System products and data managers
Solutions for the loop
Endress+Hauser is a global leader in measurement instrumentation, services and solutions for industrial process engineering

With dedicated sales centers and a strong network of partners, Endress+Hauser guarantees competent worldwide support. Our production centers in twelve countries meet your needs and requirements quickly and effectively. The Group is managed and coordinated by a holding company in Reinach, Switzerland. As a successful family-owned business, Endress+Hauser is set to remain independent and self-reliant.

Endress+Hauser provides sensors, instruments, systems and services for level, flow, pressure and temperature measurement as well as analytics and data acquisition. The company supports you with automation engineering, logistics and IT services and solutions. Our products set standards in quality and technology.

We work closely with the chemical, petrochemical, food and beverage, oil and gas, water and wastewater, power and energy, life science, mining, minerals and metals, renewable energy, pulp and paper and shipbuilding industries. Endress+Hauser helps customers to optimize their processes in terms of reliability, safety, economic efficiency and environmental impact.

To learn more about Endress+Hauser, visit:  
www.endress.com

Information on the ISO certification:  
Cybersecurity certification for Endress+Hauser
Complete solutions with system products

Everything you need from a single source
Nowadays measuring technology is required to do far more than simply record the measured value and system products are needed to complete the measuring point. The measuring devices must be powered and protected, the measured value displayed or further processed, limit values must be derived and monitored and data must be recorded securely. Endress+Hauser components and data manager are more than capable to carry out these tasks. These system products not only carry out the basic functionality; they increase your plant availability based on predictive maintenance information, they optimize your process by controlling directly at field level and use sophisticated calculation methods to measure energy consumption. It does not matter in which country or sector the solution is required, Endress+Hauser’s system products will always provide the right component with the required functionality and approvals (e.g. SIL or intrinsic safety as per ATEX, FM, CSA, TIIS or NEPSI).

Fast and innovative
Easy installation and fast commissioning are top priorities for both the simple devices such as active barriers and multifunctional devices such as the Memograph M. A simple configuration is all that is needed to adapt the various functions to the application requirements. Furthermore a wide range of possible combinations are available thanks to various fieldbuses and interfaces as well as extensive software concepts such as the Field Data Manager software. This saves time and money in practice.

Competence center for temperature measurement, temperature engineered solutions and system products
Endress+Hauser Temperature+System Products is one of the leading producers of temperature measurement, temperature engineered solutions and system products worldwide. The company employs about 700 associates worldwide. 400 of which are working in our headquarters Nesselwang (Germany), where our products are developed and produced. Associated Product Centers in Pessano (Italy), Greenwood (USA), Suzhou (China) and Aurangabad (India) guarantee customer proximity with products and services.
Fuel for thought

We reduce complexities to help you perform, comply and thrive in the Oil & Gas sector

Maximizing plant availability, safety and the efficiency of operations are the key challenges for today’s oil and gas industry. Complexity increases in the face of volatile market forces, strict international regulations and your ever-tightening resources. Close, accurate monitoring of key process parameters is critical. Our broad, reliable portfolio of instrumentation, deep industry experience, and our services and solutions make Endress+Hauser the ideal partner for optimal plant performance.

Advantages at a glance
- Mitigating risks by using state of the art technology meeting highest demands with regard to Functional Safety (IEC 61508) integrity
- Minimizing operational costs through efficient proof testing concepts, predictive maintenance and innovative data management
- Increasing plant availability with innovative technologies particularly designed for oil and gas industry applications
Product highlights

**Memograph M RSG45**

**Advanced data manager for reliable data storage and visualization**
- Unrestricted data exchange between field and control level
- Up to 20 universal (U, I, TC, RTD) or HART inputs and up to 14 digital inputs
- Easy and fast commissioning using jog/shuttle dial and buttons or via web server
- Ethernet-based fieldbuses guarantee flexible integration
- Software packages such as mathematics, tele-alarm and energy (water + steam)

**RN Series**

**Sensor supply and safe isolation of 0/4 to 20 mA and NAMUR signal circuits**
- For use in hazardous areas -40 ... +60°C (-40 ... 140°F)
- With SIL 2 (SC 3) for safety-related applications according to IEC 61508
- International Ex approvals, can be installed in Ex zone 2
- High packing density thanks to slim housing, 2 channels on 12.5 mm (0.49 inch) width (24V DC)
- Variants with wide range supply 24-230V AC/DC
- Simple and fast wiring due to pluggable connection technology

**HAW562 and HAW569**

**Customized overvoltage protection for top-hat rail or installation in the field**
- Expensive sensors and devices are safely protected against overvoltages
- Can be used in a variety of applications thanks to Ex approvals, SIL 2-compliance and compatibility with established communication signals and fieldbuses

**RID14 and RID16**

**Fieldbus display unit to show up to 8 FOUNDATION fieldbus values**
- Easy commissioning thanks to listener mode
- Various housing shapes and materials mean that the devices can be used in the most diverse applications
- Global Ex approvals including Ex d

Typical process information
- Pressure: 100 bar (1450,4 PSI)
- Temperature: 150°C (302 °F)

Separator diagram:

- Crude Oil / Gas / Water / Sediments enter the separator.
- Gas, Oil, and Bypass are directed from the separator.
- Water exits the separator.
- Gas is directed to the alternative output.
Competitive and safe

We help you boost your plant’s safety and performance

Maximizing productivity and profitability whilst meeting toughening safety and sustainability standards is the greatest challenge facing the chemical industry today. Technological innovation brings opportunity, but reliability is vital. Plant modernization is expedient, yet project delivery complex. Our innovatory instrumentation with safety built-in, allied to expert safety and project consulting, enables Endress+Hauser to deliver solutions to safely and reliably attain peak plant performance.

Advantages at a glance

- Meeting internationally recognized standards/recommendations as NAMUR and WHG
- Internationally accepted hazardous area approvals: ATEX, IECEx, FM/CSA, NEPSI, JPN EX, UK CA
- Use of state of the art technology – functional safety according to IEC 61508
- Uniform operating safety by design concepts for simple and safe operations
- Optimized material availability and minimized stocks through inventory management solutions

Chemicals
Product highlights

**Ecograph T RSG35**
Universal data manager with up to 12 universal inputs
- Secure data archiving in internal memory and additionally on SD card
- Common interfaces to make it system-compatible
- E-mail notifications in the event of limit value violations, faults and alarms

**RMA42**
Process transmitter with control unit
- Processes and transfers up to 2 analog measuring signals
- 2 mathematics channels to calculate the sum, difference, multiplication, mean value and linearization via a maximum of 32 support points
- Limit value monitoring with the help of 2 relays

**RIA15**
Loop powered display unit in the field or panel-mounted housing
- Better insight into the process through visualization of the 4 to 20 mA signal or all of the 4 HART values of a sensor
- Compact design means the device fits in any application yet still offers excellent readability
- Suitable for functional safety applications due to SIL interference freeness

**RN Series**
Sensor supply and safe isolation of 0/4 to 20 mA and NAMUR signal circuits
- For use in hazardous areas
- -40 ...+60°C (-40 ... 140°F)
- With SIL 2 (SC 3) for safety-related applications according to IEC 61508
- International Ex approvals, can be installed in Ex zone 2
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- Variants with wide range supply 24-230V AC/DC
- Simple and fast wiring due to pluggable connection technology

Distillation of liquids
Extracting more from less

In a world of lower ore grades, skill gaps and excavation challenges we can help you hit your target

Never more so than today has the mining, minerals & metals industry had to manage such tension between soaring demand, increased scarcity, lower ore grades, fluctuating prices, and toughening safety and sustainability criteria. Combining our innovative product portfolio with our deep application and industry knowledge enables Endress+Hauser customers to optimize processes, boost productivity, and ensure safety and environmental compliance.

Advantages at a glance

- Complete product basket for all applications, specifically in harsh environments
- Advanced diagnostic functionalities to make the process more safe and reliable
- Savings in raw material, water, energy and labor through accurate data of critical and quality relevant points in your process
Product highlights

**RMC621**
Flow and energy computer for applications with gas, liquids, steam and water
- Up to three full applications in one device
- Calculations based on international standards such as NX19, SGERG(88), IAPWS-IF97, API 2540

**Ecograph T RSG35**
Universal data manager with up to 12 universal inputs
- Secure data archiving in internal memory and additionally on SD card
- Common interfaces to make it system-compatible
- E-mail notifications in the event of limit value violations, faults and alarms

**RIA45 and RIA46**
Display with control unit for panel-mounting or in the field
- Combination of several functions in one device: active barrier, transmitter, control unit with relay
- Can be used in diverse applications thanks to limit value monitoring, easy calculations and linearization
- Easy-to-read, multi-colored display with color change in the event of an error

**RN Series**
Sensor supply and safe isolation of 0/4 to 20 mA and NAMUR signal circuits
- For use in hazardous areas -40 ... +60°C (-40 ... 140°F)
- With SIL 2 (SC 3) for safety-related applications according to IEC 61508
- International Ex approvals, can be installed in Ex zone 2
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**Metal integrated steel works plant**

A diagram illustrating the flow of materials and processes in a metal integrated steel works plant, including iron ore, coking plant, electric arc furnace, slab furnace, converter, ladle furnace, vacuum plant, process gas, blast furnace, gas, coal, coke, steel scrap, continuous casting, hot rolling mill, cold rolling mill, annealing line, zinc bath, galvanization, organic coating, plates, coils.
Trust in quality

We help you to improve quality while reducing operational costs

Constant demand for consistency in product quality and taste makes Food & Beverage a demanding industry. Complexity increases as ever more stringent hygiene regulations for food safety add cost pressures. Endress+Hauser’s industry leading portfolio of reliable instrumentation, expert global consulting and accredited calibration services all combine to enable greater plant availability, resource conservation and high repeatability in processing with traceable compliance.

Advantages at a glance

- Food safety and reliability due to instruments designed and manufactured specifically for all requirements in food & beverage industry
- Accurate measurement and calculations guarantee savings of raw material, water, energy and labor costs
- Optimized material availability and minimized stocks through inventory management solutions
Product highlights

**Memograph M RSG45**

Advanced data manager for reliable data storage and visualization
- Easy data exchange between field level and control level
- Up to 20 universal (U, I, TC, RTD) or HART inputs and up to 14 digital inputs
- Stainless steel front for quick cleaning and protects against contamination
- Application packages to adapt to process requirements perfectly
- FDA 21 CFR11-compliant data recording and user administration

**Ecograph T RSG35**

Universal data manager with up to 12 universal inputs
- Secure data archiving in internal memory and additionally on SD card
- Common interfaces to make it system-compatible
- E-mail notifications in the event of limit value violations, faults and alarms

**RMS621**

Steam and heat computer for steam and water
- Up to three full applications in one device
- Calculation based on international standard IAPWS-F97
- Easy-to-read, multi-colored display with color change in the event of an error

**RN Series**

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Milk and dairy process

- Milk intake
  - Milk Truck
  - Air eliminator
  - Raw milk reception
- Milk storage
  - Storage tank
  - Balance tank
- Milk heating
  - Steam injector
  - Heat exchanger
  - Temperatur holding tube
  - Expansion chamber
- Milk packaging
  - Sterile tank
  - Filling line
- Milk powder
  - Cream separator
  - Separator
  - Density mass flow
  - Cooling system
  - Homogenizer
  - To milk powder packaging
  - Second dryer
The pulse of life sciences

Trust a reliable partner who helps you achieve operational excellence

Today’s thriving biopharmaceutical industry demands high productivity and efficiency balanced with meticulous alignment to GMP standards. From our innovatory ASME-BPE compliant product portfolio enabling standardized production automation, reliable monitoring and predictive maintenance, to our expert consulting in process scale-up and operations optimization, Endress+Hauser offers the full solution. We speed time to market, sustain operational excellence, enhance productivity, and reduce risk.

Advantages at a glance

- Maximum product safety and reliability through tailored products to meet industry requirements and regulations
- Products designed to facilitate verification of compliance with important process parameters
- Accurate measurement and calculations guarantee savings of raw material, water, energy and labor costs
Product highlights

**Memograph M RSG45**
Advanced data manager for reliable data storage and visualization
- FDA 21 CFR 11-compliant data recording and user administration
- Easy data exchange between field level and control level
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**RMA42**
Process transmitter with control unit
- Processes and transfers up to 2 analogue measuring signals
- 2 mathematics channels to calculate the sum, difference, multiplication, mean value and linearization via a maximum of 32 support points
- Limit value monitoring with the help of 2 relays

**RIA15**
Loop powered display unit in the field or panel-mounted housing
- Better insight into the process through visualization of the 4 to 20 mA signal or all of the 4 HART values of a sensor
- Compact design means the device fits in any application yet still offers excellent readability
- Diagnostic tool for HART networks based on simple signal analyses

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**Bioprocess**

- **Inoculum**
- **Bioreactor**
- **Bioreactor**
- **Bioreactor**
- **Harvest tank**
- **Centrifuge**
- **Concentration**
- **Depth filtration**
- **Final product**
- **Fill and finish**
- **Freeze and thaw**
- **Virus filtration**
- **Chromatography**
Water is our life

Increase your efficiency and ensure compliance with an experienced and trusted partner

Today more than ever the water & wastewater industry must balance the opposing pressures of improving water safety and shrinking budgets. Whether treating for consumption or discharge, process complexity is rising. Endress+Hauser combines a wide portfolio of smart measuring instruments with industry-experienced consulting and expert services to flexibly and efficiently ensure water safety with verifiable regulatory compliance.

