| Level | Pressure | Flow | Temperature | Liquid Analysis | Registration | Systems Components | Services | Solutions |

Recorder and data acquisition technology

Data managers, paperless recorders and
associated software packages

Endress+Hauser

People for Process Automation

Solutions for data acquisition

As one of the worlds largest industrial recorder manufacturer Endress+Hauser has been supplying paper and paperless recorders since 1980 – that's many years of valuable experience of more than 120,000 installations world wide at your service!

International and always available:

With sales offices and representatives in almost 100 countries across the globe, we are always at your service.

Products and more:

All our products and components are designed so that they are easy to install and simple to handle.

We also pride ourselves on protecting both resources and environment.

In addition to the broad product basket, project engineering and international approvals are also available.

Endress+Hauser offers stand-alone solutions or complete monitoring systems.

Innovative and fast:

Investment in research, development and production guarantees the high product quality expected from a leading manufacturer of recording technology – even with short delivery times!

The realization of your tasks

Special applications require special solutions. Through consequent modularity in mechanical engineering, soft- and hardware we offer:

- Universally usable basic devices
- Interesting expansion possibilities/options
- Special branch and application solutions
- Devices for OEM applications

Competence in monitoring, visualizing and archiving your measurement point

More value through knowledge, reliable data recording – guaranteed!

Easy to read graphic displays combined with power failure secure storage and manipulation monitored measured data archiving guarantees safe traceability of process sequences in all industrial areas such as:

- Oil and gas
- Water and wastewater
- Power plants and energy
- Chemical and biotechnology
- Pharmaceutical and food
- Metal and primaries

The large number of possibilities of analog and digital in- and outputs, communication interfaces and intelligent unit functions such as:

- Mathematics and logic functions
- Alarm set point monitoring
- Event storage
- Batch analyzer
- Signal analysis
- Alarm using wireless technology

make solutions for a large number of applications such as sterilization, CIP, clean room monitoring, access control, quality control in manufacturing and processing, remote monitoring of pumps and unmanned stations, energy/water/gas usage, billing and documentation, as well as compliance to FDA and ISO900X regulations possible. Complete PC software concepts such as ReadWin® 2000 and OPC server manage the data and units, independently of whether they are installed locally or distributed worldwide!

How to find the right device:

In the table on the next couple of pages you can find the most suitable model for your application. Information regarding system integration and the software package Read-Win® 2000 can be found from page 24.

Recording technology from Endress+Hauser

You profit from these facts:

- Excellent price/performance ratio
- Free ReadWin® 2000 software
- Fast return on investment
- High plant availability
- Information for process improvements
- Minimum maintenance costs
- Low total cost of ownership

A recorder for every application
...At a glance

Model	Minilog B – RDL10	
Features	Data logger with 2 input channels for recording and storing analog and digital values.	
Construction		
Universal analog inputs	1	
Digital inputs	1	
Linear analog outputs	–	
Loop power supply	–	
Count inputs (impulse)/operating time counter	Yes	
Event input	Yes	
Alarm set points/relays	2 per channel/–	
Measured value display	7 digit LCD	
Signal analysis	Intermediate, total report	
Process screen	–	
E-mail functions Integrated Web Server CSV file format OPC server	Via ReadWin® 2000 – Via ReadWin® 2000 –	
Mathematics function Integration Calculation factor for integrated quantities Batch function Tele-alarm function Waste water & storm overflow function Energy software (water + steam)	– – – – Yes – –	
Text input	–	
Search function (events and values)	–	
Memory	Internal	
Scan rate	1 s	
Interfaces	RS232	
Power supply	Lithium battery, or external supply 7 to 30 V DC	
Protection class	IP65 NEMA4	
Casing size (WxHxD)	100 x 100 x 61 mm	
Pasteurization approval	–	
FDA 21 CFR 11	–	
User administration	–	
Device description as from page	6	
Order number for detailed technical information	TI089R/09/en	

	Ecograph T – RSG30	Memograph M – RSG40
	Replaces standard dotting and strip chart recorders, with up to 6 universal inputs. Displays, records and transmits ...all at an exceptional price/performance ratio.	Graphic Data Manager with universal use of analog and digital signals. Stores, visualizes, analyzes and communicates. Various interfaces, PROFIBUS® DP, Modbus and Ethernet connection.
	3 or 6	4/8/12/16 or 20
	3	6 or 14
	–	2
	1	1
	Yes	Yes
	Yes	Yes
	14/4 relays	100/6 or 12 relays
	LC color graphic, 120 mm (4.7 Inch)	TFT Color graphic, 178 mm (7 Inch)
	Optional for counter	Intermediate, daily, weekly, monthly, total/yearly reports
	–	up to 10
	Via ReadWin® 2000 Yes Yes (direct) Yes	Via ReadWin® 2000 Yes Yes (direct) Yes
	2/5 mathematics channels Yes Yes – – – –	8 mathematics channels Yes Yes Yes Yes Yes Yes
	–	30x presettable
	Yes	Yes
	Internal memory + CF card	Internal memory+SD-card+USB-stick
	100 ms	100 ms all channels
	USB, (RS232/RS485, Ethernet)	Internal memory+SD-card+USB-stick
	90 to 250 V AC 24 V AC/DC	90 to 250 V AC 20 to 30 V AC/DC
	IP 54 / NEMA2 (front)	IP 54 / NEMA4 (front)
	144 x 144 x 171 mm	190 x 144 x 158 mm
	–	Yes
	–	Yes
	–	Yes
	8	10
	TI115R/09/en	TI133R/09/en

Minilog B
The cost-effective and robust data logger

Dual-channel measured data collection device

For stand-alone applications

The Minilog B is used to display and record measured data from analog and digital input signals. It can be applied where a compact data logger is needed.

The most important features of this device are:
- 0/4...20 mA/ 0 to 1 V/ Pt100 input
- One second scan time for minimum, maximum and average value calculation
- Input 2: Potential-free contact for event, operating time or impulse counters (25 Hz)
- 1 min. to 24 hr. storage cycle
- Stores up to 64000 measured values (FIFO principle)
- Compact IP65 field housing
- 7 - 30 V DC power supply or internal battery operation
- RS232 interface for data exchange and direct set-up using a PC or modem connection.

ReadWin® 2000 for device set-up and data management is delivered free of charge with the unit.

In addition to data storage the data logger also monitors two set points. Violation of either of these set values is indicated in the display.
The device can be set up to either continuously record or record only on a set point violation (in the preset storage cycle).

The tele-alarm function (option) makes it possible to transmit a message to a computer or mobile phone using the telephone network or wireless modem when the unit enters a set point violation or the digital input is active.
The Minilog B works using an integrated lithium cell for reliable long term operation (up to 7 years) – alternatively for fixed installations or modem operation it can also be supplied for use with an external power source.

Minilog B application areas are:
- Data recording for temperature, humidity, pressure, flow, level and analysis values
- Temperature control: Warehouse temperature and transport temperature measurement
- Operating time recording
- Access control
- Piece part and quantity recording
- Quantity recording by integration of the analog signal
- Remote monitoring/data transmission using modem connection
- Tele-alarm, SMS in fault condition: Where measured values are to be automatically recorded and stored

Data visualization

The recorded data is read out, transmitted and visualized using the ReadWin® 2000 PC operating software.
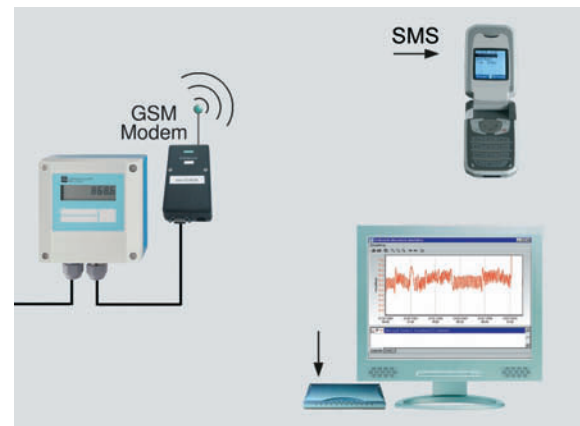The advantages are:
- Storage of the device set-up in a data base
- Instantaneous value display
- Min/max/average value recording
- Quantities
- Events
- Readout of the measured values stored in the unit
- Measured value display as curves, columns and tables
- Printout of graphics, tables and device set up parameters
- Data export to spreadsheet programmes (e.g. Excel, Lotus etc.)

Tele-alarm, makes fast messaging possible.

Continuous temperature recording in a transporter refrigeration cell using a Minilog B with a Pt100.

Molasses level measurement in customer specific tanks of a supplier. The Minilog B stores the customer usage and informs the supplier of the actual level in the storage tank. The data is collected at a central supply point and are available for the planning of just in time delivery.
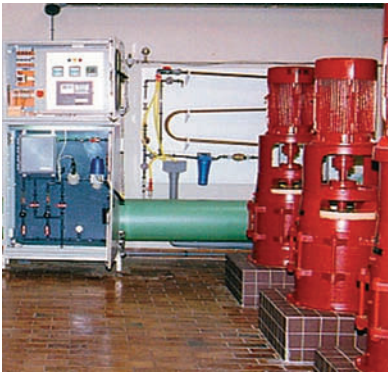
Automatic pump operating time recording using the Minilog B.

4 Minilog B devices record waste water inflow on a large treatment plant in South East Asia.

2 Minilog B devices for level measurement and dosing.

Ecograph T
The paperless recorder that saves time and money

Display, record, communicate & monitor process values.

