C, accuracy ±0,3 °C / 25 °C (TAC equivalent)
TEHU NTC 2.2	1172150	2252 Ω / 25 °C, accuracy ±0,25 °C / 25 °C (Johnson equivalent)
TEHU NTC 10	1175150	10 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Trend equivalent)
TEHU NTC 10-AN	117H150	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Andover equivalent)
TEHU NTC 10-C	117M150	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Carel equivalent)
TEHU NTC 10-KB	117B150	5025 Ω / 25 °C, accuracy ±0,5 °C / 25 °C (Satchwell equivalent)
TEHU NTC 20	1176150	20 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Honeywell equivalent)
TEHU NI 1000	117C150	1000 Ω / 0 °C, accuracy ±0,4 °C / 0 °C (Sauter equivalent)
TEHU NI 1000-LG	1178150	1000 Ω / 0 °C, accuracy ±0,5 °C / 0 °C (Siemens equivalent)
TEHU KP 10	117J150	LM235Z, 10 mV/K, 2,98 V / 25 °C

OUTDOOR TEMPERATURE SENSORS

TEU sensors are designed for measuring outdoor temperatures.

Range	-50...50 °C
IP protection class	IP54, cable downwards
Cable gland	M16
Mounting	with screws on wall, external lugs
Materials	PBT, PC, PA

°C

TYPE	ART NO.	
TEU PT 100	1173090	100 Ω / 0 °C, accuracy ±0,3 °C / 0 °C, EN 60751/B
TEU PT 1000	1174090	1000 Ω / 0 °C, accuracy ±0,3 °C / 0 °C (Honeywell, Danfoss equivalent)
TEU NTC 1.8	117E090	1800 Ω / 25 °C, accuracy ±0,3 °C / 25 °C (TAC equivalent)
TEU NTC 2.2	1172090	2252 Ω / 25 °C, accuracy ±0,25 °C / 25 °C (Johnson equivalent)
TEU NTC 10	1175090	10 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Trend equivalent)
TEU NTC 10-AN	117H090	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Andover equivalent)
TEU NTC 10-C	117M090	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Carel equivalent)
TEU NTC 10-KB	117B090	5025 Ω / 25 °C, accuracy ±0,5 °C / 25 °C (Satchwell equivalent)
TEU NTC 20	1176090	20 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Honeywell equivalent)
TEU NI 1000	117C090	1000 Ω / 0 °C, accuracy ±0,4 °C / 0 °C (Sauter equivalent)
TEU NI 1000-LG	1178090	1000 Ω / 0 °C, accuracy ±0,5 °C / 0 °C (Siemens equivalent)
TEU KP 10	117J090	LM235Z, 10 mV/K, 2,98 V / 25 °C
TEU T1	117V090	2226 Ω / 0 °C, accuracy ±0,4 °C / 0 °C

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OUTDOOR TEMPERATURE TRANSMITTERS

TEU transmitters are designed for measuring outdoor temperatures.

Supply	24 Vdc
Range	-50...50, -50...150, 0...50, 0...100 °C
Accuracy	±0,5 °C (0 °C)
Sensor	Pt1000 EN 60751/B
Output	4...20 mA, temperature/controller
IP protection class	IP54, cable downwards
Ambient temperature	-30...60 °C
Cable gland	M16
Mounting	with screws on wall, external lugs
Materials	PBT, PC, PA
Dimensions	115 x 115 x 45 mm

°C

TYPE	ART NO.	
TEU LL	1177090	2-wire transmitter, supply 22...35 Vdc, output 4...20 mA, accuracy ±0,5 °C
TEU LU	1179090	3-wire transmitter, supply 24 Vac/dc, output 0...10 V < 2 mA, accuracy ±0,5 °C
TEU-N V2	1170270	display option for the transmitters

TOOLS		
ML-SER	1139010	transmitter commissioning tool

INDUSTRIAL TEMPERATURE SENSORS

TES sensors are designed for measuring temperatures in dusty, hot and wet (industrial) spaces.

Range	-50...120 °C
IP protection class	IP67
Material	Silumin cast
Cable gland	PG11
Mounting	with screws on wall
Dimensions	98 x 90 x 36 mm

TYPE	ART NO.	
TES PT 100	1173100	100 Ω / 0 °C, accuracy ±0,3 °C / 0 °C, EN 60751/B
TES PT 1000	1174100	1000 Ω / 0 °C, accuracy ±0,3 °C / 0 °C (Honeywell, Danfoss equivalent)
TES NTC 1.8	117E100	1800 Ω / 25 °C, accuracy ±0,3 °C / 25 °C (TAC equivalent)
TES NTC 2.2	1172100	2252 Ω / 25 °C, accuracy ±0,25 °C / 25 °C (Johnson equivalent)
TES NTC 10	1175100	10 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Trend equivalent)
TES NTC 10-AN	117H100	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Andover equivalent)
TES NTC 10-C	117M100	10 kΩ / 25 °C, accuracy ±0,25 °C / 25 °C (Carel equivalent)
TES NTC 10-KB	117B100	5025 Ω / 25 °C, accuracy ±0,5 °C / 25 °C (Satchwell equivalent)
TES NTC 20	1176100	20 kΩ / 25 °C, accuracy ±0,2 °C / 25 °C (Honeywell equivalent)
TES NI 1000	117C100	1000 Ω / 0 °C, accuracy ±0,4 °C / 0 °C (Sauter equivalent)
TES NI 1000-LG	1178100	1000 Ω / 0 °C, accuracy ±0,5 °C / 0 °C (Siemens equivalent)
TES KP 10	117J100	LM235Z, 10 mV/K, 2,98 V / 25 °C

TEMPERATURE TRANSMITTERS

LLK V2 and LUK V2 are transmitters for temperature measuring. LLK V2 is a 2-wire transmitter converting the sensor resistance to the 4...20 mA signal. LUK V2 is a 3-wire transmitter converting the sensor signal to the 0...10 V signal. The transmitter needs a separate Pt1000 sensor.

Supply	24 Vdc
Range	-50...50, -50...150, 0...50, 0...100 °C
Accuracy	±0,5 °C (0 °C)
Sensor	PT 1000 EN60751/B (not included)
Output	4...20 mA, temperature/controller
Output	0...10, 2
IP protection class	IP54, cable downwards
Ambient temperature	-30...60 °C
Cable gland	2 X M16
Dimensions	115 x 115 x 45 mm

TYPE	ART NO.	
LLK V2	1182230	2-wire transmitter/controller
LLK-N V2	1182231	2-wire transmitter/controller with display
LUK V2	1182240	3-wire transmitter/controller
LUK V2-N	1182241	3-wire transmitter/controller with display

TOOLS		
ML-SER	1139010	transmitter commissioning tool

TEMPERATURE SENSOR SIMULATOR

TESIM sensor simulators are designed for simulating temperature sensor when testing a control system.

