Dear business partner,

For more than 20 years at EAP Electric GmbH we have been offering both standard and customer specific products. In the last few years, due to the large demand and satisfaction of our customers, we have concentrated our efforts in the sector of bus components with the interface RS485, Modbus-RTU, Ethernet Modbus TCP/IP.

The modern design of our products matches perfectly with modern architecture, meaning you are ideally equipped for the future.

We use our know-how in the area of electronics components and fieldbus technology in the building and domestic sector, HVAC, mechanical engineering and industrial sector. With our devices we cover many application areas, in order to implement cost efficient overall solutions.

Our customers have access to a wide range of hardware and software components as well as reliable free technical support.

Based on the wishes of our customers, as well as from our ideas and rapid implementation, we have produced the exceptionally comprehensive product portfolio of bus compatible devices, which are you can find in this NEW CATALOGUE automation technology/bus components 2019.

Kind regards, Herbert Perger

P.S.: Do you have any questions about our products? Call us at +43 2162 67910 or send an e-mail to office@eap-electric.at
THE ROUTE TO GREATER EFFICIENCY - COMPLETE SOLUTION WITH THE LATEST PRODUCTS FROM EAP ELECTRIC GMBH

Energy monitoring for optimum energy and cost efficiency (energy meters available)

With the bus components with RS485 interface Modbus®-RTU or Ethernet Modbus®-TCP-IP EAP offers you a comprehensive product range for cost optimisation of your new or existing systems. These high-quality and cost-effective components will enable you to win and implement even projects which are highly sensitive to cost.

... and if despite numerous options a special solution is required, we will be happy to look at possibilities using our many years of experience and technical know-how within the development department.

EAP IN-HOUSE DEVELOPMENT

e.g. OEM development British Telecom
R02 - THE NEW CONTROL AND REGULATION DEVICE
with integrated Linux board

The R02 is the further development of the R01.8DI and is a free programmable regulation/control device (PLC) with integrated Linux board. With this, we offer you a low-cost alternative to traditional PLCs. The MODULE 2020 expansion modules can also be used as expansion modules. For visualisation, our EAP RBG LEONIS or TAURIS can be implemented.

freely programmable
according to IEC61131-3 with logi.CAD3

in the 3rd quarter 2019: free EAP programming software
with simple graphical interface inc.
pre-made function blocks/building blocks
for a wide range of applications, such as e.g. heating, ventilation,
for mixers, solar controllers, lights and blinds, etc.

✔ Freely programmable regulating/control device (PLC) according to IEC61131-3
✔ Interfaces: internal Modbus-RTU, external RS485, RS232 (optional KNX), on the Linux subboard: Ethernet, USB.
✔ High performance 4-core CPU with 700 MHz and 512MB RAM.
✔ The directly attached I/O modules are automatically detected and included.
✔ Graphical presentation on various end devices possible.
✔ Low current consumption
✔ Location-independent processing - remote maintenance possible. The complete system (e.g. house) can be controlled and regulated as usual with keys, switches, RCD (Leonis, Tauris), smartphone and tablet.
R01.8DI - THE NEW CONTROL/REGULATION DEVICE
Modbus®-TCP/IP with switch and Modbus®-RTU Gateway (Master)

Designed as a modular concept for the demands of the new, flexible home, building and system technology - in this way you can already experience the future. Easier than ever before!

No programming knowledge required, no installation or licenses. The function of the R01 can be created very simply with a web based interface (software runs completely on the R01, to operate it only a browser such as Chrome or Firefox is necessary). When doing so, the function can be created very flexibly with ready-made function blocks by dragging and dropping and graphical programming (inputs and outputs via drop-down menu).

Advantages

✔ Maximum flexibility thanks to the modular design - I/O expansion with the expansion modules in the MODULE 2020 series.
✔ The Modbus RTU Gateway allows the connection of EAP bus sensors, RBG (LEONIS, TAURIS) and other third-party products.
✔ 3 quarter 2019: Ready-made building blocks for a wide range of functions are being prepared such as e.g. for mixer, solar control, and so on.
✔ Very short reaction times, since the data are processed locally (ideally suited for buttons).
✔ The R01.8DI can process one or more different circuits.
✔ Direct display of the digital I/O via Duo-LED.
✔ via TCP/IP the control can be deactivated and used as a slave.
✔ Can be programmed as a single room controller.
OPTIMISED FOR REAL LIFE REQUIREMENTS

The modular I/O system from EAP comprises a base module with LCD and 4 buttons with Modbus®-RTU or Ethernet Modbus® TCP-IP, which can control up to 15 expansion modules (whole range of digital and analogue I/Os).

Slave design - can be combined with the following controllers / PLC: EAP R01.8DI. Modbus TCP/IP, Priva, Wago, Loxone, Beckhoff, Schneider and many more

Templates for the application of various regulators/controllers are available - ask us!

Advantages

✔ Modular structure provides optimum flexibility - expansion modules can be plugged/unplugged in operation.
✔ Developed for open networks (not tied to supplier).
✔ Stable and secure communication with Modbus RTU or TCP/IP.
✔ Customer-specific designs possible on request.
✔ Very easy parameter setting online, but also off-line using PC configuration software.
LATEST TECHNOLOGY

The menu-driven operation and display directly on the base module in most cases does away with the need for mechanical manual operation level on the expansion modules.

Optimisation using accessories

Control panels for door installation, labelling fields, subprints and connecting cables for 2nd row control cabinet.

Further advantages

✔ Plug terminals with push-in connector up to 2.5mm².
✔ Micro-SD card slot allows the current firmware to be loaded.
✔ The base unit with Ethernet Modbus TCP/IP connection has an integrated switch (2 ports for looping) - higher throughput during data transmission.
✔ Bus protected against 24V and galvanically separated.
✔ Integrated terminating resistor can be activated with jumper and protected against 24V.
✔ Lower bus loading through more I/O per connection.
✔ Number and type of expansion modules can be acquired in an input registry.
✔ Expansion modules with two-colour LED for mode as standard.
USER-FRIENDLY PC CONFIGURATION SOFTWARE FOR MODULE 2020

For the MODULE 2020 we provide free PC configuration software for PC and tablets (Caution: USB/RS485 converter required).

This allows simple parameter setting of the permanent registry (configuration registry) and commissioning. The quick commissioning is made possible through monitoring the in/outputs and configuration registries, as well as modification of the output conditions or input values. The complete configuration of a base module can be saved.

Advantages

✔ Does not need to be installed, is only listed in a directory.
✔ The processing is possible online but also offline.
✔ Hardware properties and all relevant data are automatically read in.
✔ Setting as Drop-Down menu - possible settings can be selected.
✔ Interface largely self-explanatory.
INNOVATION:
ROOM CONTROL DEVICES RECESSED
Optionally: can be programmed as a single room controller

LEONIS
✔ with RS485 interface Modbus®-RTU
✔ with capacitive buttons, 2.4” RGB TFT
✔ Humidity and temperature sensor
✔ up to 8 freely configurable (programmable) buttons
✔ Set point adjusters
✔ in black anodised or white powder-coated alu frame
✔ Surface mounted frame white available

TAURIS
with 4.3” TFT Modbus TCP/IP (with web browser and Linux operating system) and Modbus RTU Gateway, which allows the connection of the EAP controller R01.8DI. Modbus TCP/IP, EAP bus sensor or other third party products.

Advantages
✔ Glass front (hygienic)
✔ Black anodised or white powder-coated alu frame
✔ short reaction times
✔ fast installation
✔ Graphic and plain text display
✔ with free easy-to-configure PC software (buttons, displays)
PREVIEW CATALOGUE 2 - SENSOR-, CONTROL- AND DRIVE TECHNOLOGY

You will find additional devices in the well-known reliable quality in our Catalogue 2 Sensor-, control- and drive-technology.

Products direct from the manufacturer - reliable quality - exceptional commercial products

Find out more on our website www.eap-electric.at or order our Catalogue 2 at office@eap-electric.at
1. ROOM OPERATING AND CONTROL DEVICES
Room control unit LUNA 2.4” Modbus®-RTU, TAURIS 4.3” Modbus®-TCP/IP, controller R01.8DI with switch Modbus®-TCP/IP, controller R02 without switch with integrated Linux board

2. MODULE 2020
Modular I/O System with base module B01.8DI RS485 Modbus® RTU or B02.8DI Ethernet - Modbus TCP/IP with switch and Modbus RTU Gateway, energy meter

3. STANDARD FIELD BUS DEVICES
I/O modules with Modbus® RTU / S-Bus

4. APPLICATION-SPECIFIC FIELD BUS DEVICES
Fieldbus devices for controlling fire protection flaps, valves or pumps, fieldbus devices as replacement for Messner (Vario-Miles), fieldbus adapter modules to Staefa and Johnson Controls

5. TEMPERATURE SENSOR RS485
contact, external, submerged, duct, sleeve sensor RS485 Modbus RTU / S-Bus

6. HUMIDITY, AIR QUALITY AND CO₂-SENSOR RS485
External, duct and room humidity and temperature sensor, multifunctional duct or room bus device for CO₂, air quality, humidity and temperature, dew point monitor

7. GATEWAYS, REPEATERS, SWITCHING POWER SUPPLIES
Gateways, repeaters, switching power supplies, active bus termination

8. ACCESSORIES, DATASHEETS
Housing series LUNA external housing, room housing, universal housing - compression fitting - mounting flange - sun- and ball stroke protection - sensor brackets for sleeve temperature probes - cable binders for contact sensor - immersion pockets - sensors, connecting cables - sensor resistance table - General description regarding air quality sensors
1. ROOM OPERATING AND CONTROL DEVICES

- **RBG LEONIS**: 2.4“ room control device recessed Modbus®-RTU, external gateway to TCP/IP ........................................ Page 1-2
- **RBG TAURIS**: 4.3“ Room control device recessed Modbus®-TCP/IP, Linux operating system, web browser ........................................ Page 3
- **R01.8DI**: Regulating/control device Modbus®-TCP/IP with switch. Modbus®-RTU Gateway ........................................ Page 4
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2. MODULE 2020

- **MODULE 2020**: with RS485 Modbus®-RTU or Ethernet Modbus® TCP/IP .............................................................................................. Page 6-9, 11-16
- **E3PWR**: energy meter - expansion module for MODULE 2020 ........................................................................................................ Page 10

3. STANDARD FIELD BUS DEVICES

- **FB**: fieldbus device with RS485 interface ........................................................................................................ Page 17-26

4. APPLICATION-SPECIFIC FIELD BUS DEVICES

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- **VSC1.RS485**: Fieldbus device for control of valves ........................................................................................................ Page 29
- **FB6PUMP.RS485**: Fieldbus device for control of pumps ........................................................................................................ Page 30
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- **FB**: Fieldbus adapter modules as replacements for Staefa or Johnson Controls ........................................................................ Page 35

5. TEMPERATURE SENSOR RS485

- **ALT1 RS485**: Contact temperature sensor with axial sensor tube with RS485 interface ....................................................... Page 36
- **ALT2 RS485**: Contact temperature sensor inc. clamping band with RS485 interface ....................................................... Page 37
- **ATF2 RS485**: External temperature sensor with external sensor tube with RS485 interface ....................................................... Page 38
- **ETF1 RS485**: Submersible temperature probe TH-MS with RS 485 interface ........................................................................ Page 39
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- **KTF1 RS485**: Duct temperature sensor inc. mounting flange with RS485 interface ....................................................... Page 41
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6. HUMIDITY, AIR QUALITY AND CO₂ SENSOR RS485

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- **RFTT RS485**: Room humidity and temperature sensor with RS485 interface ........................................................................ Page 48
- **TW RS485**: Dew point monitor with RS485 interface ........................................................................ Page 49
- **KCO2 + xxx RS485**: Multi-function duct bus device with RS485 interface ........................................................................ Page 50
- **RCO2+T+xx RS485**: Multi-function room bus device with RS485 interface ........................................................................ Page 51

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- **Repeater RS485**: with galvanic separation and overvoltage protection ........................................................................ Page 53
- **NEW Bus termination**: active RS485 ........................................................................ Page 54
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8. ACCESSORIES, DATASHEETS

- **Housing series Luna** ........................................................................ Page 56
- **Screw fittings, installation accessories** ........................................................................ Page 57
- **Immersion pockets** ........................................................................ Page 58
- **Sensors, connecting cables** ........................................................................ Page 59
- **Sensor resistance characteristic curve** ........................................................................ Page 60
- **General description air quality** ........................................................................ Page 61
RBG LEONIS Room control unit recessed mount 2.4“ TFT
Modbus®-RTU, glass front / black anodised alu frame or white

Application
LEONIS is a room control unit with an RS485 interface with Modbus®-RTU protocol and 8 parametrisable capacitive buttons and 1 parametrisable slider. Furthermore, 2 fixed defined capacitive buttons are present for the system. In each case up to 5 screens with up to 16 symbols each and 16 texts can be configured. A graphical tool is available for Windows PCs for this, where the look of the configuration can be created easily on the PC. In addition, there is an integrated RH+T sensor. The room control unit can be used as a slave version and as a single room controller (with customer-specific software from EAP on request). Application in the medical sector, in building engineering and industry. NEW: Surface mount housing white available as accessories.

Technical specifications
Supply voltage: 24V DC +10%, - 5%
Power: approx. 0.3 W
Display type: 2.4” RGB TFT
Resolution: 320 x 240 pixels, 65535 colours
Processor slave: 32 Bit, 48 MHz, 256k Flash, 32k RAM
Bus system slave: 1x RS485 Modbus®-RTU
Actual value: Temperature and RH / AH
Inputs: 2DI 24V / 5mA
Function buttons: 8 parametrisable capacitive buttons - can be comprehensively configured, 2 fixed defined capacitive buttons, 1x parametrisable sliders
Set point adjusters: configurable
Display: up to 16 images and 16 texts per screen with the images and texts being possible to index. The images can be different sizes and positioned anywhere. The texts can be Tact, Tset, RH, AH, numbers in different formats, texts, date, time, etc.
Menu buttons: +, - buttons comprehensively configurable
Terminating resistor: can be activated with jumper
Parity: N,E,O can be set
Baud rate: adjustable up to 115200 Baud
Environmental temperature: 0...+50°C
Humidity: < 80 % RH, non-condensing air
Connection: plug-in double push-in terminals up to 1.5mm²
Installation: on rec. box diam. 55mm
Housing: with glass front and black alu frame anodised or white powder-coated (or alternatively plastic housing)
Dimension: WxHxD 80 x 100 x 11.5 mm
Protection type: IP30
RBG LEONIS Room control unit recessed mount 2.4” TFT
Modbus®-RTU, glass front / black or white anodised alu frame

Benefits which our customers appreciate

- Glass front (hygienic)
- Short reaction times
- Fast installation
- Optionally can be used as a single room controller (with customer-specific software from EAP on request)
- Graphic and plain text display
- With free easy-to-configure PC software (buttons, displays)

Examples of display screens / PC configuration

Surface mounted frame

Connection example LEONIS Slave

Room control unit recessed mount RBG LEONIS 2.4” TFT

<table>
<thead>
<tr>
<th>Type</th>
<th>Processor</th>
<th>Connections</th>
<th>Colour</th>
<th>Item no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>RBG LEONIS Slave</td>
<td>32 bit, 48Mhz, 256k Flash, 32k RAM</td>
<td>1 x RS485 Slave</td>
<td>black</td>
<td>5401-S</td>
</tr>
<tr>
<td>RBG LEONIS Slave</td>
<td>32 bit, 48Mhz, 256k Flash, 32k RAM</td>
<td>1 x RS485 Slave</td>
<td>white</td>
<td>5401-W</td>
</tr>
</tbody>
</table>

Accessories

Surface mounted frame white WxHxD: 76x96x15.6mm white 5785

PC configuration software is available to download free of charge
RBG TAURIS Room control unit recessed mount 4.3" TFT
Modbus®-TCP/IP with Linux operating system and Modbus®-RTU Gateway

Application
TAURIS 4.3" is a room control device with a Modbus®-TCP/IP interface with a Linux operating system and integrated Modbus®-RTU Gateway. The room control unit can be used as a slave version (without special software via HTML browser function as control element for PLCs) or master version (as a compact industrial PC or as a PC-based controller). The application functions as a controller and visualisation in the medical sector, in the building industry and the industrial sector.