**State-of-the-art paperless recording system**

Ecograph T is a state-of-the-art solution to multi channel displaying, recording, monitoring and communication needs.
The unit is easy to use and comes with a host of convincing features to save costs and simplify data acquisition.
It offers an unbeatable price to performance ratio, previously unheard of in this segment.

The principle of success

Ecograph T is the technological and economical alternative to paper strip chart recorders.

- Cost effective solution to all recording & monitoring applications
- Modern technology & communication ports
- Safe & reliable data recording
- Simple to use, no special software necessary
- It saves money because it operates without pens and paper
- It saves time because it is extremely simple to operate
- It saves work because it perfectly replaces standard strip chart paper recorders
- It saves room because it will replace up to 6 individual displays

Ecograph T has a very fast pay back time.
And this with a very attractive price/performance ratio.
Due to extensive self monitoring functions, power failure secure memory and manipulation monitored archiving the device guarantees secure process data in all industrial branches.
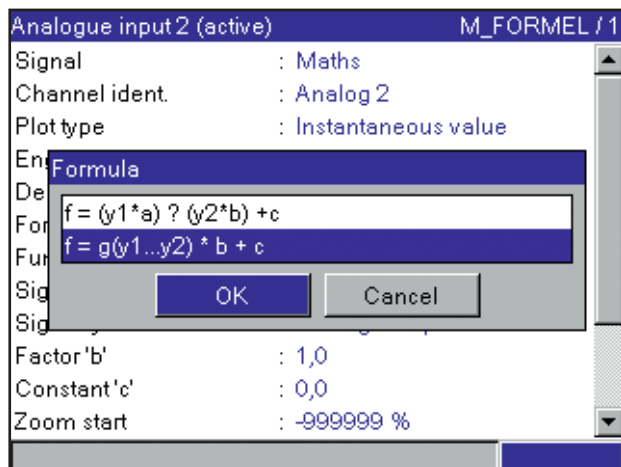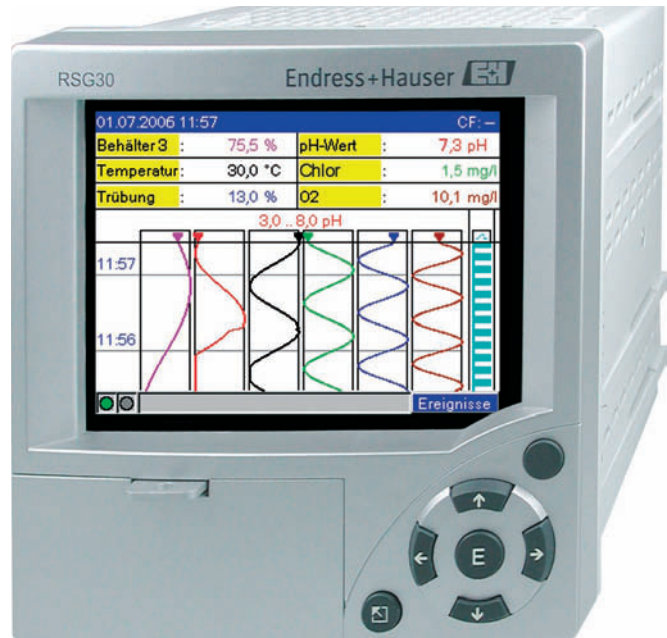
Advantages of paperless recording

- Display, data logger and communication gateway in one unit.
- Zero running costs, no maintenance or down time.
- Screen displays data in a format similar to paper charts. Simple to interpret trend indication, monitoring without complex PLC or SCADA software.
- Autonomous data acquisition system ensures that recorded data is manipulation free and PLC is relieved of data logging function. Additionally avoids access into PLC software (often containing critical control functions) for monitoring purposes.
- Highly reliable firmware and data redundancy compared to standard PC based data acquisition software.
- Offline data analysis and A4 size printed reports for process and cost optimization.

Your advantages with Ecograph T

- Connect up to 6 analog signals and 3 pulse/digital inputs.
- 100 msec scan rate, 18 bit resolution for all channels.
- Perfect replacement for all existing paper recorders (138x138 panel cut out).
- Tight limit monitoring and alarm annunciation integrated.
- Power your sensors and record their outputs using one unit save on sensor supplies.
- Secure recording through digital memory and lockable/sealable compact flash cards.
- Good overview of values and easy to read display.
- Communicate and read data anywhere, everywhere.
- Online process monitoring using a simple web browser.
- Multiple operating languages and online help integrated in the unit.

Ecograph T multi-channel display and videographic recorder in one unit

Functions and design

Compact & Rugged

The installation depth required is only 170 mm thus requiring a much smaller panel depth, translating into reduced costs and material in new installations.

Integrated alarm and set point management

Up to 14 set points, freely programmable as minimum or maximum alarms and assignable to any of the channels. The set point over-/undershoots are discretely displayed and can trigger 4 on-board relays for external alarm annunciation elements such as sirens or lamps. Alternatively valves or pumps could be switched saves a separate unit for alarm or step control functions.

Sensor power supply

A 250 mA, 24 V sensor supply enables you to power up loop powered sensors or 4–wire sensors without the need for external power supplies and additional wiring. Saves time, costs and keeps the wiring simple.

Digital memory, zero running costs

The Ecograph T is available with Industrial Grade Compact Flash memory cards to store large amounts of data and ensure minimum operator intervention to retrieve archived data. Avoid dried out pens, paper smudges and jams that lead to heavy maintenance and running costs. No more frequent trips to change paper, discs or read out limited memory capacities!

Flexible display modes

Just as a simple multi channel numerical display, or as a replacement for a strip chart recorder, or a multi channel bar graph display, the Ecograph T offers it all.

Data accessibility

Access the data files stored in the internal memory and extended memory (Compact Flash) using the communication ports available.
USB for one to one communication.
RS485 is available for simple serial networks.
Modem & remote monitoring: Via the use of a modem (connected to RS232) the recorder can be connected to a telephone line and remotely accessed from anywhere in the world.
Ethernet communications provides networking capabilities.
Embedded Web server allows you to simply browse the real time measurements using any standard web browser such as MS© Internet explorer.
Just give your Ecograph T an IP address–Scanning your process becomes as simple as browsing the internet!

Detailed off line data analysis with or without special software

The Ecograph T can save recorded data in secure ReadWin® 2000 format or "Comma Separated Values" (CSV) or both.
Just select your preference in the set up menu.
CSV files can be directly viewed and managed in standard spread sheet software such as MS© Excel.
No special software means you save on training staff and installation and management of an extra software package.
ReadWin® 2000 format files are manipulation free and can be viewed only using this PC software program.

The functions offered are:

- Set up and configuration of multiple recorders.
- Manual or automatic data read out (internal and Compact Flash) using USB, Ethernet, serial or Modem interface.
- Manual or automatic print out of reports on recorded data including your company logo.
- Archiving and import/export of configuration files for exchange or error diagnosis purposes.
- Export of data into spread sheets and text forms (CSV or ASCII format) for easy handling.
- E-mail function for alarms, events or instantaneous values to multiple clients.
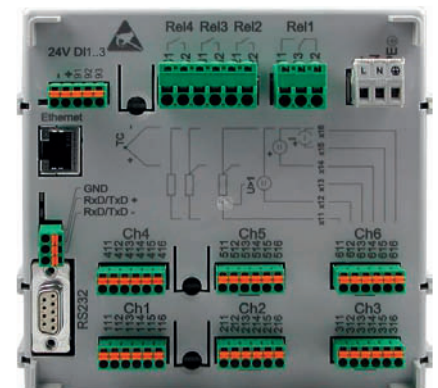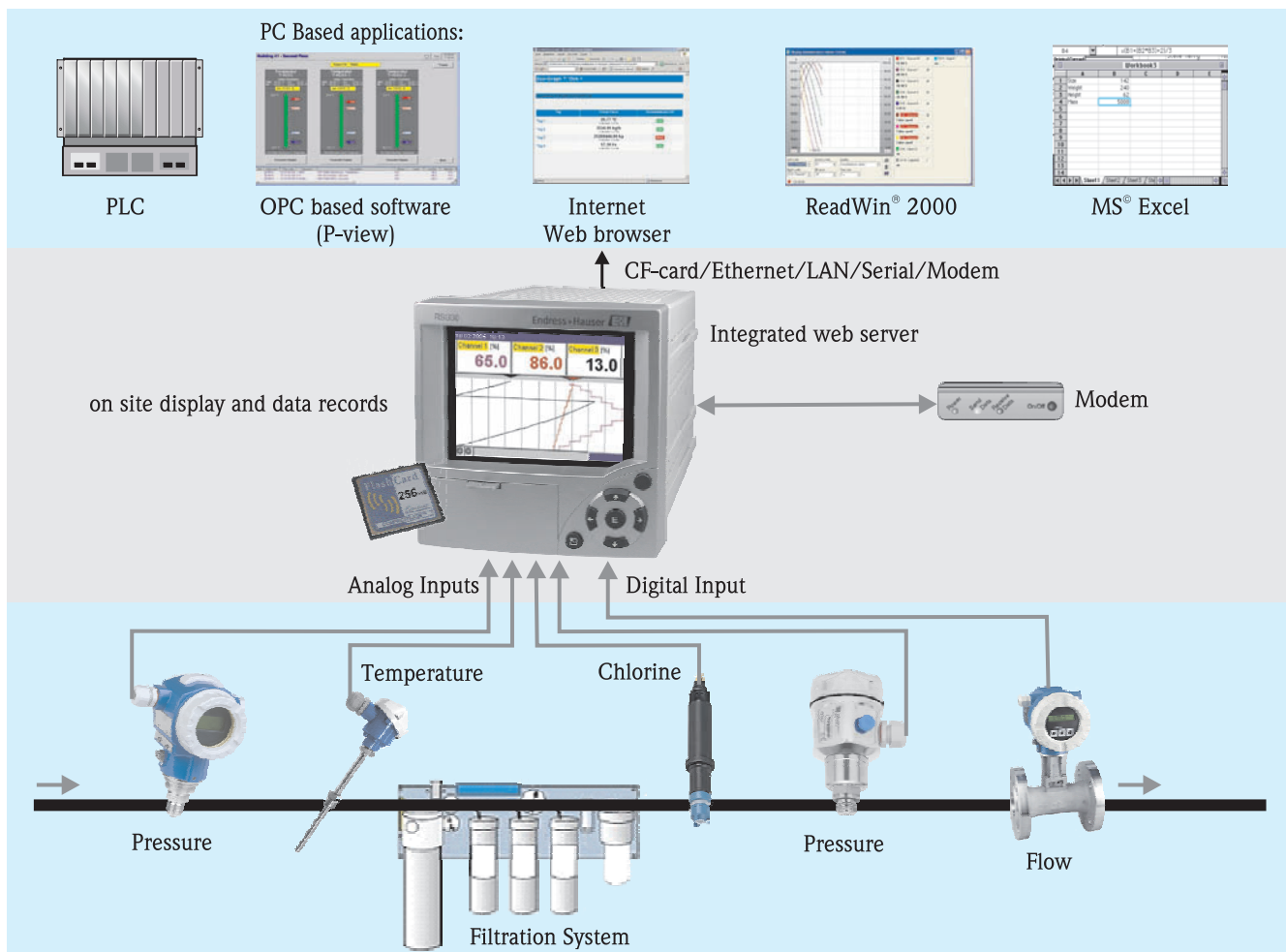
Typical Application Areas