Advantages at a glance

- Cost-effective product and service portfolio for any applications, e.g. for drinking water, wastewater and sewage, desalination
- Meeting internationally recognized standards/recommendations for drinking water applications
- Highest efficiency by easy commissioning, operation and maintenance of instruments
Product highlights

**Ecograph T RSG35**

**Universal data manager with up to 12 universal inputs**
- Secure data archiving in internal memory and additionally on SD card
- Common interfaces to make it system-compatible
- E-mail notifications in the event of limit value violations, faults and alarms

**HAW562 and HAW569**

**Customized overvoltage protection for top-hat rail or installation in the field**
- Expensive sensors and devices are safely protected against overvoltages
- Can be used in a variety of applications thanks to Ex approvals, SIL 2-compliance and compatibility with established communication signals and fieldbuses

**RIA452**

**Process display unit with pump control**
- Alternating pump control for even utilization of up to 8 pumps
- Simple flow measurement in open channels and weirs; all common channel types are stored in the device

**RN Series**

**Sensor supply and safe isolation of 0/4 to 20 mA and NAMUR signal circuits**
- For use in hazardous areas -40 ... +60°C (-40 ... 140°F)
- With SIL 2 (SC 3) for safety-related applications according to IEC 61508
- International Ex approvals, can be installed in Ex zone 2
- High packing density thanks to slim housing, 2 channels on 12.5 mm (0.49 inch) width (24V DC)
- Variants with wide range supply 24-230V AC/DC
- Simple and fast wiring due to pluggable connection technology

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**Wastewater treatment**

- **A** Sewer system
  - Public site
  - Industrial site
  - River

- **B** Inlet & mechanical treatment
  - Pump station
  - Bar screen
  - Fat / sand removal
  - Fecal station
  - Primary clarifier
  - To sludge treatment

- **C** Biological treatment
  - PO4 precipitation
  - Aeration
  - Return activated sludge (RAS)
  - Secondary clarifier
  - To sludge treatment

- **D** Effluent line
  - Final filtration
  - Disinfection
  - Point of discharge / river
Power up your plant

Power plants play a vital role, we help maximize uptime while delivering safety and productivity

Today’s Power & Energy industry must strike a complex balance: Meeting spiraling demand for affordable and reliable energy while increasing cleaner and renewable sources in the energy mix. As cost and regulatory pressures grow, modernization is essential for efficient, safe resource use. As renewables advance, so does the need for energy storage. With best-fit instrumentation, deep power application expertise, services and solutions, Endress+Hauser brings efficient, reliable productivity.

Advantages at a glance

- Functional safety: IEC 61508 SIL 2/3 certified
- Intelligent instrumentation with advanced diagnostic functions
- Minimized downtime and highest safety through modern instrumentation

Power & Energy
Product highlights

EngyCal® RH33

Custody transfer heat meter for water, water-glycol mixtures and other liquids
- Used for recording and billing heat and cold quantities
- Calibrated, electronically paired temperature sensors ensure the highest accuracy and enable replacement of individual temperature sensors
- Logging of current and counter values, of error messages and limit value violations
- Remote readout via Ethernet and fieldbuses

RIA15

Loop powered display unit in the field or panel-mounted housing
- Better insight into the process through visualization of the 4 to 20 mA signal or all of the 4 HART values of a sensor
- Compact design means the device fits in any application yet still offers excellent readability
- Suitable for functional safety applications due to SIL interference freeness

RMS621

Steam and heat computer for steam and water
- Up to three full applications in one device
- Calculation based on international standard IAPWS-F97
- Online help function for all parameters

RMA42

Process transmitter with control unit
- Processes and transfers up to 2 analogue measuring signals
- 2 mathematics channels to calculate the sum, difference, multiplication, mean value and linearization via a maximum of 32 support points
- Limit value monitoring with the help of 2 relays

Water/steam circuit

- Boiler drum
- Superheater
- Furnace
- Preheater
- Flue gas
- Steam turbine
- Main condenser (Hotwell)
- Condensate
- Electricity
- Generator
- Additional condensate from full desalination
- Condensate pump
- Steam turbine
- 350 °C
- 9 bar
- 230 °C
- 192 bar
- 360 °C
- 186 bar
- 290 °C
- 190 bar
- 200 °C
- 170 bar
- 302 °C
- 170 bar
- 525 °C
- 23 bar
- 525 °C
- 170 bar
- 40 °C
- 0.1 bar
- 38 °C
- 1.1 bar
# A data manager for every application

<table>
<thead>
<tr>
<th>Modell</th>
<th>Features</th>
<th>Construction</th>
<th>Universal analog inputs/ HART for RSG45</th>
<th>Digital inputs</th>
<th>Analog outputs</th>
<th>Loop power supply</th>
<th>Count inputs (pulse)/ operating time counter</th>
<th>Event input</th>
<th>Alarm set points/relays</th>
<th>Measured value display</th>
<th>E-mail functions</th>
<th>Integrated web server</th>
<th>CSV file format</th>
<th>OPC server</th>
<th>Mathematics function</th>
<th>Integration</th>
<th>Calculation factor for integrated quantities</th>
<th>Batch function</th>
<th>Tele-alarm function</th>
<th>Wastewater &amp; storm overflow function</th>
<th>Energy software (water + steam)</th>
<th>Text input</th>
<th>Memory</th>
<th>Scan rate</th>
<th>Interfaces</th>
<th>Power supply</th>
<th>Protection class</th>
<th>Dimensions (WxHxD) in mm (in)</th>
<th>FDA 21 CFR 11 / User administration</th>
<th>Device description as from page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ecograph T - RSG35</td>
<td>Universal data manager with up to 12 universal inputs. Display, recording and monitoring device with excellent price/performance ratio.</td>
<td>0/4/8/12</td>
<td>6</td>
<td>-</td>
<td>1 x 24 V DC, max. 250 mA</td>
<td>yes</td>
<td>yes</td>
<td>30 / 6 relays</td>
<td>TFT color graphic, 178 mm (5.7 in.) Resolution: 640 x 480 pixels</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes (optional software)</td>
<td>yes</td>
<td>-</td>
<td>4 mathematics channels (optional)</td>
<td>Yes</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Internal memory + SD card + USB stick</td>
<td>USB (front), RS232/RS485 (optional), Modbus RTU/TCP Slave (optional)</td>
<td>100 ms</td>
<td>USB (front), Ethernet (back), RS232/RS485 (optional)</td>
<td>RS232/RS485, PROFINET I/O Device, EtherNet/IP Adapter, Modbus RTU/TCP Slave, Modbus RTU/TCP Master, Ethernet, USB</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Memograph M - RSG45</td>
<td>Advanced Data Manager with universal use of analog HART and digital signals. Saves, visualizes, analyzes and communicates. Integration of process pictures.</td>
<td>0/4/8/12/16/20 or up to 40 for fieldbus</td>
<td>6 or 14</td>
<td>2</td>
<td>1 x 24 V DC, max. 250 mA</td>
<td>yes</td>
<td>yes</td>
<td>60 / 6 or 12 relays</td>
<td>TFT color graphic, 178 mm (7 in.) Resolution: 800 x 480 pixels</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes (optional software)</td>
<td>yes</td>
<td>-</td>
<td>12 mathematics channels (optional)</td>
<td>Yes</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Internal memory + SD card + USB stick</td>
<td>USB (front), RS232/RS485, PROFINET I/O device, EtherNet/IP adapter, Modbus RTU/TCP slave, Modbus RTU/TCP Master, Ethernet, USB (back)</td>
<td>100 ms</td>
<td>USB (front)</td>
<td>RS232/RS485, PROFINET I/O Device, EtherNet/IP Adapter, Modbus RTU/TCP Slave, Modbus RTU/TCP Master, Ethernet, USB</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Memograph M - RSG45 DIN rail</td>
<td>Advanced data manager and communication manager with universal use of analog HART and digital signals. Saves, visualizes, analyzes and communicates.</td>
<td>0/4/8/12/16/20 or up to 40 for fieldbus</td>
<td>6 or 14</td>
<td>2</td>
<td>1 x 24 V DC, max. 250 mA</td>
<td>yes</td>
<td>yes</td>
<td>60 / 6 or 12 relays</td>
<td>Without display, visualization via web server</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes (direct)</td>
<td>yes</td>
<td>-</td>
<td>12 mathematics channels (optional)</td>
<td>Yes</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Internal memory + SD card + USB stick</td>
<td>RS232/RS485, PROFINET I/O Device, EtherNet/IP Adapter, Modbus RTU/TCP Slave, Modbus RTU/TCP Master, Ethernet, USB</td>
<td>100 ms</td>
<td>RS232/RS485, PROFINET I/O Device, EtherNet/IP Adapter, Modbus RTU/TCP Slave, Modbus RTU/TCP Master, Ethernet, USB</td>
<td>24</td>
<td></td>
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</tr>
</tbody>
</table>
Ecograph T
Universal data manager

Monitor, visualize, record and communicate process values

Secure data recording made easy
The Ecograph T videographic recorder is the simple solution to record data manipulation-proof.

With its up to 12 universal analogue inputs and various visualization modes, such as curves, waterfall and bar graph, it is universally usable in many applications. With its additional 6 digital inputs pulses can be recorded, operating times and switch states can be registered or time can be synchronized.

The recorded measurements are stored on a 128 megabyte internal memory and optionally on a separate SD card.

By using modern interfaces such as Ethernet and various communication possibilities like Modbus TCP/RTU slave, data can be automatically transmitted to primary systems. Through this a simple system connection is possible. Up to 30 limit values can be freely assigned to the channels. Limit value infringements are displayed and stored in the device. Furthermore 6 internal relays can be used for alarm transmission.

The flexibility of the Ecograph T is increased through the optional 4 mathematics channels. The device can make individual calculations which can be simply entered using a formula editor.

An all-round package
Furthermore the Ecograph T convinces by its intuitive operation. The parameter set-up of the video graphic recorder can be carried out user-friendly by means of the integrated web server without any additional software having to be installed. Also the visualization of the instantaneous and the recorded data is possible using the web server.

Moreover, the recorded data can be selected, saved and visualized manipulation-proof in a SQL database from the device or the SD card with the help of the essential version of the field data manager software which is part of the standard device delivery package. This complete package and the excellent price-performance ratio make the Ecograph T an uncomplicated and cost-efficient solution for many applications.
Application examples

**Ecograph T – Typical application areas**
The Ecograph T is the solution in all sorts of business areas and applications such as:
- Quality and quantity monitoring water and wastewater industry
- Process monitoring in power stations
- Display and recording of critical process parameters in production processes
- Tank and level monitoring
- Temperature monitoring in metal processing

Everywhere where process parameters need to be visualized, recorded, analyzed and monitored the Ecograph T is the versatile and cost-efficient answer!

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**Advantages of the Ecograph T:**
- Versatile: Up to 12 universal inputs of the most common measurement signals
- Clear: 5.7” TFT display for the indication of the measurements in up to four groups in digital, bar graph and curve presentation modes
- Fast: Sampling rate of 100 ms for all channels
- Compact: Low installation depth, save space and money
- Simple: Intuitive operation via navigator and user-friendly parameter set-up using an integrated web server or FieldCare
- Safe: Reliable archiving reliably using the internal memory and separate SD card
- Informative: E-mail notification with alarms and limit value infringements
- System capability: Common interfaces such as Ethernet, RS232/485 (optional) and USB
- Communicative: Slave function for Modbus RTU/TCP (optional)
- Intelligent: Calculations using 4 optional mathematics channels
- Complete: Including the Essential version of the Field Data Manager software for manipulation free data storage and visualization in the scope of supply
The state-of-the-art Memograph M data manager is so much more than simply a data manager; it is a flexible and efficient system for organizing process values. It can be easily and quickly adapted to your application thanks to its intuitive operation concept.

The measured process values are clearly displayed on the 7” TFT screen and reliably logged in the device memory. Furthermore, up to 60 limit values are monitored and analyzed. The measured and calculated values can be very easily forwarded to higher-level systems using standard communication protocols such as PROFINET, EtherNet/IP or Modbus RTU/TCP for example. Individual plant modules can be connected to one another in the same way. Thanks to the various application packages, such as batch, tele-alarm, water/wastewater or energy calculation, the optional stainless steel front and Ex approval, the device is suitable for use in a broad range of industries including those listed below:

- Hygiene applications in the food and beverages industry and in life sciences
- FDA-validated applications
- Monitoring critical parameters in filtration systems for drinking water both in rivers and in rain spillway basins in sewage treatment plants
- Recording energy, gas and fluid consumption in all sectors
- Saving and monitoring the performance characteristics of turbines and boilers in power plants

The Memograph M is always the correct choice whenever a solution is required for the logging, visualization, analysis and transmission of process parameters.

The Memograph M DIN rail data manager is available as a device without a display for mounting on a DIN rail in the cabinet. The functionality is compatible with devices which have a display.

The Memograph M DIN rail is perfectly suited to applications where there is no requirement for an onsite display. Visualization of the measured data takes place preferably via the integrated Web server. The data manager can be integrated into the most diverse system architectures thanks to the various interfaces and communication options and is also suitable for IIoT/cloud applications.
**Memograph M**

**Process visualization made easy**

Memograph M optimally meets the requirement to recognize the plant status at a glance with a free of charge configuration tool. A fast and easy process visualization can be realized with two files, an image in BMP format and an initial file containing coordinates for the measured values. Whether in pumping stations, tanks or coal dumps, Memograph M provides information on what is going on in the plant at a glance.