Range	5 selectable temperature values (-50, -20, 0, 20, 50 °C)
Accuracy (PT 1000)	±0,15 °C at 0 °C
Accuracy (NTC 10)	±0,25 °C at 25 °C
IP protection class	IP54
Cable	0,9 m, banana jacks

TYPE	ART NO.	
TESIM PT 1000	1170220	Pt1000 simulator
TESIM NTC 10	1170230	NTC 10 simulator

SPECIAL MEASUREMENT AND DETECTION

The special measurement and products cover protective thermostats for heating coils' freezing protection, safety components for water leakage monitoring, thermometers, differential pressure switches, filter guards and occupancy sensors. With these components, you can complete your installation to secure air conditioning heaters, avoid water leakage damage, save energy with occupancy sensors and schedule the replacement of filters.

▶ Protection units
▶ Adjustable limits
▶ Mechanical measurements

FROST PROTECTION THERMOSTATS

Frost protection thermostats are protective devices for preventing heating coils from freezing in the air handling units.

DIN housing

Supply	24 Vac/dc, < 2 VA
Input	0...10 Vdc, 10 mA
Range	0...100 °C
Output (control)	230 Vac, 8 A, res.
Output (alarm)	60 Vdc, 1 A
Output (actuator)	0...10 Vdc, 10 mA
IP protection class	IP20
Mounting	For 35 mm DIN rail

TYPE	ART NO.	
JVA 24	1110110	forecasting, regulating; selectable sensor type (Pt1000, Ni1000-LG, PTC 1000/2000)
JVS 24	1110120	adjustable forecasting, regulating; selectable sensor type (Pt1000, Ni1000-LG, PTC 1000/2000)

FROST PROTECTION THERMOSTATS

Frost protection thermostats are protective devices for preventing heating coils from freezing in the air handling units.

Supply	24 Vac, < 2 VA
Input	0(2)...10 V, 10 mA
Range	0...100 °C
Output (control)	50 Vac, 6 A, res.
Output (alarm)	24 Vdc, 1 A
Output (actuator)	0...10 Vdc, 10 mA
IP protection class	IP20
Mounting	11-pole relay housing

TYPE	ART NO.	
EJV 24-PT	1110080	for Pt1000 sensor (1000 Ω / 0 °C), AR 1 relay included
JV 24-PT	1110090	for Pt1000 sensor (1000 Ω / 0 °C), contact output 50 Vac 6 A res.

THERMOSTATS

TF capillary thermostats are protective devices for preventing heating coils from freezing in the air handling units.

Range	-10...10 °C
Accuracy	±1 °C
Output	24...250 Vac, 15 A
IP protection class	IP65
Ambient temperature	...55 °C
Humidity	10...90 %rH
Dimensions	65 x 140 x 62 mm

TYPE	ART NO.	
TF 18	1240230	thermostat, capillary element length 1.8 m, automatic reset
TF 18R	1240231	thermostat, capillary element length 1.8 m, manual reset
TF 30	1240220	thermostat, capillary element length 3 m, automatic reset
TF 30R	1240221	thermostat, capillary element length 3 m, manual reset
TF 60	1240210	thermostat, capillary element length 6 m, automatic reset
TF 60R	1240211	thermostat, capillary element length 6 m, manual reset
DBZ-05	1240200	capillary element mounting bracket

CONDENSATION SWITCH

Condensation switch KA 10 is designed for detecting water condensation in cooling systems, for example in cooling beams. With the condensation switch it is possible to control the cooling water supply when the water starts to condensate on the pipe. The KA 10-EXT model has an external condensation sensor.

Supply	24 Vac/dc, < 1 VA
Output	0...10 Vdc, condensation information
Output	24 Vac/dc, 1 A, relay output
IP protection class	IP54, cable downwards
Ambient temperature	0...50 °C
Cable gland	M16
Mounting	with two cable ties on the side or under the pipe (Ø10...100 mm)

TYPE	ART NO.	
KA 10	1187030	condensation switch
KA 10-EXT	1187031	condensation switch with external sensor, cable length 2 m

CONDENSATION SENSOR

KEK 1 condensation sensor is designed for detecting water condensation in cooling systems, for example in cooling beams.

Nominal resistance	approx. 100 kΩ at condensation point
Cable	2 m, other lengths also available
Mounting	with two cable ties on the side or under the pipe (Ø10...100 mm)

TYPE	ART NO.	
KEK 1	1187040	condensation sensor

WATER LEAKAGE RELAY

VVK 2 monitors the status of the water leakage sensors connected to the relay. When the sensor becomes wet the resistance decreases and the alarm relay will be activated. Also the sensor circuit is monitored (alarms if R > 330 kΩ).

Supply	24 Vac/dc, < 2 VA
Set point	< 10 kΩ or < 80 kΩ
Range	10...300 kΩ or 10 kΩ / 80...300 kΩ, selectable
Output	60 Vdc, 2 A, res. change-over contact
IP protection class	IP20
Mounting	For 35 mm DIN rail

TYPE	ART NO.	
VVK 2	1187024	water leakage relay

WATER LEAKAGE RELAY

LPH 10 monitors the resistance of the sensors. When the sensor becomes wet, the resistance decreases and the alarm relay is activated.

Supply	24 Vac/dc, < 2 VA
Set point	approx. 10 kΩ
Output (alarm)	60 Vdc, 300 mA, res. change-over contact. Alarm is also indicated with an indicator light and buzzer.
IP protection class	IP20
Material	ABS plastic
Mounting	with screws on wall or on junction box (hole distance 60 mm)
Dimensions	87 x 86 x 32 mm

TYPE	ART NO.	
LPH 10	1187010	water leakage relay

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WATER LEAKAGE SENSORS

VVA and VVN sensors will be used with VVK 2 and LPH 10.
The sensors can be installed on the floor and VVN also e.g. on
the side of the pipe monitoring possible condensation.

Nominal resistance	approx. 300 kΩ when dry

TYPE	ART NO.	
VVA 1	1187020	sensor with connection box
VVA 2	1187021	sensor with 2 m cable
VVA 3	1187026	sensor (25 x 200 mm) with 2 m cable and adhesive tape
VVN 1	1187025	sensor, 1 m sensor band and 2 m cable
VVN 2	1187023	sensor, 2 m sensor band and 2 m cable

THERMOMETERS

DTM is a mechanical thermometer for a duct installation. Two
scales are available. The meters are factory-calibrated.

Accuracy	±2 °C
Sensor	Ø 9 x 185 mm
IP protection class	IP40
Ambient temperature	-20...60 °C
Humidity	35...85 %rH
Mounting	by a flange
Dimensions	100 x 100 x 230 mm

TYPE	ART NO.	
DTM -40/40	1240050	duct thermometer -40...40 °C
DTM 0/60	1240060	duct thermometer 0...60 °C

DIFFERENTIAL PRESSURE SWITCHES

CPS switches are designed for monitoring over and under pressures and pressure differences in systems that handle air and other non-flammable gases.

Accuracy	±15 % from the set value
Output	24...250 Vac, 5 A, res. (1 A ind.)
IP protection class	IP54
Ambient temperature	-15...80 °C

TYPE	ART NO.	
CPS 330	1240100	differential pressure switch 20...330 Pa
CPS 450	1240110	differential pressure switch 30...500 Pa
CPS 1100	1240120	differential pressure switch 100...1100 Pa
CPS 4000	1240130	differential pressure switch 500...4000 Pa
OPTIONS		
PEK-AS	1240300	accessory kit for differential pressure products

DIFFERENTIAL PRESSURE SWITCHES

PEK switches are designed for monitoring over and under pressures and pressure differences in systems that handle air and other non-flammable gases.