- Monitoring drinking water filtration systems and river waters for critical parameters
- Ensuring safe limits of chemical and biological elements in waste water from industrial plants and in domestic communities
- Remote monitoring of deep wells, mineral water springs and pumping stations
- Keep track of harmful emissions, wastes and gases at various manufacturing and petrochemical processing plants
- Monitoring tanks for level, overflow and recording consumption trends
- Enabling traceability through recording to achieve cost and quality leadership in various treatment processes in the manufacturing of metals, plastics, ceramics, tyres, cables, electronics etc.
- Keeping track of critical parameters in processing, packaging and cold storage of food, beverage and dairy processing
- Data acquisition OEM units on special stand alone skids such as filling machines, wine sterilizers, milk pasteurizers, cheese processors and milk collection stations
- Multi-channel display application in process and machine industry
- Applications requiring a reliable multi channel gateway with or without redundant data logging between intranet/internet/visualization software and process sensors

- Recording and billing consumption of gasses, fluids and energy in industries
- Recording and monitoring of performance characteristics of turbines, boilers and reactors at power plants

In short wherever there is a need to display, monitor, record and analyze process parameters the new Ecograph T is the answer!

## System overview: Application example for a filtration system

PC Based applications:

PLC   OPC based software (P-view)   Internet Web browser   ReadWin® 2000   MS® Excel

CF-card/Ethernet/LAN/Serial/Modem

Integrated web server

on site display and data records

Modem

Analog Inputs   Digital Input

Temperature   Chlorine

Pressure   Filtration System   Pressure   Flow

Ecograph T
Applications

Pressure monitoring on oil drilling rigs
Together with pressure transmitters Ecograph T monitors the torque and load as well as drilling material fatigue.

Monitoring and recording system
Process control in recycling reactors.
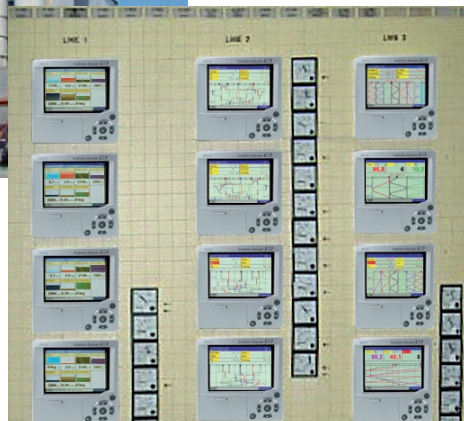
Oil content and pressure condensation monitoring
with Ecograph T (OilDewControl). The data is recorded, are traceable and free from manipulation. The user can follow the plot on line from his desk. The installation was done at a food manufacturer in accordance with the new hygiene laws.

Portable device for service use and test runs or in a field housing for front end use.

Memograph M
Graphic Data Manager

The new generation in videographic recorders – Memorize, visualize, analyze and communicate process values

State-of-the-art data recording

With the Graphic Data Manager Memograph M Endress+Hauser introduces its new videographic recorder. The innovative device is impressive because of its high functionality, modular construction and its intuitive operator concept.

The ideal fields of application for Memograph M are in the process measurement in the water/waste water, power and the food as well as pharmaceutical industries. The functionality, flexibility, secure data recording, the informative measurement evaluation and brilliant measurement display means that the applications are limitless. As a standalone system or as an efficient system component Memograph M is the ideal solution for every task.

The device is easy to operate and offers a multitude of possibilities to save costs and simplify data storage.

Memograph M
is the "Window to the process"!

- Selectable, easily understandable screen display mode.
- Front end trend value monitoring without complex PLC/SCADA software.
- Independent data recording system guarantees manipulation protected data recording for the most demanding tasks.
- Off-line data evaluation and reports in standard paper-size print-outs for process and cost optimization.
- No programming, only set-up.
- Simple process traceability.
- Compliance with quality parameters can proven at any time.

Advantages of Memograph M

- **Brilliant:**
  7" TFT display as a front end display for optimum readability.
- **Fast:**
  100 msec scan rate for all channels, high speed memory cycle of 100 msec.
- **Secure:**
  Security package with user defined access rights and electronic signature (FDA 21 CFR 11).
- **Modular:**
  Simple expansion to 20 universal- and 14 digital inputs or 12 relays.
- **Flexible:**
  Selectable display mode e.g. instrument, process screen and circular chart display
- **Limitless:**
  Integrated Web-server, fieldbus (PROFIBUS, Modbus), standard protocols and interfaces such as USB, TCP/IP, OPC, Ethernet are supported.
- **Informative:**
  Event search, automatic signal evaluation
- **Practical:**
  158 mm installation depth, IP65, NEMA4 front bezel; Operating via external USB keyboard, printout via USB printer.
- **Concise:**
  Alarm management with all active, acknowledged and historical alarms.
- **Comfortable:**
  Re-calibration of a measurement chain can be done in an installed system.

Memograph M
# Functions and design

Generous basic features, flexibly expandable

As the only device on the market in this class Memograph M can internally record up to 20 universal inputs, analyze the raw data and store analog values, counter values or quantities and simultaneously up to 6 different operating times

Loop power supply

A sensor power supply (200 mA, 24 V) makes direct connection of a loop powered or 4-wire sensor possible. This saves time and costs, and simplifies the wiring requirement.
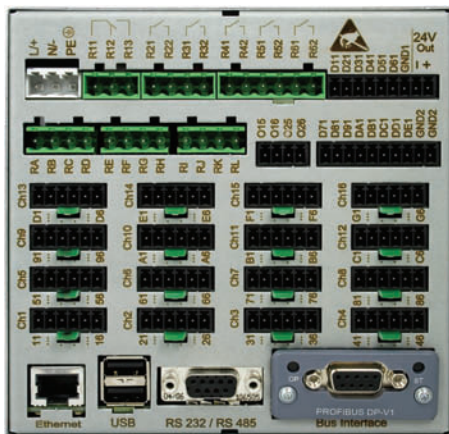
Important information at a glance due to the large 7" display

The process values and event messages are shown on the high definition 7" TFT display and can therefore be easily read from a large distance thus making direct access on the spot for current and historical production data possible for the user. The large screen represents a number of different display formats such as curves, bar graph, but also circular chart and analog instrument display. Depending on the requirements, mixtures of these can also be set up by the user. Active channels can be assigned into 10 groups. For clear identification these groups can be assigned individual names e.g. "temperature boiler 1" or "daily average values for all boilers".

or switching states. By using PROFIBUS or Modbus the device can be extended to 40 channels and be connected to SCADA and PLC systems. The processing of arbitrary nonlinear signals is no longer a problem, because a 32 point linearization table can be defined for each individual input. 2 analog outputs provide additional flexibility.

Front-end operation of the device

Operation of the device is dialog-based via menus, using a navigator (jog-shuttle) in combination with 4 push buttons Alternatively Memograph M can be operated using an external keyboard (USB). Another highlight is the integrated on-line help which almost makes the published user manual superfluous.

Operation using PC-Software

Set-up and operation of the device is also possible via the ReadWin® 2000 PC software.
Set-up and communication is done using:

- USB interface
- Ethernet
- Serial interface
- SD-memory card

Set-up data can also be stored on an SD-card or USB-stick and printed out for archiving purposes. Device set-up can be transmitted to the device directly from a memory card.

Text input

Notes and comments can be allocated to the recorded signals and subsequently saved.

Operation language

The operating language (e.g. German, English, French, Italian) can be easily changed directly at the device even during operation.

Compact and robust

The required installation depth amounts to only 158 mm, thus narrow control panels can be used. This reduces costs and materials, especially for new installations. The robust front bezel plastic materials ensures the IP65, NEMA4 protection class.