**Integrated HART inputs – Exploit the full potential of HART devices not only the 4 to 20 mA signal!**

The Memograph M RSG45 offers a genuinely unique selling position with the new inputs for HART signals. The HART signal is supported by most sensors in the field. With the HART inputs, the RSG45 can use both the 4 to 20 mA analog signal and all four HART values of a connected field device and process up to 40 HART values simultaneously. HART multidrop is also possible with up to 5 field devices per channel.

The RSG45 thus helps to obtain more information from the field. It also offers a HART gateway function. This means direct access from the PC configuration software to the field device without the need for an additional modem. Configuration of the field devices is thus possible from the measuring control room. Furthermore, detailed field device status information is available.

**Advantages at a glance:**

- Process transparency increases plant safety and availability. Predictive maintenance means that unscheduled process interruptions and outages can be avoided.
- Easy access to field devices ensures time savings
Integrated web server – Ideal functions for remote maintenance of the RSG45

The integrated web server means you can access current and historic process data at any time and any place using a conventional web browser. Remote access and remote control of the device are possible in addition to the display of current values including status and device state. Furthermore the integrated web server features a number of excellent, new functions, e.g.:

- Option to print out, save and import device settings
- Firmware update of the RSG45 possible
- Protection against unauthorized access of the RSG45 through the use of 3 password-protected user levels.
- Online visualization:
  - Trend display
  - Complete device parameter configuration
  - Password-protected access

Advantages at a glance:

- Fast and easy display of current and historic data via web browser
- Better insight into the process at all times and anywhere in the world
- Time- and cost-saving commissioning and operation without additional configuration software

WebDAV – Data exchange that knows no limits

WebDAV (Web Distributed Authoring and Versioning) is an open standard for the provision of data on the Internet/Intranet. The WebDAV server and client function have been implemented in the Advanced Data Manager. Using the server function it is possible to read out the files on the SD card of the RSG45 with the help of a WebDAV client, e.g. a web browser. Using the client functionality the RSG45 automatically transfers the recorded data to a connected WebDAV server (e.g. NAS drive).

Advantages at a glance:

- Time-saving data access and data transmission using standard protocol
- Increased flexibility as no special add-on is required on the PC
- Secure data transmission possible using SSL encryption
Stainless steel front with touchscreen and Ex p approval

The RSG45 is available with an optional stainless steel front and touchscreen. Operation is easy and fast even when wearing gloves thanks to the optimized, touch-based user interface. Scrolling through historic data or changing the various display groups is easy with a simple swipe. The main emphasis of this stainless steel version made from 316L material is on critical ambient conditions. Cleaning is easy due to the hygiene-compliant design and the device can be operated directly in hazardous areas when the stainless steel front is combined with installation in a flameproof cabinet.

Alternatively the device can be easily operated on site or using the PC software. A navigator and 4 function keys enable dialogue-guided operation. The Memograph M can be very easily operated with a USB keyboard or mouse. Device configuration is also possible using the FieldCare or DeviceCare PC software. In this case, the menu structure and appearance are the same as on the device to make configuration easier.
System integration and communication

- SPS/PLC
- OPC based software
- Webserver
- FDM
- WebDAV
- Ethernet
- 4G/5G Router
- PROFIBUS DP, PROFINET
- Modbus, Ethernet/IP
- RS232
- Modbus TCP / RTU Master
- Webserver via USB
- SD-card / USB-stick
  - *.csv
  - *.dat
- Field Data Manager

Advanced data manager Memograph M
Automatic signal evaluation

The Memograph M automatic signal analysis provides easily read conditions. Actual and previous signal quantities and peaks are listed in tables. This gives a fast overview of, for example, the last shift, the actual day, the last month etc.:

- Automatically calculates averages, minimum and maximum values for the analogue measurement points
- Calculates intermediate, daily, monthly, yearly reports (up to 4 analyses possible)
- Shows counter values, operating times and quantities

Another advantage of these analyses is that the values are determined by using the actual measured values and not afterwards by using already optimized values. This gives an exact overview at all times.

IIoT applications

The Memograph M is a flexible and efficient system for organizing process values. The measured values can be easily forwarded to higher-level systems using standard communication protocols – either directly or after pre-processing (application packages and maths functions). In addition to analogue interfaces, common digital communication protocols (HART, Modbus, etc.) are also available to communicate with the field level (instrumentation). The data managers can be easily and quickly integrated into the most diverse IT system architectures using standard interfaces based on RJ45 (Ethernet TCP/IP, OPC). As well as user data (measured value), condition data and service data for the connected sensors can also be recorded and communicated.

The Memograph M can thus also be used as an application-focused edge device for IIoT solutions. The data are transferred between the various network structures in the „Industrial Internet of Things“. Internal storage means that data can also be held offline in the event that Internet connectivity is temporarily lost; this is necessary, for example, if the sensor technology has no internal data memory. The management and processing of accumulated data are considerably more efficient while at the same time data traffic and the network load to the cloud are reduced.
NETILION

web applications

Edge Device

Ethernet

RSG45

HART

Temperature sensors
iTherm TrustSens
iTHERM TrustSens Calibration Monitoring with the Memograph M RSG45

Applications in the life sciences and food & beverage sectors rely on the highest standards in process safety. Calibration of the sensors is vital in order to ensure process and product safety. Today’s standard procedure involves manual calibration of temperature sensors which is very costly and time-consuming.

Endress+Hauser’s new iTHERM TrustSens is the first self-calibrating temperature sensor on the global market. iTHERM TrustSens offers a solution for inline calibration with a minimum of effort and 100% compliance.

When used in conjunction with Endress+Hauser’s RSG45 Data Manager, this thermometer offers automated iTHERM TrustSens calibration monitoring, i.e. the automatic creation of calibration reports in the RSG45. If FDM (Field Data Manager software) is used, it is also possible to save the reports automatically, e.g., on a server.

Data security – FDA 21 CFR Part 11 – compliant data recording

FDA 21 CFR 11– compliant data recording is often needed particularly in the pharmaceutical industry but also often in the context of IT security requirements. As part of fulfilling this requirement, electronic signatures are given the same legal status as a conventional signature. The Memograph M features FDA-compliant data recording and user administration as standard and it can be activated as required.

This functionality includes:
- Integrated user and rights management
- ID + password = electronic signature
- Prompt to change password at regular intervals
- Key lock for access protection
- 3 invalid log-in attempts results in blocked access
Power supplies & barriers, overvoltage protection

- **Active barrier | 24 V DC**
  - 1/2 channel, signal doubler
  - 4 ... 20 mA/HART®, T-connector
  - In/Out active or passive, HART® signal tapping
  - cULus, SIL 2 (SC 3), Marine (DNV)
  - ATEX/IECEx, EAC, NEPSI, CSA, JPN Ex

- **RLN22**
  - Power supplies & barriers, overvoltage

- **RNO22**
  - Surge arresters
    - For installation in field device
    - 4 ... 20 mA; PROFIBUS PA, FOUNDATION Fieldbus
    - DIN rail, 0-66 V or 80-230 V
    - Non-Ex; Ex ia; ATEX/IECEx, non-Ex, CSA

- **RN22**
  - Surge arresters
    - DIN rail
    - 4 ... 20 mA, HART®, PFM, PROFIBUS PA, FOUNDATION Fieldbus or RS-485, Modbus, 10-55 V; 90-230 V
    - SIL 2; ATEX/IECEx, non-Ex, CSA

- **RL22**
  - Surge arresters
    - DIN rail
    - 4 ... 20 mA, HART®, PFM, PROFIBUS PA, FOUNDATION Fieldbus or RS-485, Modbus, 10-55 V; 90-230 V
    - SIL 2; ATEX/IECEx, non-Ex, CSA

- **RNB22**
  - Surge arresters
    - For installation in field device
    - 4 ... 20 mA; PROFIBUS PA, FOUNDATION Fieldbus
    - 0-66 V or 80-230 V
    - Non-Ex; Ex ia/d; ATEX/IECEx, CSA

- **RBL2**
  - Passive barrier
    - 1/2 channel, loop-powered
    - 4 ... 20 mA; input or output
    - HART® sockets
    - SIL 3
    - ATEX, FM, CSA

- **RLN22**
  - **NAMUR isolating amplifier | 24 V DC**
    - 1/2 channel, relay output, T-connector
    - Line fault detection, wire break or short-circuit
    - SIL 2, Marine (DNV)
    - ATEX/IECEx

- **Output isolating amplifier | 24 V DC**
  - 4 ... 20 mA/HART®
  - Line fault detection
  - SIL 2 (SC 3), Marine (DNV)
  - ATEX/IECEx

- **System power supply | 100-250 V AC/24 V DC 2.5 A**
  - Static/dynamic boost 3.125 A / 5 A
  - Parallel operation for redundancy
  - Preventive function monitoring
  - Power supply for RN Series or 4 W sensors

- **RNB22**
  - Surge arresters
    - DIN rail
    - 4 ... 20 mA, HART®, T-connector
    - In/Out active or passive, HART® signal tapping
    - cULus, SIL 2 (SC 3), Marine (DNV)
    - ATEX/IECEx, EAC, NEPSI, CSA, JPN Ex

- **RN22**
  - Surge arresters
    - DIN rail
    - 4 ... 20 mA, HART®, PFM, PROFIBUS PA, FOUNDATION Fieldbus or RS-485, Modbus, 10-55 V; 90-230 V
    - SIL 2; ATEX/IECEx, non-Ex, CSA

- **RNF22**
  - Passive barrier
    - 1/2 channel, loop-powered
    - 4 ... 20 mA; input or output
    - HART® sockets
    - SIL 3
    - ATEX, FM, CSA

- **RN42**
  - Surge arresters
    - For installation in field device
    - 4 ... 20 mA; PROFIBUS PA, FOUNDATION Fieldbus
    - DIN rail, 0-66 V or 80-230 V
    - Non-Ex; Ex ia/d; ATEX/IECEx, CSA

- **RLN42**
  - **NAMUR isolating amplifier | 24 to 230 V AC/DC**
    - 2 channel, relay output
    - Line fault detection, wire break or short-circuit
    - SIL 2, Marine (DNV)
    - ATEX/IECEx

- **RB223**
  - Passive barrier
    - 1/2 channel, loop-powered
    - 4 ... 20 mA; input or output
    - HART® sockets
    - SIL 3
    - ATEX, FM, CSA

- **HAW562**
  - Surge arresters
    - DIN rail
    - 4 ... 20 mA, HART®, PFM, PROFIBUS PA, FOUNDATION Fieldbus or RS-485, Modbus, 10-55 V; 90-230 V
    - SIL 2; ATEX/IECEx, non-Ex, CSA

- **HAW569**
  - Surge arresters
    - For installation in field device
    - 4 ... 20 mA; PROFIBUS PA, FOUNDATION Fieldbus
    - DIN rail, 0-66 V or 80-230 V
    - Non-Ex; Ex ia/d; ATEX/IECEx, CSA

- **HAU562**
  - Surge arresters
    - DIN rail
    - 4 ... 20 mA, HART®, PFM, PROFIBUS PA, FOUNDATION Fieldbus or RS-485, Modbus, 10-55 V; 90-230 V
    - SIL 2; ATEX/IECEx, non-Ex, CSA

- **HAU569**
  - Surge arresters
    - For installation in field device
    - 4 ... 20 mA; PROFIBUS PA, FOUNDATION Fieldbus
    - DIN rail, 0-66 V or 80-230 V
    - Non-Ex; Ex ia/d; ATEX/IECEx, CSA

- **Process indicator & control units**
  - **Loop-powered**
    - 4 ... 20 mA or HART®
    - Versions for level, analysis
    - Field housing or panel
    - Ex ia
    - Aluminum or polymer (PC)
    - SIL, Marine (DNV)
    - ATEX, FM, CSA, IECEx, EAC, NEPSI, TIS

  - **Fieldbus indicator**
    - FOUNDATION Fieldbus or PROFIBUS PA, 8 channels
    - Field housing, aluminum or stainless steel (316L)
    - Ex d (flameproof)
    - ATEX, CSA, FM, IECEx

  - **RMA42**
    - Process indicator with control unit
      - 1/2 analog, temperature inputs
      - 1/2 analog, 0/2 relay outputs
      - Multiplication, average, differential functions
      - Linearization, limit value, overfill prevention
      - cULus, SIL 2, Marine (DNV)
      - ATEX, FM, CSA, NEPSI

  - **RIA45**
    - Process indicator with control unit
      - 1/2 analog, temperature inputs
      - 1/2 analog, 0/2 relay outputs
      - Multiplication, average, differential functions
      - Linearization, limit value, overfill prev.
      - cULus, SIL 2, Marine (DNV)
      - ATEX, FM, CSA

  - **RIA46**
    - Process indicator with control unit
      - 1/2 analog, temperature inputs
      - 1/2 analog, 0/2 relay outputs
      - Multiplication, average, differential functions
      - Linearization, limit value, overfill prev.
      - cULus, SIL 2
      - ATEX, FM, CSA

  - **RJA452**
    - Process indicator
      - Alternating pump control
      - Linearization, integration
      - Limit function
      - 1 analog input, 4/8 relay outputs
      - FM, CSA
### Application & energy managers

**RH33**
- **BTU meter for custody transfer**
  - Water, glycol, other fluids
  - Bidirectional measurement
  - IAPWS-97 calculation standard
  - Web server, USB, TCP/IP, Modbus, M-Bus
  - MID, DIML R75, CSA GP, PTB

**RS33**
- **Steam calculator; mass and energy**
  - Saturated and superheated steam
  - IAPWS-97 calculation standard
  - Web server, USB, TCP/IP, Modbus, M-Bus
  - CSA GP

**RA33**
- **Batch controller**
  - Stacking and dosing
  - Automatic after-run correction
  - ASTM D1250-04
  - USB, TCP/IP, Modbus TCP, RTU, RS-232
  - CSA GP, NTEP