Technical specifications
- Supply voltage: 24V DC ±10%
- Power: 3W
- Display type: 4.3" TFT with projected capacitive Multi-Touch
- Resolution: 272x480 pixels
- Colour: 65535 colours
- Backlight: dimmable
- Processor: ARM Cortex A8 CPU, ARM Mali 400 GPU
- SD-card: included in scope of supply
- Cycle frequency: 1 GHz
- Memory: 8 GB uSD Card, 512 MB RAM
- Bus system: Modbus®-TCP/IP with Linux operating system Ethernet: 10/100MBit auto MDIX, DHCP or fixed IP address
- Connections: 2 x RJ45 TCP
- Modbus RTU-Gateway for connecting sensors and detached devices
- Configuration: menu-driven via web browser
- IP parameters: adjustable
- Environmental temperature: 0...+50°C
- Humidity: < 90 % RH, non-condensing air
- Connection: 1xRJ45 TCP/IP
- Installation: on REC box Ø 55mm or control cabinet door (vertical or horizontal)
- Housing: with glass front and black anodised alu frame
- Dimensions: WxHxD 79x120x11mm
- Protection type: IP30

Caution: 0V must be directly connected to functional earth in order to ensure reliable touch function.

Benefits which our customers appreciate
- Glass front (hygienic), short reaction times, fast installation
- with projected capacitive multi touchscreen
- the programming as slave is done within a PLC which creates a webpage with HTML5 for the Taurus. In Taurus, no customer-specific software is then required

Room control unit recessed mount RBG TAURIS 4.3" TFT

<table>
<thead>
<tr>
<th>Type</th>
<th>Colour</th>
<th>Item no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>RBG Taurus 4.3&quot;</td>
<td>black</td>
<td>5420</td>
</tr>
</tbody>
</table>

Programming according to IEC 61131-3 with logi.CAD 3

EAP programming software inc. function blocks (in 3rd quarter 2019)
R01.8DI regulator/control unit
Modbus®-TCP/IP with Switch, Modbus®-RTU Gateway

Application
The R01.8DI Modbus®-TCP/IP is a regulation/control unit with an RS485 / Ethernet interface. The application is in domestic, building and plant technology. Ready-made building blocks (applications), logic and time functions are integrated which can be easily programmed and parameters set in a browser environment, meaning that no programming knowledge is needed. Via the Modbus®-RTU interface, EAP bus sensors, room control devices (Leonis, Tauris) and also other third party devices can be connected. For expansion of the I/Os, up to 15 expansion modules (248 I/Os) of the MODULE 2020-series can be used.

Technical specifications
Supply voltage: 24V DC +10%, -5%
Idle current: 70mA
max. Current consumption: 100mA + 5mA/DI input
Bus protocol: Ethernet Modbus®-TCP/IP Slave
Configuration: menu-driven via web browser
transfer rate: 10/100 MBit
Display: LCD display plain text
Manual operation level: menu-driven operation, display of the actual conditions or actual values
Inputs: 8DI 24V DC, 5mA, pnp or npn,
Connections: Modbus®-RTU for connecting sensors and detached devices
Firmware update: via microSD or ethernet
SD-card NOT included in the scope of supply
Housing: 45mm row design syst. WxHxD: 70x90x58mm
Terminals: Plug terminals with push-in connector up to 1.5 mm²
Installation: Top hat rail TS35
Environmental temperature: -10...+50°C
Protection type: IP20

Benefits which our customers appreciate
- max. flexibility thanks to modular design
- Remote maintenance with control of the I/O and software updates via ethernet
- very short reaction times, since the data are processed locally (ideally suited for buttons)
- The complete system (e.g. house) can be controlled and regulated as usual with keys, switches, RCD (LEONIS, TAURIS), smartphone or tablet.
- via TCP/IP the control can be deactivated and used as a slave
- graphical programming and parameter setting via web browser

Regulating/control device Modbus®-TCP/IP with Switch, Modbus®-RTU Gateway R01.8DI

<table>
<thead>
<tr>
<th>Type</th>
<th>Item no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>R01.8DI Modbus®-TCP/IP</td>
<td>5702</td>
</tr>
</tbody>
</table>
**R02 regulator/control unit**

with integrated Linux board

**Application**
The R02 is a control and regulation device with an integrated Linux board, and the following interfaces: internal Modbus-RTU, external RS485, RS232 (optional KNX) on the Linux sub board: Ethernet, USB. The application is in domestic, building and plant technology. For expansion of the I/Os, up to 15 expansion modules (248 I/Os) of the MODULE 2020-series can be used.

**Technical specifications**
- **Supply voltage:** 24V DC +15%, -5%
- **Current consumption:** 200mA
- **PLC:** integrated Linux board with quad-core up to 700 MHz, 512M RAM
- **Interfaces:** internal Modbus-RTU, external: RS485, RS232, (optional KNX) on the Linux sub board: Ethernet, USB
- **Firmware update:** Module 2020 via micro-SD
- **SD-card NOT included in the scope of supply**
- **Linux PC via ethernet or USB**
- **Housing:** 45mm row design system
- **Terminals:** Plug terminals with push-in connector up to 1.5 mm²
- **Installation:** Top hat rail TS35
- **Environmental temperature:** -10...+50°C
- **Protection type:** IP20

**Benefits which our customers appreciate**
- freely programmable regulating/control device (PLC) according to IEC61131-3 (in 2nd quarter: free EAP programming software with simple graphical interface including ready-made functional blocks/ building blocks for a whole range of applications such as e.g. mixers, solar controllers, light and blinds, and so on)
- high performance 4-core CPU with 700 MHz and 512MB RAM
- administrative remote maintenance with control of the I/O
- graphical presentation of the end devices possible
- I/O modules are automatically detected and included
- max. flexibility thanks to modular design
- The complete system (e.g. house) can be controlled and regulated as usual with keys, switches, RCD (LEONIS, TAURIS), smartphone or tablet.

**Regulating/control device with integrated Linux board, R02**

<table>
<thead>
<tr>
<th>Type</th>
<th>Item no.</th>
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<tbody>
<tr>
<td>R02</td>
<td>5703</td>
</tr>
<tr>
<td>R02 KNX</td>
<td>5704</td>
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</tbody>
</table>

Programming according to IEC 61131-3 with logi.CAD 3

EAP software inc. function blocks (in 3rd quarter 2019)
Module 2020
Modular I/O system with Modbus®-RTU or Ethernet - Modbus® TCP/IP

Application
The Module 2020 from EAP is an I/O system comprising a base module with LCD, four buttons and microSD card slot, which can control up to 15 expansion modules (max. 248 I/Os). On the base module, the outputs can be controlled in a menu-driven way using buttons on the LCD display, or manually on the expansion module via rocker switch (and potentiometer). This I/O system is a logical further development of central and decentralised field bus devices. Just like the fieldbus devices, this system is used to construct distributed systems (fieldbus systems) in the industrial sector, building technology and HVAC. The devices can be arranged centrally and decentraly, and receive and send signals via RS485 Modbus®-RTU or Ethernet Modbus®-TCP/IP from a central CPU (DDC, PLC, PC) or with a HAKKO touch panel.

New: Expansion module Energy meter - see page 10

Technical specifications

**Supply voltage:** 24V DC +10%, -5%
**Idle current:** B01 40mA, B02 110mA
**Max. Current consumption:** see table
**Bus protocol:** RS485 Modbus®-RTU, Ethernet Modbus®-TCP/IP with galvanic separation
**Transmission rate:** 4.800...230,400 Baud

**Base modules:**
B01 with Modbus®-RTU LCD display, 4 buttons, microSD card slot and 8DI 24V (ppn or npn)
B02 with Modbus® TCP/IP 2-Port Switch, LCD Display, 4 buttons, Modbus®-RTU Gateway for connecting Modbus®-RTU sensor, microSD card slot and 8DI-24V (ppn or npn)

**Base module housing:** 45mm row design system
**Display:** LCD display plain text

**Manual operation level:** LCD plain text + 4 button - menu-driven operation / control of the outputs, Display of the actual conditions or actual values

**Expansion modules:**
**Digital input:** 24V DC, 5mA (ppn or npn) inc. meter function up to 100Hz and toggle registry
**Analogue input:** PT100/1000. MR: -100...+500°C, Nt1000, Nt1000 TK5000, KTY81-110, KTY81-210, Resolution 0.1°C and resistance up to 6553.5, NTC5kOhm, NTC10kOhm, NTC20kOhm, resistance up to 6.5 mohm, 0...10V (resolution 1mV), 4...20mA (resolution 1µA)

**Digital output:** Open Collector 1-36V DC npn / 1A, short circuit resistant E8OC - max. frequency 1kHz - 0.1% tolerance. E16OC - max. frequency 250Hz - 1% resistance OCP - 6-36V DC pnp (inc. tolerances) / 1.1A/8 channels in, short-term 2.5A, short circuit resistant, thermally protected 2.2A / if only 1 channel/plug is active, parallel circuit permitted, current adds correspondingly
Module 2020
Modular I/O system with Modbus®-RTU or Ethernet - Modbus® TCP/IP

Technical specifications - continued

Digital output: TR (Triac) - 0-230V AC 50/60 Hz / 0.7 A/8 channels on, startup current 50A/20ms, 4A/5 sec pulse packet control with zero passage throughput, not short circuit and overload resistant. Relay closer 230V AC / 5A ohmic load 230V AC / 0.5 A cos phi 0.4 Relay converter 230V AC / 5A ohmic load 230V AC / 0.5 A cos phi 0.4, HL 55V DC/ 10 A AC1 ohmic load.

Analogue output: 0.10V (unit of 1mV), 4...20mA (unit of 1µA)

Housing expansion module: 45mm row design system

Status display: DUO-LED (red, green, yellow and invertable for DI/DO integrated as standard, 1 x LED for mode number depending on module type - see table

Manual operation level: mechanical control of the outputs via rocker switch and potentiometer

Terminals: Plug terminals with push-in connector up to 2.5 mm²

Installation: Top hat rail TS35

Environmental temperature: -10...+50°C

Accuracy: < 0.1 %, analogue resolution: 0.1°C

EMC: according to EN 61326

Protection type: IP20

Standards: CE conformity

Benefits which our customers appreciate
- completely new design brought up to the latest technology level
- developed for open networks (not tied to supplier)
- flexible composition of the I/O at an unbeatable price/performance ratio
- the base unit with Ethernet Modbus®-TCP/IP connection has an integrated switch (2 ports for looping)
- high throughput during data transmission and integrated gateway Modbus®-RTU for connecting Modbus®-RTU sensors

Labelling fields, plug terminals with push-in connector up to 2.5mm²

Base module B01.8Di.modbus -RTU microSD card slot - allows the current firmware to be loaded

E8Di.4Do-R/H (inc. manual level)
E8Do-TR/H (inc. manual level)
New: E8Do-HL
### Module 2020

Modular I/O system with Modbus®-RTU or Ethernet - Modbus® TCP/IP

#### Module 2020 with RS485 Modbus®-RTU or Ethernet - Modbus® TCP/IP

<table>
<thead>
<tr>
<th>Type</th>
<th>Article no</th>
<th>Digital inputs</th>
<th>Inputs Analogue</th>
<th>Outputs Digital</th>
<th>Outputs Analogue</th>
<th>Status-indicator</th>
<th>Manual level</th>
<th>Description</th>
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<tbody>
<tr>
<td>B01.8DI Modbus-RTU</td>
<td>5700</td>
<td>8x24V npn/pnp</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>LCD display</td>
<td>LCD display</td>
<td>B01.8DI Modbus-RTU</td>
</tr>
<tr>
<td>B02.8DI Modbus TCP/IP w/ switch+ Modbus-RTU Gateway</td>
<td>5701</td>
<td>8x24V npn/pnp</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>LCD display</td>
<td>LCD display</td>
<td>B02.8DI Modbus TCP/IP w/ switch+ Modbus-RTU Gateway</td>
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<tr>
<td>E16DI</td>
<td>5710</td>
<td>16x24V npn/pnp</td>
<td>16 LED</td>
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<td>E16DI</td>
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<tr>
<td>E16XI</td>
<td>5711</td>
<td>16xXI*</td>
<td>16 LED</td>
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<td>E16XI</td>
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<tr>
<td>E8XI.4AO-U</td>
<td>5712</td>
<td>8xXI*</td>
<td>4x0-10V</td>
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<td>E8XI.4AO-U</td>
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<tr>
<td>E8XI.4AO-U/H</td>
<td>5712-2</td>
<td>8xXI*</td>
<td>4x0-10V, 4 RS</td>
<td>4 RS/4 pot.</td>
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<td>E8XI.4AO-U/H</td>
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<tr>
<td>E8DI.4DO-R</td>
<td>5721</td>
<td>8x24V npn/pnp</td>
<td>4x relay closer</td>
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<td></td>
<td></td>
<td>E8DI.4DO-R</td>
</tr>
<tr>
<td>E8DI.4DO-R/H</td>
<td>5721-2</td>
<td>8x24V npn/pnp</td>
<td>4x relay closer</td>
<td></td>
<td></td>
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<td>E8DI.4DO-R/H</td>
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<tr>
<td>E16N-PTC</td>
<td>5720</td>
<td>16xN-PTC*</td>
<td>16 LED</td>
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<td>E16N-PTC*</td>
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<tr>
<td>E4DO-R</td>
<td>5724</td>
<td>4x relay closer</td>
<td>4 LED</td>
<td></td>
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<td>E4DO-R</td>
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<tr>
<td>E4DO-R/H</td>
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<td>4x relay closer</td>
<td>4 LED</td>
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<td></td>
<td></td>
<td>E4DO-R/H</td>
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<tr>
<td>E8DO-R</td>
<td>5713</td>
<td>8x relay closer</td>
<td>8 LED</td>
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<td>E8DO-R</td>
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<tr>
<td>E8DO-R/H</td>
<td>5713-2</td>
<td>8x relay closer</td>
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<td>E8DO-R/H</td>
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<tr>
<td>E6DO-W/H</td>
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<td>E6DO-W/H</td>
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<td>E8DO-OC</td>
<td>5715</td>
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<td>E8DO-OC/H</td>
<td>5715-2</td>
<td>8xOC npn</td>
<td>8 LED</td>
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<td>E8DO-OC/H</td>
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<tr>
<td>E8DO-OCP</td>
<td>5722</td>
<td>8xOCP npn</td>
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<td>E8DO-OCP</td>
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<td>E8DO-OCP/H</td>
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<td>8xOCP npn</td>
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<td>E16DO-OC</td>
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<td>E8DO-TR</td>
<td>5723</td>
<td>8xTriac</td>
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<td>E8DO-TR</td>
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<td>8xTriac</td>
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<td>E8DO-TR/H</td>
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<tr>
<td>E8DO-HL NEW</td>
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<td>8x HL</td>
<td>8 LED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>E8DO-HL NEW</td>
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</table>

* XI* universal input configuration 0.10V, resistance 0-6553.5 Ohm, PT1000, Ni1000, Ni1000TK5000, T1S-Sensor, PT100, KTY81-110, KTY81-210 possible.

*N-PTC* - configuration possible as NTC5kOhm, NTC10kOhm, NTC20kOhm. resistance 0-6.5 mOhm, PT100, PT1000, Ni1000, Ni1000TK5000, KTY81-110, KTY81-210
Module 2020
Modular I/O system with Modbus®-RTU or Ethernet - Modbus® TCP/IP

Module 2020 with RS485 Modbus®-RTU or Ethernet - Modbus® TCP/IP

<table>
<thead>
<tr>
<th>Type</th>
<th>Article no</th>
<th>Digital inputs</th>
<th>Analogue</th>
<th>Inputs Digital</th>
<th>Outputs Digital</th>
<th>Outputs Analogue</th>
<th>Status indicator</th>
<th>Manual level Do/AO</th>
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<tbody>
<tr>
<td>E4AI-1AO-I</td>
<td>5716</td>
<td>4x4. 20mA</td>
<td>4x4. 20mA</td>
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<tr>
<td>E4AI-1AO-I/H</td>
<td>5716-2</td>
<td>4x4. 20mA</td>
<td>4x4. 20mA</td>
<td></td>
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<td>4 RS/4 pot.</td>
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<tr>
<td>EBAO-U</td>
<td>5718</td>
<td></td>
<td></td>
<td>8x0-10V</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBAO-U/H</td>
<td>5718-2</td>
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<td></td>
<td>8x0-10V</td>
<td></td>
<td></td>
<td>4 RS/4 pot.</td>
<td></td>
</tr>
<tr>
<td>E4DI-4XI 2AO-U 2DO-R</td>
<td>5719</td>
<td>4x24V</td>
<td>4xXI*</td>
<td>2x relay closer</td>
<td>2x0-10V</td>
<td>6 LED</td>
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<td>2 RS/2 pot.</td>
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<tr>
<td>E4DI-4XI 2AO-U 2DO-R/H</td>
<td>5719-2</td>
<td>4x24V</td>
<td>4xXI*</td>
<td>2x relay closer</td>
<td>2x0-10V</td>
<td>6 LED</td>
<td></td>
<td>2 RS/2 pot.</td>
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XI* universal input configuration 0-10V, resistance 0-6553.5 Ohm, PT1000, NI1000, NI1000TK5000, T1S-Sensor, PT100, KTY81-110, KTY81-210 possible.