Graphic Data Manager Memograph M
High security standard

By fulfilling the requirements laid down in the 21 CFR Part 11, electronic recording and signatures are given an identical legal status as traditional documentation and hand written signatures. All the old problems with the time consuming traditional recording (paper jam, paper and pen change) are a thing of the past – electronic evidence is the new direction!

The following functions guarantee compliance with the FDA 21 Part 11 and, therefore, the traceability of all process sequences:
- Integrated user and rights management.
- ID + password = electronic signature.
- Mechanisms that request the user to change his password regularly.
- More than 50 users with various access levels and rights can be entered.
- Access protection.
- Access block on entry of 3 invalid login attempts.

All operation steps and messages generated by the unit, e.g.
- Login/-out
- Set-up changes
- Alarm set point violations
- Recalibration
- Text entry/comments
- Events and power failures

These are placed and stored in the Audit Trail and time stamped with allocation to the respective responsible user (in both the unit and the ReadWin® 2000 PC software).

Data security
The Graphic data manager completely archives process curves and events. Stored data is not lost, not even during a power down.

Details at a glance:
- Large internal memory capacity of 256 MB.
- The internal memory operates as a ring memory according to the FIFO principle (First In – First Out).
- Optimal storage utilization by data compression.
- Additional storage on external industrial grade SD cards (can be used as a ring or stack memory) or USB memory stick.
- Minimum, maximum and average values as well as envelope values, quantities and events are stored in predetermined memory time cycles.

SD-card in industrial standard
- High data integrity and failure security.
- Low intrinsic heating.
- 2 million write/delete cycles per block.
- High reliability (MTBF > 3 million hours).

Data transmission to PC via ReadWin® 2000 software
The recorded values are only stored in the PC database after a fault-free transmission. Any possible manipulation of the data is recognized and subsequently highlighted. The data can of course also be exported to other programs (e.g. MS®-Excel) without changing the original protected data.

Intelligent alarm- and limit management
Reliable and punctual recognition of limit value violations safeguards high quality and reduces costs.
Memograph M supervises analog values and counters.

Flexible possibilities to save on external components and time consuming wiring:
- 100 alarm limit set points can be allocated to the channels.
- Pre-alarm and main alarms can be selected.
- Adjustable hysteresis.
- Short-time peaks can be ignored.
- Device-internal switched outputs (up to 12 relays) can be freely allocated. These can be allocated to individual alarm annunciators (e.g. siren, lamp.) Alternatively, valves or pumps can also be controlled. This saves additional equipment for the alarm annunciator or sequence control.
- Freely adjustable event report texts.
- Acknowledgeable alarm violations make sure that the violation is recognized.
- Displaying the limit value as a channel-related colored line on the display.
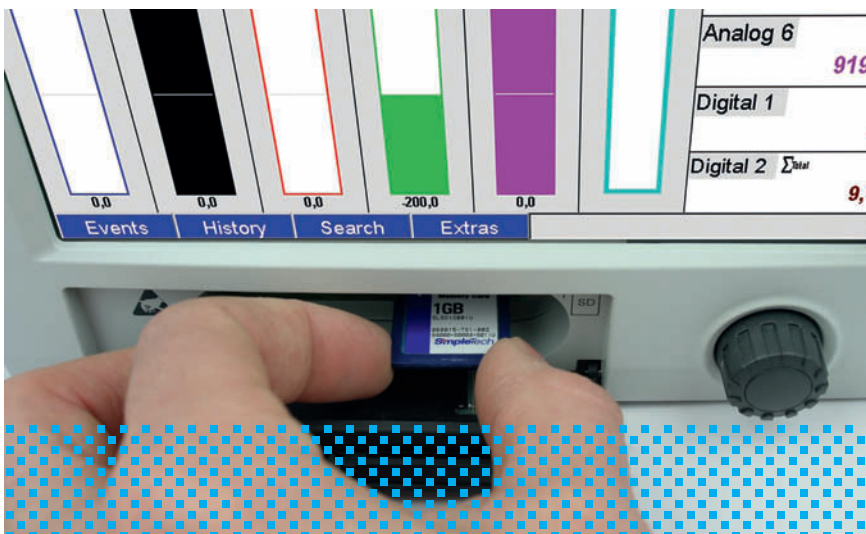
Flexible display mode selection
Visualization

For different types of data different graphic displays are often required. Are only the analog values to be displayed or should these be combined with digital signals?
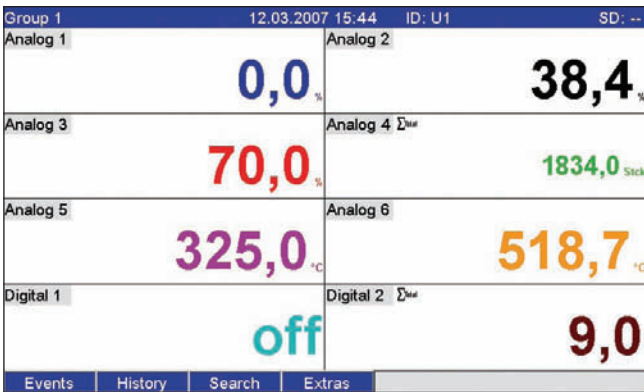
Memograph M leaves the choice to the operator at the touch of a button. Up to 10 groups each with a mix of maximum 8 channels can be displayed.
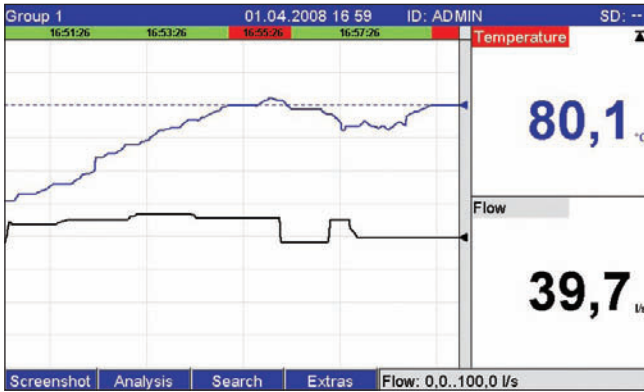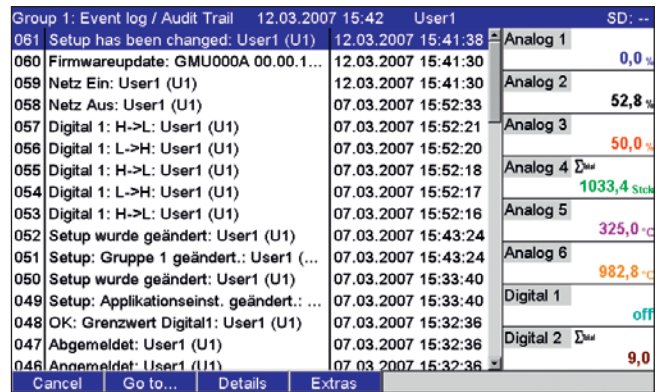

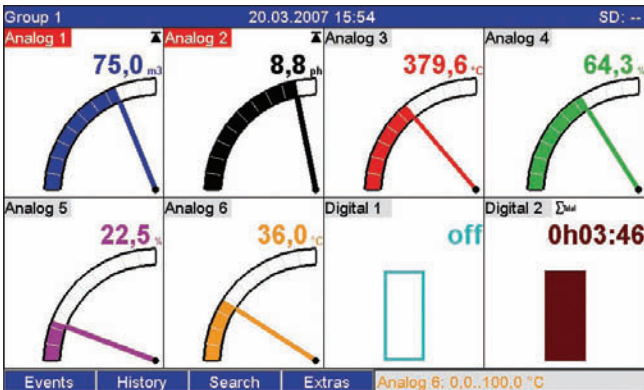Curve display with digital measured values
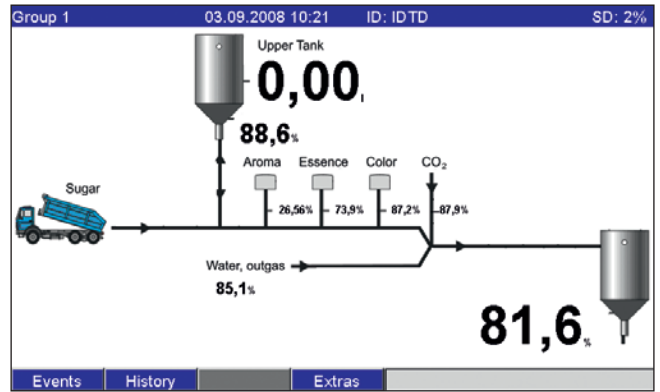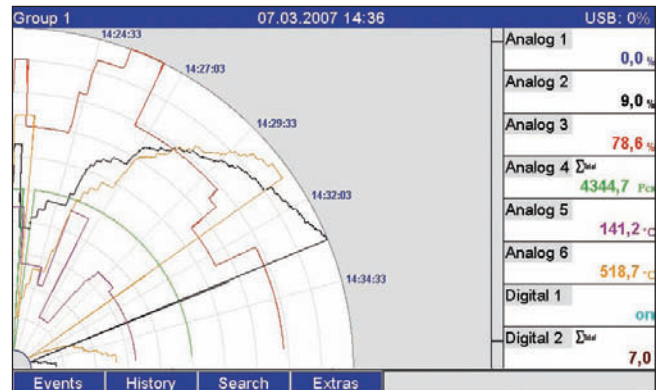

Process screen with digital measured values

Digital display

Event log / Audit Trail

Analog instrument display

Circular chart display

Intelligent videographic recorder Memograph M
Calculate and solve tasks

Mathematics and logic

With the optional mathematics package eight additional channels are available. Individual channels can be combined with each other and then calculated using various mathematic functions. The calculated mathematics channels are treated like "real" channels irrespective of whether they are or connected conventionally or via a fieldbus.