**RMS621**
- **Steam and heat computer**
  - Steam and water
  - Up to 3 applications
  - IAPWS-97 calculation standard
  - RS-232, 2x RS-485, PROFIBUS DP, Modbus
  - M-Bus, DIML R75

**RMC621**
- **Universal flow/energy computer**
  - Gas, liquids, steam, water
  - Up to 3 applications
  - IAPWS-97, NX19, SGERG88, AGAB
  - RS-232, 2x RS-485, PROFIBUS DP, Modbus
  - M-Bus, DIML R75, ATEX, CSA, FM

### Connectivity

**SWA70**
- **WirelessHART® adapter**
  - Fast upgrade of HART® devices to WirelessHART® technology
  - Wireless transmission of 4 ... 20 mA/ HART® signals
  - ATEX, CSA, IEC Ex, JPN Ex

**SWG70**
- **WirelessHART® Fieldgate**
  - Easy commissioning and diagnosis of a self-organizing WirelessHART® network
  - Ethernet and RS-485 interfaces
  - ATEX, IECEx Ex, FM

**SMT70**
- **Tablet PC for device configuration**
  - HART®, PROFIBUS DP/PA, FOUNDATION Fieldbus, Modbus protocols
  - Connection to Netilion (Endress+Hauser IIoT ecosystem)
  - ATEX, IECEx, UL

**SMT77**
- **Tablet PC for device configuration in Ex Zone 1**
  - HART®, PROFIBUS DP/PA, FOUNDATION Fieldbus, Modbus protocols
  - Connection to Netilion (Endress+Hauser IIoT ecosystem)
  - ATEX, IECEx, UL

**SMT50**
- **Ethernet HART® gateway**
  - For remote monitoring and configuration
  - Integrated web server
  - UL

**SFG250**
- **Ethernet/PROFIBUS gateway**
  - Ethernet/PROFIBUS DP gateway with integrated web server
  - Monitoring of PROFIBUS and HART® device status
  - Fieldgate modules SFM500: display of process values and diagnostics

**SG500**
- **FieldEdge**
  - PROFIBUS, HART®, WirelessHART® in conjunction with Fieldgates
  - Connection to Netilion (Endress+Hauser IIoT ecosystem)

**SGC500**
- **FieldEdge**
  - Bluetooth®, LTE
  - API (Application Programming Interface)
  - Connection to Netilion (Endress+Hauser IIoT ecosystem)

**SGC200**
- **BT/Wireless HART® adapter (FieldPort)**
  - Converts HART® signal of field device to Bluetooth® or Wireless HART® signal
  - 2- and 4-wire HART® field devices
  - ATEX, IECEx

### Data managers & data loggers

**RSG35**
- **Graphic data manager**
  - Up to 12 universal inputs
  - 30 limit values/relays
  - 4 math channels
  - USB, Ethernet, RS-232/RS-485
  - Modbus RTU/TCP-slave

**RSG45**
- **Advanced data manager**
  - Front panel; stainless steel, DIN rail
  - Math channels, teletalarm
  - Batch controller, energy computer
  - W, WW, application packages
  - Transmitter calibration monitoring
  - Up to 20 universal channels (analog/HART®)
  - Up to 40 channels with fieldbus
  - 6/16 D1, D2/limit values, 12 relay outputs
  - RS-232/RS-485, PROFIBUS DP, PROFIBUS I/O, EtherNet IP
  - Modbus RTU/TCP/Modbus/Slave, USB

**FDM**
- **Analysis software**
  - Compliant with FDA 21 CFR Part 11
  - Data integrity in accordance with GMP
  - Supports SGL databases

**SFG500**
- **FieldGate modules SFM500**

**SGC500**
- **FieldEdge**

**SGC200**
- **BT/Wireless HART® adapter (FieldPort)**
Memograph M

Application packages

Batch monitoring

Secure recording of up to 4 batches

Batch monitoring serves for secure recording and visualization of discontinuous processes which have a specified beginning and an end. No matter where these processes take place e.g. in food industry such as the ripening process of yoghurt, or in mechanical construction where temperature ovens are monitored – Memograph M is the right solution.

Up to 4 independent batches can be documented in parallel. At the end of a batch run the batch report can be printed out per PC software or directly using a printer connected to the unit via USB.

The batch report contains:
- Complete information regarding the product and process run
- Batch number
- Batch time, start and stop times for the batch run
- Min.-/max.-/mean values of all active channels, quantities and operating times
- Event log / audit trail entries
- Front-end or controller batch control is possible.

Mathematics function (optional)

In addition to the universal inputs eight mathematics channels are available which can be used as independent channels. The formulae of the individual mathematics channels can be easily set-up using an easy-to-use editor with predefined functions, similar to MS Excel. Moreover, integration or a 32 point linearization is possible for each channel.

Tele-alarm

Plant remote monitoring and control

With the tele-alarm software in the Memograph M it is possible to react even when on the road. The device creates a message in case of upper and lower limit infringements or on an active digital input. An SMS message will be sent with text that can be individually defined for each incident. The receipt of the message can also be acknowledged by SMS. If the message is not acknowledged further persons can be alerted.

Furthermore, instantaneous values can be easily requested by sending an SMS to the device. Then the Memograph M sends values by SMS. It is also possible to switch relays via SMS so that e.g. plants or pumps can be re-started. This enables full control over the plant without additional tools!
Example of a fault message in a pumping station:

11:15 Pump 1 faulty, SMS sent to the responsible technician
11:17 Technician reads the SMS
11:18 An SMS message acknowledgement is sent by the technician to the Memograph M.
11:19 Technician requests and receives the instantaneous values from the Memograph M using SMS
11:21 Relay 2 in the Memograph M is switched via SMS. This means that pump 1 is re-started.
11:22 Pump 1 runs again, malfunction removed!

Application package wastewater (including tele-alarm) – rainwater overflow tanks and pumping stations safely under control

The Memograph M provides a complete solution for rainwater overflow tanks and pumping stations. It controls the tanks or pumps, alerts in case of alarms via SMS or e-mail and records all relevant data.

The following values can be recorded in case of rainwater overflow:

- Start, duration and end of filling
- Start, duration, end and quantity of overflow
- Filling and overflow frequency

Furthermore data can be transmitted to operating log books via OPC-Server. Moreover, with this wastewater application a seepage water recording is possible according to ATV (German Association for wastewater). Thus Memograph M offers a complete package.

Application package energy - Energy content calculation of water, steam and water-glycol mixtures

With the energy package it is possible to offer heating counters and steam computer functions with optimal data recording as a complete solution package for energy monitoring. The Memograph M energy package provides e.g. for steam boilers the possibility to calculate and permanently monitor the boiler efficiency. This leads to recognizing and implementing starting points for process optimization and energy savings.

The thermal capacity of water and steam is determined according to the internationally recognized standard IAPWS-IF-97 on the basis of the variables flow, temperature and pressure.

The following values can be calculated:

- Water heat quantity
- Difference in water heat quantity
- Steam heat quantity
- Difference in steam heat quantity
- Water-glycol heat quantity
- Difference in water-glycol heat quantity
## Energy and application managers

### Overview

<table>
<thead>
<tr>
<th>Model</th>
<th>Features</th>
<th>Construction</th>
<th>Software functions</th>
<th>Medium</th>
<th>Number of applications</th>
<th>Data storage</th>
<th>Calculation standards</th>
<th>Highly accurate temperature measurement CVD</th>
<th>Differential pressure compensation</th>
<th>Approvals</th>
<th>Communication</th>
<th>Power supply</th>
<th>Loop power supply</th>
<th>Protection class</th>
<th>Dimensions (WxHxD) in mm (in)</th>
<th>Device description as from page</th>
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<tr>
<td>EngyCal RH33</td>
<td>Custody transfer BTU meter for recording and measuring energy flow in heating/cooling circuits of water, water/glycol mixtures or other liquids, bidirectional measurement</td>
<td><img src="image1.png" alt="Image" /></td>
<td>Heat quantity and heat quantity difference</td>
<td>- Water</td>
<td>1</td>
<td>✓</td>
<td>IAPWS-97</td>
<td>✓</td>
<td>✓</td>
<td>MID (EN1434), OIML R75, CSA GP, PTB type approval, UK CA (in preparation)</td>
<td>Web server, USB, Ethernet TCP/IP, Modbus TCP, Modbus RTU, M-Bus</td>
<td>100 to 230 V, 24 V AC/DC</td>
<td>1x 24 V DC, 70 mA</td>
<td>IP65</td>
<td>144x175x138 (5.67x6.89x5.43)</td>
<td>36</td>
</tr>
<tr>
<td>EngyCal RS33</td>
<td>Steam calculator for recording and measuring the mass and energy flow of saturated or super heated steam, bidirectional measurement</td>
<td><img src="image2.png" alt="Image" /></td>
<td>Mass/heat quantity</td>
<td>- Steam</td>
<td>1</td>
<td>✓</td>
<td>IAPWS-97</td>
<td>✓</td>
<td>✓</td>
<td>CSA GP, UK CA (in preparation)</td>
<td>Web server, USB, Ethernet TCP/IP, Modbus TCP, Modbus RTU, M-Bus</td>
<td>100 to 230 V, 24 V AC/DC</td>
<td>1x 24 V DC, 70 mA</td>
<td>IP65</td>
<td>144x175x138 (5.67x6.89x5.43)</td>
<td>36</td>
</tr>
<tr>
<td>RSG45</td>
<td>The Memograph M with energy package calculates mass and energy flows in water and steam applications</td>
<td><img src="image3.png" alt="Image" /></td>
<td>Mass/heat quantity, heat quantity difference</td>
<td>- Gas</td>
<td>6</td>
<td>✓</td>
<td>IAPWS-97</td>
<td>✓</td>
<td>✓</td>
<td>UL, FDA 21 CFR 11, UK CA (in preparation)</td>
<td>Web server, USB, RS232/RS485, PROFINET I/O device, EtherNet/IP adapter, RTU/TCP slave, Modbus RTU/TCP master, Ethernet</td>
<td>90 to 250 V AC, 24 V AC/DC</td>
<td>1 x 24 V, max. 250 mA</td>
<td>IP65 (front-panel)</td>
<td>190 x 144 x 158 (7.48 x 5.67 x 6.22)</td>
<td>24</td>
</tr>
</tbody>
</table>

**System products and data managers**

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**Model**: EngyCal RH33  
**Features**: Custody transfer BTU meter for recording and measuring energy flow in heating/cooling circuits of water, water/glycol mixtures or other liquids, bidirectional measurement.

**Features**: Steam calculator for recording and measuring the mass and energy flow of saturated or super heated steam, bidirectional measurement.

**Model**: RSG45  
**Features**: The Memograph M with energy package calculates mass and energy flows in water and steam applications.
<table>
<thead>
<tr>
<th></th>
<th>RMS621</th>
<th>RMC621</th>
<th>RA33</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model</strong></td>
<td>Energy manager for calculation of steam and water, simultaneous calculation of up to 3 applications, split-range-measurement</td>
<td>Universal flow and energy manager for calculations of gases, liquids, steam and water, simultaneous calculation of up to 3 applications, split-range-measurement</td>
<td>Batch controller for filling and dosing of any media with automatic correction of overrun quantity</td>
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<tr>
<td><strong>Features</strong></td>
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<tr>
<td></td>
<td>Mass/heat quantity, heat quantity difference</td>
<td>Mass/heat quantity, heat quantity difference, for gases: standard volume, heating value, mass</td>
<td>Volume calculation, 1- or 2-stage operation, manual and automatic correction of overrun quantity</td>
</tr>
<tr>
<td></td>
<td>✓</td>
<td>✓ via table</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Number of applications</strong></td>
<td>3</td>
<td>3</td>
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</tr>
<tr>
<td><strong>Medium</strong></td>
<td>- Water</td>
<td>- Water/Glycol</td>
<td>- Steam</td>
</tr>
<tr>
<td></td>
<td>- Customer-specific liquids</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>- Steam</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>- Gas</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>%-% concentration</td>
<td>%-% via table</td>
<td>%-%</td>
</tr>
<tr>
<td><strong>Construction</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Software functions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Heat quantity and heat quantity difference</td>
<td>Mass/heat quantity, heat quantity difference</td>
<td></td>
</tr>
<tr>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-</td>
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</tr>
<tr>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td><strong>Medium</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Number of applications</strong></td>
<td>1</td>
<td>1</td>
<td>6</td>
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<tr>
<td><strong>Data storage</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Calculation standards</strong></td>
<td>IAPWS-97</td>
<td>IAPWS-97, NX19, SGERG88, AGA8, real gas equations (SRK, RK)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Approvals</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MID (EN1434), OIML R75, CSA GP, PTB type approval, UK CA (in preparation)</td>
<td>CSA GP, NTEP, UK CA (in preparation)</td>
<td></td>
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<tr>
<td><strong>Communication</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Web server, USB, Ethernet TCP/IP, Modbus TCP, Modbus RTU, RS232</td>
<td>Web server, USB, RS232/RS485, PROFINET I/0 device, EtherNet/IP adapter, RTU/TCP slave, Modbus RTU/TCP master, Ethernet</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td>100 to 230 V, 24 V AC/DC</td>
<td>100 to 230 V, 24 V AC/DC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1x 24 V DC, 70 mA</td>
<td>1x 24 V DC, 70 mA</td>
<td></td>
</tr>
<tr>
<td><strong>Loop power supply</strong></td>
<td>1x 24 V DC, 70 mA</td>
<td>1x 24 V DC, 70 mA</td>
<td></td>
</tr>
<tr>
<td><strong>Protection class</strong></td>
<td>IP65</td>
<td>IP65</td>
<td></td>
</tr>
<tr>
<td><strong>Dimensions (WxHxD) in mm (in)</strong></td>
<td>144x175x138 (5.67x6.89x5.43)</td>
<td>144x175x138 (5.67x6.89x5.43)</td>
<td></td>
</tr>
<tr>
<td><strong>Device description as from page</strong></td>
<td>37</td>
<td>37</td>
<td>36</td>
</tr>
</tbody>
</table>

---

**Notes:**
- **RMS621** and **RMC621** are energy managers for calculating heat and mass flows in steam and water applications.
- **RA33** is a batch controller for filling and dosing of any media with automatic overrun correction.
- **RMS621** and **RMC621** can handle up to 3 applications simultaneously.
- **RA33** can handle up to 6 applications.
- **RA33** is approved by MID (EN1434), OIML R75, CSA GP, PTB type approval, UK CA (in preparation).
- **RA33** supports communication via web server, USB, Ethernet TCP/IP, Modbus TCP, Modbus RTU, RS232.
- **RA33** supports power supply of 100 to 230 V AC/DC, 24 V DC, 70 mA.
- **RA33** has a loop power supply of 1x 24 V DC, 70 mA per analogue input.
- **RA33** is IP65 (front-panel) and IP20 (rest).
Energy managers

Energy measurements in water and steam

Heating and cooling are energy-intensive processes. As the costs are constantly rising and, depending on the industry the energy costs amount up to 40% of the total industrial production costs, energy optimization is a very current topic. The basis for optimization is the recording of energy flows.