Accuracy	±15 % from the set value
Output	250 Vac, 1.5 A, res. (0,4 A ind.)
IP protection class	IP54
Ambient temperature	-20...85 °C

TYPE	ART NO.	
PEK 300	1240310	differential pressure switch 20...300 Pa
PEK 400	1240320	differential pressure switch 30...400 Pa
PEK 500	1240330	differential pressure switch 50...500 Pa
PEK 1000	1240340	differential pressure switch 200...1000 Pa
PEK 2500	1240350	differential pressure switch 500...2500 Pa
PEK 5000	1240360	differential pressure switch 1000...5000 Pa
OPTIONS		
PEK-AS	1240300	accessory kit for differential pressure products

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FILTER GUARDS

SV filter guards are designed for filter monitoring in systems that handle air and other non-flammable gases. The guards include a pressure gauge and a differential pressure switch.

Accuracy (switching)	±15 % from the set value
Accuracy (gauge)	±15 % from the full scale
Output	250 Vac, 1.5 A, res. (0,4 A ind.)
IP protection class	IP54
Ambient temperature	–5...50 °C
Mounting	vertically (with screws)
Dimensions	170 x 150 x 68 mm

TYPE	ART NO.	
SV 250	1240370	filter guard, 250 Pa
SV 500	1240380	filter guard, 500 Pa
PEK-AS	1240300	accessory kit for differential pressure products

OCCUPANCY SENSORS

LA 14 is an occupancy sensor for controlling ventilation and lighting. Intelligent, processor based, logic prevents false functions being at the same time very sensible. Relay function is quiet and the release delay is adjustable.

Supply	24 Vac/dc, < 0.5 VA
Output (signal)	60 Vdc, 100 mA, NC or NO. Delay is selectable (2 s, 2 min, 10 min or 20 min)
IP protection class	IP20
Mounting	flush (surface mounting casing optional)
Materials	white plastic

TYPE	ART NO.	
LA 14	1185050	occupancy sensor
KO PRA	KO3602	casing for surface mounting

OCCUPANCY SENSORS

LA 15 is designed for controlling lighting. Up to 1.5 A continuous fluorescent lighting load is allowed.

Supply	24 Vac/dc
Output (signal)	60 Vdc, 100 mA, NC or NO. Delay 2 s.
Output (lighting)	250 Vac, 1.5 VA, delay is selectable (2 s, 2 min, 10 min or 20 min)
IP protection class	IP20
Mounting	flush (surface mounting casing optional)
Materials	white plastic

TYPE	ART NO.	
LA 15	1185060	movement / occupancy sensor for switching lighting on/off
LA-RAJ	1185070	180° area guard for occupancy sensor
KO PRA	KO3602	casing for surface mounting

OCCUPANCY SENSORS

PLT 24 is a detector for monitoring occupancy through body heat and movements. The passive infrared PIR detector reacts to temperature changes in the range of the detection beams. Mounting bracket and screws are included to the delivery.

Supply	24 Vac/dc
Output (alarm)	60 Vdc, 100 mA, NC or NO, delay is selectable (2 s, 2 min, 10 min or 20 min)
IP protection class	IP20
Ambient temperature	-10...45 °C
Dimensions	64 x 95 x 50 mm

TYPE	ART NO.	
PLT 24	1185040	PIR movement detector
PLT 24-K	1185045	PIR movement detector, ceiling mounting

OCCUPANCY SENSORS

PLT 12 is a detector for monitoring occupancy through body heat and movements. The detector is passive infrared (PIR) which reacts to temperature changes in range of the detection beams. Mounting bracket and screws are included to the delivery.

Supply	12 Vdc
Output (alarm)	24 Vdc, 100 mA, NC
IP protection class	IP20
Ambient temperature	-10...40 °C
Dimensions	64 x 95 x 50 mm

TYPE	ART NO.	
PLT 12	1185080	PIR movement detector

THERMAL ACTUATORS AND CONTROL VALVES

Thermal actuators, control valves and solenoid valves designed for building automation needs complement our wide product offering for automated HVAC management systems.

▶ *Complementary products for all HVAC systems*

▶ *Valves for heating and cooling applications*

▶ *Adapters for almost all manufacturers' valves*

CONTROL VALVES

2-way valves with different sizes and with different Kvs values for HVAC applications are available. Valves can be used for controlling heating and cooling. A VA 80 adapter is needed for connecting a NV valve with a thermal actuator.

Ambient temperature	...120 °C
Mounting	inner thread ISO 7/1; outer thread ISO 228/1
Materials	CW617N (brass parts), peroxide-cured EPDM (seals)
Pressure rating	PN 10

TYPE	ART NO.	
NV2D10	1230100	valve 3/8" (DN10) fixed Kvs 1,20
NV2D10F	1230102	valve 3/8" (DN10) adjustable Kvs 0,05...0,35
NV2D10V	1230101	valve 3/8" (DN10) adjustable Kvs 0,10...0,80
NV2D15	1230150	valve 1/2" (DN15) fixed Kvs 1,20
NV2D15F	1230152	valve 1/2" (DN15) adjustable Kvs 0,05...0,35
NV2D15V	1230151	valve 1/2" (DN15) adjustable Kvs 0,10...0,80
NV2D20	1230200	valve 3/4" (DN20) fixed Kvs 1,50
NV2D20V	1230201	valve 3/4" (DN20) adjustable Kvs 0,10...0,80

THERMAL ACTUATORS

Valve actuators are available for 24 Vac/dc and for 230 Vac supply with a NC or NO function. Control signal may be a PWM or a 0...10 Vdc signal. Connection cables may be fixed (length 1 m) or removable. Different lengths of removable cables are available. An adapter between the valve and the actuator is always needed.

TYPE	ART NO.	
A 20405-00N00-1S	1210027	thermal actuator 230 V NC, fixed cable 1 m
A 21405-10N00-1S	1210028	thermal actuator 230 V NO, fixed cable 1 m
A 40405-00N00-1S	1210011	thermal actuator 24 V NC, fixed cable 1 m
A 41405-10N00-1S	1210021	thermal actuator 24 V NO, fixed cable 1 m
AST 20405-00N00-0	1210031	thermal actuator 230 V NC, removable cable (sold separately)
AST 21405-10N00-0	1210032	thermal actuator 230 V NO, removable cable (sold separately)
AST 40405-00N00-0	1210041	thermal actuator 24 V NC, removable cable (sold separately)
AST 41405-10N00-0	1210046	thermal actuator 24 V NO, removable cable (sold separately)
APR 40405-01N00-0	1210052	thermal actuator 2...10 V NC, removable cable (sold separately)
VA 80	1220010	adapter for Produal NV valves

Actuator	Cable order numbers						
	1 m	2 m	3 m	5 m	10 m	15 m	20 m
AST	1220021	1220022	1220023	1220025	1220026	1220027	1220028
APR	1220031	1220032	1220033	1220035	1220036	1220037	1220038

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To connect a thermal actuator to control valve, a special adapter ring is needed. Thermal actuators can be mounted to the Produal NV2 control valves by using a VA 80 adapter ring.

The adapter rings are also available for other valve manufacturers' valves. See the following table for more information.