*N-PTC - configuration possible as NTC5kOhm, NTC10kOhm, NTC20kOhm, resistance 0-6.5 mOhm, PT100, PT1000, NI1000, NI1000TK5000, KTY81-110, KTY81-210

max. current consumption with open bus base module

<table>
<thead>
<tr>
<th>Type</th>
<th>Item no</th>
<th>mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>B01.8Di Modbus-RTU</td>
<td>5700</td>
<td>40+5 channel</td>
</tr>
<tr>
<td>B02.8Di Modbus-TCP/IP</td>
<td>5701</td>
<td>110+5 channel</td>
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max. current consumption with open bus expansion modules

<table>
<thead>
<tr>
<th>Type</th>
<th>Item no</th>
<th>mA</th>
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<tbody>
<tr>
<td>E16DI</td>
<td>5710</td>
<td>10+5/channel</td>
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<tr>
<td>E16Xi</td>
<td>5711</td>
<td>15+0/channel</td>
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<tr>
<td>E8Xi 4AO-U</td>
<td>5712</td>
<td>10+2/channel</td>
</tr>
<tr>
<td>E8Xi 4AO-U/H</td>
<td>5712-2</td>
<td>10+2/channel</td>
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<tr>
<td>E8DI 4DO-R</td>
<td>5721</td>
<td>10-5/DO+10/DO</td>
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<tr>
<td>E8DI 4DO-R/H</td>
<td>5721-2</td>
<td>10-5/DO+10/DO</td>
</tr>
<tr>
<td>E16N-PTC</td>
<td>5720</td>
<td>10+0/channel</td>
</tr>
<tr>
<td>E4DO</td>
<td>5724</td>
<td>10-10/channel</td>
</tr>
<tr>
<td>E4DO-R/H</td>
<td>5724-2</td>
<td>10-10/channel</td>
</tr>
<tr>
<td>E8DO</td>
<td>5713</td>
<td>10-10/channel</td>
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<tr>
<td>E8DO-R/H</td>
<td>5713-2</td>
<td>10-10/channel</td>
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max. current consumption with open bus expansion modules

<table>
<thead>
<tr>
<th>Type</th>
<th>Item no</th>
<th>mA</th>
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<tbody>
<tr>
<td>E6DO-W</td>
<td>5714</td>
<td>10-10/channel</td>
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<td>E6DO-W/H</td>
<td>5714-2</td>
<td>10-10/channel</td>
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<tr>
<td>E8DO-OC</td>
<td>5715</td>
<td>30+0/channel</td>
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<td>E8DO-OC/H</td>
<td>5715-2</td>
<td>30+0/channel</td>
</tr>
<tr>
<td>E16DO-OC</td>
<td>5717</td>
<td>10+1/channel</td>
</tr>
<tr>
<td>E8DO-OCP</td>
<td>5722</td>
<td>6+1.5/channel</td>
</tr>
<tr>
<td>E8DO-OCP/H</td>
<td>5722-2</td>
<td>6+1.5/channel</td>
</tr>
<tr>
<td>E8DO-TR</td>
<td>5723</td>
<td>5+2/channel</td>
</tr>
<tr>
<td>E8DO-TR/H</td>
<td>5723-2</td>
<td>5+2/channel</td>
</tr>
<tr>
<td>E4AI-1.4AO-I</td>
<td>5716</td>
<td>15-20/channel</td>
</tr>
<tr>
<td>E4AI-1.4AO-I/H</td>
<td>5716-2</td>
<td>15-20/channel</td>
</tr>
<tr>
<td>EBAO-U</td>
<td>5718</td>
<td>10+2/channel</td>
</tr>
<tr>
<td>EBAO-U/H</td>
<td>5718-2</td>
<td>10+2/channel</td>
</tr>
<tr>
<td>E4DI 4XI ZAO-U 2DO-R</td>
<td>5719</td>
<td>10-5/DO+10/DO</td>
</tr>
<tr>
<td>E4DI 4XI ZAO-U 2DO-R/H</td>
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<td>10-5/DO+10/DO</td>
</tr>
<tr>
<td>E8DO-HL</td>
<td>5725</td>
<td>5+3/channel</td>
</tr>
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</table>
E3PWR ENERGY METER
Expansion module for MODULE 2020

Application
This expansion module from the MODULE 2020 series is used for 1/3-phase power and energy metering. The module supports two-direction operation.

Technical specifications
- Mains voltage per phase: 230V / 400V 50Hz
- max. Current consumption: 50mA (24V from the base unit)
- Voltage supply: 5 screw terminals RM 7.5 bis 2.5²
  for voltage path L1, L2, L3, N, PE
  NE and PE must be connected.
  L1-L3 as required
- Current measurement: via RJ12 plug-in external current transformer
  max. 80A, can also be plugged during
  operation. Optional: flip converter if the
  current flow is not permitted to be
  interrupted during installation.
- Power range: per phase up to 230V x 80A = 18kW
- Function: the power per channel of L-N and
  the associated current transformer is
  measured.
- Measurement values: 3x voltage, 3x current,
  3x active power, summated active power,
  3x individual energy source, 3x individual
  energy sink, summated energy source,
  summated energy sink
- Housing: 45mm row design system
- Dimensions: WxHxD: 52.5x90x58mm
- Protection type: IP20

Benefits which our customers appreciate
- Two direction operation
- Quick and excellent resolution, therefore suitable
  for regulators in contrast to S0 devices.
- Up to 3 single phase or 1 three-phase
  consumers can be connected.

MODULE 2020 energy meter - expansion module

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Article no</th>
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<tbody>
<tr>
<td>E3PWR</td>
<td>Expansion module for MODULE 2020</td>
<td>5740</td>
</tr>
<tr>
<td>RING-TYPE TRANSDUCER 3PH</td>
<td>Ring-type transducer max. 80A</td>
<td>8662-2</td>
</tr>
<tr>
<td>FLIP CONVERTER 3PH</td>
<td>Flip converter max. 80A</td>
<td>8662-5</td>
</tr>
</tbody>
</table>
Module 2020
Modular I/O system with Modbus®-RTU or Ethernet - Modbus® TCP/IP

Accessories Module 2020

<table>
<thead>
<tr>
<th>Type</th>
<th>Item description</th>
<th>Item no.</th>
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</thead>
<tbody>
<tr>
<td>BF3T</td>
<td>Labelling fields expansion module (3 TE)</td>
<td>5790</td>
</tr>
<tr>
<td>BF4T</td>
<td>Labelling fields base module (4 TE)</td>
<td>5791</td>
</tr>
<tr>
<td>SUBPRINT10P</td>
<td>Subprint 1-8 above -10-pole plug on 2x8 pole plug RM 3.5mm with screw terminals</td>
<td>5792</td>
</tr>
<tr>
<td>SUBPRINT10P</td>
<td>Subprint 9-16 under -10-pole plug on 2x8 pole plug RM 3.5mm with screw terminals</td>
<td>5792-1</td>
</tr>
<tr>
<td>SUBPRINT5P</td>
<td>Subprint 1-4 above -5-pole plug on 14 pole plug RM 3.5mm with screw terminals</td>
<td>5793</td>
</tr>
<tr>
<td>SUBPRINT5P</td>
<td>Subprint 1-4 under -5-pole plug on 14 pole plug RM 3.5mm with screw terminals</td>
<td>5793-1</td>
</tr>
<tr>
<td>Bus cable 80 cm</td>
<td>Connecting cable 80 cm (for 2nd switch cabinet row from top right - to bottom left)</td>
<td>5794-08</td>
</tr>
<tr>
<td>BFT16SW</td>
<td>Control panel door installation 16 x rocker switch 1-A-0 + 16 Duo LED (red/green) + mode LED, dimensions: 96x48mm</td>
<td>5795</td>
</tr>
<tr>
<td>BFT32LED</td>
<td>Control panel door installation 32 x Duo LED (red/green) + mode LED, dimensions: 96x48mm</td>
<td>5796</td>
</tr>
<tr>
<td>BFT8POT</td>
<td>Control panel door installation 8 x rocker switch M-O-A + 8 x potentiometers + mode LED, dimensions: 96x48mm</td>
<td>5797</td>
</tr>
<tr>
<td>BUS CABLE</td>
<td>Bus connection cable for door installation control panel</td>
<td>5798</td>
</tr>
<tr>
<td>BFT-BFT</td>
<td>Labelling field for BFTxx</td>
<td>5799</td>
</tr>
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</table>
Module 2020
Connection examples

Connection example B01.8DI Modbus®-RTU

Connection example B02.8DI Modbus®TCP/IP

Connection example E16DI

Connection example E16XI
Module 2020

Connection examples

Connection example E8XI.4AO-U

Connection example E8DI.4DO-R

Connection example E16N-PTC

Connection example E4DO-R
Module 2020
connection examples

Connection example E8DO-R

Connection example E6DO-W

Connection example E8DO-OC

Connection example E8DO-OCP

EAP electric GmbH Floranstraße 4, A-2460 Bruck / Leitha E-Mail office@eap-electric.at Web: www.eap-electric.at Tel: +43 2162 67 910 Fax: +43 2162 67 910-10
Module 2020

connection examples

Connection example E16DO-OC

Connection example E8DO-TR

Connection example E4AI-I 4AO-I

Connection example E8AO-U
Module 2020
Connection examples

Connection example E4DI.4XI.2AO-U.2DO-R

Connection example E8DO-HL
**FB ...**

Fieldbus device with digital and analogue in/outputs, RS485 interface

**Application**

The FB... is a fieldbus module to construct distributed systems (fieldbus systems) in the industrial sector, building technology and HVAC. These devices can be arranged centrally and decentrally, and receive and send signals via RS485 and Modbus®-RTU S-Bus from a central CPU (DDC, PLC, PC) or with a Hakko touch panel. Depending on the application, different digital and analogue in/and outputs are used.

**Technical specifications**

- **Supply voltage:** 24V DC ±20%
- **Idle current:** 20mA
- **Max. Current consumption:** see table
- **Bus protocol:** RS485, Modbus®-RTU / S-Bus
- **Digital input:** 24V DC, 5mA
- **Analogue input:** PT100/1000: MR. -100...+500°C, resolution 0.1°C, N1000, N1000 TK5000, T1S and resistance 0...10V (resolution 1mV) 4...20mA (resolution 1µA)
- **Digital output:** Open Collector, 30VDC 0.7 A, short circuit resistant
- **Relay 230V AC / 5A ohmic load 230V AC / 0.5 A cos phi 0.4
- **Analogue output:** 0...10V (unit 1mV) max. 5mA max. 10mA at Module FB4Di 4 AO-U.M.S 4...20mA (unit 1µA)
- **Analogue/digital output:** Triac/PWM 12-250V, AC 0.5A programmable as digital output or PWM in percent
- **Environmental temperature:** -10...+50°C
- **Accuracy:** < 0.1 %
- **Analogue resolution:** 0.1°C
- **EMC:** according to EN 61326
- **Terminals:** Plug-in terminals up to 1.5mm²
- **Housing:** 45mm row design system
- **Installation:** Top hat rail TS35
- **Air humidity:** <95% r. h. non-condensing
- **Protection type:** IP20. Standards: CE conformity

**Benefits which our customers appreciate**

- Low cost centralised and decentralised digital and analogue inputs and outputs
- You save a lot of cabling effort
- Analogue processing 24 bit input, 13 bit output
- High quality
- Failsafe (overvoltage protection 400 W, ESD protection 15 kV)
- Address and baud rate (up to 38,400 Baud) are easy to adjust by means of dip switches
- Plug-in terminals (service friendly)
- COMBINE THE FIELDBUS DEVICE WITH OUR ROOM BUS DEVICES on p. 42-43
FB ...
Fieldbus device with digital and analogue in/outputs, RS485 interface

max. Current consumption with open bus base

<table>
<thead>
<tr>
<th>Type</th>
<th>Item no.</th>
<th>mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>FB16Di M.S.</td>
<td>7738</td>
<td>130</td>
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<tr>
<td>FBA16Di M.S.</td>
<td>7738-1</td>
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<td>FB10DO-R.M.S.</td>
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max. Current consumption with open bus base

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### Fieldbus device (RS485 interface) FB

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<th>Type</th>
<th>Article no</th>
<th>Digital inputs</th>
<th>Inputs Analogue</th>
<th>Outputs Digital</th>
<th>Outputs Analogue</th>
<th>Status-indicator</th>
<th>Manual level</th>
<th>DO/DO</th>
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<td>4 x Relay</td>
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Additional registries on the input terminals PT/NI allow the acquisition of an alternative temperature resistance 0-3.300 Ohm
FB ...
Fieldbus device with digital and analogue in/outputs, RS485 interface

Fieldbus device (RS485 interface) FB

<table>
<thead>
<tr>
<th>Type</th>
<th>Article no</th>
<th>Digital inputs</th>
<th>Analogue Inputs</th>
<th>Outputs Digital</th>
<th>Outputs Analogue</th>
<th>Status-indicator</th>
<th>Manual level</th>
<th>Di/Do</th>
<th>AO</th>
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Xi universal inputs - configuration as digital inputs 24V or analogue inputs 4...20mA or 0-10V possible
Xi2 universal inputs - configuration as analogue inputs PT/Ni, 4...20mA or 0-10V possible
Xi3 universal inputs - configuration as analogue inputs PT/Ni, T1S or 0-10V possible

* Triac-output programmable also pulse width modulated (PWM) in percent

** Caution housing size = W x H x D 158 x 90 x 58mm

Additional registries on the input terminals PT/Ni allow the acquisition of an alternative temperature resistance 0-3,300 Ohm
FB ...
connection examples

Connection example FB 10PT/NI.6AO-U.M.S.

Connection example FB4PT/NI.3AI-U4AO-U.M.S.

Connection example FB8DI.8AI-I.M.S.

Connection example FB4DI.4AI-I4DO-R.2AO-I.M.S.
FB ...

connection examples

Connection example FB 8PT/NI 8DO-OC M.S.

Connection example FB4DI 4AO-U.M.S.

Connection example FB2DI 6AI-U 6AO-U.M.S.
FB ...
connection examples

Connection example FB SPT/NI.4XI.STR.M.S.

Connection example FB10DI.10XI.M.S.

Connection example FB8XI.8DI.6AO-U7DO.R.M.S.
FB ... connection examples

Connection example FB 8XI.6AO-U.M.S.

Connection example FB8XI.M.S.

Connection example FB 2DI.4PT/NI.4AI-U4AO-U.2DO-R.M.S.
FB ...

connection examples

Connection example FB 8DO-R.4AO-U.M.S.

Connection example FB4DI 2PT/NI 2AO-U 4DO-R.M.S.

1 Room operating and control devices
2 Module 2020
3 Standard field bus devices
4 Application-specific field bus devices
5 Temperature sensor RS485
6 Humidity, air quality and CO2 sensor RS485
7 Repeater, gateway, switching power supplies
8 Accessories, data sheets
FB4DI.2DO-R

BSK module - Fieldbus device for control of fire protection flaps

**Application**
The FB4DI.2DO-R is a fieldbus module to construct distributed systems (fieldbus systems) in the industrial sector, building technology and HVAC. These devices are arranged decentrally, and be controlled via the interfaces RS485 and Modbus®-RTU from a central CPU (PLC, PC). This module is used for the control of fire protection flaps.