This is where energy managers are used. They use flow, temperature and/or pressure to calculate the energy content of liquids and steam. With the devices EngyCal RH33 and RS33 these values can be recorded as the load curve e.g. with 15 minutes mean values.

While in the case of steam applications the total measurement error results from the flow measurement, in case of heat quantity difference measurements in liquids this depends on the temperature difference.

In case of temperature differences of more than 20 °C (68 °F) the error also comes from the flow measurement, in case of differences of less than 20 °C (68 °F) the error mainly results from the temperature measurement. In order to minimize errors in differences of less than 20 °C (68 °F) paired sensors had to be used. EngyCal RH33 offers highly precise, electronic temperature sensor pairs via the Calendar van Dusen coefficient. For more than one application the RMS/RMC621 offer great advantages as simultaneous calculation of up to three applications is possible. Alternatively, if more channels are needed the Memograph M can be used. This device can perform up to eight calculations and additionally provides data storage and visualization.

Batch controller RA33

The batch controller RA33 provides precise results and at the same time easy handling.

An exact dosing is extremely important in filling processes particularly in case of cost-intensive products. Systematic errors such as the overrun quantity which result from closing times of valves need to be eliminated. The batch controller records these quantities and corrects them with a time-shifted closing command. The measurement of the overrun quantity is done in the background at each further filling process and is then continuously corrected. Thus even continuous changes due to e.g. valve aging or deposits in the piping system are compensated. Furthermore, a volume correction is possible. Here density is compensated by an additional temperature measurement. This saves resources and reduces costs.

Lockable: The set-up of the device can be locked. This lock can be done either by using a four digit release code or using a hardware switch on the inside of the front cover. Operation via FieldCare is also locked if the hardware switch is activated.

Lead-sealable: The housing is lead-sealable through a ring on the right lower side of the device and an additional special sealing screw. By means of the hardware switch and the sealing, the device can be verifiably protected against manipulation.

Unchangeable: The stored measured data and protocols in the RA33 batch controller are unchangeable. Safe storage is guaranteed even on an electrical power outage. The data is stored tamper-proof in the device, transferred and stored in the SQL database of the evaluation software.

Documentable: The RA33 batch controller supports the direct automatic print out of batch protocols. A printer can either be connected directly to the RS232 interface or the Field Data Manager software can be used for the print out of archived batch protocols.
Energy and application managers

- **EngyCal RS33**
  - Memograph M RSG45
  - RMS621

- **EngyCal RH33**
  - Memograph M RSG45
  - RMS621

- **Memograph M RSG45**

Steam

- Flow, pressure, temperature

Fluid- Heating & cooling

- Flow, 2x temperature

Compressed air

- Differential pressure monitoring in pipe networks and segments of the distribution system, electricity

Gas

- Flow, pressure, temperature

Field Data Manager software

- Visualization & manipulation-proof data storage
Application examples

Energy managers

**RH33 – highly accurate measurement with Callender van Dusen coefficient**

The RH33 measures the energy flow in a heating/cooling circuit of liquids. Standard sensors for which a calibration determines the Callender van Dusen coefficient can be used for measurement. These coefficients are entered into the EngyCal RH33 and the sensors are electronically paired. This enables a highly accurate measurement. If one sensor fails it is not necessary to replace both temperature sensors as it is the case with the classic paired sensors. Only one sensor has to be exchanged. This saves time and costs!

**RMC621/RMS621 steam and heat difference measurement**

In heating circuits with steam, the steam is condensed in the heat exchanger. The energy content of the condensate must be deducted for the calculation. This is a difference measurement of steam heat quantity. Thereby flow, pressure and temperature of the steam need to be recorded in front of the heat exchanger and the temperature of the condensate needs to be recorded after the heat exchanger. The mass of the steam corresponds to the mass of the condensate. The RMC/RMS621 can calculate such differences in steam and heat quantity. Additionally the devices can monitor the steam state and generate a wet steam alarm if required.
**Filling process with the batch controller RA33**

In this application the basic use of the batch controller RA33 is shown. The minimum requirement on filling and dosing applications is the measurement of the flow as well as the possibility for the flow control e.g. through a valve. If only one valve is applied attention has to be paid that the filling time has to be more than 10 seconds. One example for the use of the RA33 is the filling of liquid soaps. Here various substances with predefined quantities are dosed into a tank. The batch controller RA33 takes over the exact dosing and documentation of the filled quantity and thus provides the quality proof. The integrated correction of overrun quantity saves resources and reduces costs!
## Process indicators for each measurement point

<table>
<thead>
<tr>
<th>Model</th>
<th>RIA14</th>
<th>RIA15</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Features</strong></td>
<td>Loop powered field indicator with pressure encapsulated metal housing (explosion protected according to Ex d)</td>
<td>Loop powered indicator, panel and field version, field housing made of robust aluminum or saltwater-resistant plastic, display of 4 to 20 mA and HART values, basic settings for Endress+Hauser sensors</td>
</tr>
<tr>
<td><strong>Construction</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>- Number of digits</td>
<td>20.5 mm (0.81 in)</td>
<td>17 mm (0.67 in)</td>
</tr>
<tr>
<td>- Height</td>
<td>LC display, backlit, bargraph</td>
<td>LC display, bargraph, backlight can be activated</td>
</tr>
<tr>
<td>- Type</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td>Loop powered 4 to 20 mA</td>
<td>Loop powered 4 to 20 mA</td>
</tr>
<tr>
<td><strong>Voltage drop</strong></td>
<td>&lt; 4 V</td>
<td>≤ 1 V for 4 to 20 mA, ≤ 1.9 V for HART (additional 2.9 V with backlight)</td>
</tr>
<tr>
<td><strong>Input</strong></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>- Analogue</td>
<td>-</td>
<td>HART (option)</td>
</tr>
<tr>
<td>- Digital / HART</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>- Temperature (RTD, TC)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Loop power supply</strong></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Signal isolation</strong></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td>1</td>
<td>4/8</td>
</tr>
<tr>
<td>- Analogue</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>- Digital (OC)</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>- Relay</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Software functions</strong></td>
<td>Limit value function</td>
<td>Display of up to 4 HART values (SV, PV, TV, QV) of one measurement device. Configuration of the following level or analysis sensors: - Micropilot FMR20, Waterpilot FMX21 - Gammapilot FMG50, Proservo NMS8x - Liquiline CM82</td>
</tr>
<tr>
<td><strong>Approvals</strong></td>
<td>ATEX, IECEx, EAC, FM, CSA, TIIS, NEPSI, cURus, DNV, UK CA (in preparation)</td>
<td>ATEX, IECEx, EAC, FM, CSA, JPN Ex, NEPSI DNV, UK CA (in preparation)</td>
</tr>
<tr>
<td><strong>SIL</strong></td>
<td>-</td>
<td>SIL interference freeness</td>
</tr>
<tr>
<td><strong>Mounting location</strong></td>
<td>Field</td>
<td>Panel, Field</td>
</tr>
<tr>
<td><strong>Dimensions (WxHxD) in mm (in)</strong></td>
<td>132 x 135 x 106 (5.2 x 5.31 x 4.17)</td>
<td>Panel: 96 x 48 x 41.5 (3.78 x 1.89 x 1.69) Field: 131 x 81.5 x 55.5 (5.16 x 3.21 x 2.19)</td>
</tr>
<tr>
<td><strong>Description as from page</strong></td>
<td>43</td>
<td>42</td>
</tr>
<tr>
<td>Model</td>
<td>Description</td>
<td>Features</td>
</tr>
<tr>
<td>-------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>RIA16</td>
<td>Loop powered field indicator</td>
<td>Loop powered field indicator with pressure encapsulated metal housing (explosion protected according to Ex d)</td>
</tr>
<tr>
<td>RIA45</td>
<td>Process indicator</td>
<td>Loop powered indicator, panel and field version, field housing made of robust aluminum or saltwater-resistant plastic, display of 4 to 20 mA and HART values, basic settings for Endress+Hauser sensors</td>
</tr>
<tr>
<td>RIA46</td>
<td>Field indicator</td>
<td>Loop powered indicator</td>
</tr>
<tr>
<td>RIA452</td>
<td>Process indicator</td>
<td>Process indicator with control unit in panel mounting for monitoring and displaying analog measurement values</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model</th>
<th>Voltage drop</th>
<th>Input</th>
<th>Signal isolation</th>
<th>Power supply</th>
<th>Software functions</th>
<th>Approvals</th>
<th>Mounting location</th>
<th>Dimensions (WxHxD) in mm (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RIA16</td>
<td>≤ 1 V for 4 to 20 mA, ≤ 1.9 V for HART (additional 2.9 V with backlight)</td>
<td>Analogue</td>
<td>-</td>
<td>Loop powered</td>
<td>Limit value function</td>
<td>ATEX, IECEx, EAC, FM, CSA, NEPSI, DNV, cURus, UK CA (in preperation)</td>
<td>Field Panel Field Panel Field Panel</td>
<td></td>
</tr>
<tr>
<td>RIA45</td>
<td>≤ 1 V</td>
<td>Analogue</td>
<td>-</td>
<td>Loop powered</td>
<td>Limit value function</td>
<td>ATEX, EAC, FM, CSA cURus, DNV, WHG, UK CA (in preperation)</td>
<td>Panel</td>
<td></td>
</tr>
<tr>
<td>RIA46</td>
<td>&lt; 4 V</td>
<td>Analogue</td>
<td>-</td>
<td>Loop powered</td>
<td>Limit value function</td>
<td>ATEX, EAC, FM, CSA cURus, WHG, UK CA (in preperation)</td>
<td>Panel</td>
<td></td>
</tr>
<tr>
<td>RIA452</td>
<td>≤ 4 V</td>
<td>Analogue</td>
<td>-</td>
<td>Loop powered</td>
<td>Limit value function</td>
<td>FM, CSA, EAC, UK CA (in preperation)</td>
<td>Panel</td>
<td></td>
</tr>
</tbody>
</table>

Limit value function: +, - mean value, multiplication, linearization, differential pressure, limit value function, overfill protection

Field indicators with control units in panel mounting for monitoring and displaying analog measurement values.
Indicators with and without power requirement

Loop powered indicators

These indicators require no power supply and can be universally used in current measuring circuits. They can be easily installed in intrinsically safe applications. They are used where measurement values have to be clearly visible or where the display of the measuring device is hard to read due to the installation conditions. They are very convincing because of their high contrast display of process values under all environmental conditions. Due to not requiring a power supply installation cost savings are made, so that displays that would have been too costly can now be realized. The worldwide certification and various housing versions permit direct installation in Ex-areas. The RIA15 offers a real added value with the possibility to function as a HART display. The measurement value is displayed highly accurately and there is the possibility to indicate up to 4 values of a measurement device on one RIA15.

Process indicators with control function

Indicators with control function combine several functionalities in one device:
- Active barrier
- Transmitter
- Control unit with relay

These features combined with the brilliant displays offer highest comfort and best functionality on site. The indicators are available for panel mounting as well as for field mounting. Operation is easy and intuitive despite the high functionality. The devices can be operated without any problems by using the operating keys on site or by using the PC software FieldCare. Thus enables fast and easy commissioning. Moreover, the devices can be ordered pre-configured.

In addition, the RIA15 with HART can be used to estimate the HART signal level, the valid communication resistance, and the noise load of the network. Thus, the RIA15 can be used as a simple diagnostic tool for HART networks. When used in conjunction with the Micropilot FMR20 radar level sensor, the Waterpilot FMX21 hydrostatic level sensor, the Gammapilot FMG50 and the Liquiline CM82 compact analytical sensor, the RIA15 unit can also be used to make the basic settings for the sensors. The RIA15 field housing is also available in saltwater-resistant plastic. This makes the indicator also suitable for use in shipbuilding and offshore.