The formula can be an arbitrary combination of arithmetic calculations and logical operations. Analog, digital or also mathematics channels already active can be used.
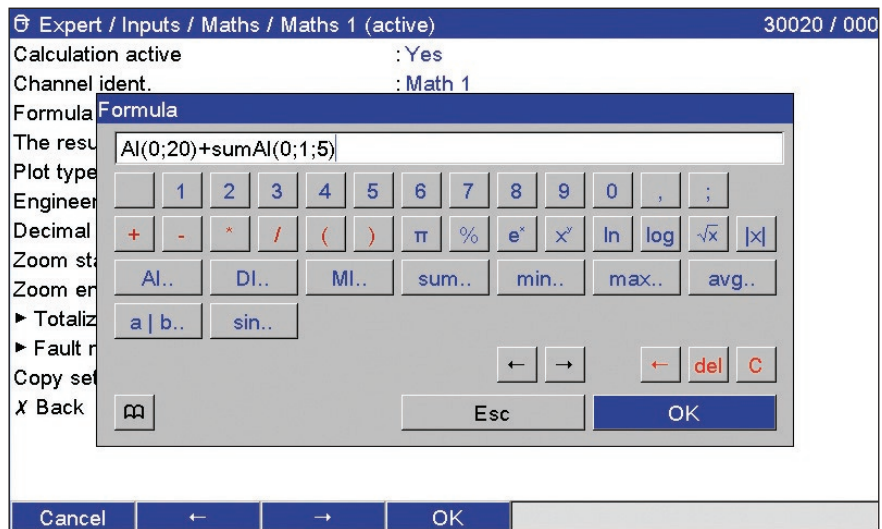
Save both time and money with these functions:
- Basic arithmetical operations combine analog measurements.
- Trigonometrical as well as absolute value, root and square functions.
- F0 calculations (e.g. in sterilization processes).
- Factors and constants complete the calculation functions.
- Channels calculated mathematically can be combined/cascaded.
- Square root extraction linearizes squared signals.

Linearization

Up to 32 linearization points for all active analog inputs can be entered directly or by means of the PC software ReadWin® 2000.

Integration (totalizer)

By using the integration (totalizer) function the quantity can be calculated (in m^3) from an analog signal (e.g. flow in m^3/h). This can then be displayed as day, week, month, year and total values.

Automatic signal analysis

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 analog measurement points.
- Calculates intermediate, daily, monthly, yearly reports.
- Shows counter values, operating times and quantities.

Search function: Answers to all questions

The search for certain information was to this day a very time and cost consuming task. In the future leave this up to the Memograph M Graphic Data Manager!

It will answer all questions asked:
- When did the temperature rise above 80 °C?
- What happened yesterday at 12:00 o'clock?
- When was the filling stopped?
- How long was the plant down?
- When/how long did the pumps run?
- How have the signals developed over a longer time period?

Memograph M
System integration and communication

All units are equipped with a number of different communication possibilities. Interfaces connect these to PC, modem or PLC and will also connect them to bus systems. The units can then be remote-controlled and the measured values read out.

Whether as a stand-alone solution or a part of an existing system the units operate individually or as redundant monitoring and recording systems.
This means that they increase security and avoid process downtime even during network breakdowns.
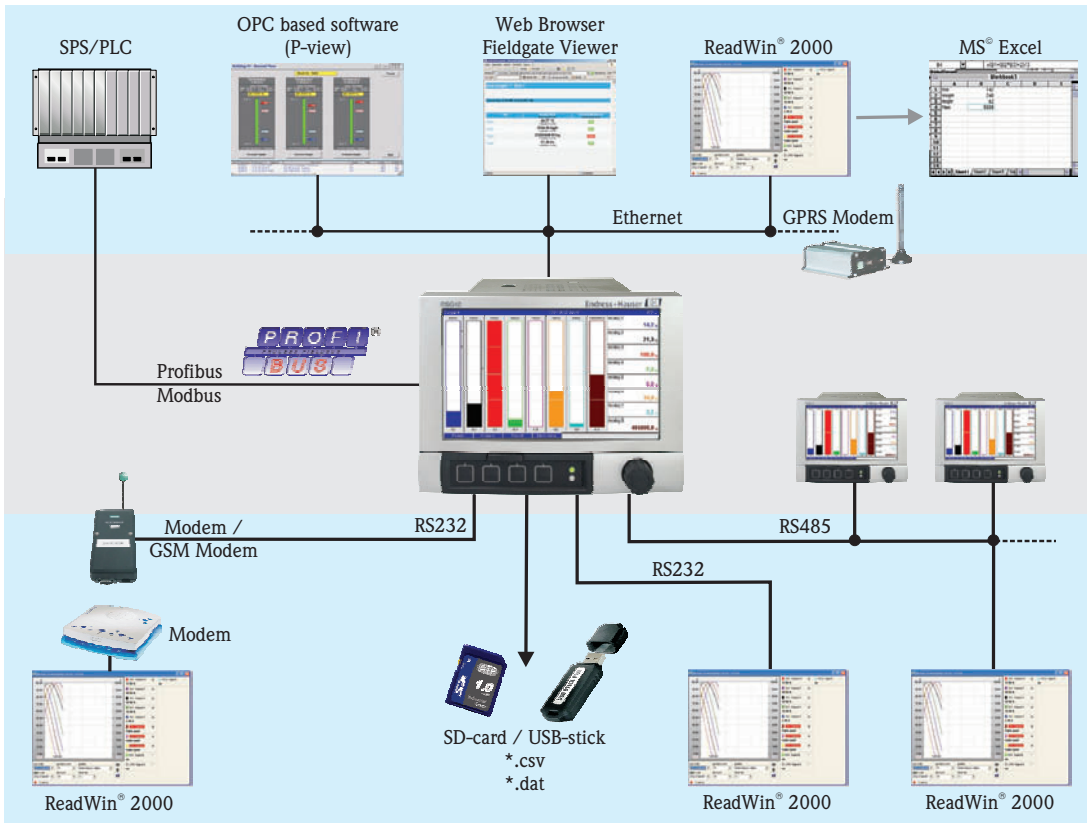
USB interface
In the standard version the device has two front mounted USB interface ports.
The interfaces can be used differently.
The USB host interface serves for data transmission to a USB-stick.
The USB function interface serves for the direct connection with a PC/laptop computer.
Using this interface the stored data and device configuration can be accessed.

RS232/RS485
The serial interfaces serve for the connection of either a modem (RS232) for remote monitoring of the device or for the communication with a PC/laptop computer.
By using the RS485 interface, a simple serial network can be built up (max. 32 devices).

Ethernet connection
Using this interface, paperless recorders can be connected to the local area network (LAN). By using the TCP/IP protocol, the measured data from the connected units can be accessed via any Internet/Intranet compatible PC or laptop computer and the delivered ReadWin® 2000 PC software. Stored data can be visualized and, with the help of the PC software, transmitted to the network compatible database.
The IP address is set up directly in the unit or automatically from a DHCP server.

Remote monitoring/modem use
All functions available via serial link can of course also be used with modem connection. The videographic recorder can therefore be monitored worldwide.

Integrated web server
Standard web browsers like MS® Internet Explorer™ permit the simple access to instantaneous measured values.

Simple process data exchange using an OPC server
OPC is the industrial standard for exchanging process data on auf MS® Windows™ based computers.

Modbus Slave RTU / TCP (Option)
By using the internally available Modbus interface, a total of 40 external analog inputs and 14 digital inputs can be recorded and stored by Memograph M.
Via this interface, Memograph M can be connected to a master PC or a PLC control system.

PROFIBUS® DP Slave (Option)
By using the internally available PROFIBUS® DP interface, a total of 40 external analog inputs and 14 digital inputs can be recorded and stored by Memograph M.
Via this interface, Memograph M can be connected to a master PC or a PLC control system.

Memograph M
Application package for energy
Monitor energy efficiently

With the energy software it is possible to combine heating counters and steam computer functions with data recording and a brilliant color display and offer this to your customers as a complete solution package e.g. for steam boiler monitoring.

The Memograph M energy package provides users with the possibility of calculating the mass and energy flow in water and steam applications on the basis of the following input variables:

- Flow
- Pressure
- Temperature (or temperature differential)

Furthermore, energy calculations are also possible using glycol-based refrigerant media.
By balancing the results against one another or by linking the results to other input variables (e.g. gas flow, electr. energy), users can perform overall balances, calculate efficiency levels etc. These values are important indicators for the quality of the process and form the basis for process optimization efforts, maintenance, etc.
The internationally recognized IAPWS–IF 97 standard is used to calculate the thermodynamic state variables of water and steam.

Advantages at a glance:
- Long term archive of consumption values.
- Front end calculation and visualization of important values.
- Local/global data management.