**Technical specifications**
- **Supply voltage:** 24V DC ±10% or 230V AC ±10%
- **Max. current consumption:**
  - 24V DC: Relay off 5mA
  - Relay on 14mA (at 28V approx. 12mA, at 20V approx. 16mA)
  - 230VAC: Relay off 1.2W, relay on 1.5W
- **Bus protocol:** RS485, Modbus®-RTU
- **Digital input:** 24V DC (npn)
- **Digital output:** 230V AC / 5A AC1 ohmic load
  - 230V AC / 0.5A cos phi 0.4
  - (24V AC or 24V DC 5A ohmic load only possible with 24 V DC version)
- **Environmental temperature:** -10...+50°C
- **Accuracy:** < 0.1 %
- **EMC:** according to EN 61326
- **Terminals:** Plug terminals with push-in connector up to 2.5mm²
- **Housing:** Plastic, colour white
- **Dimensions WxHxD:** 125 x 115 x 58 mm
- **Installation:** Wall mounting
- **Cable gland:** 6 x M16, 2 x M20 with strain relief
- **Air humidity:** <95% r.h. non-condensing
- **Protection type:** IP54
- **Standards:** CE conformity

**NEW: Design with Belimo plug**

**Benefits which our customers appreciate**
- optimum I/O composition for fire protection flap control
- Designed for wall mounting
- plug-in double terminals with push-in connector up to 2.5mm²

**BSK module - Fieldbus device for control of fire protection flaps FB4DI.2DO-R**

<table>
<thead>
<tr>
<th>Type</th>
<th>Supply voltage</th>
<th>Inputs Digital</th>
<th>Inputs Analogue</th>
<th>Outputs Digital</th>
<th>Outputs Analogue</th>
<th>Item no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FB4DI.2DO-R</td>
<td>24V DC</td>
<td>4 x 24V</td>
<td></td>
<td>2 x Relay</td>
<td></td>
<td>8901</td>
</tr>
<tr>
<td>FB4DI.2DO-R</td>
<td>230V AC</td>
<td>4 x 24V</td>
<td></td>
<td>2 x Relay</td>
<td></td>
<td>8901-1</td>
</tr>
<tr>
<td>FB4DI.2DO-R.BELIMO</td>
<td>24VDC</td>
<td>4 x 24V</td>
<td></td>
<td>2 x Relay</td>
<td></td>
<td>8901-5</td>
</tr>
</tbody>
</table>
FB4DI.2DO-R
BSK module - Fieldbus device for control of fire protection flaps

Connection example - FB4DI.2DO-R  24V DC
(motor side 24V DC, 24V AC)

Connection example - FB4DI.2DO-R  24V DC
(motor side 230V AC)

Connection example - FB4DI.2DO-R  230V AC
(motor side 230V AC)
VSG1.RS485
Fieldbus device for control of valves

Application
The VSG1.RS485 is a fieldbus module to construct distributed systems (fieldbus systems) in the industrial sector, building technology and HVAC. These devices are arranged decentrally and be controlled via the interfaces RS485 and Modbus®-RTU from a central CPU (PLC, PC). This module is used for the control of valves.

Technical specifications
- Supply voltage: 24V DC ±10%
- Max. current consumption: 8mA (without load)
- Bus protocol: RS485, Modbus®-RTU
- Analogue outputs: 0-10V (3-pole valve) or PWM (2-pole valve)
- Environmental temperature: -20...+60°C
- Accuracy: < 0.1 %
- EMC: according to EN 61326
- Terminals: single or double push-in terminals up to 1.5 mm²
- Housing: PC/ABS with snap-in bracket for wall mounting, colour pure white (similar to RAL9010)
- Dimensions WxHxD: 52 x 64 x 29 mm
- Installation: Wall mounting
- Cable gland: 3 x M16, with strain relief
- Air humidity: <95% r.h. non-condensing
- Protection type: IP54
- Protection class: III (according to EN 60 730)
- Standards: CE conformity

Benefits which our customers appreciate
- Specially designed for the control of valves
- Flat design

Fieldbus device for control of valves VSG1.RS485

| Type       | Inputs | Inputs | Outputs | Outputs | Item-No.
|------------|--------|--------|---------|---------|---------
| VSG1.RS485 | 1 x 0-10V/PWM | 5010   |
FB6PUMP-24.RS485
Fieldbus device for control of pumps

Application
The FB6PUMP-24 RS485 is a fieldbus module to construct distributed systems in the industrial sector, building technology and HVAC. These devices can be arranged centrally and decentrally, and be controlled via the interfaces RS485 and Modbus®-RTU from a central CPU (PLC, PC). This module is used for the control of up to 6 Wilo Geniax 1.0 pumps. The electrical control of the pumps takes place via the pump module, which is installed independent of the pumps, but in their immediate vicinity. The control signals which are sent from the CPU to the pump module, are used to specify the pump speed and therefore the mass flow and the heating power.

Technical specifications
Supply voltage: 24V DC ±20%
Current consumption: Idle 28mA, max. current 2.2A
Bus protocol: RS485, Modbus®-RTU
Analogue input: 6 x water temperature, resolution 0.1°C
Analogue output: 6 x motor speed control 0...5000rpm
Terminals: Plug terminals for supply and bus
Plug for pump: RJ12
Environmental temperature: -10...+50°C
Accuracy: < 0.1 %
EMC: according to EN 61326
Housing: 45mm row design system
Dimensions WxHxD: 5 TE: 88 x 90 x 58 mm
Installation: Top hat rail TS35
Air humidity: <95% r.h. non-condensing
Protection type: IP20
Standards: CE conformity

Benefits which our customers appreciate
- RJ12 ports for direct connections with Wilo Geniax 1.0 pump

Connection example

Fieldbus device for control of pumps FB6PUMP-24.RS485

<table>
<thead>
<tr>
<th>Type</th>
<th>Inputs</th>
<th>Inputs</th>
<th>Outputs</th>
<th>Outputs</th>
<th>Item-No</th>
</tr>
</thead>
<tbody>
<tr>
<td>FB6PUMP-24.RS485</td>
<td>Digital</td>
<td>Analogue</td>
<td>Digital</td>
<td>Analogue</td>
<td>5020</td>
</tr>
<tr>
<td></td>
<td>6 x water temperature</td>
<td>6 x motor speed control</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PUMP1

Pump control unit without bus connection

Application
The PUMP1 is a pump control unit and is used to control a Wilo Geniax 1.0 pump. The electrical control of the pumps takes place via the pump module, which is installed independent of the pumps but in their immediate vicinity. The control range set via potentiometer, is specified for the pump speed and therefore the mass flow and heating power.

Technical specifications
Supply voltage: 230V AC ±15%
Max. current consumption: 50 mA at max. speed
Pump speed: adjustable via potentiometer: 1000 - 6000 rpm
Terminals: 2pole screw terminal up to 1.5mm²
Plug for pump: RJ12
Housing: in plastic, material polyamide, colour pure white (similar to RAL9010)
Dimensions WxHxD: 57 x 81 x 30 mm
Environmental temperature: -20...+50°C
Installation: Wall mounting
Cable gland: M16, with strain relief
Air humidity: <95% r.h. non-condensing
Protection type: IP20
Protection class: III (according to EN 60 730)
Standards: CE conformity
EMC: according to EN 61326

Benefits which our customers appreciate
- adjustable pump power - pump speed 1000 - 6000 rpm
- high efficiency
- Pump can be attached without tools

Pump control unit without bus connection PUMP1:

<table>
<thead>
<tr>
<th>Type</th>
<th>Item-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUMP1-230V</td>
<td>5031</td>
</tr>
</tbody>
</table>
FB ...
Fieldbus device as a replacement for Messner (Vario-Miles)

Application
The FB... is a fieldbus module to construct distributed systems (fieldbus systems) in the industrial sector, building technology and HVAC. These devices can be arranged centrally and decentrally, and receive and send signals via RS485 and Modbus®-RTU from a central CPU (PLC, PC) or with a Hakko touch panel. Depending on the application, different digital and analogue in/and outputs are used.

Technical specifications
- Supply voltage: 24V DC ±20%
- Idle current: 20mA
- Max. Current consumption: see table
- Bus protocol: RS485, Modbus®-RTU
- Digital input: 24V DC, 5mA
- Analogue input: X1 configurable as:
  - PT100/1000: MR: -100...+500°C, resolution 0.1°C, NI1000, NI1000 TK5000, T1S and resistance, 0...10V (resolution 1mV)
  - LM235Z, LM135Z, NTC10kOhm
- Digital output: HL 60V / 80mA
- Analogue output: 0...10V (resolution 1mV)
- Environmental temperature: -10...+50°C
- Accuracy: < 0.1 %
- Analogue resolution: 0.1°C
- EMC: according to EN 61326
- Terminals: Plug terminals with push-in connector up to 2.5mm²
- Housing dimensions: 45mm row design system HXWxD:108x133x43 mm
- Installation: Top hat rail TS35
- Air humidity: <95% r.h. non-condensing
- Protection type: IP00
- Standards: CE conformity

Benefits which our customers appreciate
- Plug terminals with push-in connector up to 2.5mm²
FB ...
Fieldbus device as a replacement for Messner (Vario-Miles)

max. Current consumption with open bus base

<table>
<thead>
<tr>
<th>Type</th>
<th>Item no</th>
<th>mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>FB32Di</td>
<td>5600-1</td>
<td>70</td>
</tr>
<tr>
<td>FB32HL</td>
<td>5601-1</td>
<td>27</td>
</tr>
<tr>
<td>FB24Di.8HL</td>
<td>5602-1</td>
<td>75</td>
</tr>
<tr>
<td>FB16Di.8HL.4Xi.4Ao-U</td>
<td>5603-1</td>
<td>85</td>
</tr>
<tr>
<td>FB24Xi.8Ao-U</td>
<td>5604-1</td>
<td>35</td>
</tr>
</tbody>
</table>

Field bus devices as a replacement for Messner (Vario-Miles) FB

<table>
<thead>
<tr>
<th>Type</th>
<th>Inputs Digital</th>
<th>Inputs Analogue</th>
<th>Outputs Digital</th>
<th>Outputs Analogue</th>
<th>Status indicator D/DQ</th>
<th>Manual level DO/DO</th>
<th>Item-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FB32Di</td>
<td>32 x 24V</td>
<td>yes</td>
<td>no</td>
<td>5600-1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FB32HL</td>
<td>32 x HL</td>
<td>yes</td>
<td>no</td>
<td>5601-1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FB24Di.8HL</td>
<td>24 x 24V</td>
<td>8 x HL</td>
<td>yes</td>
<td>5602-1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FB16Di.8HL.4Xi.4Ao-U</td>
<td>16 x 24V</td>
<td>4 x XI</td>
<td>8 x HL</td>
<td>4 x 0-10V</td>
<td>yes</td>
<td>5603-1</td>
<td></td>
</tr>
<tr>
<td>FB24Xi.8Ao-U</td>
<td>24 x XI</td>
<td>8 x 0-10V</td>
<td>no</td>
<td>5604-1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

XI..... universal inputs - configuration as analogue inputs PT/NI, T1S, 0-10V, NTC10kOhm, LM135SZ or LM235SZ possible

Additional registries on the input terminals PT/NI allow the acquisition of an alternative temperature resistance 0-3,300 Ohm or in NTC mode 0.65535 Ohm.
FB ...
Fieldbus device as a replacement for Messner (Vario-Miles)

Connection example FB32HL

Connection example FB24DI.8HL

Connection example FB16DI.8HL.4XI.4AO-U

Connection example FB24XI.8AO-U
FB .. available on request!
Fieldbus adapter modules for Staefa or Johnson Controls

Application
The FB NRUF AS1000, FB NRD24 and FB DX9121 are field bus adapters which can be used as a replacement for Staefa Integral AS1000, Staefa NRD24 and Johnson Controls DX9121. The fieldbus adapter modules are driven via a standard interface Modbus®-RTU / S-Bus with a central DDC or PLC.

Technical specifications
- Supply voltage: 24V DC ±20%
- Idle current: 30mA
- Max. Current consumption: FB NRUF AS1000: 220mA
  FB NRD24: 210mA
  FB DX9121: 160mA
- Bus protocol: RS485, Modbus®-RTU / S-Bus
- Digital / analogue I/Os see table
- Environmental temperature: 0...+50°C
- Accuracy: < 0.1 %
- Analogue resolution: 0.1°C
- EMC: according to EN 61326
- Terminals: Plug-in terminals up to 1.5mm²
- Housing: Stainless steel 1.4301
- Dimensions WxHxD: FB NRUF AS1000: 265 x 288 x 35mm
  FB NRD24: 170 x 162 x 35mm
  FB DX9121: 200 x 185 x 45mm
- Installation: FB NRUF AS1000, FB NRD24 on baseplate
  FB DX9121: DIN rail 35mm
- Air humidity: <95% r.h. non-condensing
- Protection type: IP00
- Standards: CE conformity

Field bus adapter modules

<table>
<thead>
<tr>
<th>Type</th>
<th>Inputs Digital</th>
<th>Inputs Analogue</th>
<th>Outputs Digital</th>
<th>Outputs Analogue</th>
<th>Status-indicator</th>
<th>Manual level</th>
<th>Item-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FB NRUF AS1000</td>
<td>8 x 24V</td>
<td>16 x AI¹</td>
<td>16 Relay</td>
<td>8x 0-10V</td>
<td>8 RS*</td>
<td>8581</td>
<td></td>
</tr>
<tr>
<td>FB NRD24</td>
<td>24 x 24V</td>
<td>2 x Relay</td>
<td>8828</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FB DX9121</td>
<td>8 x 24V</td>
<td>8 x AI²</td>
<td>6 x Relay</td>
<td>8x 0-10V</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

AI¹...configuration as analogue inputs N1000/T1000, T1S or 0-10V possible
AI²...configuration as analogue inputs P1000 / N1000 / N1000/T5000, T1S or 0-10V possible
RS * Rocker switch for the function auto-manual, the control button is used as a quick way to control the output from 0-10 V in manual mode

Additional registries on the input terminals P1/N1 allow the acquisition of an alternative temperature resistance 0-3,300 Ohm
**ALTF 1 RS485, inc. clamping band**

**Contact temperature sensor / pipe contact sensor with RS485 output**

**Application**
The ALTF 1 RS485 is an electronic pipe contact resistance thermometer with an axial sensor tube whose signal communicates via RS485 and via Modbus®-RTU / S-Bus. Housing with quick-close screws, protection class IP 54, for recording the temperature via surface measurement on pipes, lines (e.g. cold and hot water) or on heating circuits for heating control.

**Technical specifications**
- **Measurement ranges:**
  - -10°C to +105°C PVC, LiYY, 2x0.25 mm²
  - -50°C to +180°C Silicone, SiHF, 2x0.25 mm²
- **Power supply:** 24V DC ± 20%
- **Power consumption at idle:** 15mA
- **Bus protocol:** RS485 Modbus®-RTU / S-Bus
- **Configuration option:** via DIP-switch (address number, parity, Baud)
- **Address number:** 1 to 63 (0 not permitted)
- **Parity Mode with Modbus:** no parity, even parity, odd parity
- **Saia S-Bus:** Data Mode
- **Transmission rate:** 4800, 9600, 19200, 38400 Baud
- **Inputs:**
  - Environmental temperature: -30°C...+60°C
  - Bearing temperature: -40°C...+70°C
- **Accuracy:** <0.1% for temperature measurement
- **Temperature coefficient:** <0.003% / K for temperature measurement
- **Process connection:** Clamping band in plastic (is included in scope of supply)
- **Connection head:** in plastic, material polyamide, 30% glass ball reinforced, with quick closure screws, colour pure white (similar to RAL9010)
- **Dimensions:** 70 x 62 x 37 mm
- **Electrical connection:** up to 2.5 mm² via double push-in terminals
- **Connecting cable:** 2m PVC or 2m Silicone
- **Cable gland:** 2 x M16, with strain relief
- **Insulation resistance:** ≥ 100 MΩ, at 20 °C (500V DC)
- **Humidity:** < 95 % r. h., non-condensing air
- **Protection class:** III (according to EN 60 730)
- **Protection type:** IP 54 (according to IEC 529)
- **Standards:** CE conformity
- **EMC guidelines:** according to EN55011 Class B

**Benefits which our customers appreciate**
- switchable terminal resistor removes the need to attach a resistance to the terminals on the last device of both cable ends
- Double push-in terminals

**Contact temperature sensor / pipe contact sensor ALTF1 RS485**

<table>
<thead>
<tr>
<th>Type</th>
<th>Protection type</th>
<th>Item no</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALTF1-RS485 2m PVC</td>
<td>IP54</td>
<td>8765</td>
</tr>
<tr>
<td>ALTF1-RS485 2m Silicone</td>
<td>IP65</td>
<td>8765-1</td>
</tr>
</tbody>
</table>

**Accessories**

<table>
<thead>
<tr>
<th>Item no</th>
</tr>
</thead>
<tbody>
<tr>
<td>6741</td>
</tr>
</tbody>
</table>
ALTF 2 RS485 inc. clamping band
Contact temperature sensor / pipe contact sensor with RS485 output

Application
The ALTF 2 RS485 is an electronic pipe contact resistance thermometer which communicates its signal via RS485 and Modbus®-RTU / S-Bus. Housing with quick-close screws, protection type IP65, for measuring temperature via surface measurement on pipework, pipes (e.g. hot and cold water) or on heating circuits for heating control.