You gain through
- Excellent price-performance ratio
- Fast, simple and comfortable commissioning and operation
- Very short delivery time and optional customized presets
- Additional security through local measured value display
Application examples

Process indicators

Alternating pump control with RIA452
RIA452 is a pump specialist. It offers an alternating pump control which ensures an equal use of several pumps. If the power supply is interrupted not all pumps run at the same time but at staggered intervals. If a pump failure occurs the respective pump is taken out of the control. Thus the pumping station is optimally controlled. Up to 8 pumps can be controlled in parallel.

Separation of Ex-area, linearization, monitoring
To directly display pressure values in zone 1 the devices RIA14 and RIA16 can be used. In the described application RIA46 provides:
- the separation to the Ex-area,
- the power supply of the sensors in the Ex-area and
- the linearization of the filling level and the monitoring of the maximum filling height.
Furthermore the temperature limit value is monitored (range, maximum or minimum).

The calculated tank content (volume) as well as the measured temperature are transmitted a 4 to 20 mA signal. A sensor set-up via a HART Handheld can be done without additionally installing a communication resistance. The communication resistance is already integrated in the RIA45 and RIA46.
A comfortable and fast maintenance is possible any time without interrupting the measuring loop.
# Fieldbus indicators

<table>
<thead>
<tr>
<th>Model</th>
<th>RID14</th>
<th>RID16</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Features</strong></td>
<td>8-channel field indicator with FOUNDATION Fieldbus or PROFIBUS PA protocol with pressure encapsulated metal housing (explosion protected according to Ex d)</td>
<td>8-channel field indicator with FOUNDATION Fieldbus or PROFIBUS PA protocol</td>
</tr>
<tr>
<td><strong>Construction</strong></td>
<td>![RID14 Image]</td>
<td>![RID16 Image]</td>
</tr>
<tr>
<td><strong>Protocol</strong></td>
<td>![FOUNDATION Fieldbus Image]</td>
<td>![PROFIBUS PA Image]</td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>- Number of digits: 5 &lt;br&gt; - Height in mm (in): 20.5 (0.81) &lt;br&gt; - Type: LC display, backlit, bargraph</td>
<td>- Number of digits: 5 &lt;br&gt; - Height in mm (in): 26 (1.02) &lt;br&gt; - Type: LC display, backlit, bargraph</td>
</tr>
<tr>
<td><strong>Power supply</strong></td>
<td>Via the fieldbus &lt;br&gt; &lt;11 mA</td>
<td>Via the fieldbus &lt;br&gt; &lt;11 mA</td>
</tr>
<tr>
<td><strong>Channels</strong></td>
<td>Up to 8</td>
<td>Up to 8</td>
</tr>
<tr>
<td><strong>Special features</strong></td>
<td>Listener mode, On FOUNDATION Fieldbus also function block connection: Display transducer block, Advanced diagnostic block, 2 x input selector, Arithmetic block, Integrator block, PID block</td>
<td>Listener mode, On FOUNDATION Fieldbus also function block connection: Display transducer block, Advanced diagnostic block, 2 x input selector, Arithmetic block, Integrator block, PID block</td>
</tr>
<tr>
<td><strong>Approvals</strong></td>
<td>ATEX, IECEx, EAC, CSA, FM</td>
<td>ATEX, IECEx, EAC, CSA, FM</td>
</tr>
<tr>
<td><strong>Mounting location</strong></td>
<td>Field</td>
<td>Field</td>
</tr>
<tr>
<td><strong>Dimensions (WxHxD) in mm (in)</strong></td>
<td>132 x 135 x 106 (5.2 x 5.31 x 4.17)</td>
<td>199 x 158 x 96 (7.83 x 6.22 x 3.78)</td>
</tr>
<tr>
<td><strong>Description as from page</strong></td>
<td>45</td>
<td>45</td>
</tr>
</tbody>
</table>
Indicators for integration into fieldbus systems

These indicators support all bus devices and indicate the values communicated on the bus. The PROFIBUS PA version of the devices acts as a pure listener without an own device address. The FOUNDATION Fieldbus indicators can be operated either in a listener mode or in the standard mode using a function block connection. A simple and fast set-up is possible via e.g. the configuration software FieldCare or DIP switches. The devices convince by their high contrast, backlit display of the respective value. The integrated bargraph with over- and under range indication in the RID14 and RID16 offers a swift value overview. Both devices also offer an integrated 14-segment field for plain text or TAG.

You gain through

- Large display, easily readable at all ambient conditions
- High plant availability through integrated safety functionalities
- Comfortable and easy integration into bus systems
- Service support through diagnosis functions

Example of a FOUNDATION Fieldbus connection

Example of a PROFIBUS PA connection
## Interface devices

<table>
<thead>
<tr>
<th>Model</th>
<th>RNB22</th>
<th>RNF22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keyword</td>
<td>System power supply</td>
<td>Power supply and error message module</td>
</tr>
<tr>
<td>Features</td>
<td>24 V DC 2.5 A power supply in compact size, static / dynamic boost: 3.125 / 5 A, can be connected in parallel for redundancy and power increase, system power supply of the RN Series or for 4-wire devices</td>
<td>for redundant supply of 24 V DC 3.75 A on DIN rail bus connector, error message failure power supply or fuse failure as well as collective error evaluation of connected NAMUR isolation amplifiers</td>
</tr>
</tbody>
</table>

### Design

### Input

<table>
<thead>
<tr>
<th>Input voltage range</th>
<th>100 ... 240 V AC, -15 ... +10 %</th>
<th>110 ... 250 V DC, -20 ... +40 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power consumption (maximum)</td>
<td>static boost</td>
<td>0.85 A (100 V AC) / 0.37 A (240 V AC)</td>
</tr>
<tr>
<td>Inrush current limitation</td>
<td>typ. 10 A / &lt; 0.1 A²s</td>
<td></td>
</tr>
<tr>
<td>Frequency range (Hz)</td>
<td>50 ... 60 Hz, -10 ... +10 %</td>
<td></td>
</tr>
<tr>
<td>Mains failure bypass typ.</td>
<td>54 ms (120 V AC) / 54 ms (230 V AC)</td>
<td></td>
</tr>
</tbody>
</table>

### Output

<table>
<thead>
<tr>
<th>Nominal output tap</th>
<th>24 V DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output voltage range</td>
<td>24 ... 28 V DC (setting range, constant power)</td>
</tr>
<tr>
<td>Nominal output current</td>
<td>2.5 A</td>
</tr>
<tr>
<td>Maximum output voltage</td>
<td>3.125 A / 5.0 A (Statischer / Dynamischer Boost)</td>
</tr>
</tbody>
</table>

### Performance data

<table>
<thead>
<tr>
<th>Output power</th>
<th>60 W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of connectable signal conditioners (depending on type)</td>
<td>typically 35 - 50 channels (see current consumption signal isolator)</td>
</tr>
<tr>
<td>Parallel connectivity</td>
<td>yes, redundancy and power increase</td>
</tr>
<tr>
<td>Ambient temperature (operating)</td>
<td>-25 °C ... 70 °C (-13 °F ... 158 °F)</td>
</tr>
</tbody>
</table>

### Approvals

<table>
<thead>
<tr>
<th>Shipbuilding</th>
<th>DNV</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIL</td>
<td>-</td>
</tr>
<tr>
<td>Protection type</td>
<td>IP20</td>
</tr>
</tbody>
</table>

### General

<table>
<thead>
<tr>
<th>Dimensions W x L x H in mm (in)</th>
<th>32 x 99 x 95 (1.26 x 3.90 x 3.74)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection cross section</td>
<td>2.5 mm²</td>
</tr>
</tbody>
</table>

### Further information

<table>
<thead>
<tr>
<th>Device description from page</th>
<th>50</th>
</tr>
</thead>
</table>

-
## Interface devices

**Model**

<table>
<thead>
<tr>
<th>Model</th>
<th>RN22</th>
<th>RLN22</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Keyword</strong></td>
<td>Supply isolator, HART transparent</td>
<td>NAMUR Isolation amplifier</td>
</tr>
<tr>
<td><strong>Features</strong></td>
<td>1 or 2 channel supply isolator for isolation of 0/4 to 20 mA standard signal circuits, optionally as signal coupler, 24 V DC, HART transparent, input supply or non-supply, output active or passive</td>
<td>1- or 2-channel NAMUR isolation amplifier 24 V DC with relay signal output, input for proximity sensors according to NAMUR (EN60947-5-6) as well as unswitched or resistance-switched contacts, line fault monitoring input circuits for break and short circuit</td>
</tr>
</tbody>
</table>

### Design

**Input**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>RN22</th>
<th>RLN22</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of channels</strong></td>
<td>1 / 2</td>
<td>1 / 2</td>
</tr>
<tr>
<td><strong>Signal input</strong></td>
<td>0/4 to 20 mA, feeding or non feeding</td>
<td>NAMUR proximity sensors (EN60947-5-6)</td>
</tr>
<tr>
<td><strong>Transmitter supply</strong></td>
<td>17.5 V ±1 V at 20 mA</td>
<td>~ 8 V DC</td>
</tr>
<tr>
<td><strong>Transmitter power supply</strong></td>
<td>Open circuit voltage: 24.5 V ±5 %</td>
<td>-</td>
</tr>
</tbody>
</table>

### Output

<table>
<thead>
<tr>
<th>Parameter</th>
<th>RN22</th>
<th>RLN22</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of outputs</strong></td>
<td>1 / 2</td>
<td>1 / 2</td>
</tr>
<tr>
<td><strong>Output signal</strong></td>
<td>0/4 to 20 mA, active or passive</td>
<td>Relay, 1 changeover contact (1-channel) 1 NO contact per channel (2-channel)</td>
</tr>
<tr>
<td><strong>Open circuit voltage</strong></td>
<td>17.5 V (± 5%) Active operation</td>
<td>-</td>
</tr>
<tr>
<td><strong>External voltage passive mode</strong></td>
<td>$U_{ext} = 12 \ldots 30$ V</td>
<td>-</td>
</tr>
<tr>
<td><strong>Transmission behavior</strong></td>
<td>1:1 to input signal, HART transparent, bidirectional, option signal coupler: output 2 with HART filter</td>
<td>-</td>
</tr>
<tr>
<td><strong>Maximum load active passive</strong></td>
<td>$\leq 500 \Omega$ $R_{max} = (U_{ext} - 2 \text{ V}) / 0.022 \text{ A}$</td>
<td>-</td>
</tr>
</tbody>
</table>

#### Performance data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>RN22</th>
<th>RLN22</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supply voltage</strong></td>
<td>24 V DC</td>
<td>24 V DC</td>
</tr>
<tr>
<td><strong>Power consumption</strong></td>
<td>1-channel: ≤ 1.5 W (20 mA) / 2-channel: ≤ 3 W (20 mA) / Signal doubler: ≤ 2.4 W (20 mA)</td>
<td>1-channel: &lt; 0.65 W 2-channel: &lt; 0.8 W</td>
</tr>
<tr>
<td><strong>Power dissipation</strong></td>
<td>1-channel: ≤ 1.2 W (20 mA) / 2-channel: ≤ 2.4 W (20 mA) / Signal doubler: ≤ 2.1 W (20 mA)</td>
<td>1-channel: &lt; 0.65 W 2-channel: &lt; 1 W</td>
</tr>
<tr>
<td><strong>Signal separation / barrier</strong></td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td><strong>Interfaces</strong></td>
<td>HART connection lugs</td>
<td>-</td>
</tr>
<tr>
<td><strong>Ambient temperature (operating)</strong></td>
<td>–40 ... 60 °C (~40 ... 140 °F)</td>
<td>~40 ... 60 °C (~40 ... 140 °F)</td>
</tr>
</tbody>
</table>

#### Approvals

<table>
<thead>
<tr>
<th>Approvals</th>
<th>RN22</th>
<th>RLN22</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Approvals Ex</strong></td>
<td>ATEX, IECEx</td>
<td>ATEX, IECEx</td>
</tr>
<tr>
<td><strong>Shipbuilding</strong></td>
<td>DNV</td>
<td>DNV</td>
</tr>
<tr>
<td><strong>SIL</strong></td>
<td>SIL 2 SC 3</td>
<td>SIL 2</td>
</tr>
<tr>
<td><strong>Protection type</strong></td>
<td>IP 20</td>
<td>IP20</td>
</tr>
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</table>

#### General

<table>
<thead>
<tr>
<th>Parameter</th>
<th>RN22</th>
<th>RLN22</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimensions W x L x H in mm (in)</strong></td>
<td>12.5 x 116 x 107.5 (0.49 x 4.57 x 4.23)</td>
<td>17.5 x 116 x 107.5 (0.69 x 4.57 x 4.23)</td>
</tr>
<tr>
<td><strong>Connection cross sections screw</strong></td>
<td>0.2 ... 2.5 mm²</td>
<td>0.2 ... 2.5 mm²</td>
</tr>
</tbody>
</table>

### Further information

| Device description from page | 50 | 50 |
# Interface devices

<table>
<thead>
<tr>
<th>Model</th>
<th>RNO22</th>
<th>RB223</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Keyword</strong></td>
<td>Output isolating amplifier, HART transparent</td>
<td>Signal isolator</td>
</tr>
<tr>
<td><strong>Features</strong></td>
<td>1- or 2-channel output isolating amplifier 24 V DC, HART transparent, transmission and galvanic isolation of analog 0/4 to 20 mA signals for controlling I/P converters, control valves and displays with line fault monitoring</td>
<td>1- or 2-channel, loop-powered passive isolator for safe isolation of 4 to 20 mA standard signal circuits, transmission of signals from non-Ex to Ex areas or optionally from Ex areas to non-Ex areas.</td>
</tr>
</tbody>
</table>