Further documentation:
- Application package for energy, water and steam CS007R/09/en
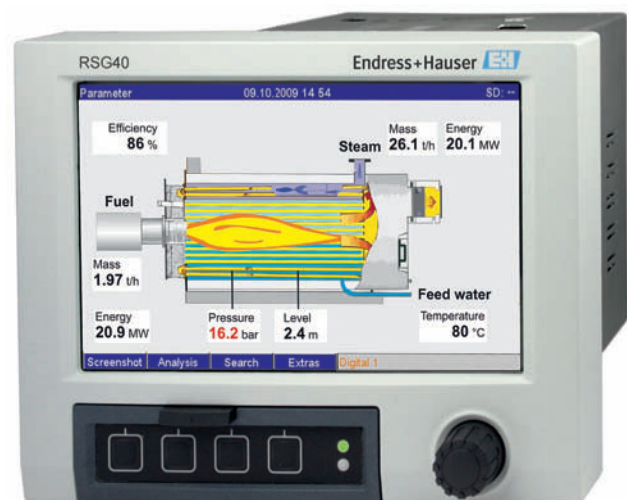
Memograph M
Application package for batch or continuous processes
Easy operation of up to 4 batches

The Batch software allows for secure recording and visualization of discontinuous processes e.g. in multi product plants. Batches are provided with batch specific information and the measurement readings, the beginning, the end and the duration of every batch are displayed on the device and in the ReadWin® 2000 software with the current batch status. A batch printout at the end of each batch can be done directly at the device (USB printer) or can be printed out using a PC with ReadWin® 2000.

Complete reports for continuous and batch processes

Using Memograph M and ReadWin® 2000, processes can be monitored and recorded online and offline. This results in a simple and swift analysis and documentation.
The batch report contains:
- Complete information regarding the product and process run
- All sequences signed by the responsible operator
- The product identifier and product code
- The batch number
- The batch time, start and stop times for the batch run
- Event log / Audit trail entries

Automatic report printouts

At the end of a batch run, the batch report can be printed out per PC software ReadWin® 2000 or directly using a printer connected to the unit. This function can be started either manually or automatically.
The advantage is obvious - obtaining the required documents swiftly and simply. That means the laborious task of manually extracting the relevant data is now a thing of the past!
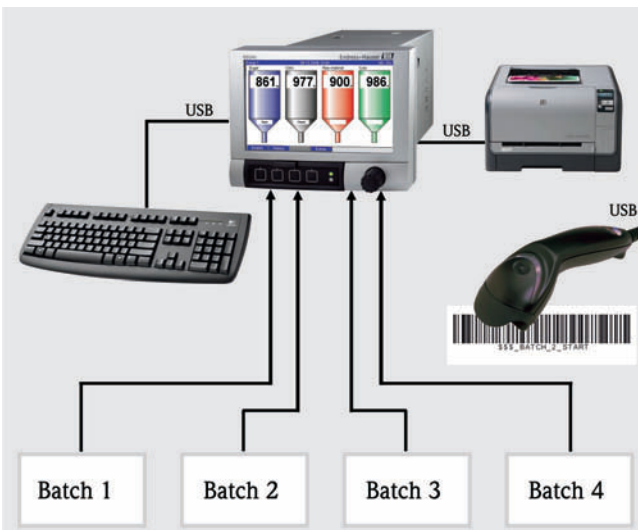
Advantages at a glance:
- 4 batches in parallel.
- Front end or controller batch control.
- Preset counter.
- Front end batch report printout.

Further documentation:
- Application package for batch monitoring CS005R/09/en

Memograph M
Application package for tele–alarm
## Plant remote monitoring and control

With the tele-alarm software it is possibly to react even when on the road. E–mails or SMS messages triggered by process alarms or other important process events can be transmitted simultaneously to several recipients or can be automatically forwarded. Reports can be confirmed, relays remotely switched and instantaneous measurements retrieved via mobile telephones.

Memograph M with GSM (GPRS) or Ethernet connection is the perfect solution in the environmental industry for applications supervising unmanned outstations but also ideally suitable for tank level supervision.
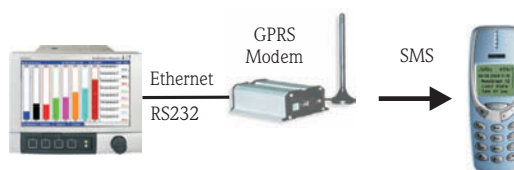
Advantages at a glance:
- Reduction of travel time for unmanned plants
- Alarm condition transfer via SMS
- Remote measured value request via SMS
- Remote relay control via SMS
- Message transmission to one or multiple recipient possible
- Escalation steps presettable
- Message on upper and lower limit infringements or on active digital input
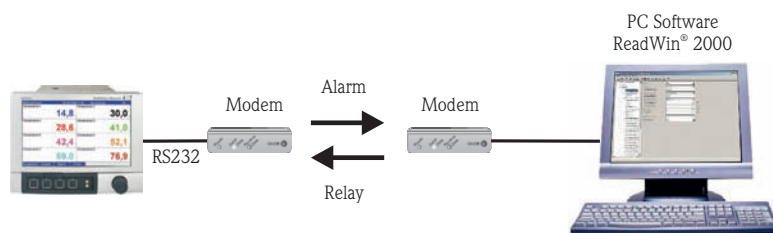
Further documentation:
- Application package for tele-alarm CS004R/09/en
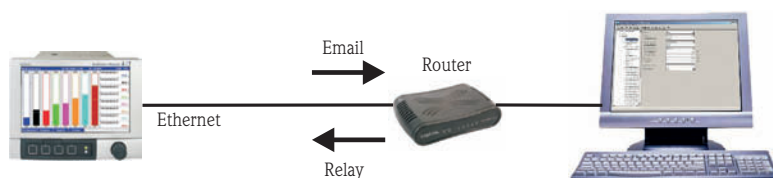
Memograph M
Application package water/waste water (incl. tele-alarm)
Remote monitoring and data recording in a sewer network

A Memograph M with the water/waste water software supports in the operational supervision of the water/waste water channel systems by recording information regarding the quality and economics of the treatment plant.
For each supply channel the daily, weekly, monthly, yearly highest and lowest values are recorded.

Seepage water recording as well as the supervision of storm overflow tanks for overflow events are also a part of this software application package.

Measured data recording in communal monitoring of a waste water treatment plant using a Memograph M instead of a PLC.
Data preparation for authorities can be done also in small sewage plants using the data manager to record the inflow or outflow online data.
The Memograph M makes the evaluation of the data easier for the sewage plant staff. Moreover, the daily evaluated peak, average and low values can be used for simplified calculation of the sewage plant loading.

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   2 relays in the Memograph M are switched via SMS.
         This means that pump 1 is re-started.

11:22   Pump 1 runs once more, fault is cured!

Advantages at a glance:
- Visualization, control and storage of storm overflow tank data with just one device.
- Fault alarms using SMS/E-mail messaging.
- Seepage water recording.
- Fast overview using the alarm statistic.

Further documentation:
- Application package for wastewater and stormwater overflow tank (incl. tele-alarm) CS006R/09/en

Memograph M
Application examples
Versatile application in food, energy and primaries industries


Food: Monitoring heating processes

In the production of foods such as juices or sauces, and especially in the production of milk, certain important measurements must be recorded and documented during their heat treatment. Included in these are, for example, heating temperature, flow, heating agent temperature, cooling agent temperature or heat exchanger pressure differential.

Benefits of the Memograph M with MVO-approval:

- Maximum security by monitoring the heating temperature using a double Pt100.
- Stand-alone solution for monitoring and recording the heating plant.
- Pressure difference calculation in the device.
- Simple connection to superior systems using the OPC server, PROFI-BUS®, Modbus, Ethernet.
- Dependent on the number of measured signals up to a max. 4 heaters can be monitored with one device.
- Simple commissioning using the supplied device set-up for various heaters.
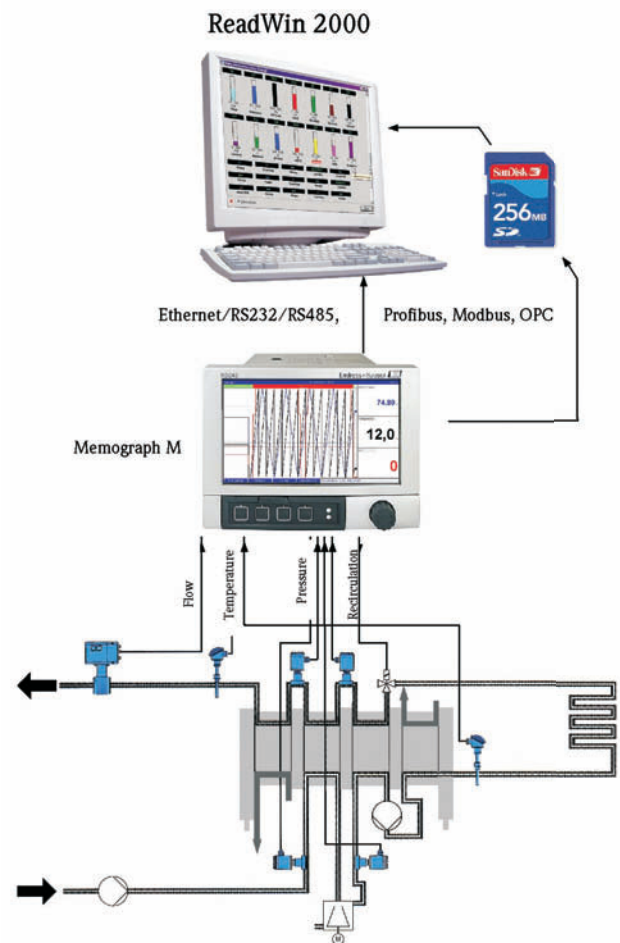
Energy: Multi-tariff application

Steam or gas suppliers invoice delivered quantities using different rates based on agreed delivery terms. The Memograph M stores quantities used dependent on the actual value into various counters.
The data can then be transmitted for invoicing to superior systems.