NOTE: : If you can't find the needed valve from the table, you can fill in the form on our website (Product selection guides/ Valve measuring guide) and send the dimensions to Produal customer support. The customer support will determine the correct adapter ring.

Valve manufacturer	Valve type	Adapter	Product number	Adapter description	Notes
Comap		VA 70H	1220006	M28x1,5, grey	
Danfoss	RTD-N	VA 76	1220007	M30x1,5, white	
	RTD-G	VA 79	1220008	M30x1,5, white	
	RA-N 10/15	VA 78	1220013	white	
	RA-C				
	RA-U 10				
	FHF-6				
	RAV	VA 72H	1220057	M30x1,5, light grey	
	TWA-K	VA 80	1220010	M30x1,5, light grey	
Flowcon	EVC	VA 41	1220016	M30x1,5, dark green	
Giacomini		VA 26	1220017	M30x1,5, grey	
Honeywell	V2020EVS10	VA 80	1220010	M30x1,5, light grey	
	V2020DSL				
	V2000VS				
Johnson Controls	VG5200CC	VA 53H	1220002	M28x1,5, grey	
	VG5400CC	VA 55H	1220003	M28x1,5, grey	
	VG5410EC				
	VG5800CC				
LK		VA 02	1220005	M30x1,5, grey	
MMA	FVXR 15	VA 55H	1220003	M28x1,5, grey	
	FVR 10	VA 54	1220014	M28x1,5, dark blue	
	EKV 15				
Oras		VA 35H	1220004	M26x1,5, grey	
Oventrop	Cocon	VA 10	1220012	M30x1,5, light grey	
	F series				
	AV6				
	before 1998	VA 39	1220019	M30x1, white	
Siemens	VXP	VA 10	1220012	M30x1,5, light grey	
	VD115	VA 80	1220010	M30x1,5, light grey	
Tour & Andersson	TRV-2	VA 80	1220010	M30x1,5, light grey	
	TBV-C				
	TBV-CM	VA 90	1220011	M30x1,5, crimson	With 4,5 mm stroke actuator.
		VA 10	1220012	M30x1,5, light grey	With 4 mm stroke actuator.
		VA 32	1220015	M28x1,5, light green	
	RVT 40	VA 31H	1220001	M28x1,5, grey	
	COMPACT-P	VA 10	1220012	M30x1,5, light grey	Select a thermal actuator with 5 mm stroke.
Universa	before 1999	VA 70H	1220006	M28x1,5, grey	
Uponor / Velta	proVario	VA 02	1220005	M30x1,5, grey	
Uponor	Magna				
	Pro 1"				Q&E plastic manifold
	WGF	VA 32	1220015	M28x1,5, light green	
Wehofloor	manifold	VA 80	1220010	M30x1,5, light grey	
Wirsbo	manifold	VA 17	1220009	M28x1,5, white	

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SOLENOID VALVES

MV solenoid valves are designed for building automation needs of the water control, for example in heating and cooling systems with closed circuit (valves are not suitable for domestic water circuit). Solenoid valves work in zero pressure difference and the valves are either normally closed (NC) or normally open (NO). Standard coils are for 230 Vac supply and 24 Vac or 24 Vdc coils are available as options. The valve coils are not designed for continuously energized applications.

Supply	230 Vac
IP protection class	IP65
Ambient temperature	-5...90 °C
Materials	brass

TYPE	ART NO.	
MV 1/2 NC 230V	1260220	1/2" solenoid valve (NC, DN15)
MV 1/2 NO 230V	1260250	1/2" solenoid valve (NO, DN15)
MV 1 1/2 NC 230V	1260300	1 1/2" solenoid valve (NC, DN40)
MV 1 1/4 NC 230V	1260290	1 1/4" solenoid valve (NC, DN32)
MV 1 NC 230V	1260240	1" solenoid valve (NC, DN25)
MV 3/4 NC 230V	1260230	3/4" solenoid valve (NC, DN20)
MV 3/4 NO 230V	1260260	3/4" solenoid valve (NO, DN20)

OPTIONS		
MV-VK 24VAC-8W	1260280	changeable coil 24 Vac for the solenoid valves (sizes 1/2" – 1")
MV-VK 24VDC-8W	1260281	changeable coil 24 Vdc for the solenoid valves (sizes 1/2" – 1")
MV-VK 24VDC-14W	1260282	changeable coil 24 Vdc for the solenoid valves (sizes 1 1/4" – 1 1/2")

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TRANSDUCERS AND ACCESSORIES

Our wide selection of transducers and accessories helps you finalize regulation and control solutions. For example, I/O modules, dividers and transducers allow various signal type changes between Modbus, digital, analogue and 3-point signals. Transformers and electric power regulators with relay modules and solid state relays are useful for voltage supply and control load power. Our wide range of input signals and adjustable set points on relay modules enable applications like control fan coils, heaters and actuators.

- ▶ *Useful devices for finalizing BA projects*
- ▶ *Galvanic isolation*
- ▶ *Inputs 0...10 V, 2...10 V, 0...20 mA, 4...20 mA*
- ▶ *Outputs 0...10 V, 2...10 V, 0...20 mA, 4...20 mA, relay*

CONVERTERS

DA 6 converts 1...6 digital (contact) inputs into one analogue 0...10 V or 4...20 mA output. The state of each contact can be identified by the control system software.

Supply	24 Vac, < 1 VA
Input	6 x potential free contact input
Output (1)	0...10 Vdc, 2 mA
Output (2)	4...20 mA, 500 Ω
IP protection class	IP20
Mounting	for 35 mm DIN rail
Dimensions	68 x 77 x 42 mm

TYPE	ART NO.	
DA 6	1182040	DI/AO converter

CONVERTERS

ISO 10 provides galvanic isolation between input and output signals and supply. Signal can also be converted, e.g. a 0...10 V signal into a 4...20 mA signal.

Supply	24 Vac/dc, < 2 VA
Input	0...1 V, 0...10 V, 2...10 V, 0...20 mA or 4...20 mA
Output	0...10 Vdc, 2 mA, or 2...10 Vdc
Output	0...20 mA, 500 Ω, or 4...20 mA
IP protection class	IP20
Ambient temperature	0...50 °C
Mounting	For 35 mm DIN rail

TYPE	ART NO.	
ISO 10	1182060	signal isolator

CONVERTERS

0...10 V -> 3-point control

PMU 3 converts a 0...10 Vdc signal into a 24 Vac 3-point control signal.

Supply	24 Vac, < 1 VA
Input	0...10 Vdc, 1 mA
Output	24 Vac, 2 A, for 3-point actuator
Output (actuator running time)	adjustable, 15...240 s
IP protection class	IP20
Mounting	11-pole relay housing

TYPE	ART NO.	
PMU 3	1182120	from 0...10 V to 3-point converter

CONVERTERS

3-point control -> 0...10 V

UMP 3 converts a 3-point control signal into a 0...10 Vdc signal.

Supply	24 Vac, < 1 VA
Input	10...40 Vac/dc
Output	0...10 Vdc, 1 mA
Output (change speed)	adjustable, 15...240 s
IP protection class	IP20
Mounting	11-pole relay housing

TYPE	ART NO.	
UMP 3	1182150	from 3-point to 0...10 V converter

CONVERTERS

UV 10 is an amplifier for 0...10 V signals. UV 10 can also be used for controlling fluorescent lamps with electronic transformers.