Technical specifications
Measurement range: -30 ...+110 °C
Power supply: 24V DC ± 20%
Power consumption at idle: 15mA
Bus protocol: RS485 Modbus®-RTU / S-Bus
Configuration option: via DIP-switch (address number, parity, Baud)
Address number: 1 to 63 (0 not permitted)
Parity Mode with Modbus: no parity, even parity, odd parity
Saia S-Bus: Data Mode
Transmission rate: 4800, 9600, 19200, 38400 Baud
Inputs: PT1000 1/3 DIN (24 Bit resolution / 0.1°C)
Environmental temperature: -30°C ...+60°C
Bearing temperature: -40°C ...+70°C
Accuracy: <0.1% for temperature measurement PT1000
Temperature coefficient: <0.003% / K for temperature measurement PT1000
Process connection: Clamping band in plastic (is included in scope of supply)
Clamping band dimensions Ø = 13 - 61 mm (1/4 - 2") 180 mm
Connection head: in plastic, material polyamide, 30% glass ball reinforced, with quick closure screws, colour pure white (similar to RAL9010)
Dimensions: 70 x 62 x 37 mm
Electrical connection: up to 2.5 mm² via double push-in terminals
Cable gland: 1 or 2 x M16, with strain relief
Insulation resistance: ≥100 MΩ at 20 °C (500V DC)
Humidity: <95 % r. h., non-condensing air
Protection class: III (according to EN 60 730)
Protection type: IP 54 (according to IEC 529)
Standards: CE conformity
EMC guidelines: according to EN55011 Class B

Benefits which our customers appreciate
- switchable terminal resistor removes the need to attach a resistance to the terminals on the last device of both cable ends
- Double push-in terminals

Contact temperature sensor/pipe contact sensor inc. clamping band ALTF 2 RS485

<table>
<thead>
<tr>
<th>Type</th>
<th>Item no</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALTF2-RS485 with 2 cable glands</td>
<td>8641</td>
</tr>
<tr>
<td>ALTF2-RS485 with 1 cable gland</td>
<td>8641-1</td>
</tr>
</tbody>
</table>

Accessories

<table>
<thead>
<tr>
<th>Item no</th>
<th>Heat conducting paste (2mg spray)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6741</td>
<td></td>
</tr>
</tbody>
</table>
**ATF 2 RS485**

**External temperature sensor/humid room sensor with RS485 output**

**Application**

The ATF 2 is an electronic external resistance thermometer which communicates its signal via RS485 and via Modbus®-RTU/S-Bus. Housing with quick-lock fasteners and external sensor pipe in stainless steel, protection type IP65, for measuring the external temperature in the humidity sector, e.g. as a weather sensor for mounting on external walls, in refrigeration rooms and plant nurseries, in halls and in agriculture. In external areas installation is preferably on the north side or at a protected location. With direct insolation sun protection must be used.

**Technical specifications**

- **Measurement range:** -50 ... +90 °C
- **Power supply:** 24V DC ± 20%
- **Power consumption at idle:** 15mA
- **Bus protocol:** RS485 Modbus®-RTU / S-Bus
- **Configuration option:** via DIP-switch (address number, parity, Baud)
- **Address number:** 1 to 63 (0 not permitted)
- **Parity Mode with Modbus:** no parity, even parity, odd parity
- **Saia S-Bus:** Data Mode
- **Transmission rate:** 4800, 9600, 19200, 38400 Baud
- **Inputs:** Pt1000 1/3 Din (24 Bit resolution / 0.1 °C)
- **Environmental temperature:** -30°C ... +60°C
- **Bearing temperature:** -40°C ... +70°C
- **Accuracy:** <0.1% for temperature meas. PT1000
- **Temperature coefficient:** <0.003% / K for temperature measurement PT1000
- **Housing:** in plastic, material polyamide, 30% glass ball reinforced, with quick closure screws, colour pure white (similar to RAL9010)
- **Dimensions:** 70 x 62 x 37 mm
- **Cable gland:** 1 or 2 x M16, with strain relief
- **Electrical connection:** up to 2.5 mm² via double push-in terminals
- **Insulation resistance:** ≥ 100 MO, at 20 °C (500V DC)
- **Humidity:** < 95 % r. h., non-condensing air
- **Protection class:** III (according to EN 60 730)
- **Protection type:** IP 65 (according to IEC 529)
- **Standards:** CE conformity
- **EMC guidelines:** according to EN55011 Class B

**Benefits which our customers appreciate**

- switchable terminal resistor removes the need to attach a resistance to the terminals on the last device of both cable ends
- Double push-in terminals

**External temperature sensor/humid room sensor ATF 2 RS485**

<table>
<thead>
<tr>
<th>Type</th>
<th>Item no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATF2-RS485 - (lateral sensor tube) with 1 cable gland</td>
<td>8628</td>
</tr>
<tr>
<td>ATF2-RS485 - (lateral sensor tube) with 2 cable glands</td>
<td>8628-1</td>
</tr>
</tbody>
</table>

**Accessories**

<table>
<thead>
<tr>
<th>Item no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSBW Sun- and ball throw protection - transverse installation</td>
</tr>
</tbody>
</table>

Caution: With output RS485 with 2 PGs in outside areas please take into account that the 2nd PG is closed (for humidity reasons) or use the version with 1 PG.
ETF 1 RS485 inc. immersion pocket brass nickel-plated
Screw-in/submersible temperature sensor with RS485 output

Application

The ETF 1 RS485 is an electronic screw-in resistance thermometer which communicates its signal via RS485 and via Modbus®-RTU/S-Bus. Housing with quick-close screws, protection type IP65, for measuring the temperature of liquids and gases. Applications are in pipework, heating technology, storage systems, compact district heating stations, hot and cold water systems, oil and lubricants circuits, in machines, apparatus and in plant engineering as well as in the general industrial sector. For aggressive media, the stainless steel immersion pockets 1.4571 must be used!

Technical specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement range</td>
<td>-50 °C to +150 °C</td>
</tr>
<tr>
<td>Power supply</td>
<td>24VDC ± 20%</td>
</tr>
<tr>
<td>Power consumption at idle</td>
<td>15mA</td>
</tr>
<tr>
<td>Bus protocol</td>
<td>RS485 Modbus®-RTU / S-Bus</td>
</tr>
<tr>
<td>Configuration option</td>
<td>via DIP-switch (address number, parity, Baud)</td>
</tr>
<tr>
<td>Address number</td>
<td>1 to 63 (0 not permitted)</td>
</tr>
<tr>
<td>Parity Mode with Modbus</td>
<td>no parity, even parity, odd parity</td>
</tr>
<tr>
<td>Saia S-Bus</td>
<td>Data Mode</td>
</tr>
<tr>
<td>Transmission rate</td>
<td>4800, 9600, 19200, 38400 Baud</td>
</tr>
<tr>
<td>Environmental temperature</td>
<td>-30°C to +60°C</td>
</tr>
<tr>
<td>Bearing temperature</td>
<td>-40°C to +70°C</td>
</tr>
<tr>
<td>Accuracy</td>
<td>&lt;0.1% for temp. measurement PT1000</td>
</tr>
<tr>
<td>Temperature coefficient</td>
<td>&lt;0.003% / K for temp. measurement PT1000</td>
</tr>
<tr>
<td>Process connection</td>
<td>Screw-in thread with G 1/2</td>
</tr>
<tr>
<td>Immersion pocket</td>
<td>Nickel-plated brass G 1/2, AF 22, Ø = 8mm</td>
</tr>
<tr>
<td>Protective pipe</td>
<td>Stainless steel, 1.4571, V4A, Ø = 6mm</td>
</tr>
<tr>
<td>Connection head</td>
<td>in plastic, material polyamide, 30% glass ball reinforced, with quick closure screws, colour pure white (similar to RAL9010)</td>
</tr>
<tr>
<td>Dimensions</td>
<td>70 x 62 x 37mm</td>
</tr>
<tr>
<td>Cable gland</td>
<td>2 x M16, with strain relief</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>up to 2.5 mm² via double push-in terminals</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>≥ 100 MΩ, at 20 °C (500V DC)</td>
</tr>
<tr>
<td>max. Pressure imm. pocket</td>
<td>16 bar</td>
</tr>
<tr>
<td>Humidity</td>
<td>&lt; 95 % r.h., non-condensing air</td>
</tr>
<tr>
<td>Protection class</td>
<td>III (according to EN 60 730)</td>
</tr>
<tr>
<td>Protection type</td>
<td>IP 65 (according to IEC 529)</td>
</tr>
<tr>
<td>Standards</td>
<td>CE conformity, EVM: acc. ENS5011 Class B</td>
</tr>
</tbody>
</table>

Screw-in/submersible temperature sensor including immersion pocket in brass G1/2. ETF 1 RS 485

<table>
<thead>
<tr>
<th>Type / installed length</th>
<th>Item no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETF1-RS485 IL 50mm</td>
<td>8640-05</td>
</tr>
<tr>
<td>ETF1-RS485 IL 100mm</td>
<td>8640-10</td>
</tr>
<tr>
<td>ETF1-RS485 IL 150mm</td>
<td>8640-15</td>
</tr>
<tr>
<td>ETF1-RS485 IL 200mm</td>
<td>8640-20</td>
</tr>
<tr>
<td>ETF1-RS485 IL 250mm</td>
<td>8640-25</td>
</tr>
<tr>
<td>ETF1-RS485 IL 300mm</td>
<td>8640-30</td>
</tr>
<tr>
<td>ETF1-RS485 IL 400mm</td>
<td>8640-40</td>
</tr>
</tbody>
</table>
ETF 2 RS485 inc. immersion pocket stainless steel
Screw-in/submersible temperature sensor with RS485 output

Application
The ETF 2 RS485 is an electronic screw-in resistance thermometer which communicates its signal via RS485 and Modbus®-RTU / S-Bus. Housing with quick closing screws, protection type IP 65, for measuring the temperature of aggressive liquids and gases. Its application is in pipework, heating systems, storage systems, compact district heating systems, hot and cold water systems, oil and lubricant circuit systems, in machine, apparatus and plant construction as well as in the general industrial sector.

Technical specifications
- Measurement range: -50 ... +150 °C
- Power supply: 24V DC ± 20%
- Power consumption at idle: 15mA
- Bus protocol: RS485 Modbus®-RTU / S-Bus
- Configuration option: via DIP-switch (address number, parity, Baud)
- Address number: 1 to 63 (0 not permitted)
- Parity Mode with Modbus: no parity, even parity, odd parity
- Saia S-Bus: Data Mode
- Transmission rate: 4800, 9600, 19200, 38400 Baud
- Inputs: PT1000 1/3 DIN (24 Bit resolution / 0.1°C)
- Environmental temperature: -30°C ... +60°C
- Bearing temperature: -40°C ... +70°C
- Accuracy: <0.1% for temp. measurement PT1000
- Temperature coefficient: <0.003% / K for temp. measurement PT1000
- Process connection: Screw-in thread with G 1/2
- Immersion pocket: Stainless steel 1.4571 V4A G1/2 AF27 Ø = 8mm
- Protective pipe: Stainless steel 1.4571 V4A Ø = 6mm
- Connection head: in plastic, material polyamide, 30% glass ball reinforced, with quick closure screws
- Colour pure white (similar to RAL9010)
- Dimensions: 70 x 62 x 37mm
- Cable gland: 2 x M16, with strain relief
- Electrical connection: up to 2.5 mm² via double push-in terminals
- Insulation resistance: ≥ 100 MΩ, at 20 °C (500V DC)
- max. Pressure imm. pocket: 40 bar
- Humidity: < 95 % r. h., non-condensing air
- Protection class: III (according to EN 60 730)
- Protection type: IP 65 (according to IEC 529)
- Standards: CE conformity, EMC: acc. EN55011 Class B

Screw-in/submersible temperature sensor inc. immersion pocket stainless steel G1/2, ETF 2 RS 485

<table>
<thead>
<tr>
<th>Type / installed length</th>
<th>Item no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ETF2-RS485 IL 50mm</td>
<td>8719</td>
</tr>
<tr>
<td>ETF2-RS485 IL 100mm</td>
<td>8719-10</td>
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<tr>
<td>ETF2-RS485 IL 150mm</td>
<td>8719-15</td>
</tr>
<tr>
<td>ETF2-RS485 IL 200mm</td>
<td>8719-20</td>
</tr>
<tr>
<td>ETF2-RS485 IL 250mm</td>
<td>8719-25</td>
</tr>
<tr>
<td>ETF2-RS485 IL 300mm</td>
<td>8719-30</td>
</tr>
<tr>
<td>ETF2-RS485 IL 400mm</td>
<td>8719-40</td>
</tr>
</tbody>
</table>
KTF 1 RS485 inc. mounting flange
Duct temperature sensor/air duct sensor with RS485 output

Application
The KTF 1 RS485 is an electronic duct resistance thermometer which communicates its signal via RS485 and via Modbus®-RTU/S-Bus. Housing with quick closing screws, protection type IP 65, for measuring the temperature of gases, e.g. in heating ventilation and air-conditioning ducts.

Technical specifications
- Measurement range: -50...+150°C
- Power supply: 24V DC ± 20%
- Power consumption at idle: 15mA
- Bus protocol: RS485 Modbus®-RTU / S-Bus
- Configuration option: via DIP-switch (address number, parity, Baud)
- Address number: 1 to 63 (0 not permitted)
- Parity Mode with Modbus: no parity, even parity, odd parity
- Saia S-Bus: Data Mode
- Transmission rate: 4800, 9600, 19200, 38400 Baud
- Inputs: PT1000 1/3 DIN (24 Bit resolution / 0.1°C)
- Environmental temperature: -30°C...+60°C
- Bearing temperature: -40°C...+70°C
- Accuracy: <0.1% for temp. measurement PT1000
- Temperature coefficient: <0.003% / K for temp. measurement PT1000
- Protective pipe: Stainless steel, 1.4571, V4A, Ø = 6mm
- Connection head: Plastic, material polyamide, 30% glass ball reinforced, with quick closure screws, colour pure white (similar to RAL9010)
- Dimensions: 70 x 62 x 37mm
- Cable gland: 2 x M16, with strain relief
- Electrical connection: up to 2.5 mm² via double push-in terminals
- Process connection: via flange, galvanised steel (is included in scope of supply)
- Insulation resistance: ≥ 100 MΩ, at 20 °C (500V DC)
- Humidity: < 95 % r. h., non-condensing air
- Protection class: III (according to EN 60 730)
- Protection type: IP 65 (according to IEC 529)
- Standards: CE conformity
- EMC guidelines: according to EN55011 Class B

Benefits which our customers appreciate
- switchable terminal resistor removes the need to attach a resistance to the terminals on the last device of both cable ends
- Double push-in terminals

Duct temperature sensor/air duct sensor inc. mounting flange KTF 1 RS485

<table>
<thead>
<tr>
<th>Type / installed length</th>
<th>Item no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>KTF1-RS485 IL 50mm</td>
<td>8703</td>
</tr>
<tr>
<td>KTF1-RS485 IL 100mm</td>
<td>8703-10</td>
</tr>
<tr>
<td>KTF1-RS485 IL 150mm</td>
<td>8703-15</td>
</tr>
<tr>
<td>KTF1-RS485 IL 200mm</td>
<td>8703-20</td>
</tr>
<tr>
<td>KTF1-RS485 IL 250mm</td>
<td>8703-25</td>
</tr>
<tr>
<td>KTF1-RS485 IL 300mm</td>
<td>8703-30</td>
</tr>
<tr>
<td>KTF1-RS485 IL 400mm</td>
<td>8703-40</td>
</tr>
</tbody>
</table>
HTF RS485

Sleeve sensor/ cable temperature sensor with RS485 output

Application
The HTF RS485 is an electronic cable resistance thermometer whose signal is communicated via RS485 and Modbus®-RTU/S-Bus. It is used to measure the temperature of liquids and gases, e.g. via installation in immersion pockets.