## Design

<table>
<thead>
<tr>
<th><strong>Input</strong></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of channels</td>
<td>1 / 2</td>
<td>1 / 2</td>
</tr>
<tr>
<td>Signal input</td>
<td>0/4 to 20 mA</td>
<td>0/4 to 20 mA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Output</strong></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of outputs</td>
<td>1 / 2</td>
<td>1 / 2</td>
</tr>
<tr>
<td>Output signal</td>
<td>0/4 to 20 mA, active or passive</td>
<td>0/4 to 20 mA</td>
</tr>
<tr>
<td>Open circuit voltage</td>
<td>≤ 27 V</td>
<td>-</td>
</tr>
<tr>
<td>External voltage passive mode</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Transmission behavior</td>
<td>1:1 to input signal, HART transparent, bidirectional</td>
<td>1:1 to input signal, HART transparent, bidirectional</td>
</tr>
<tr>
<td>Maximum load active passive</td>
<td>≤ 700 Ω</td>
<td>≤ 600 Ω</td>
</tr>
</tbody>
</table>

## Performance data

| **Supply voltage** | 24 V DC               | loop powered |
| **Power consumption** | 1-channel: ≤ 1.1 W (20 mA) 2-channel: ≤ 2 W (20 mA) | -            |
| **Power dissipation** | 1-channel: ≤ 0.8 W (20 mA) 2-channel: ≤ 0.4 W (20 mA) | ≤ 0.3 W (with HART resistance) |
| **Signal separation / barrier** | HART Bushings | HART Bushings |
| **Interfaces** | -                       | -                                        |
| **Ambient temperature (operating)** | -40 ... +70 °C (~-40 ... 158 °F) | -20 ... 60 °C (~-4 ... 140 °F) |

## Approvals

<table>
<thead>
<tr>
<th><strong>Approvals</strong></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Approvals Ex</td>
<td>ATEX, IECEx</td>
<td>ATEX, FM, CSA</td>
</tr>
<tr>
<td>Approvals DNV</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>SIL</td>
<td>SIL 2 SC 3</td>
<td>SIL 3</td>
</tr>
<tr>
<td>Protection type</td>
<td>IP 20</td>
<td>IP 20</td>
</tr>
</tbody>
</table>

## General

| **Dimensions W x L x H in mm (in)** | 12.5 x 116 x 107.5 (0.49 x 4.57 x 4.23) | 22.5 x 112 x 110 (0.89 x 4.41 x 4.33) |
| **Connection cross section** | 0.2 ... 2.5 mm² | -                                        |

## Further informationen

<p>| <strong>Device description from page</strong> | 50 | 50 |</p>
<table>
<thead>
<tr>
<th>Model</th>
<th>RN42</th>
<th>RLN42</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keyword</td>
<td>Supply isolator, HART transparent</td>
<td>NAMUR Isolation amplifier</td>
</tr>
<tr>
<td>Features</td>
<td>1-channel supply isolator with wide range supply AC/DC for safe isolation of 0/4 to 20 mA standard signal circuits, HART transparent wide range supply, input supply or non-supply, output active or passive, option for 180° rotated installation (sensor connection terminals on top or bottom)</td>
<td>2-channel NAMUR isolation amplifier with wide range supply AC/DC and relay signal output, input for proximity sensors according to NAMUR (EN 60947-5-6) as well as unswitched or resistance switched contacts, line fault monitoring input circuits for break and short circuit</td>
</tr>
</tbody>
</table>

**Design**

**Input**

<table>
<thead>
<tr>
<th>Number of channels</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal input</td>
<td>0/4 to 20 mA, feeding or non feeding</td>
<td>NAMUR proximity sensors (EN60947-5-6) &lt; 1.2 mA (blocking), &gt; 2.1 mA (conducting), unswitched or resistor-switched contacts</td>
</tr>
<tr>
<td>Transmitter power supply</td>
<td>17.5 V ±1 V at 20 mA</td>
<td>~ 8 V DC</td>
</tr>
<tr>
<td>Transmitter supply voltage</td>
<td>Open circuit voltage: 24.5 V ±5 %</td>
<td>-</td>
</tr>
</tbody>
</table>

**Output**

<table>
<thead>
<tr>
<th>Number of outputs</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output signal</td>
<td>0/4 to 20 mA, active oder passive</td>
<td>Relay, 1 changeover per channel</td>
</tr>
<tr>
<td>Open circuit voltage</td>
<td>17.5 V (±5%) Active operation</td>
<td>-</td>
</tr>
<tr>
<td>External voltage passive mode</td>
<td>$U_{min} = 12 \ldots 30$ V</td>
<td>-</td>
</tr>
<tr>
<td>Transmission behavior</td>
<td>1:1 to input signal, HART transparent, bidirectional</td>
<td>-</td>
</tr>
<tr>
<td>Maximum load active passive</td>
<td>≤ 500 Ω</td>
<td>≤ 8 V DC</td>
</tr>
<tr>
<td>$R_{max} = (U_{ext} - 2 V) / 0.022$ A</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Performance data**

<table>
<thead>
<tr>
<th>Supply voltage</th>
<th>24 ... 230 VAC/DC</th>
<th>24 ... 230 VAC/DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power consumption</td>
<td>≤ 4.9 VA / 2.4 W (20 mA)</td>
<td>≤ 1.1 W</td>
</tr>
<tr>
<td>Power dissipation</td>
<td>≤ 2 W (20 mA)</td>
<td>≤ 1.3 W</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Signal separation / barrier</th>
<th>HART Bushings</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interfaces</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Ambient temperature (operating)</td>
<td>−40 ... 60 °C (−40 ... 140 °F)</td>
<td>−40 ... 60 °C (−40 ... 140 °F)</td>
</tr>
</tbody>
</table>

**Approvals**

<table>
<thead>
<tr>
<th>Approvals Ex</th>
<th>ATEX, IECEx, EAC, CSA, NEPSI, JPEX</th>
<th>ATEX, IECEx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approvals</td>
<td>DNV, cULus</td>
<td>DNV</td>
</tr>
<tr>
<td>SIL</td>
<td>SIL 2 SC 3</td>
<td>SIL 2</td>
</tr>
<tr>
<td>Protection type</td>
<td>IP 20</td>
<td>IP20</td>
</tr>
</tbody>
</table>

**General**

<table>
<thead>
<tr>
<th>Dimensions W x L x H in mm (in)</th>
<th>17.5 x 116 x 107.5 (0.69 x 4.57 x 4.23)</th>
<th>17.5 x 116 x 107.5 (0.69 x 4.57 x 4.23)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection cross section</td>
<td>0.2 ... 2.5 mm²</td>
<td>0.2 ... 2.5 mm²</td>
</tr>
</tbody>
</table>

**Further information**

| Device description from page | 50 | 50 |
Interface devices for DIN rail

With the interface devices, we pass on our many years of experience in industrial measurement technology to our customers in the form of hardware and software solutions optimally adapted to their respective tasks. The product spectrum ranges from devices that have been optimized precisely for one function, such as power supply to the sensor or analog signal isolation, to multifunctional products with logic and calculation functions or limit value monitoring.

With SIL approvals according to IEC 61508 and international Ex certificates, the interface family covers sophisticated functionalities for safe applications as well as cost-effective solutions. Endress+Hauser offers a product range adapted to our measurement technology to complete your measuring point.

Compact design, easy installation
Compact design and simple and fast installation are the focus of the DIN rail devices. With up to 2 channels on 12.5 mm width, pluggable screw or push in terminals and the connection of several modules via the DIN rail bus connector for supply as well as for collective error message, this is realized easily and quickly. Compatibility with well-known interface manufacturers facilitates the expansion of existing systems. If a HART device is connected, almost all devices offer HART communication sockets / eyelets via which the HART devices can be parameterized without having to open the measuring loop. This saves time and money.

SIL certified
In the process industry, safety-oriented instrumentation is becoming more and more common. This safety orientation is also increasingly required for interface devices. Endress+Hauser offers evaluation devices with SIL2 or SIL3 certification. For you, this means increased safety in the application.

Versatile use
Due to the extensive equipment, the devices offer a wide range of application possibilities. This goes from the simple supply of measuring instruments, passive or active supply isolators and output isolating amplifiers, NAMUR isolating switching amplifiers up to two-channel measuring transducers with calculation functions and limit value relays. Thus, many applications can be easily solved with the interface devices from Endress+Hauser.

You gain through:
- Functionality tailored to your application
- High system availability thanks to safety-oriented functionalities and SIL certification
- Multi-channel applications in the tightest of installation spaces
- International Ex approvals
- HART communication sockets or taps
- Pluggable screw or push in terminals
- DIN rail bus connectors for power supply and group fault indication
Application examples

The supply isolators or output isolating amplifiers perform several functions. In addition to galvanic signal isolation and proportional transmission of the analog 0/4 to 20 mA signals, they supply connected sensors or actuators. The following examples show typical applications of Endress+Hauser supply isolators and output isolators. The input and output signals can be used both actively and passively. Few device variants, perfectly tailored to Endress+Hauser sensors or process automation requirements.

RN22 Sensor supply and signal isolation for a pressure measurement in an explosion-proof area
The PMP71B passive 2-wire sensor supplies a current signal proportional to the pressure to the active input of the RN22 supply isolation amplifier. The RN22 isolation amplifier supplies an active (or passive) current output signal proportional to the input signal to a passive (or active) input of the evaluation unit. The signal path is bidirectional HART transparent.
RN Series: Feeding and separating

**RN22 Signal isolation for flow measurement in an explosion-proof area**
The Promag P300 active 4-wire sensor supplies a current signal proportional to the flow to the passive input of the isolation amplifier. The RN22 isolation amplifier supplies a passive (or passive) current output signal proportional to the input signal to an active (or passive) input of the evaluation unit.

**RN22 sensor supply, signal separation and signal doubling**
The Prowrirl F200 passive 2-wire sensor supplies a current signal proportional to the flow to the active input of the isolation amplifier. The RN22 signal coupler supplies the HART signal and an active (or passive) current output signal proportional to the input signal to a passive (or active) input of the RSG45 data manager via its output 1. Via output 2, it supplies an active (or passive) current output signal proportional to the input signal to a passive (or active) input of the controller. The HART signal is filtered in the second output.
RN Series: Output isolating amplifier

RNO22 output isolating amplifier for controlling actuators in explosion-proof areas
Application example: Control valve actuation in explosion-proof area. The active output of the control unit supplies an analog current signal to the passive input of the RNO22 output isolating amplifier. After galvanic isolation, this then supplies an active output signal proportional to the input signal 0/4 to 20 mA as well as the HART signal to the control valve, which is thereby controlled. Furthermore, the signal lines are monitored for interruption and short circuit and transmitted accordingly to the control system as an error signal.

RN Series: Passive barrier with SPS

RB223 Loop-powered passive isolator for safe signal isolation.
If a sensor in the hazardous area is to be supplied by a feeding PLC, the use of an isolator is necessary. The RB223 transfers the supply from the non-Ex area to the Ex area and transmits the impressed 4 to 20 mA signal back. The HART signal is transmitted bidirectionally. The RB223 does not require any auxiliary power, because it draws its power from the 4-20 mA loop. The voltage drop must be taken into account.
RN Series: NAMUR isolation amplifier

The NAMUR isolating amplifiers isolate and translate the analog NAMUR signal of connected proximity or limit switches into binary relay output states. NAMUR sensors are operated with an impressed current and have four states, so that the fault cases such as short circuit or line break can also be detected. NAMUR sensors can have four states at the output:
- Current 0 mA: wire break; circuit open.
- Current <1.2 mA: Sensor ready, undamped
- Current >2.1 mA: Sensor ready, damped
- Current maximum value >6 mA: short circuit, maximum current

The following examples show typical applications of Endress+Hauser NAMUR isolating amplifiers:

**RLN22 Limit value / level monitoring of a tank and line fault monitoring**

The Liquiphant FTL41 passive sensor with FEL48 evaluation unit supplies a NAMUR signal value of 1.2 mA or 2.1 mA to the active input of the RLN22 NAMUR isolation amplifier. This evaluates the signal and supplies a binary output signal (relay contact) dependent on the input signal to a digital input of the controller. Line interruption or short circuit of the 2-wire sensor line are monitored and indicated via LEDs. In addition, an error message is sent to the controller via the DIN rail bus connector (T-connector) and RNF22 power supply and error message module.
Resistive coupler

DI

FTE20

Input (1.2 or 2.1 mA)

Output (binary)

Fault signal

Power supply

24 V DC

RLN22

PLC

Deltapilot S

Pressure display: RIA16

Level display: RIA16

RMA42

Feeding, separating, evaluate signals

DRLN22 Line fault monitoring of a rotary paddle limit switch with mechanical switching contact

In the example, a level of a solids silo is monitored via the rotary paddle limit switch. The FTE20 supplies a binary signal via a mechanical switching contact. By default, a line fault is not detected. By wiring the contact in the FTE20 with a resistor coupling element and evaluating it via the RLN22, the connecting lines to the FTE20 are monitored for line interruption and short circuit.