Supply	24 Vac/dc, < 2 VA
Input	0(2)...10 Vdc, < 0,5 mA
Output	0(2)...10 V / 10...(2)0, max. 20 mA
IP protection class	IP20
Dimensions	23 x 77 x 42 mm

TYPE	ART NO.	
UV 10	1182160	signal amplifier

CONVERTERS

0...10 V -> 2 x 0...10 V/3 x 0...10 V

AO 2 and AO 3 are signal converters designed for HVAC applications. The converters divide one 0...10 V signal to two (AO 2) or three (AO 3) 0...10 V signals.

Supply	24 Vac/dc, < 0.5 VA
Input	0...10 Vdc, 0,2 mA
IP protection class	IP20
Mounting	For 35 mm DIN rail
Dimensions	23 x 77 x 41 mm

TYPE	ART NO.	
AO 2	1182220	signal divider, 2 outputs
AO 3	1182210	signal divider, 3 outputs

ELECTRIC POWER REGULATION

BAK 64 binary step controller is designed for controlling electric heating power. It can be used with all systems with 0...10 V outputs. Relays like AR 1 or RY 1 are needed for contact outputs. Power steps must be in binary sequence e.g. 1, 2, 4, 8, 16, 32 kW.

Supply	24 Vac, < 3 VA
Input	0...10 Vdc or 10...0 Vdc
Output	40 Vdc, 100 mA, for AR 1 and RY 1 relays
Step delay	adjustable, 0,7...60 s
IP protection class	IP20
Mounting	11-pole relay housing

TYPE	ART NO.	
BAK 64	1140010	binary step controller
AR 1	1183010	relay with normally open (NO) contact, width 13 mm
RY 1	1183020	relay with change-over contact, width 23 mm

ELECTRIC POWER REGULATION

STS 4 converts 0...10 V signal to one time proportional and up to 3 contact outputs. Each step must be identical in power.

Supply	24 Vac, < 1 VA
Input	0...10 Vdc, 1 mA
Output	35 Vdc, 50 mA, for solid state relay, time proportional
Output	3 x 35 Vdc, 100 mA, for AR 1 and RY 1 relays
Number of steps	selectable, 1...4 pcs
IP protection class	IP20
Mounting	11-pole relay housing

TYPE	ART NO.	
STS 4	1140020	electric power controller
AR 1	1183010	relay with normally open (NO) contact, width 13 mm
PRMK	1140070	solid state relay control signal converter, Vac -> Vdc
PR 10/440	1140060	solid state relay 230...400 Vac, < 10 A, input 3...32 Vdc
PR 50/440	1140030	solid state relay 230...400 Vac, < 25 A, input 3...32 Vdc
RY 1	1183020	relay with change-over contact, width 23 mm

RELAY MODULES

coil 24 Vac/dc

RY 1 and AR 1 are relays with a 24 Vac/dc coil voltage. RYVA 16 can be used for lighting control because it withstands a short-term inrush current peak.

Input	24 Vac/dc, 0,5 VA
Output	250 Vac, 10 A, res.
IP protection class	IP20
Mounting	For 35 mm DIN rail

TYPE	ART NO.	
AR 1	1183010	relay with normally open (NO) contact, width 13 mm
RYVA 16	1183060	relay for fluorescent lamps, 10 A (inrush current < 80 A, < 2,5 ms)
RY 1	1183020	relay with change-over contact, width 23 mm
RY 1-K	1183021	relay with change-over contact, socket connection at the output

RELAY MODULES

RY 1-U and RY 1-U-K are voltage controlled relays with 0...10 V input.

Supply	24 Vac/dc, < 1 VA
Set point	adjustable, 0...10 V
Input	0...10 Vdc, 0,2 mA
Range	0...10 V
Output	250 Vac, 8 A, res., change-over contact
IP protection class	IP20
Mounting	For 35 mm DIN rail
Dimensions	23 x 77 x 41 mm

TYPE	ART NO.	
RY 1-U	1183040	voltage controlled relay
RY 1-U-K	1183041	voltage controlled relay, socket connection at the output

RELAY MODULES

3-speed relay units for controlling fan coils (fan speed). FCRY 3 is for 0...10 Vdc input, and FCRY 3-R is for 3...7 kΩ input.

Supply	24 Vac/dc, < 1.5 VA
Set point	FCRY 3: adjustable, factory settings 2,5 V, 5,0 V and 7,5 V. FCRY 3-R: 3 kΩ = RL4; 4 kΩ = off; 5 kΩ = RL1; 6 kΩ = RL2; 7 kΩ = RL3
Input	0...10 Vdc, 0,2 mA
Output	3 x 230 Vac, 8 A, res. NO (interlocked)
IP protection class	IP20
Mounting	For 35 mm DIN rail
Dimensions	45 x 90 x 48 mm

TYPE	ART NO.	
FCRY 3	1183070	fan coil relay, input 0...10 Vdc
FCRY 3-R	1183080	fan coil relay, input 3...7 kΩ

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RELAY MODULES

TH 5 is a surface mounted driver that can drive several parallel connected thermal actuators.

Supply	24 Vac
Input	5...30 Vac/dc, 10 mA
Output	5 x 24 Vac, 0.6 A, total load max. 3 A
IP protection class	IP66
Material	PP plastic
Mounting	with screws on wall or on junction box (hole distance 60 mm)

TYPE	ART NO.	
TH 5	1183090	driver for thermal actuators, 5 outputs

SET POINT SELECTORS

KASPO 10 is a remote control unit with a 0...10 Vdc output for controlling e.g. temperature, humidity, lights or ventilation fans. Unit can be installed on the flush mounting box. Installation on the wall is possible by using the box sold as an accessory.

Supply	24 Vac/dc, < 0.5 VA
Output	0...10 Vdc, 2 mA
IP protection class	IP20
Dimensions	86 x 86 x 35 mm

TYPE	ART NO.	
KASPO 10.1	1182070	remote control unit, scale 0...100
KASPO 10.2	1182071	remote control unit, scale ±3
KO PRA	KO3602	casing for surface mounting

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TRANSFORMERS

JY is a switch mode power supply converting a 24 Vac/dc supply into a lower DC voltage supply. Electronic protection for overloading.

Supply	24 Vac/dc
Output	3.6...24 Vdc, 1 A (0...12 V); 0,5 A (12...24 V)
IP protection class	IP20
Mounting	For 35 mm DIN rail
Dimensions	45 x 90 x 58 mm

TYPE	ART NO.	
JY	1184020	AC/DC to DC transformer

TRANSFORMERS

M230/24-15 transforms 230 Vac supply to 12/24 Vac supply.

Supply	230 Vac, < 15 VA
Output	24 Vac, 15 VA / 12 Vac, 7,5 VA
IP protection class	IP20
Ambient temperature	0...40 °C
Mounting	For 35 mm DIN rail
Dimensions	35 x 87 x 60 mm

TYPE	ART NO.	
M230/24-15	1184090	transformer

TRANSFORMERS

M230/24-30 transforms 230 Vac supply to 12/24 Vac supply.