Technical specifications

- Measurement range: -10° ... +105°C PVC, LiYY, 2x0.25 mm²
- 50° ... +180°C Silicone, SiHF, 2x0.25 mm²
- 50° ... +220°C Teflon, Li-6YY-02, 2x1.0 mm²
- 50° ... +350°C Glass silk/SS-braid
- Ends stripped of insulation, with ferrules
- Power supply: 24V DC ± 20%
- Power consumption at idle: 15mA
- Bus protocol: RS485 Modbus®-RTU / S-Bus
- Configuration option: via DIP-switch (address number, parity, Baud)
- Address number: 1 to 63 (0 not permitted)
- Parity Mode with Modbus: no parity, even parity, odd parity
- SaaS S-Bus: Data Mode
- Transmission rate: 4800, 9600, 19200, 38400 Baud
- Environmental temperature: -30°C ... +60°C, bearing temperature: -40°C ... 70°C
- Accuracy: <0.1% for temp. measurement Pt1000
- Temperature coefficient: <0.003% / K for temp. measurement Pt1000
- Prot. pipe (sensor sleeve): Stainless steel 1.4571, V4A, Ø=6mm, NL=50mm
- Connection head: in plastic, material polyamide, 30% glass ball reinforced, with quick closure screws, colour pure white (similar to RAL9010)
- Dimensions: 70x62x37mm
- Connecting cable: 2m (optionally also other lengths)
- Cable gland: 2 x M16, with strain relief
- Electrical connection: up to 2.5 mm² via double push-in terminals
- Humidity: < 95 % r. h., non-condensing air
- Protection class: III (according to EN 60 730)
- Protection type: IP65 or IP54 (according to IEC 529)

Sleeve sensor/ cable temperature sensor HTF RS485

<table>
<thead>
<tr>
<th>Type / output / cable length / insulation</th>
<th>Protection type</th>
<th>Item no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTF-RS485 2m PVC</td>
<td>IP54</td>
<td>8704-2P</td>
</tr>
<tr>
<td>HTF-RS485 2m Silicone</td>
<td>IP65</td>
<td>8704-2S</td>
</tr>
<tr>
<td>HTF-RS485 2m Teflon</td>
<td>IP65</td>
<td>8704-2T</td>
</tr>
<tr>
<td>HTF-RS485 2m GLS/VA</td>
<td>IP54</td>
<td>8704-2G</td>
</tr>
</tbody>
</table>

Surcharges:
- per linear metre connecting cable 2-conductor (PVC)
- per linear metre connecting cable 2-conductor (Silicone)
- per linear metre connecting cable 2-conductor (Teflon)
- per linear metre connecting cable 2-conductor (GLS/SS braid)

Accessories:
- TH immersion pockets see accessories p. 55
RPTF RS485
Room swing temperature sensor with RS485 output

Application
The RPTF RS485 is an electronic resistance thermometer which communicates its signal via RS485 and via Modbus®-RTU/S-Bus Housing with quick closing screws, protection type IP 65, for measuring the temperature particularly in large halls and spaces. The RPTF RS485 (globe thermometer) measures the effective radiation proportion or also the active radiation heat at the measurement location.

Technical specifications
- Measurement range: -30...+75°C
- Power supply: 24V DC ± 20%
- Power consumption at idle: 15mA
- Bus protocol: RS485 Modbus®-RTU / S-Bus
- Configuration option: via DIP-switch (address number, parity, Baud)
- Address number: 1 to 63 (0 not permitted)
- Parity Mode with Modbus: no parity, even parity, odd parity
- Saia S-Bus: Data Mode
- Transmission rate: 4800, 9600, 19200, 38400 Baud
- Environmental temperature: -30°C...+60°C
- Bearing temperature: -40°C...+70°C
- Accuracy: <0.1% for temp. measurement PT1000
- Temperature coefficient: <0.003% / K for temp. measurement PT1000
- Connection head: Plastic, material polyamide 30% glass ball reinforced, with quick closure screws, colour pure white (similar to RAL9010)
- Dimensions: 70 x 62 x 37mm
- Sensor cable: 2m PVC, LiYY 2x0.25mm² (optionally also other lengths)
- Protective pipe: Stainless steel, 1.4571, V4A Ø = 15mm, nominal length NL=100mm
- Electrical connection: up to 2.5 mm² via double push-in terminals
- Cable gland: 2 x M16, with strain relief
- Humidity: < 95 % r. h., non-condensing air
- Protection class: III (according to EN 60 730)
- Protection type: IP65 (according to IEC 529)
- Standards: CE conformity
- EMC guidelines: according to EN55011 Class B

Benefits which our customers appreciate
- Switchable terminal resistor removes the need to attach a resistance to the terminals on the last device of both cable ends
- Double push-in terminals

Room swing temperature sensor RPTF RS485

<table>
<thead>
<tr>
<th>Type / output</th>
<th>Item no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPTF-RS485</td>
<td>5676</td>
</tr>
</tbody>
</table>
**RTF RS485**

Room bus device with RS485 output

**Application**
The RTF RS485 is a room bus device for measuring the temperature in closed and dry spaces, for example in domestic dwellings, offices and commercial spaces. Additional design of various controls, potentiometer, button, rotary switch, LED and relative humidity.

**Designs**
- Temperature: semiconductor, resolution 0.1°C
- Potentiometer: (resolution 0...1023)
- Rotary switch: max. 5 stages
- Duo-LED: max. 2x green, red
- Button: closer
- relative humidity: 0...100% r.H., resolution 1%
- Measurement error at 20...80% ±3%

**Technical specifications**
- Measurement range: -30...+60°C
- Power supply: 24V DC ± 20%
- Current consumption: 4mA
- Bus protocol: RS485 Modbus®-RTU / S-Bus
- Configuration option: via DIP-switch (address number, parity, Baud)
- Parity Mode with Modbus: no parity, even parity, odd parity
- Saia S-Bus: Data Mode
- Transmission rate: 4800, 9600, 19200, 38400 Baud
- Inputs: semiconductor (12 bit resolution / 0.1°C) Potentiometer (resolution 0...1023)
- Status display: LED (2 Duo-LED)
- Environmental temperature: -30°C...+60°C
- Bearing temperature: -20°C...+80°C
- Accuracy: <0.1 %
- Housing: Plastic, material ABS, colour pure white (similar to PAL9010), (optionally other colours)
- Dimensions: 80 x 105 x 23.5mm
- Installation: on rec. box Ø = 55mm
- Electrical connection: 0.14 - 1mm², via screw terminals
- Humidity: < 90 % r.h., non-condensing air
- EMC guidelines: according to EN55011 Class B
- Protection class: III (according to EN 60 730)
- Protection type: IP 30 (according to IEC 529)

**Benefits which our customers appreciate**
- up to 50% cost saving compared with conventional sensors including additional costs (I/Os etc.)
- simple commissioning
- offset no longer needed (max. measurement error 0.2 Kelvin)
RTF RS485
Room bus device with RS485 output

Special manufacture for larger quantities possible on request!

Connection diagram

Room bus device with RS485 output RTF RS485

<table>
<thead>
<tr>
<th>Base device</th>
<th>RTF RS485</th>
</tr>
</thead>
</table>

Additional prices for controls - all options can be combined in one device!

- Potentiometer / P
- Duo-LED green, red / Duo-LED
- Button / T
- Rotary switch / RS max. 5 positions
- relative humidity
- OC 30V DC, 1A, short-term 4A, short circuit resistant
- Special printing single colour print
- Special painting

Ordering details: Type, protocol, various controls

e.g. RTF RS485, T, 2 x Duo-LED, P, DS A-0-1-2-3, relative humidity
**AFTF RS485**

External humidity and temperature sensor with RS485 output

**Application**
The AFTF RS485 is an electronic humidity/temperature sensor, which communicates its signal via RS485 and Modbus®-RTU / S-Bus, and which measures the relative, absolute humidity and the temperature of air and other non-aggressive gases. It is used in refrigeration, air conditioning and clean room technology, in growing houses and holes. The housings are suitable for wall mounting.

**Technical specifications**
- Power supply: 24V DC ± 20%
- Power consumption at idle: 5mA
- Bus protocol: RS485 Modbus®-RTU / S-Bus
- Configuration option: via Dip-switch (address number, parity, Baud)
- Address number: 1 to 63 (0 not permitted)
- Parity Mode with Modbus: no parity, even parity, odd parity
- Transmission rate: 4800, 9600, 19200, 38400 Baud
- Measurement range temp.: MR: -30...+80°C, resolution 0.1°C, Measurement error ± 0.3°C
- Measurement range relative humidity: MR: 0...100% r.h., working range 20...95% r.h. Resolution 1%, measurement error at 20...80% ±3%
- Measurement range absolute humidity: 0.1 gr/m³
- Environmental temperature: -30°C...+60°C
- Connection head: Plastic, material polyamide, 30% glass ball reinforced, with quick closure screws, colour pure white (similar to RAL9010)
- Dimensions: 70 x 62 x 37mm
- Cable gland: 2 x M16, with strain relief
- Electrical connection: 0.14 - 1.5 mm² via screw terminals on Board
- Process connection: via screws
- Protection class: III (according to EN 60 730)
- Protection type: Housing IP 65, sensor IP40 (according to IEC 529)
- Standards: CE conformity, EMC guidelines: according to EN55011 Class B)

**Benefits which our customers appreciate**
- Measurement of relative or absolute humidity possible
- You save the analogue inputs on the controller
- 2 cable glands for double cable entry (sensors can be "looped through")
- smaller print - more space for the cables

**External humidity and temperature sensor AFTF RS485**

<table>
<thead>
<tr>
<th>Type / output</th>
<th>Measurement range humidity</th>
<th>Measurement range temperature</th>
<th>Item-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFTF-RS485</td>
<td>0...100 % / 0.1 gr/m³</td>
<td>-30...+80°C</td>
<td>5650</td>
</tr>
</tbody>
</table>
KFTF RS485
Duct humidity and temperature sensor with RS485 output

Application
The KFTF RS485 is an electronic humidity/temperature sensor, which communicates its signal via RS485 and Modbus®-RTU / S-Bus, and measures the relative, absolute humidity and the temperature of air and other non-aggressive gases. It is used in refrigeration, ventilation, air conditioning and clean room technology, in growing houses and holes. The housings are suitable for duct mounting.

Technical specifications
- Power supply: 24V DC ± 20%
- Power consumption at idle: 5mA
- Bus protocol: RS485 Modbus®-RTU / S-Bus
- Configuration option: via DIP-switch (address number, parity, Baud)
- Address number: 1 to 63 (0 not permitted)
- Parity Mode with Modbus: no parity, even parity, odd parity
- Transmission rate: 4800, 9600, 19200, 38400 Baud
- Measurement range temp.: 40°C, resolution 0.1°C, measurement error ± 0.3°C
- Measurement range relative humidity: 0°C, 100% r.h., working range 20...95% r.h.
- Resolution 1%, measurement error at 20...80% ±3%
- Measurement range absolute humidity: 0.1 gr/m³
- Environmental temperature: -30°C...+60°C
- Connection head: Plastic, material polyamide, 30% glass ball reinforced, with quick closure screws, colour pure white (similar to RAL9010)
- Dimensions: 70 x 62 x 37mm
- Protective pipe: in metal
- Installed length: 130 mm (optionally other installed lengths)
- Cable gland: 2 x M16, with strain relief
- Electrical connection: via mounting flange (is included in the scope of supply)
- Protection class: III (according to EN 60 730)
- Protection type: Housing IP 65, sensor IP40
- (according to IEC 529)
- Standards: CE conformity
- EMC guidelines: according to EN55011 Class B

Benefits which our customers appreciate
- Measurement of relative or absolute humidity possible
- You save the analogue inputs on the controller
- 2 cable glands for double cable entry (sensors can be "looped through")
- smaller print - more space for the cables

Duct humidity and temperature sensor KFTF RS485

<table>
<thead>
<tr>
<th>Type / output</th>
<th>Measurement range humidity</th>
<th>Measurement range temperature</th>
<th>Item-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>KFTF-RS485</td>
<td>0...100 % / 0.1 gr/m³</td>
<td>-30...+80°C</td>
<td>5651</td>
</tr>
</tbody>
</table>
**RFTF RS485**

Room humidity and temperature sensor, surface mount, with RS485 output

**Application**
The RFTF is an electronic humidity/temperature sensor where the signal communicates via RS485 and Modbus®-RTU / S-Bus, and measures the relative, absolute humidity and temperature of the air, e.g. in refrigeration, air conditioning and clean room technology, in domestic dwellings, offices, hotels, plant rooms, conference and meeting rooms.

**Technical specifications**
- **Power supply:** 24V DC ± 20%
- **Power consumption at idle:** 5mA
- **Bus protocol:** RS485 Modbus®-RTU / S-Bus
- **Configuration option:** via DIP-switch (address number, parity, Baud)
- **Address number:** 1 to 63 (0 not permitted)
- **Parity Mode with Modbus:** no parity, even parity, odd parity
- **Transmission rate:** 4800, 9600, 19200, 38400 Baud
- **Measurement range temp.:** MR: 0...+50°C resolution 0.1°C, measurement error ± 0.3°C
- **Measurement range relative humidity:** MR: 0...100% r.h., working range 20...95% r.h., Resolution 1%, measurement error at 20...80% ±3%
- **Measurement range absolute humidity:** 0.1 gr/m³
- **Environmental temperature:** 0°C...+50°C
- **Housing:** Plastic, material ABS, colour pure white (similar to RAL9010)
- **Dimensions:** 80 x 105 x 23.5mm
- **Installation:** Wall mounting or on recessed box Ø 55mm, lower part with 4 holes, for fixing on vertical or horizontal recessed boxes
- **Electrical connection:** 0.14 - 1mm², via screw terminals
- **Protection class:** III (according to EN 60730)
- **Protection type:** IP30 (according to IEC 529)
- **Standards:** CE conformity
- **EMC guidelines:** according to EN55011 Class B

**Benefits which our customers appreciate**
- Measurement of relative or absolute humidity possible
- You save the analogue inputs on the controller

### Room humidity and temperature sensor RFTF RS485

<table>
<thead>
<tr>
<th>Type / output</th>
<th>Measurement range humidity</th>
<th>Measurement range temperature</th>
<th>Item-No</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFTF-RS485</td>
<td>0...100% / 0.1 gr/m³</td>
<td>0...+50°C</td>
<td>8865</td>
</tr>
</tbody>
</table>
TW RS485
Dew point monitor with RS485 output

Application
The TW RS485 is a dew point monitor which communicates its signal via RS485 and Modbus®-RTU, and is used for preventing dew formation on pipes. The dew point temperature is the temperature at which air reaches saturated conditions and water starts to condense. Shortly before reaching the dewpoint (=> 95% r.h.) or faulty functions, control system measures are taken, e.g. heating or other devices activated, thereby preventing dew formation. Signals indicating device and power supply interruptions are also provided. Installation is possible both on metal pipes and optionally with CU film also on plastic pipes.

Technical specifications
- Power supply: 24V DC ± 20%
- Power consumption at idle: 15mA
- Bus protocol: RS485 Modbus®-RTU
- Configuration option: via DIP-switch (address number, parity, Baud)
- Address number: 1 to 63 (0 not permitted)
- Parity Mode with Modbus: no parity, even parity, odd parity
- Transmission rate: 4800, 9600, 19200, 38400 Baud
- Switching point: 93% ±5%
- Hysteresis: approx. 5%
- Process connection: Endless clamping band with metal lock, 180 mm, for pipes up to 3’ (is included in scope of supply) optional with CU film mounting on plastic pipes possible
- Environmental temperature: -30°C...+60°C
- Connection head: Plastic, material polyamide, 30% glass ball reinforced, with quick closure screws, colour pure white (similar to RAL9010)
- Dimensions: 70 x 62 x 37mm
- Cable gland: 2 x M16, with strain relief
- Electrical connection: up to 1.5 mm² via double push-in terminals
- Protection class: III (according to EN 60 730)
- Protection type: IP54

Benefits which our customers appreciate
- Analogue measuring value also available, allowing the PLC to react sooner or later.

Dew point monitor TW RS485

<table>
<thead>
<tr>
<th>Type / output</th>
<th>Item-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TW RS485</td>
<td>5656</td>
</tr>
</tbody>
</table>
KCO2 + xxx RS485 or KLQ + T + x RS485
Multifunctional duct bus device CO2- and/or air quality sensor RS485

Application
The KCO2 + T + xx multifunctional channel bus device - whose signal communicates via RS485 and via Modbus®-RTU / S-Bus, depending on the version records the CO2 content and the temperature and/or the air quality and the relative and absolute humidity in the air.

Technical specifications
- Power supply: 24V DC ± 10%
- KCO2 12mA (max. 60mA)
- KCO2+T 12mA (max. 60mA)
- KCO2+T+RH 12mA (max. 60mA)
- KCO2+T+RH+AQ 23mA (max. 80mA)
- KLQ-T / KLQ-T+RH 18mA
- Bus protocol: RS485 Modbus RTU / S-Bus
- Configuration option: via Dip-switch (address number, parity, baud)
- Address number: 1 to 63 (0 not permitted)
- Parity mode with Modbus: no parity, even parity, odd parity
- Transmission rate: 4800, 9600, 19200, 38400 Baud
- CO2: MR: 0...5000 ppm, resolution 1 ppm,
  Measurement error ± 30 ppm
- Auto-calibration CO2: adjustable via jumper
- Manual calibration CO2: via clean air and calibration button
- Temperature: MR: -50...+100°C, resolution 0.1°C,
  Measurement error ± 0.3°C
- Air quality: 1 LSB / 0...1000, 0 LSB clean air
  1000 LSB poor air
- Relative humidity: MR: 0...100%, resolution 1%,
  Measurement error at 20...80%, ±3%
- Absolute humidity: 0.1gr/m³
- Environmental temperature: 0...+50°C
- Connection head: Plastic, material polyamide, 30%
glass ball reinforced, with quick closure
  screws, colour pure white (similar to RAL9010)
- Dimensions: 70 x 62 x 37 mm
- Protective pipe: in metal
- Electrical connection: 0.14 - 1.5 mm² via terminals on board
- Process connection: via mounting flange (inc. in scope of supply)
- Cable gland: 2 x M16, with strain relief
- Protection class: III (according to EN 60 730)
- Protection type: Housing IP 65, sensor IP40
  (according to IEC 529)
- Standards: CE conformity, EMC acc. EN55011 Class B

Connection diagram

Caution:
When selecting installation position it is essential to consider flow direction!