RMA42: Feeding, separating, evaluate signals

Differential pressure measurement with RMA42

The hydrostatic filling level measurement with the Deltapilot S and the RMA42 is ideal for use in pressurized tanks. The devices calculate filling level and volume by using the signals coming from the pressure sensors (one at the bottom and one at the top) of the tank. Additionally, the pressure at the top of the tank is displayed. Thus an effective tank monitoring is possible without complex SPS programming.
## Surge arresters

### HAW562 – for DIN rail mounting

<table>
<thead>
<tr>
<th>Version / order code</th>
<th>HAW562-AAB</th>
<th>HAW562-AAC</th>
<th>HAW562-AAA</th>
<th>HAW562-BDA</th>
<th>HAW562-AAD</th>
<th>HAW562-AAE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction</strong></td>
<td><img src="image1" alt="Image" /></td>
<td><img src="image2" alt="Image" /></td>
<td><img src="image3" alt="Image" /></td>
<td><img src="image4" alt="Image" /></td>
<td><img src="image5" alt="Image" /></td>
<td><img src="image6" alt="Image" /></td>
</tr>
<tr>
<td><strong>Application</strong></td>
<td>Surge protection for power supplies</td>
<td>Surge protection for signal cables / communication cables, direct and indirect grounding possible</td>
<td>Surge protection for signal cables</td>
<td>Surge protection for signal cables</td>
<td>Surge protection for signal cables</td>
<td>Surge protection for signal cables</td>
</tr>
<tr>
<td><strong>Area / signal</strong></td>
<td>10 to 55 V (+/-20 %)</td>
<td>90 to 230 V (+/-10 %)</td>
<td>4 to 20 mA, HART, PFM, PA, FF</td>
<td>4 to 20 mA, HART, PFM, PA, FF</td>
<td>RS485, Modbus, PROFIBUS DP</td>
<td>Protection module Prosionic S</td>
</tr>
<tr>
<td><strong>SPD class</strong></td>
<td>Type3 P3</td>
<td>Type1 P1</td>
<td>Type2 P1</td>
<td>Type2 P2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Certificates</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Approvals</strong></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Accessories</strong></td>
<td>Field housing, mounting kit</td>
<td>Field housing, mounting kit, screen grounding clamp</td>
<td>Field housing, mounting kit</td>
<td>Field housing, mounting kit</td>
<td>Field housing, mounting kit</td>
<td>Field housing, mounting kit</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>18 x 90 (0.71 x 3.54)</td>
<td>18 x 90 (0.71 x 3.54)</td>
<td>12 x 90 (0.47 x 3.54)</td>
<td>12 x 90 (0.47 x 3.54)</td>
<td>12 x 90 (0.47 x 3.54)</td>
<td>12 x 90 (0.47 x 3.54)</td>
</tr>
</tbody>
</table>

### HAW569 – for field mounting

<table>
<thead>
<tr>
<th>Version / order code</th>
<th>HAW569-AA2B</th>
<th>HAW569-DA2B</th>
<th>HAW569-CB2C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction</strong></td>
<td><img src="image7" alt="Image" /></td>
<td><img src="image8" alt="Image" /></td>
<td><img src="image9" alt="Image" /></td>
</tr>
<tr>
<td><strong>Application</strong></td>
<td>Surge protection of signal cables (4 to 20 mA, PFM, HART, FF, PA)</td>
<td>Surge protection of signal cables (4 to 20 mA, PFM, HART, FF, PA) and power supply cables (0 to 66 V &amp; 80 to 230 V)</td>
<td>Surge protection of signal cables (4 to 20 mA, PFM, HART, FF, PA) and power supply cables (0 to 66 V &amp; 80 to 230 V)</td>
</tr>
<tr>
<td><strong>SPD class</strong></td>
<td>Type2 P1</td>
<td>Type2 P2</td>
<td>Type2 P2</td>
</tr>
<tr>
<td><strong>Installation</strong></td>
<td>Lead through version (direct and indirect screen grounding). Lead-through of power supply / signals - no extra cable gland</td>
<td>Lead through version (direct screen grounding). Lead-through of power supply / signals - no extra cable gland</td>
<td>Screw-in version Parallel connection – no additional resistor in the circuit</td>
</tr>
<tr>
<td><strong>Approvals</strong></td>
<td>Non Ex area</td>
<td>ATEX/IECEx, CSA</td>
<td>ATEX/IECEx, CSA</td>
</tr>
<tr>
<td><strong>Certificates</strong></td>
<td>SIL 2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Accessories</strong></td>
<td>M20 / NPT1/2” adapter Cable gland set Grounding washer</td>
<td>M20 / NPT1/2” adapter Cable gland set Grounding washer</td>
<td>M20 / NPT1/2” adapter</td>
</tr>
<tr>
<td><strong>Dimensions</strong></td>
<td>SW 27 x 71 mm (AF 27 mm x 2.8 in)</td>
<td>SW 27 x 71 mm (AF 27 mm x 2.8 in)</td>
<td>SW 27 x 63 mm (AF 27 mm x 2.48 in)</td>
</tr>
</tbody>
</table>
Secure the plant availability

Plant availability is very important as even short failures in production may cause high losses in sales. Therefore respective protection of the devices e.g. surge protection as well as a high availability of plant parts needs to be ensured.

Direct and indirect lightning as well as switching operations within a process can produce voltage overloads into supply lines and communication circuits, such as fieldbus systems. These overloads are rapidly changing impulses, also named transients, which can reach several kilovolts (up to 10 kV) within microseconds.

Even though sensors are tested according to the EMC guidelines (EN 1000-4-5) for these impulses, however, only up to 2 kV on main power lines or 1 kV on signal lines. This means that overvoltage protection matched to both sensors and process industry requirements is absolutely necessary. The HAW562 and HAW569 devices limit the overloads in both power/supply circuits as well as signal/communication cables to a tolerable value for the sensitive electronics. HAW562 and HAW569 surge arresters have been especially developed for the protection of sensitive measurement electronics and thereby secure plant availability by reducing the excess values in the lightning protection stages and automatic reset after the event.

When installing surge arresters it has to be ensured that both sides of a line are equipped with a surge arrester. Endress+Hauser offers surge arresters for DIN rail mounting in the panel and for direct mounting in a field housing.
Netilion – the multi-brand ecosystem

Netilion is a cloud-based IIoT ecosystem, designed for industrial processes. It connects the physical and digital worlds to send valuable information from the field straight to your phone, tablet or other devices. Netilion empowers you to improve efficiency and drive innovation.

Multi-brand ecosystem
You have equipment from various vendors in your installation. An IIoT solution should provide data from as many assets as possible, and Netilion can do that. This multi-brand ecosystem brings transparency into a plant regardless of device type or manufacturer.

Security and privacy
Your facility’s information is valuable and needs protection. Netilion allows users to access data digitally because it meets internationally recognized standards of cloud-platform security. It’s a safe harbor for your data.

Decentralized processes monitored efficiently
- Reduction of routine checkup tours through comprehensive visualization of essential process variables, e.g. flow quantities, limit values, levels, temperature, pressure or physicochemical quality parameters
- Low operating costs through fast reaction in case of failure

Legal compliance thanks to automation
- Continuous measurement of quantitative and qualitative parameters
- Generation of legally compliant documentation thanks to integrated reporting systems

Data access around the clock
- Complete data access independent of time and place
- Numerous options to analyze and visualize ratios, amounts, thresholds, time series and trends, as well as balances
- Everything at a glance thanks to the web-based visualization of networks with optimized depiction for highly diverse terminal devices

More about Netilion:
www.netilion.endress.com
1. Physical world
Infrastructure (pipes, pumps, valves, etc.)

2. Data collection and control
Smart field devices and sensors (flow, analysis, pressure, level, temperature, etc.)

3. Data collection and transmission
Flexible edge connectivity solutions

4. Data management and visualization
Monitoring of networks and decentralized infrastructures

5. Data fusion and analysis
Algorithms for leakage detection, verification, forecasts, etc.
Field Data Manager software MS20/MS21

Data management made easy

The FDM software offers various possibilities to display, manage and archive data from the production process. Data is stored in a database, thus extensive searching and complicated data handling is avoided. With the help of the manipulation proof data management the requirements of the legislator and company compliance specifications can be easily fulfilled. Flexible display possibilities support the transparent representation and offer a solid basis for process analysis. This makes the complete data storage of a measurement point possible, e.g.

- Measurements (analog and digital signals, calculated values)
- Event diagnostics
- Protocols
- Online visualization of instantaneous values (“live data”)
Flexibility and safety through SQL database
Using the FDM software the stored data as well as the device configuration can be read out (automatically) manipulation protected and saved locally, in a network or in an SQL database. The process data is stored in a secure, efficient and cost effective manner over the complete product lifecycle and can be accessed at any time. A PostgreSQL™ database (free of charge) which is included in the scope of delivery can be installed and used together with the software. Besides that, FDM is open for other SQL databases (Oracle™, Microsoft SQL Server™) so that storing can be performed into an already existing database.
SQL offers a standardized interface to further systems. ERP systems (such as SAP) can directly access the stored measurements and reprocess these.

Automatic/Export & import function
Data are automatically read via an integrated system service. This service allows device data to be read out and stored in the database in parallel with other tasks such as report generation or export and import actions. The import functionality can be used to load planned values into the database in XLS or CSV format. This data can be used to compare planned/actual values for the purpose of energy monitoring. Furthermore, reports or TrustSens calibration certificates (which were logged in the RSG45 using the TrustSens Calibration Monitoring function) can be automatically saved as a PDF. This is of particular benefit in the pharmaceutical industry. FDA 21 CFR 11 security is guaranteed by the software’s FDA-compliant audit trail as well as extensive user administration. Restricted access can be granted using various user models. Here, employees are only given access to information that is relevant for their area of responsibility. FDM satisfies the security requirements of the FDA 21 CFR 11 rules as follows:
- Data encryption with tamper detection and marking
- Safe password and access authorization system
- Tamper-proof storage of all access in the audit trail

Intuitive user guidance and modern interface
The user is assisted by a wizard through all setting steps and activities. An on-line help function is available for each individual step. Reports that have already been generated can be saved as templates and are therefore available for a later renewed data analysis. Movable, individual action windows make it possible to work simultaneously on several monitors. All sorts of reports as well as tables and graphics can be compared with each other. The FDM software can read out and archive data from the following devices:
- EngyCal RH33, RS33 and batch controller RA33
- Ecograph, Ecograph A/C/T
- Memograph, Memograph M/S
- Sampler with Liquiline CM44x
Visualization of current measured values
In addition to archived data, the current values of a number of devices can be visualized simultaneously in FDM. Up to 40 analog values or 100 digital values can be displayed in measured value curves, as a bar graph or digital value. A mixture of display modes is also possible in different windows that can be positioned as required. The channel name and configured measuring range are shown for all display modes in addition to the current value and the unit. The affected channel is indicated appropriately in the event of a limit value violation. All of this information provides a quick and detailed overview of the process.

Central User Management - Connection to Directory Services
FDM offers with the integrated LDAP interface (Lightweight Directory Access Protocol) an open and cross-platform protocol that is used to synchronize FDM accounts with directory services (e.g. Microsoft Active Directory, Oracle UD, and many more). The LDAP feature in FDM replicates user password changes in directory domains to the FDM user accounts and enables fast and secure authentication of users.

Trial version
You can test the FDM software without obligation. We offer a trial version which can be used for 60 days free-of-charge.

License model
MS20 single-user license: Software installation on one computer at the same time.
MS21 multi-user license (floating licenses): Multiple users simultaneously depending on the number of available licenses.

Order number for detailed technical information: TI01022R
You find the current software version on the Internet:
www.endress.com/ms20
www.endress.com/ms21
OPC server
Visualization, monitoring and control of processes

Today OPC stands for ‘Openness, Productivity and Collaboration’ and is an interface standard in factory and process automation.

Based on Windows technology OPC enables a simple and standardized data exchange between engineering processes and process monitoring and control. Today higher and higher requirements on the availability, productivity and quality are made in all areas of automation technology. The integration of hundreds of devices from different manufacturers is, in this case, the greatest challenge. The integration of these measurement points into primary, central visualization and control systems takes a lot of time and money.

Use a standardized technology like OPC to integrate measuring points and express process data in a simple and fast way. The Endress+Hauser OPC Server is a comprehensive tool for all Endress+Hauser recorders, data managers and energy managers, that are equipped with a serial and/or Ethernet interface.

Simple data exchange
Depending on the type of device, data access to the following instantaneous values is possible:

- Analog channels
- Digital channels (digital combination)
- Mathematics channels and calculated process values
- Totalizer
- Time synchronization
- Date/time
- Calculated process values
- Quantities and energy

Test version
You can test the OPC server without obligation. We offer a trial version which can be used free of charge for 30 days.

Order number for detailed technical information: TIO0122R
You find the current software version of the OPC server on the Internet: www.endress.com/rxo20

<table>
<thead>
<tr>
<th>Compatibility list</th>
<th>Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecograph T</td>
<td>RS232/RS485</td>
</tr>
<tr>
<td>Memograph M, Memograph S</td>
<td>Ethernet TCP/IP</td>
</tr>
<tr>
<td>Alphalog</td>
<td>RS232/RS485</td>
</tr>
<tr>
<td>Steam and heat manager RMS621</td>
<td>RS232/RS485</td>
</tr>
<tr>
<td>Energy manager RMC621</td>
<td>Ethernet TCP/IP (RS232 adapter)</td>
</tr>
<tr>
<td>Energy manager RH33, Steam calculator RS33</td>
<td>Ethernet TCP/IP</td>
</tr>
<tr>
<td>Application manager RMM621</td>
<td>RS232/RS485, Ethernet TCP/IP</td>
</tr>
<tr>
<td>Batch controller RA33</td>
<td></td>
</tr>
</tbody>
</table>

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Further information:

- Level measurement FA00001F
- Pressure measurement FA00004P
- Flow measurements for liquids, gases and steam FA00005D
- Temperature measurement FA00006T
- pH measuring technology FA00007C
- Analyzers for water and wastewater FA00012C
- Service KOMPAKT FA00018H

Have you found “Your” device?
We would be pleased to send you further detailed Technical Information.

Or alternatively as download under:
www.endress.com/download

www.addresses.endress.com