Supply	230 Vac, < 30 VA
Output	24 Vac, 30 VA / 12 Vac, 15 VA
IP protection class	IP20
Ambient temperature	0...40 °C
Mounting	For 35 mm DIN rail
Dimensions	54 x 87 x 60 mm

TYPE	ART NO.	
M230/24-30	1184050	transformer

TRANSFORMERS

M230/12-4 transforms 230 Vac supply to 12 Vdc 4 VA supply.

Supply	230 Vac, < 4 VA
Output	12 Vdc, 250 mA
IP protection class	IP20

TYPE	ART NO.	
M230/12-4	1184080	230 Vac/12 Vdc 4 VA power supply

TRANSFORMERS

T20 transforms 230 Vac supply to 24 Vac supply.

Supply	230 Vac, < 20 VA
Output	24 Vac, 20 VA
IP protection class	IP33
Ambient temperature	0...40 °C
Dimensions	61 x 85 x 50 mm

TYPE	ART NO.	
T20	1184100	transformer

TRANSFORMERS

T35 transforms 230 Vac supply to 24 Vac supply.

Supply	230 Vac, < 35 VA
Output	24 Vac, 35 VA
IP protection class	IP44
Mounting	with screws
Dimensions	63 x 103 x 55 mm

TYPE	ART NO.	
T35	1184111	transformer

TRANSFORMERS

T40 transforms 230 Vac supply to 24 Vac supply.

230 Vac -> 24 Vac, 38 VA

Supply	230 Vac, < 38 VA
Output	24 Vac, 38 VA
IP protection class	IP54
Ambient temperature	0...40 °C
Mounting	with screws
Dimensions	77 x 123 x 70 mm

TYPE	ART NO.	
T40	1184120	transformer

TRANSFORMERS

T60 transforms 230 Vac supply to 24 Vac supply.

230 Vac -> 24 Vac, 60 VA

Supply	230 Vac, < 60 VA
Output	24 Vac, 60 VA
IP protection class	IP54
Ambient temperature	0...40 °C
Mounting	with screws
Dimensions	77 x 123 x 70 mm

TYPE	ART NO.	
T60	1184130	transformer

TRANSFORMERS

T120 transforms 230 Vac supply to 24 Vac supply.

230 Vac -> 24 Vac, 120 VA

Supply	230 Vac, < 220 VA
Output	24 Vac, 120 VA
IP protection class	IP54
Ambient temperature	0...40 °C
Mounting	with screws
Dimensions	89 x 174 x 92 mm

TYPE	ART NO.	
T120	1184140	transformer

TRANSFORMERS

T220 transforms 230 Vac supply to 24 Vac supply.

Supply	230 Vac, < 220 VA
Output	24 Vac, 220 VA
IP protection class	IP54
Ambient temperature	0...40 °C
Mounting	with screws
Dimensions	104 x 168 x 105 mm

TYPE	ART NO.	
T220	1184150	transformer

TIMERS

LAP timers are designed for extending plant operating hours by pushing a button. The selected time is indicated by an indicator light.

Supply	24 Vac / 230 Vac, 2 VA
Accuracy (time)	±10 s/h
Output	250 Vac, 8 A, res., change-over contact
IP protection class	IP20
Mounting	on a junction box or on the wall surface, surface mounting casing included

TYPE	ART NO.	
LAP 1	1185025	12...60 minutes (max. time can be restricted to 12...36 minutes)
LAP 5	1185020	1...5 hours (max. time can be restricted to 1...3 hours)
LAP 10	1185021	2...10 hours (max. time can be restricted to 2...6 hours)

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PUSH BUTTONS

PJP is a low voltage push button device with 1, 2 or 4 buttons and indicator lights. The indicator lights are controlled externally.

Output	60 Vdc, 0.8 A
IP protection class	IP20
Mounting	flush (surface mounting casing optional)

TYPE	ART NO.	
PJP 1	1185030	1 push button and 1 indicator light
PJP 2	1185031	2 push buttons and 2 indicator lights
PJP 4	1185032	4 push buttons and 4 indicator lights
KO PRA	KO3602	casing for surface mounting

I/O MODULES

MIO 12 I/O modules can read analogue and/or digital inputs, and control thermal or 3-point actuators and also 0...10 V analogue outputs. The module has RS-485 connection for Modbus RTU communication.

Supply	24 Vac, < 2 VA
Output (voltage)	4 x 0...10 Vdc, 2 mA
Output (triac)	4 x 24 Vac, 1 A, for thermal actuators or two 3-point actuators
IP protection class	IP20
Ambient temperature	5...40 °C
Mounting	For 35 mm DIN rail
Dimensions	53 x 90 x 58 mm

TYPE	ART NO.	
MIO 12-PT	1181300	Modbus I/O, 4 analogue inputs (Pt1000) or potential free digital inputs
MIO 12-V	1181310	Modbus I/O, 4 analogue inputs (0...10 V) or potential free digital inputs
MIO 12-NILG	1181320	Modbus I/O, 4 analogue inputs (Ni1000-LG) or potential free digital inputs

CASINGS

KO IVS is a protective casing for room sensors in spaces like sports halls. Casing is transparent and with a lock.

Ambient temperature	0...50 °C
Mounting	with screws (included)
Materials	PC plastic
Dimensions	136 x 136 x 40 mm

TYPE	ART NO.	
KO IVS	KO5239	protective casing for room sensors

INDICATOR LIGHTS

LEKA 24 is an indicator light device with green and red light.

Supply	24 Vac/dc, < 0.5 VA
Input	2 x 24 Vac/dc
IP protection class	IP20
Mounting	flush (surface mounting casing optional)
Dimensions	85 x 85 x 17 mm

TYPE	ART NO.	
LEKA 24	1185090	indicator light
KO PRA	KO3602	casing for surface mounting

AIR FLOW PRODUCT SELECTION GUIDE

Application		Air flow measurement products				
		IVL	PEL 2500 [3]	IML	PEL 2500 [3] + PP-PK/PP-SK	IML + PP-PK/PP-SK
Fan flow (fan with measuring inlets)	The fan K-value is known			• [1]		
	The fan K-value is unknown		•			
Flow in duct	Customer's probe for which the K-value is known			•		
	Customer's probe for which the K-value is unknown		•			
	Probe not available (air velocity and temperature measurement)	•				
	Probe not available (air volume measurement)	• [2]			•	• [1]
Page		30	27	28	27 and 29	28 and 29

[1] Supported fan manufacturers: Fläkt Woods, Rosenberg, Comefri, Ziehl-Abegg, ebm-papst, Nicotra and Gebhardt. Universal formula available for other manufacturer's fans.

[2] Air volume = air velocity x duct cross section area.

[3] PEL 2500 with flow linear output (Q).