Multifunctional duct bus device KCO2+xxx or KLQ+T+x RS485

<table>
<thead>
<tr>
<th>Type</th>
<th>Item description</th>
<th>Item-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>KCO2 RS485</td>
<td>Duct CO2 sensor</td>
<td>5660</td>
</tr>
<tr>
<td>KCO2 + T RS485</td>
<td>Duct CO2 sensor + temperature</td>
<td>5660-1</td>
</tr>
<tr>
<td>KCO2 + T + RH/AH RS485</td>
<td>Duct-CO2-sensor + temperature + relative/absolute humidity</td>
<td>5660-2</td>
</tr>
<tr>
<td>KCO2 + T + AQ + RH/AH RS485</td>
<td>Duct-CO2-sensor + temperature + air quality + relative/absolute humidity</td>
<td>5660-3</td>
</tr>
<tr>
<td>KLQ + T RS485</td>
<td>Duct AQ sensor + temperature</td>
<td>5670</td>
</tr>
<tr>
<td>KLQ + T + RH/AH RS485</td>
<td>Duct-AQ-sensor + temperature + relative/absolute humidity</td>
<td>5670-1</td>
</tr>
</tbody>
</table>
RCO2 + T + xx RS485 or RLQ + T + x RS485

Multifunction room bus device CO2- and/or air quality sensor RS485

Application
The RCO2 + T + xx multifunctional room bus device - whose signal communicates via RS485 and via Modbus®-RTU / S-Bus, depending on the version of the device records the CO2 content and the temperature and/or the air quality and the relative and absolute humidity in the room air.

Technical specifications
- **Power supply:** 24V DC ± 10%
- **Current consumption:**
  - RCO2+T 12mA (max. 60mA)
  - RCO2+T+AQ 23mA (max. 80mA)
  - RCO2+T+RH 12mA (max. 60mA)
  - RCO2+T+RH+AQ 23mA (max. 80mA)
  - RLQ+T / RLQ+T+RH 18mA
- **Bus protocol:** RS485 Modbus RTU / S-Bus
- **Configuration option:** via DIP-switch (address number, parity, baud)
- **Address number:** 1 to 63 (0 not permitted)
- **Parity mode with Modbus:** no parity, even parity, odd parity
- **Transmission rate:** 4800, 9600, 19200, 38400 Baud
- **CO2:**
  - MR: 0...5000 ppm, resolution 1 ppm,
  - Measurement error ± 30 ppm
- **Temperature:**
  - MR: 0...+50°C, resolution 0.1°C,
  - Measurement error ± 0.3°C
- **Air quality:**
  - 1 LSB / 0...1000
  - 0 LSB clean air
  - 1000 LSB poor air
- **Relative humidity:**
  - MR: 0...+100%, resolution 1%
  - Measurement error at 20...80%, ±3%
- **Absolute humidity:**
  - 0.1gr/m³
- **Operating temperature:** 0°C...+50°C
- **Bearing temperature:** -20°C...+80°C
- **Terminals:** Screw terminals 0.14 - 1 mm² (acc. VDE)
- **Housing:** Plastic, material ABS,
  - colour pure white (similar to RAL9010)
- **Dimensions:** W x H x D 105 x 80 x 23,5 mm
- **Installation:** on rec. box, Ø 55mm
- **EMC guidelines:** according to EN55011 Class B
- **Standards:** CE conformity
- **Protection type:** IP30

### Multifunctional room bus device RCO2+T+xx or RLQ+T+x RS485

<table>
<thead>
<tr>
<th>Type</th>
<th>Item description</th>
<th>Item-No</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCO2 + T RS485</td>
<td>Room CO2 sensor + temperature</td>
<td>8864-1</td>
</tr>
<tr>
<td>RCO2 + T + AQ RS485</td>
<td>Room CO2 sensor + temperature + air quality</td>
<td>8864-2</td>
</tr>
<tr>
<td>RCO2 + T + RH/AH RS485</td>
<td>Room-CO2-sensor + temperature + relative/absolute humidity</td>
<td>8865-1</td>
</tr>
<tr>
<td>RCO2 + T + RH/AH + AQ RS485</td>
<td>Room-CO2-sensor + temperature + relative/absolute humidity + air quality</td>
<td>8865-2</td>
</tr>
<tr>
<td>RLQ + T RS485</td>
<td>Room AQ sensor + temperature</td>
<td>8864-3</td>
</tr>
<tr>
<td>RLQ + T + RH/AH RS485</td>
<td>Room-AQ-sensor + temperature + relative/absolute humidity</td>
<td>8865-3</td>
</tr>
</tbody>
</table>
**GATEWAY WITH WEBSERVER**

**Modbus®-TCP/IP - Modbus®-RTU Slave/Master or Master/Slave**

**Application**
The Gateway with Webserver Modbus®-TCP/IP - Modbus®-RTU Slave/Master or Master/Slave is a device which converts the Modbus®-RTU protocol to TCP/IP or TCP/IP to Modbus®-RTU. Existing serial ‘slave’ devices can therefore be integrated into a Modbus®-TCP/IP or Modbus RTU network without any problems.

**Technical specifications**
- **Supply voltage:** 9-26V DC
- **max. Current consumption:** 0.45 W measured
  (typical 0.5W) = approx. 21mA
- **Ethernet Interface**
  - **Number of connections:** 1
  - **Speed:** 10/100 Mbps, Auto MDI/MDIX, Auto-negotiation
  - **Plug connection:** 8-pin RJ45
  - **Insulation protection:** 1.5 KV
- **Serial interface**
  - **Number of connections:** 1
  - **Standard serial:** RS485
  - **Connection:** Screw terminal block
  - **ESD protection:** 15 kV for all signals

**Serial communication parameters**
- **Data bits:** 7,8
- **Stop bits:** 1, 1.5, 2
- **Parity:** None, Even, Odd
- **Baud rate:** 300 bps to 230.4 Kbps
- **Serial signals:** RS485: Data+, Data-, GND
- **Operating temperature:** 0...+55 °C
- **Bearing temperature:** -20...+70° C
- **Housing:** Plastic
- **LED display:** 2x LED with TX and RX
- **Dimensions WxHxD:** 175 x 90 x 55mm
- **Installation:** Top hat rail TS35
- **Air humidity:** <95% r.h. non-condensing
- **Protection type:** IP20
- **Standards:** CE conformity
  EMC according to EN61326

**Benefits which our customers appreciate**
- user-friendly configuration interface
- adjustable transmission speed

---

**Gateway with Webserver Modbus®-TCP/IP - Modbus®-RTU Slave/Master or Master/Slave**

<table>
<thead>
<tr>
<th>Type</th>
<th>Item-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gateway Modbus®-TCP/IP - Modbus®-RTU Slave/Master or Master/Slave</td>
<td>9310</td>
</tr>
</tbody>
</table>
Repeater RS485

with galvanic separation and overvoltage protection

Application
The RS485 repeater is used to multiply the range and insulation of the RS-485 bus signal.

Technical specifications
- Supply voltage: 24V AC/DC ±20%
- max. Current consumption: 50mA
- Connection: RS485
- Data rate: max. 38400 Kbit/s
- LED display: Power / RX and TX
- Devices which can be connected: max. 12 repeaters
- Operating temperature: -10…+60°C
- Terminals: Screw terminals
- Housing: Plastic
- Dimensions WxHxD: 17.5 x 90 x 55mm
- Installation: Top hat rail TS35
- Air humidity: <95% r.h. non-condensing
- Protection type: IP20
- Standards: CE conformity
- EMC according to EN61326

Benefits which our customers appreciate
- Transmission distance up to 1200 m
- Use of max. 12 repeaters -> transmission route of up to 14.4 km possible
- Baud rate easy to adjust by means of dip switches
- Screw terminals
- LED displays for power and TX and RX
- 2.5 kV insulation protection

Setting baud rate

<table>
<thead>
<tr>
<th>D1</th>
<th>D2</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>4800</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>9600</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>19200</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>38400</td>
</tr>
</tbody>
</table>

Dip switch 3 and 4 in preparation for higher baud rate
BUS TERMINATION ACTIVE RS485

Application
The bus terminator active RS485 is a bus terminator which produces a defined level on an open bus. The application is with non-failsafe transceivers. With failsafe transceivers the resistance to interference is improved considerably. For long cables the galvanic separation is more favourable due to common mode signals.

Technical specifications
- Supply voltage: 24V DC ± 15%
- Power supply: galvanically separated
- Fixed terminating resistance: 120 Ohm
- Operation display: LED
- Operating temperature: -10...+50 °C
- Bearing temperature: -20...+70°C
- Housing: Plastic
- Dimensions WxHxD: 17.5 x 90 x 55mm
- Installation: Top hat rail TS35
- Air humidity: <95% r. h. non-condensing
- Protection type: IP20
- Standards: CE conformity
  EMC according to EN61326

Connection diagram

<table>
<thead>
<tr>
<th>Type</th>
<th>Item-No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus termination active</td>
<td>5100</td>
</tr>
</tbody>
</table>

Bus termination active RS485
Switching power supply

Application

The primary cycled switching power supply is short-circuit resistant and overload proof. DIN rail mounting.

Technical specifications

<table>
<thead>
<tr>
<th>Input voltage:</th>
<th>see table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output voltage:</td>
<td>24 V DC (adjustable)</td>
</tr>
<tr>
<td>Operating temperature range:</td>
<td>-20...+60°C DR-15, DR-30, DR-60, DR-100</td>
</tr>
<tr>
<td></td>
<td>-10...+70°C DRP-480, DRP-480S</td>
</tr>
<tr>
<td>Bearing temperature:</td>
<td>-20...+85°C</td>
</tr>
<tr>
<td>Overload protection:</td>
<td>105...160% DR15, DR30, DR60, DR100</td>
</tr>
<tr>
<td></td>
<td>105...150% DR75, 120, DRP240, 480, 480S</td>
</tr>
<tr>
<td>Overvoltage protection:</td>
<td>115...135% DR15, DR30, DR60, DR100</td>
</tr>
<tr>
<td></td>
<td>115...142% DR75, 120, DRP240, 480, 480S</td>
</tr>
<tr>
<td>Insulation resistance:</td>
<td>100MΩ</td>
</tr>
<tr>
<td>Installation:</td>
<td>DIN rail mounting</td>
</tr>
</tbody>
</table>

Switching power supply DR

<table>
<thead>
<tr>
<th>Type</th>
<th>Output voltage</th>
<th>Output current</th>
<th>Input voltage</th>
<th>Dimensions W X H X D mm</th>
<th>Item No</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR-15-24</td>
<td>24V DC</td>
<td>0.63 A</td>
<td>85...264 VAC, 120...370 V DC</td>
<td>25 x 95 x 56</td>
<td>1518</td>
</tr>
<tr>
<td>DR-30-24</td>
<td>24V DC</td>
<td>1.5 A</td>
<td>85...264 VAC, 120...370 V DC</td>
<td>78 x 95 x 56</td>
<td>1377</td>
</tr>
<tr>
<td>DR-60-24</td>
<td>24V DC</td>
<td>2.5 A</td>
<td>88...264 VAC, 124...370 V DC</td>
<td>78 x 95 x 56</td>
<td>1456</td>
</tr>
<tr>
<td>DR-100-24</td>
<td>24V DC</td>
<td>4.2 A</td>
<td>88...264 VAC, 124...370 V DC</td>
<td>100 x 93 x 56</td>
<td>1457</td>
</tr>
<tr>
<td>DR-75-24</td>
<td>24V DC</td>
<td>3.2 A</td>
<td>85...264 VAC, 120...370 V DC</td>
<td>55.5 x 125.2 x 100</td>
<td>1328</td>
</tr>
<tr>
<td>DR-120-24</td>
<td>24V DC</td>
<td>5 A</td>
<td>88...132/176, 264 V AC, 248...370 V DC</td>
<td>65.5 x 125.2 x 100</td>
<td>1453</td>
</tr>
<tr>
<td>DRP-240-24</td>
<td>24V DC</td>
<td>10 A</td>
<td>85...264 VAC, 120...370 V DC</td>
<td>125.5 x 125.2 x 100</td>
<td>1452</td>
</tr>
<tr>
<td>DRP-480-24</td>
<td>24V DC</td>
<td>20 A</td>
<td>180...264 V AC, 250...370 V DC</td>
<td>227 x 125.2 x 100</td>
<td>1454</td>
</tr>
<tr>
<td>DRP-480S-24</td>
<td>24V DC</td>
<td>20 A</td>
<td>90...132/180, 264 V AC, 254...370 V DC</td>
<td>227 x 125.2 x 100</td>
<td>1455</td>
</tr>
</tbody>
</table>
HOUSING SERIES LUNA

Accessories

Housing series LUNA

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions (mm)</th>
<th>Protection type</th>
</tr>
</thead>
<tbody>
<tr>
<td>AG external housing</td>
<td>52 x 93 x 28</td>
<td>IP 54</td>
</tr>
<tr>
<td>RG room housing</td>
<td>80 x 105 x 25.5</td>
<td>IP 30</td>
</tr>
<tr>
<td>UG universal housing</td>
<td>70 x 62 x 37</td>
<td>IP 65</td>
</tr>
</tbody>
</table>

Surcharges

various colours for room housing
ACCESSORIES

Screw fittings, installation accessories

Application
The KL clamping screws are suitable for enclosing protective sleeves. With clamping ring in Teflon for temperatures up to 200° C and clamping ring in stainless steel for temperatures up to 500° C.

Clamping screw KL

<table>
<thead>
<tr>
<th>Type</th>
<th>Material</th>
<th>Thread</th>
<th>Internal diameter</th>
<th>Clamping ring</th>
</tr>
</thead>
<tbody>
<tr>
<td>KL1VA/Teflon</td>
<td>VA</td>
<td>1/4&quot;</td>
<td>6mm</td>
<td>Teflon</td>
</tr>
<tr>
<td>KL1VA/VA</td>
<td>VA</td>
<td>1/4&quot;</td>
<td>6mm</td>
<td>VA</td>
</tr>
<tr>
<td>KL1VA/Teflon</td>
<td>VA</td>
<td>1/2&quot;</td>
<td>6mm</td>
<td>Teflon</td>
</tr>
<tr>
<td>KL1St/VA</td>
<td>Galvanised steel</td>
<td>1/2&quot;</td>
<td>6mm</td>
<td>VA</td>
</tr>
<tr>
<td>KL10St/VA</td>
<td>Galvanised steel</td>
<td>M10x1.5mm</td>
<td>6mm</td>
<td>VA</td>
</tr>
<tr>
<td>other types</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sensor bracket for sleeved temperature sensor HFH and clamping bands

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSBW</td>
<td>Sun/ball throw protection material: Stainless steel W x H x D 150(105) x 150 x 48 mm - transverse mounting</td>
</tr>
<tr>
<td>HFH</td>
<td>Sensor bracket for sleeve temperature sensor RS485</td>
</tr>
<tr>
<td>CABLE TIE</td>
<td>Plastic clamping band 4.8 x 282 mm</td>
</tr>
<tr>
<td>WLP-1</td>
<td>Heat conducting paste (2mg spray)</td>
</tr>
</tbody>
</table>

Installation accessories

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MF-35</td>
<td>Mounting flange (galvanised steel, ID Ø 6.3 mm or OD Ø 35 mm for duct temperature sensor RS485</td>
</tr>
</tbody>
</table>
## IMMERSION POCKETS

**Accessories for ETF, HTF RS485**

![TH-ms](image1)

![TH-VA](image2)

---

### Immersion pockets for screw-in temperature and sleeve temperature sensors (ETF, HTF RS485)

<table>
<thead>
<tr>
<th>Type / Material (Pmax/Tmax) / Installed length</th>
<th>Immersion pockets Ø</th>
<th>Wt. Ø 50mm</th>
<th>100mm</th>
<th>150mm</th>
<th>200mm</th>
<th>250m</th>
<th>300mm</th>
<th>400mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>TH-ms/xx nickel-plated brass 16 bar / 150°C</td>
<td>8x0.75</td>
<td>1/2”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TH-VA/xx stainless steel VA 1.4571 40 bar / 600°C</td>
<td>8x0.75</td>
<td>1/2”</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# SENSORS, CONNECTING CABLES