Primaries branch metal:

Each Memograph M monitors one furnace and secures the quality of the stainless steel.

System integration and communication

All units are equipped with a number of different communication possibilities. Interfaces connect these to PC, modem or PLC and will also connect them to bus systems. The units can then be remotely controlled and the measured values read out.

Whether as a stand-alone solution or a part of an existing system the units operate individually or redundantly monitoring and recording system. This means that they increase security and avoid process downtime even during network breakdowns.

Serial communication

The paperless recorders are fitted with an RS232 interface as standard. An additional RS485 or Ethernet interface is available as an option. Both interfaces can be used independently at the same time without one influencing the other.

Sending e-mails

Due to the possibility of event controlled or time dependent e-mail transmission, the user is always informed of the situation of the plant including any unusual events. This means that the emergency service can be set into motion and the maintenance staff can be utilized more efficiently.

Ethernet connection

Using this interface, paperless recorders can be connected to the local area network (LAN). By using the TCP/IP protocol it is possible for all users to call off the measured data from the connected unit by using any Internet/Intranet compatible PC or laptop computer and the relevant software.

Stored data can be visualized and, with the help of the PC software, transmitted to the network compatible database.

The administrator decides who has right of access to the data and who can set-up devices etc.

Modem use/special solutions

All functions that are possible using serial connection can also be used with a modem connected between the units.

Customer-specific solutions, such as calling preset telephone numbers in the case of an alarm set point violation, (e.g. SMS), are available on request.

PROFIBUS®

Memograph or Memograph S are connected to the PROFIBUS® DP fieldbus system as a bidirectional slave using a PROFIBUS® DP coupler.

This function was specially designed for communication between central control systems/PLC and the paperless recorders. The data is transmitted with a maximum transmission speed of 12 Mbit/s on the PROFIBUS® DP side.

PROFIBUS® measurement points can be mathematically combined with each other as well as with standard analog channels. PROFIBUS® and standard measurement points can be used simultaneously.

Simple process data exchange using an OPC server

OPC – OLE for process control is the industrial standard for exchanging process data on Windows based computers.

The advantage:

With the Endress+Hauser OPC server it is possible to connect process data from the units per plug & play into most standard visualization or process control systems.
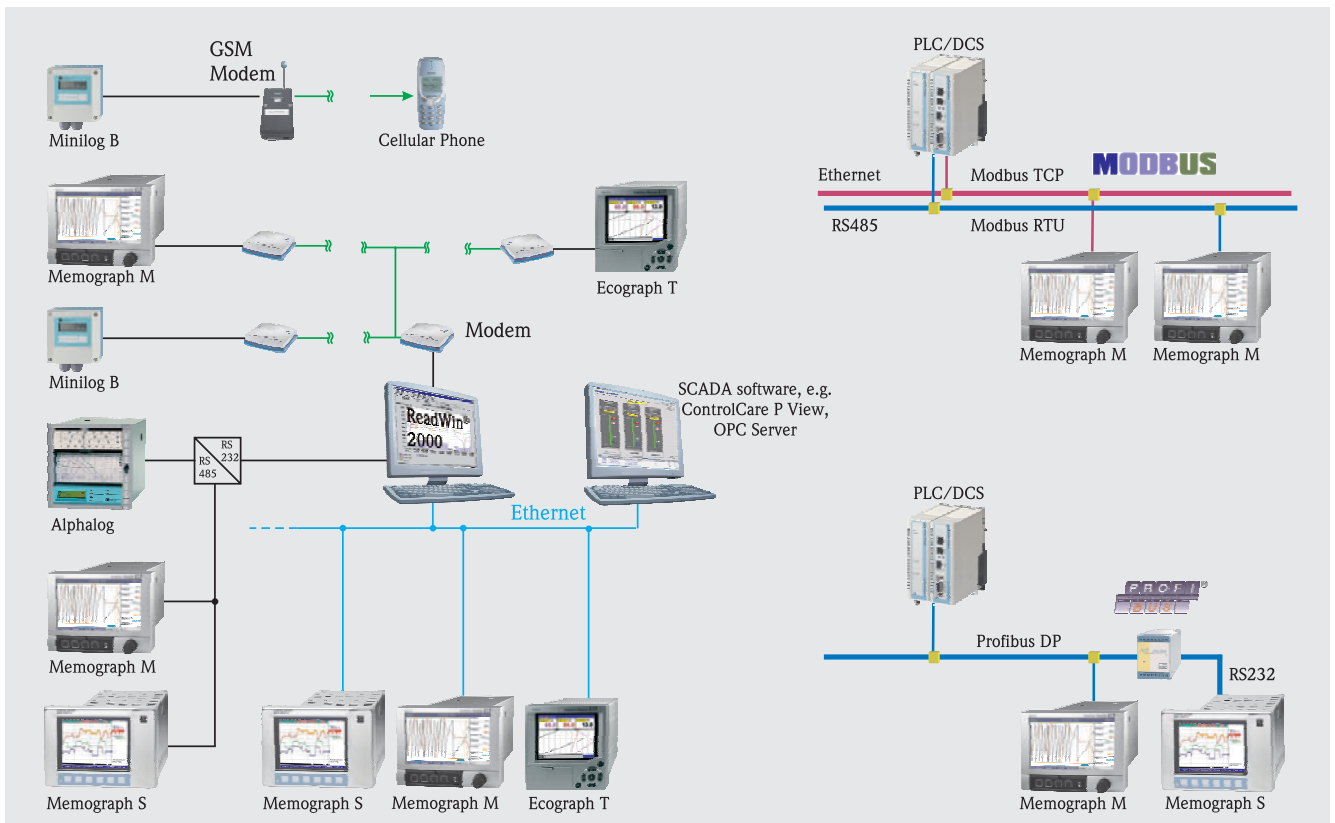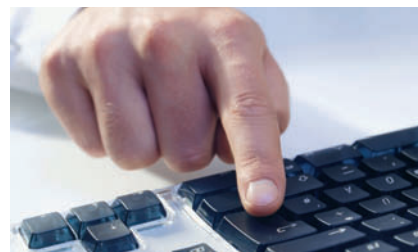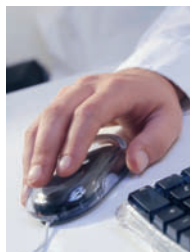
ReadWin® 2000
MS-Windows® PC software

Unit set-up, visualization and archiving measured values and measured value sequences

Application areas

ReadWin® 2000 is a common PC software for all Endress+Hauser recorders, temperature transmitters, water samplers, and system components from Endress+Hauser that are fitted with a serial interface.

The system operates on computers that comply to the following hard- and software requirements:

- PC from Pentium 600 MHz
- Min. 128 MB RAM (1GB recommended)
- Screen resolution from 800 x 600 pixel
- Min. 200 MB free hard drive space
- Windows™ 2000 SP4 / XP™ / Vista™ / 7
- CD-ROM drive

The concept

ReadWin® 2000 is supplied free of charge! It is an integral part of the delivery of units. Users can install and use the software without any restrictions. There are no extra hidden costs.

The newest ReadWin® 2000 version can be found on the Internet at:
www.endress.com/readwin
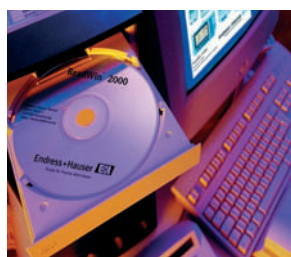
Features and benefits

Dependent on the features of the instrumentation being used the software can:

- Operate/set-up the unit per PC
- Electronically archive measurement points
- Visualize signal curves
- Export predefined values into other programs (e.g. MS® Excel™)
- Use modem/GSM wireless modem connection to remote devices
- Analyze data
- Selectively printout time or value ranges
- Remote control of processes

ReadWin® 2000 – The benefits

The easy to read operating level is extremely user-friendly. ReadWin® 2000 can be started in any one of 13 selectable languages.

- Compatibility to modern 32 Bit Windows® operating system
- Highest data security
- State-of-the-art communication and network capability
- Simple handling with complete online help
- Operating instructions in PDF format
- Combination of unit set-up in groups with selectable sort function

	A	B	C	D	E	F	G
1	Date/Time	Status	Cond.	Dis. Oxy.	Outflow	pH	Turbidity
2			Average	Average	Average	Average	Average
3			mS/cm	mg/l	m3/h	pH	TEF
4	23.03.2005 14:23	OK	49.37	74.86	237.9	0.704	93.40
5	23.03.2005 14:24	OK	78.07	97.87	455.5	2.038	96.26
6	23.03.2005 14:25	OK	100.00	80.31	799.2	5.007	36.24
7	23.03.2005 14:26	OK	78.47	22.90	989.8	8.396	39.38
8	23.03.2005 14:27	OK	31.87	28.39	932.6	11.440	48.71
9	23.03.2005 14:28	OK	29.28	38.84	656.0	13.450	99.51
10	23.03.2005 14:29	OK	45.27	91.86	297.3	13.974	62.58
11	23.03.2005 14:30	OK	53.27	90.30	34.6	12.891	50.57
12	23.03.2005 14:31	OK	93.06	36.15	-1.8	10.447	23.31
13	23.03.2005 14:32	OK	95.32	33.27	206.3	7.195	89.27
14	23.03.2005 14:33	OK	58.12	25.31	555.5	3.869	85.30
15	23.03.2005 14:34	OK	13.20	82.44	872.5	1.221	18.31
16	23.03.2005 14:35	OK	14.25	97.01	1000.0	00.15	16.29

Network compatible data base

ReadWin® 2000 is a powerful database with a large number of advantages:

- Real network capability
- Presettable access and user authorization rights
- Unit interconnection using RS232/RS485/modem/GSM wireless modem and Ethernet

ReadWin® 2000
Flexible and system compatible

ReadWin® 2000 PC software complies to the FDA 21 CFR 11

The Windows–based ReadWin® 2000 PC software is the powerful package that can be used for device set–up, visualization and archiving measured values and measure–ment procedures. In addition to displaying continuous measured value sequences ReadWin® 2000 can also be used to display measured values in batch processes.