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CONTROLLER SELECTION GUIDE

		Controller																		
		HLS 16	HLS 21	HLS 33	HLS 44	HLS 44-V	HLS 44-CO2	HLS 44-3P	HLS 44-6W	HLS 44-BAC	HLS 44-EC	HLS 45	R402	PDS 2	PDS 2.2	HS 2.2-M	C221	C222	C230	CU
Application	4-pipe fan coil unit control		•	•	•	•	•	•	•	•	•	•					•	•	•	•
	2-pipe fan coil unit control											•								•
	Floor heating	•	•									•								•
	Floor heating/cooling	•										•								•
	Chilled beam	•	•	•	•	•	•	•	•	•	•	•	•				•	•	•	•
	Heating radiator control	•	•	•	•	•	•	•	•	•	•	•	•				•	•	•	•
	Domestic water temperature control													•						
	Air handling unit control													•						
	6-way valve control								•			•					•	•	•	•
	Universal controller														•	•				
	Middle roof installation																•	•	•	•
Actuator	Thermal	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	3-point		•					•				•	•	•	•	•				•
	0…10 V			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Function	Control stages	1	2	2/3	2/3	2/3	2/3	2/3	2/3	2/3	2/3	1/2	2/2	1	1	1	2/2	2/2	2/2	2/2
	Control modes	P	P	P	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI
	3-speed fan control with FCRY 3			•	•	•	•	•	•	•	•						•		•	•
	EC fan control					•	•	•	•	•	•									•
	VAV control				•	•	•	•	•	•	•	•					•	•	•	•
	Summer/winter	•										•								
	CO_2 based ventilation control					•	•	•	•	•	•						•	•	•	•
	Lighting control on/off						•													
	Modbus				•	•	•	•	•	•	•		•	•	•	•	•	•	•	•
	BACnet									•										•
	Page	16	15	15	14	14	14	14	14	14	14	14	16	21	21	22	20	20	19	18

		Transmitters with control output																			
		HDH, HDK, HDU	ILH, ILK	IML	KLH	KLK	LLK, LUK	PEL 1000	KPEL, KPEL 9K	TEAT	TEHR	TEK	TEKA	TEKV	TEKY	TENA	TEP	TEPK	TEU	TEV
Control output	4…20 mA					•	•		•	•	•	•	•	•	•	•	•	•	•	•
	0…10 V	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	Relay	•	•		•	•														
Function	Control stages	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Control modes	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI	P/PI
	Cooling control	•	•		•		•			•	•	•	•	•	•	•	•	•	•	•
	Heating control	•	•	•	•	•				•	•	•	•	•	•	•	•	•	•	•
	CO_2 control	•																		
	VOC control		•																	
	Humidity control	•	•																	
	Pressure control			•				•	•											
	Modbus	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•		•
	BACnet	•																		
	Page	34	37	28	31	33	74	27	27	53	71	60	61	55	64	54	57	58	73	56

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Product		Measured property														
Type	Page	°C	RH	CO$_2$	VOC	CO	Pa	bar	m/s	⟳	m³/s	lux	W/m²	H$_2$O	PIR	⊓ Qty
HDH	34	•	•	•											•	
HDHFL	49	•	•	•												
HDK	35	•	•	•												
HDU	36	•		•												
HML	39					•										
ILH	37	•	•		•											
ILK	38	•	•		•											
IML	28						•				•					
IVL	30	•							•							
KA 10	78													•		
KLH	31	•	•													
KLHJ	32	•	•													
KLK	33	•	•													
KLU	32	•	•													
KLUFL	48	•	•													
LA	82...83														•	
LAFL	49											•			•	
LLK V2	74	•														
LUK V2	74	•														
LUX	39...40	•										•				
MMSP1	40												•			
PAFL	50															•
PEK / CPS	81						•									
PEL	27						•									
PLT	83														•	
TEAT	53	•														
TEFL	47	•	•													
TEHR	69...71	•														
TEHU	72	•														
TEK	60	•														
TEKA	61...62	•														
TEKHA	59	•														
TEKV	55	•														
TEKY	64...66	•														
TEL	67	•														
TEM	68	•														
TENA	54	•														
TEP	57	•														
TEPK	58	•														
TES	74	•														
TESK	63	•														
TEU	73	•														
TEUFL	48	•														
TEV	56	•														
TUNA 20	42								•							
UV7+UV7-VV	42								•	•						
VPEL	41							•								
VPL	41							•								
VS 3000	43								•	•						
VVA / VVN	80													•		

Type	Output								Commissioning tool
	Ω	V	mA	relay	Modbus	BACnet	wireless	controller	
HDH		•		•	•	•		•	ML-SER
HDHFL		•					•	•	FLSER / ML-SER
HDK		•		•	•			•	ML-SER
HDU		•		•	•			•	ML-SER
HML		•	•						
ILH		•		•	•			•	ML-SER
ILK		•		•	•			•	ML-SER
IML		•			•				
IVL		•	•						
KA 10		•		•					
KLH		•	•	•	•			•	ML-SER
KLHJ		•	•						
KLK		•	•	•	•			•	ML-SER
KLU		•	•						
KLUFL		•	•				•		FLSER
LA				•					
LAFL							•		FLSER
LLK V2			•					•	ML-SER
LUK V2		•						•	ML-SER
LUX		•	•						
MMSP1		•	•						
PAFL							•		FLSER
PEK / CPS				•					
PEL		•	•		•			•	ML-SER
PLT				•					
TEAT	•	•	•		•			•	ML-SER
TEFL							•		FLSER
TEHR	•	•	•		•			•	ML-SER
TEHU	•								
TEK	•	•	•		•			•	ML-SER
TEKA	•	•	•		•			•	ML-SER
TEKHA	•								
TEKV	•	•	•		•			•	ML-SER
TEKY	•	•	•		•			•	ML-SER
TEL	•								
TEM	•								
TENA	•	•	•		•			•	ML-SER
TEP	•	•	•		•			•	ML-SER
TEPK	•	•	•					•	ML-SER
TES	•								
TESK	•	•	•						
TEU	•	•	•					•	ML-SER
TEUFL							•		FLSER
TEV	•	•	•					•	ML-SER
TUNA 20		•	•						
UV7+UV7-VV		•							
VPEL		•	•						
VPL		•	•						
VS 3000		•							
VVA / VVN	•								