## Single components and surcharges

### Sensors

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT100 DIN Class B</td>
<td>(according to DIN EN 60751, class B)</td>
</tr>
<tr>
<td>PT100 DIN Class A</td>
<td>(according to DIN EN 60751, class A)</td>
</tr>
<tr>
<td>PT100 1/3 DIN</td>
<td>(according to DIN EN 60751, class B)</td>
</tr>
<tr>
<td>PT500 DIN Class B</td>
<td>(according to DIN EN 60751, class B)</td>
</tr>
<tr>
<td>PT1000 DIN Class B</td>
<td>(according to DIN EN 60751, class B)</td>
</tr>
<tr>
<td>PT1000 DIN Class A</td>
<td>(according to DIN EN 60751, class A)</td>
</tr>
<tr>
<td>PT1000 1/3 DIN</td>
<td>(according to DIN EN 60751, class B)</td>
</tr>
<tr>
<td>PT2000</td>
<td>(according to DIN EN 60751, class B)</td>
</tr>
<tr>
<td>Ni500 DIN</td>
<td>(according to DIN EN 43760, class B)</td>
</tr>
<tr>
<td>Ni1000 DIN</td>
<td>(according to DIN EN 43760, class B. TKR 6180 ppm/K)</td>
</tr>
<tr>
<td>Ni1000 TK5000</td>
<td>(TKR 5000 ppm/K)</td>
</tr>
<tr>
<td>NTC 1.8k, NTC5k, NTC10k, NTC10k PRE, NTC20k, NTC103 AT-2</td>
<td></td>
</tr>
<tr>
<td>KTY81-110, KTY81-122, KTY81-210, KTY11-6</td>
<td></td>
</tr>
<tr>
<td>LM235Z</td>
<td>(10mV/K, 2.75K/°C)</td>
</tr>
<tr>
<td>SAT (Satchwell)</td>
<td>Print version</td>
</tr>
</tbody>
</table>

### Connecting cables

<table>
<thead>
<tr>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connecting cable 2-conductor PVC</td>
</tr>
<tr>
<td>Connecting cable 3-conductor PVC</td>
</tr>
<tr>
<td>Connecting cable 4-conductor PVC</td>
</tr>
<tr>
<td>Connecting cable 2-conductor silicone</td>
</tr>
<tr>
<td>Connecting cable 3-conductor silicone</td>
</tr>
<tr>
<td>Connecting cable 4-conductor silicone</td>
</tr>
<tr>
<td>Connecting cable 2-conductor Teflon</td>
</tr>
<tr>
<td>Connecting cable 3-conductor Teflon</td>
</tr>
<tr>
<td>Connecting cable 4-conductor Teflon</td>
</tr>
<tr>
<td>Connecting cable 2-conductor glass silk with stainless steel braid</td>
</tr>
<tr>
<td>3-conductor connection for cable sensors</td>
</tr>
<tr>
<td>4-conductor connection for cable sensors</td>
</tr>
<tr>
<td>moisture-sealed burnished / moisture sealed embossed with cable sensors</td>
</tr>
</tbody>
</table>
## Sensor resist. charact. curves, max. current information

<table>
<thead>
<tr>
<th>Temp.</th>
<th>PT100</th>
<th>PT1000</th>
<th>PT500</th>
<th>NI1000</th>
<th>NI1000</th>
<th>NTC</th>
<th>NTC</th>
<th>NTC</th>
<th>NTC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>°C</td>
<td>Ohm</td>
<td>Ohm</td>
<td>Ohm</td>
<td>Ohm</td>
<td>Ohm</td>
<td>Ohm</td>
<td>Ohm</td>
<td>kOhm</td>
</tr>
<tr>
<td>-50</td>
<td>80.51</td>
<td>805.10</td>
<td>401.53</td>
<td>743.00</td>
<td>790.88</td>
<td></td>
<td></td>
<td>200.338</td>
<td>333.914</td>
</tr>
<tr>
<td>-40</td>
<td>84.27</td>
<td>842.70</td>
<td>421.35</td>
<td>791.90</td>
<td>850.83</td>
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**Temp.**
- NI1000
- NI5000
- 1kOhm
- 20kOhm
- 103 AT'2
- 81-110
- 81-122
- 81-210
- 11-6
- 235Z

**Meas. curr.**
- °C
- kOhm
- Ohm
- Ohm
- Ohm
- Ohm
- Ohm
- mVolt
- Ohm

**400μA, 3mA, 1mA**
- °C
- kOhm
- Ohm
- Ohm
- Ohm
- Ohm
- Ohm
- mVolt
- Ohm
GENERAL DESCRIPTION
regarding air quality sensors VOC

Application
Air quality issues require measurement of the air quality or air class based on a mixed gas sensor/VOC sensor (volatile organic compounds).

They are used

- for measurement of air quality in offices, hotels, convention and meeting rooms, apartments, shops, restaurants and so on
- for quantitative assessment of the air room quality in terms of loading from contaminating gases (cigarette smoke, body excretions, solvent vapours, emissions from building components and cleaning agents).
- for adjustable sensitivity with respect to the max. expected air contamination
- for demand based ventilation of rooms, this is possible while saving energy, since only loaded air is subject to a replacement.

Due to the linearisation and high operating temperature, the air quality sensor requires a low drift with respect to any humidity as well as good stability. Automatic self calibration of the sensor takes place.

The air quality sensor does not measure the concentration of an individual gas, but instead evaluates the mixed gas, i.e. the measurement of gas concentration is not done selectively. For this reason it is also not possible to indicate gas concentration in the unit ppm.

Detectable gases: mixed gas, alkanol vapours, cigarette smoke, automotive exhaust fumes, breathing air, combustion smoke (from wood, paper, plastics). Other VOC include for example compounds in the groups of alkane, alkene, aromatics, terpenes, halogenated hydrocarbons, esters, aldehydes and ketones, as well as naturally occurring VOC such as terpenes and isoprene. Emit VOC gases, from chemical building products, such as for example coating materials, adhesives or sealants, interior fittings, cleaning and care agents, office chemicals and carpets. The device can be reset via zero point and final value regulator by the user taking into account the calibration regulation. The service life of the sensor depends on the type of loading and the gas concentration.

The output signal, using which the switching point is defined in the controller, depends on various chemical gases according to the desired air quality.
1. General

1.1 For supplying and other services provided by EAP electric GmbH (Supplier) the conditions of sale and delivery apply exclusively. They are for use exclusively with businesses, who after concluding the contract act in a commercial or independent professional capacity.

1.2 Deviating conditions from the purchaser, which the supplier does not expressly recognise, are not binding, even if the supplier has not expressly rejected them.

1.3 All agreements, modifications and side agreements require written confirmation.

1.4 The inclusion and provisions of these sale and supply conditions, take effect in the same way as concluding and providing commercial business with the purchaser, exclusively according to the laws of the Republic of Austria.

1.5 In the event that provisions of these conditions of sale and supply are demonstrated to become invalid, this does not affect the validity of the other conditions. Purchaser and supplier will work together to replace the invalid provisions with new provisions, which are permitted legally and match the intended legal and commercial provisions as closely as possible.

1.6 The purchaser authorities, without notification, the supplier to collect person-related data as part of the agreement and to the extent necessary for the implementation of the contractual agreement, to storage and to process it, as well as to transmit it to departments involved in the implementation of the contractual agreement within the company. The supplier expressly reserves the right to conclude credit insurance in respect of the agreements, and in this connection to require the necessary data from the purchaser to the insurer which is acknowledged by the purchaser.

1.7 Place of fulfilment for all obligations directly or indirectly resulting from these contract conditions, including payment obligation, is the location of the supplier.

1.8 Place of jurisdiction is the legal body responsible at the company headquarters of the supplier. The supplier is also entitled to bring a claim to a jurisdiction which is locally responsible for the headquarters or branch of the purchaser.

2. Offers, scope of supply and conclusion of contract

2.1 Offers are non-binding.

2.2.1 The order confirmation is exclusively binding for the scope of the contractually agreed services.

2.2 For purchaser-specific products, deviations of the ordered quantity of up to +10% are permissible, where these are unavoidable for technical reasons and attributable to the purchaser.

2.3 The supplier also reserves the right to change design, selection of material, specification and type after sending an order confirmation to the extent that these changes do not contradict the specification of the purchaser or the order confirmation.

2.4 Partial deliveries are permitted.

2.5 The purchaser is required to take delivery of the supplied items without effect on their rights with respect to liability and warranty.

2.6 The documentation of the offer or order basis, such as diagrams, drawings, dimensions and weight details, are generally to be understood as approximate values, unless expressly designated as binding.

2.7 An order is only deemed to have been accepted, once confirmed in writing from the supplier, however where required on delivery, if this should have taken place without prior order confirmation Orders placed cannot be withdrawn.

2.8 Information provided by the purchaser, especially regarding the use of the item or items to be supplied, are only binding on the supplier if confirmed or provided in writing.

2.9 If a significant change of the financial conditions present at order conclusion takes place, then the supplier may defer delivery until the purchaser has provided the relevant partial payments or suitable security.

3. Prices and payment conditions

3.1 The prices unless otherwise agreed apply ex-works, including loading in the works, however without packaging and other dispatch costs. The packaging is charged at cost and will not be taken back. In addition to the prices the relevant added tax will apply as defined by law.

3.2 In each case the prices should be taken from the relevant price list at the point of dispatch.

3.3 For devices which are not intended for "sale from stock", the minimum order value indicated in the price list will be charged.

3.4 In the event of significant, unforeseeable changes of provision costs which cannot be influenced by the supplier, the supplier reserves the right to agree a price which deviates from the order confirmation.

3.5 Where the purchaser desires changes after order confirmation, the additional costs arising will be charged.

3.5.1 Payments must be made within 30 days from the date of invoice without deduction or within 14 days with 2% discount.

3.5.2 The date of fulfilment for all payments is the date on which the purchaser has provided the payment due.

3.5.3 For late payments, additional interest will be charged of 11%.

3.5.4 Bills and cheques will only be taken for payment and only apply as payment once confirmed as valid. Bank, discounting and other costs will be charged to the purchaser.

4. Delivery deadlines, acceptance and dispatch

4.1 The supplier must make efforts to comply with the delivery dates indicated. The delivery date information will be provided on a best efforts basis, however without binding nature, unless a fixed date is agreed in the order confirmation.

4.2 The delivery time starts on the date of the order confirmation. A reasonable extension of this period will be granted however, if the purchaser does not provide the documentation to be provided by them on time, or fails to meet significant contractual and payment obligations. The same applies in the event of industrial relations disputes, especially strikes, as well as in the event of unexpected obstacles occurring, which lie outside the suppliers control - e.g. delivery delays of a sub supplier, distribution and operational issues, unavailability of material or energy - and which can be demonstrated to have a significant impact on the manufacture or supply of the items to be delivered. The conditions described above also are not the responsibility of the supplier, if they have already taken place during existing delays.

4.3 The delivery time has been complied with, if the item to be supplied has left the works, or readiness for dispatch has been communicated at the time of expiry.

4.4 If, after setting a reasonable revised deadline, the supplier is still late thereby causing the purchaser Demonstrable damages, then with the exclusion of further claims, the purchaser is entitled to claim 0.5% per week of delay up to a maximum of a total of 5% of the value of the relevant part of the delivery or other services, which could not be used on time, or in accordance with the contract. Any additional claims from the purchaser for the event of late delivery or performance are excluded. This does not apply, if mandatory by law.

4.5 The right of the purchaser to terminate the contract following the setting of a revised delivery deadline remains unaffected.

4.6 To the extent that no fixed periods are agreed, the purchaser must accept the delivered item within 8 days after notification of completion.

4.7 If the supplier has provided an order or a call off basis, they must accept the delivered item - in the event of ordering multiple items all - within 12 months of the date of the order. number 4.2.1 applies accordingly. Special conditions apply for development contracts.

4.8 If the purchaser fails to meet their obligations stated in 4.2.1 or 4.2.2, then the supplier is entitled, without prejudice to additional legal options, to demand immediate payment and to store the delivery item at the cost and risk of the purchaser, or, to hold the delivery object in another way after previous notification and to deliver to the purchaser at the next possible date. In these cases the risk of increase in loss or incidental deterioration transfers on notification of readiness for dispatch to the purchaser.

4.9 Dispatch always takes place ex-works in the cost and risk of the purchaser. Transportation, breakage, theft and other insurance is to be provided only at the express written wishes of the purchaser and at their cost.

4.10 If the dispatch is delayed at the request of the purchaser, then they will be charged. starting one month after notification of readiness for dispatch the costs resulting in respect of readiness for dispatch are charged at the rate of 0.5% of the supplying facility per month. The supplier is entitled however, after settlement and unsuccessful sale to have a reasonable replacement delivery time for the item and to supply the item with a reasonable extended delivery time to the purchaser.
5. Installation and assembly

For installation and assembly work, the “business conditions for installation and assembly” of the supplier will apply, which will be made available to the purchaser in the event that these kinds of services are included within the contract.

6. Transfer of risk

Risk transfers to the purchaser on acceptance, on the day of unjustified rejection of acceptance, inability of the purchaser following expiry of the deadlines from the previous clauses 4.2.1 and 4.2.2 or any specially agreed delivery deadline, if dispatch to the purchaser or third parties is agreed, then the risk transfers on handover of the item to be supplied to the transportation company (logistics company, railway etc.) In all cases risk transfers once the supplied item is taken into use. If the supplier takes back goods for reasons for which they are not responsible, then the purchaser bears the risk until receipt of the goods at the supplier.

7. Retention of title

7.1 Fundamentally goods sold remain the property of the supplier until the fulfilment of all obligations from the business transaction. The supplier is obliged to release corresponding securities once at least 90% of the requirements have been met.

7.2 The purchaser must not mortgage or transfer goods where the title is still retained. In the event of mortgaging or seizing of goods or other encumbrances from third parties, the supplier must be informed immediately.

7.3 If the goods are moved or processed by the purchaser, the retention of the title will extend to the complete new property. In the event of processing, connection or mixing with third party goods, the supplier will be entitled to claim title to that part relating to the value of their goods used by the purchasing in the processing, connection or mixing. The purchaser is entitled to sell the goods under the retention of title as part of ongoing business.

8. Warranty and liability

8.1 Defects which are demonstrated to the supplier within goods supplied by them within 6 months after commissioning, however at the latest 12 months after transfer of risk in writing, must be rectified by the supplier as they choose or by supplying replacement goods, to which they are also entitled in the event of failure to remedy the defect. Retains the right to choose either rejection of the contract or reduction of the price, to the extent that attempts at rectification and replacement supply are not successful. After 9 months have expired, the entitlement for the purchaser to demand rectification and exclusion is excluded.

8.2 Obvious defects must be remedied at the latest within 14 days after transfer of the goods to the purchaser, defects which are not obvious must be remedied immediately after recognition. Spare parts or wear parts or parts for additional processing must be inspected immediately after supply by the purchaser, and any defects notified immediately in writing. For defects which could have been identified prior to installation or processing, all liability for warranty becomes invalid after the processing or installation.

8.3 If the supplier is not liable for damage, resulting from the following reasons: unsuitable or improper use, incorrect assembly or commissioning by the purchaser or third parties, failure to comply with the operating manual, incorrect or careless treatment, natural wear and tear, to the extent not related to misconduct or gross negligence of the supplier, nonapproved modifications or repair works.

8.4 For consequential damages from defects, the supplier will only be liable if they were caused by misconduct or gross negligence, by them, their legal representatives, or management employees. If the damage was caused by simple negligence, the supplier will only be liable in the case that key contract obligations are breached. If the supplier is liable for consequential damages within the remit of simple negligence then their liability is limited to the value of damage typically foreseeable as a result of the delivery of control system components.

8.5 If the purchaser initiates verification of goods supplied by the supplier and indicates an error, for which the supplier would be liable, the purchaser must bear the costs for dispatch and verification, if it becomes apparent that no defect is present.

9. Repairs

For repair services, the conditions of business for maintenance and repair of the supplier will apply, which were provided to the purchaser in the event that these kinds of services are included within the contract.

10. Copyright

The supplier retains copyright to drawings, photos, software and hardware, sketches, cost indications and other documents appended to offers and order confirmations. The purchaser must only use them for the agreed purposes, and must not copy them or make them accessible to third parties without permission from the supplier. On demand, these documents themselves and all copies of them must be returned to the supplier.

10.2 Tools and/or equipment manufactured by the supplier will continue to remain their property even if the costs for these have been fully or partially charged. If demanded by the purchaser, the supplier must provide a fair value proportion fair value of the tools and/or equipment. If the supplier refuses, then the purchaser may require issuance according to special conditions.

10.3 The list prices shown in the catalogue remain valid until they are withdrawn.

IMPORTANT: Errors, technical modifications as well as image and price errors reserved. For commissioning, only the operating instructions provided with the products must be used!
NOTES