8

SENSOR CHARACTERISTICS

Sensor element	Pt 100	Pt 1000	Ni 1000	Ni 1000-LG	NTC 1.8	NTC 2.2	NTC 3.0	NTC 10	NTC 20	NTC 10-AN	NTC 10-C	NTC 10-KB	KP 10	T1
Tol.	±0,3°C/0°C EN60751 B	±0,3°C/0°C EN60751 B	±0,4°C/0°C DIN43760	±0,4°C/0°C tcr 5000ppm Siemens	±0,3°C/25°C TAC	±0,25°C/25°C Johnson	±0,25°C/25°C	±0,25°C/25°C Trend / Distech	±0,25°C/25°C H&W	±0,25°C/25°C Andover	±0,25°C/25°C Carel	±0.5°C/25°C	LM235Z 10 mV/K	±0,4°C/0°C
Temp. °C	Ω	Ω	Ω	Ω	Ω	Ω	Ω	Ω	Ω	Ω	Ω	Ω	V	Ω
140	153.38	1533.8	1909	1737	71	53	70	235	351	298	381	324		
130	149.82	1498.2	1833	1675	87	68	90	301	459	377	474	385		3675
120	146.06	1460.6	1760	1615	110	90	117	389	609	483	597	467		3552
110	142.29	1422.9	1688	1557	139	115	153	511	818	624	758	576		3430
100	138.50	1385	1618	1500	178	153	204	679	1114	817	973	723	3,73	3311
95	136.60	1366	1583	1472	202	178	236	787	1307	940	1108	815	3,68	3252
90	134.70	1347	1549	1444	230	207	275	916	1541	1084	1266	923	3,63	3194
85	132.80	1328	1516	1417	264	241	321	1071	1823	1255	1451	1048	3,58	3136
80	130.89	1308.9	1483	1390	303	283	377	1256	2166	1458	1668	1194	3,53	3079
75	128.98	1289.8	1450	1364	349	334	444	1480	2585	1700	1924	1364	3,48	3022
70	127.07	1270.7	1417	1337	403	395	525	1751	3099	1990	2228	1562	3,43	2966
65	125.16	1251.6	1385	1311	468	469	625	2082	3732	2339	2588	1791	3,38	2910
60	123.24	1232.4	1353	1285	545	560	746	2488	4517	2760	3020	2056	3,33	2855
55	121.32	1213.2	1322	1260	638	673	896	2986	5494	3271	3536	2358	3,28	2800
50	119.40	1194	1291	1235	750	811	1080	3600	6718	3893	4160	2702	3,23	2745
45	117.47	1174.7	1260	1210	885	984	1310	4365	8259	4656	4911	3088	3,18	2692
40	115.54	1155.4	1230	1186	1049	1200	1598	5323	10211	5594	5827	3517	3,13	2638
35	113.61	1136.1	1200	1162	1250	1471	1959	6528	12698	6754	6940	3987	3,08	2585
30	111.67	1116.7	1171	1138	1496	1814	2417	8054	15887	8197	8313	4492	3,03	2532
29	111.28	1112.8	1165	1132	1552	1893	2522	8408	16628	8525	8622	4597	3,02	2522
28	110.90	1109	1159	1128	1610	1977	2633	8777	17407	8869	8944	4703	3,01	2512
27	110.51	1105.1	1153	1123	1671	2064	2749	9165	18228	9229	9281	4809	3,00	2501
26	110.12	1101.2	1147	1119	1734	2156	2872	9572	19092	9606	9632	4917	2,99	2491
25	109.73	1097.3	1141	1114	1800	2252	3000	10000	20000	10000	10000	5025	2,98	2480
24	109.35	1093.5	1136	1109	1869	2353	3135	10452	20962	10413	10380	5134	2,97	2470
23	108.96	1089.6	1130	1105	1941	2458	3277	10923	21973	10845	10780	5243	2,96	2460
22	108.57	1085.7	1124	1100	2017	2572	3426	11417	23039	11297	11200	5353	2,95	2449
21	108.18	1081.8	1118	1095	2095	2689	3583	11938	24164	11771	11630	5462	2,94	2439
20	107.79	1077.9	1112	1091	2177	2813	3748	12490	25350	12268	12090	5573	2,93	2429
15	105.85	1058.5	1084	1068	2649	3538	4714	15710	32346	15136	14690	6126	2,88	2377
10	103.90	1039	1056	1045	3241	4482	5971	19900	41567	18787	17960	6667	2,83	2326
5	101.95	1019.5	1028	1022	3989	5718	7619	25400	53812	23462	22050	7183	2,78	2276
0	100.00	1000	1000	1000	4940	7353	9795	32660	70203	29490	27280	7661	2,73	2226
-5	98.04	980.4	973	978	6159	9533	12694	42340	92322	37316	33900	8093	2,68	2176
-10	96.09	960.9	946	956	7730	12460	16589	55340	122431	47549	42470	8472	2,63	2127
-15	94.12	941.2	919	935	9771	16428	21868	72980	163777	61030	53410	8796	2,58	2078
-20	92.16	921.6	893	914	12443	21860	29092	97120	221088	78930	67770	9067	2,53	2030
-25	90.19	901.9	867	893	15969	29398	39073	130400	301297	102890	86430	9288	2,48	1982
-30	88.22	882.2	842	872	20659	39908	53005	177000	414698	135233	111300	9466	2,43	1934
-35	86.25	862.5	816	851	26955	54751	72658	243120	576763	179280		9605	2,38	
-40	84.27	842.7	791	831	35480	75953	100701	337270	810861	239831		9712	2,33	
-45	82.29	822.9	767	811	47135	106603	141183	473370	1152992	323859		9793		
-50	80.31	803.1	743	791	63229	151470	200348	672600	1659082	441667		9854		

8

PRODUAL MyTool™ APPLICATION

An ideal single commissioning tool on your mobile phone or tablet

▸ *Free Android application for commissioning and configuration of all the Produal PUMP™ platform-based products*

▸ *Ease of use and a and unified user experience on your mobile phone or tablet, with wireless connection via Bluetooth*

▸ *Produal MyCloud cloud service to help keep configuration and project information secured, and minimizing the risk of human error with parameters*

Coming up: connectivity to 3rd party cloud/system

- secured data connection
- configuration settings backup
- firmware updates

- wireless commissioning
- configuration modification
- firmware updates

BMS (RS-485 or ethernet, with Modbus or BACnet)

Firmware updates

With a couple of button presses, you can update the firmware in Produal PUMP™ products. This enables you to update all devices with new options and features in the future.

Easy and fast configurations

Reach all parameters of a Produal PUMP™ device from the configuration menu in Produal MyTool™ application. Configuration menus are easy to navigate and simple to understand.

Test installations

With the test installation menu, you can read real-time measurement data and force outputs, when you want to test the system after installation.
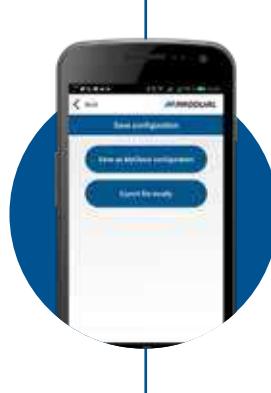
Store configurations

You can store and reuse the configurations you create in Produal MyCloud, your personal storage space. Or you can store a configuration on the local file system on an Android device.

9

COMMISSIONING TOOLS FOR EASY AND QUICK CONFIGURATIONS

ML-SER

Easy and quick tool for commissioning on the field

▶ *Configuration tool for Produal transmitters*
▶ *Easy to configure the settings or execute a one-point field calibration when required*
▶ *Configuration of one device at a time*
  - *Activation of built-in controller option*
  - *Modbus addressing*
  - *Factory settings restore*

Examples:

1 Easy configuration of the controller functions for the CO_2 room transmitter

2 Easy tuning of the duct sensor's temperature measurement

3 Easy configuration of the differential pressure transmitter's user selectable measurement and output ranges

See the sensor and transmitter selection guide (page 102)

OTHER USEFUL CONFIGURATION TOOLS

▶ *Configuration tools for HLS temperature controllers: HLS 44-SER (page 14), HLS 44-CO2-SER (page 14), HLS 44-3P-SER (page 14), HLS 44-6W-SER (page 14), HLS 45-SER (page 14)*
▶ *Commissioning tool H402 for R402 (page 16)*
▶ *Configuration tool H203 for C230 (page 19), C221 and C222 (page 20) control units*
▶ *Wireless configuration tool FLSER (page 46)*
▶ *Tool for monitoring wireless network FLSNIF (page 51)*

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