Text/comments on batches or even unusual plot sequences can be commented on and signed also at a later date.

A large number of user-friendly functions in one software package:

- Swift device commissioning at the PC using 13 different selectable operating languages
- Device set–up stored into the data base
- Instantaneous value display of devices connected in the form of digital values, curves or bar graphs
- Read out of the measured values, events and the complete Audit Trail
- Automatic data read out and database management
- Combined display of channels from different groups and devices
- Measured value export to other programs, e.g. MS® Excel™
- Data exchange with superior systems
- Overview table for batches produced including alarm set point markings

Audit Trail with filter function for a swift overview (ReadWin® 2000)

This software fulfills the high security requirements laid down in by the FDA in the 21 CFR by:

- Encrypted data with manipulation protection and identification
- Powerful password and access rights system
- All changes are stored in the Audit Trail
- TÜV tested (valit until 09.2007)

Check and monitor the PC software for the correct process sequence using the Audit Trail. Signal sequences can be commented on at a later time after entering the correct electronic signature. Marking points indicate the exact storage time. Simultaneous display of various channels from different devices (channel mix) is also possible.
ReadWin®2000 offers an optimum screen display and an additional acoustic signal on alarm set point violations.

Device management

Device set-up can be displayed, changed and stored as a set-up file. These values can be read out and transmitted to the device using the integrated interfaces (RS232/RS485, Ethernet, Modem) or using an ATA flash/CF card. Simple control and documentation can be made by printing out the device set-up.

Advantages at a glance

- Automatic batch printout
- Time synchronization
- Readout and retransmission per e-mail of instantaneous values
- Notification of alarm conditions, alarm set point violations and cable open circuit conditions to a number of people via e-mail

Data security

Memograph S records and stores measurement values, batches and events front end. Once these have been correctly transmitted to a PC they are stored in the PC database.

Visualization

After the correct ID/password combination has been entered, the user has access to instantaneous values or historic values. The user selects the measured value display that they would prefer to see.

OPC-Server
Complete the Link!

Visualization, monitoring and control of processes

Today OPC stands for 'Openness, Productiv–ity 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 the time and money.

Use a standardized technology like OPC to integrate measuring points and express process data in a simple and fast way.

You can count on Endress+Hauser that as a complete supplier we have the optimal solution for your requirement on system compatibility.
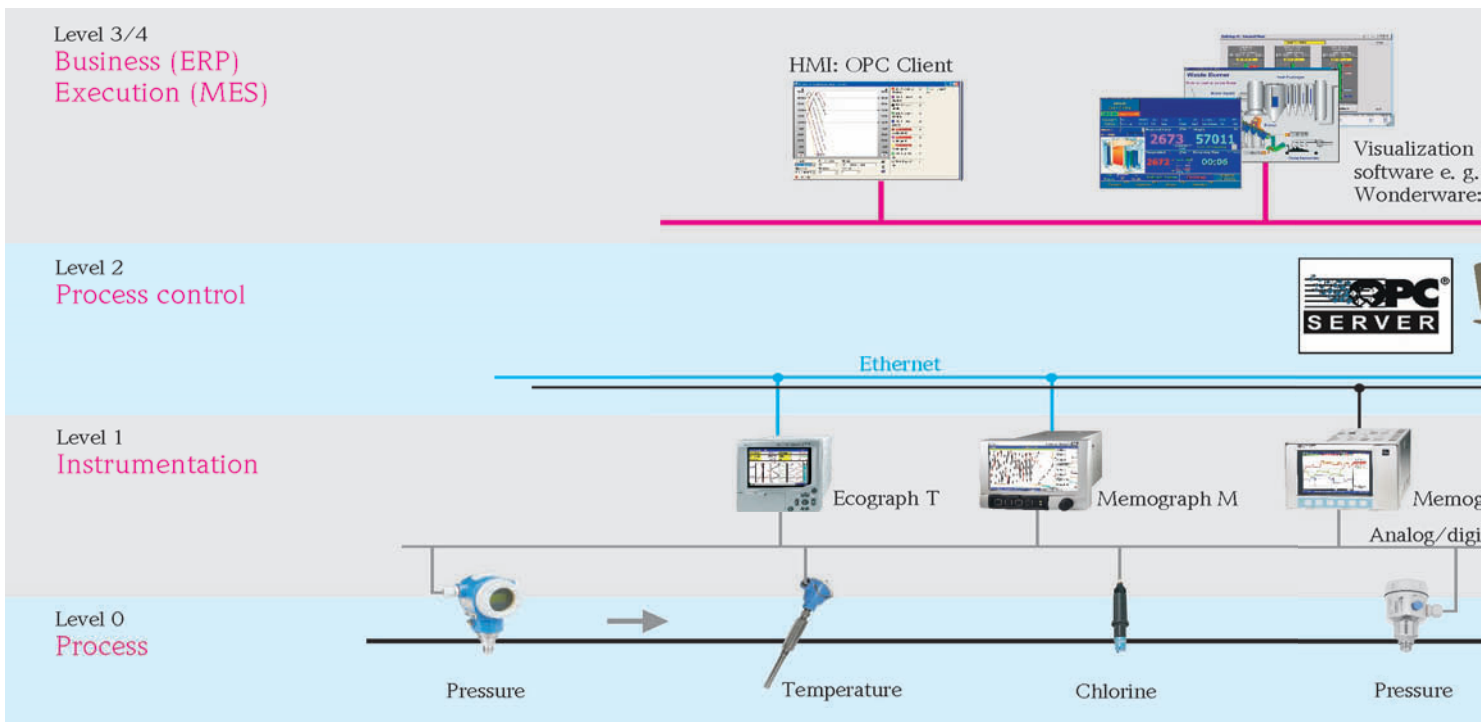
Features and benefits

- Low integration cost
- Simple connection to process visualization systems, e.g. ControlCare P View.
- Simple to use on plant expansion.
- Fulfills the OPC Specification Data Access DA.
- Connection to a number of OPC Clients possible.
- Different Client–Server installation methods:
  - Local: OPC Client is on the same PC as the Server.
  - Remote: OPC Client and Server are on different PCs.
- In connection with the Data Manager: Redundant data storage in the recorders guarantees continuous documentation of the processes.
- When applied together with energy managers: Simple access to the calculated energy values directly from the process.
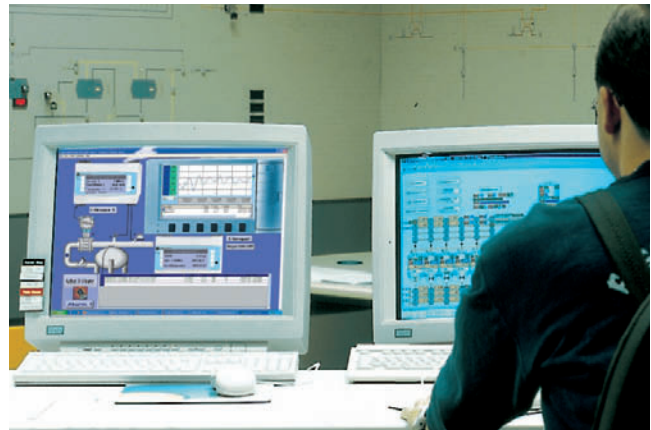
Process visualization in a control room – an optimum solution when done together with an Endress+Hauser OPC Server.

Level 3/4
Business (ERP)
Execution (MES)

HMI: OPC Client

Visualization software e. g. Wonderware:

Level 2
Process control

Ethernet

Level 1
Instrumentation

Ecograph T   Memograph M   Memog

Analog/digi

Level 0
Process

Pressure   Temperature   Chlorine   Pressure

OPC-Server
One tool for many devices

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.

Equipment	Communication
▪ Ecograph T, A ▪ Memograph, Memograph S	Serial RS232/RS485 Ethernet TCP/IP
▪ Alphalog	Serial RS232/RS485
▪ Steam and heat manager RMS621 ▪ Energy manager RMC621	Serial RS232/RS485 Ethernet TCP/IP (using an Ethernet/RS232 Adapter)
▪ Application Manager RMM621	Serial RS232/RS485, Ethernet TCP/IP

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.

Typical application areas

OPC is already used in many areas of factory and process automation.
HMI (Humane Machine Interface), SCADA system (Supervisory Control And Data Acquisition) and DCS (Distributed Control System) manufacturers offer OPC interfaces with their products.
OPC is put into plants of various sizes. Everywhere where safe data exchange between field controllers and process visualization is required, e.g. ControlCare P view.

- Pharmaceutical
- Food
- Oil and Gas
- Energy
- Chemical
- Water/waste water
- Building automation

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. You find the current software version of the OPC server on the Internet:
www.products.endress.com/rxo20

System requirements

Operating system	Windows™ 2000 SP4 / XP™
Processor	Speed 400 MHz or higher
Memory	128 MB or more

Order number for the technical information brochure:
TI122R/09/en
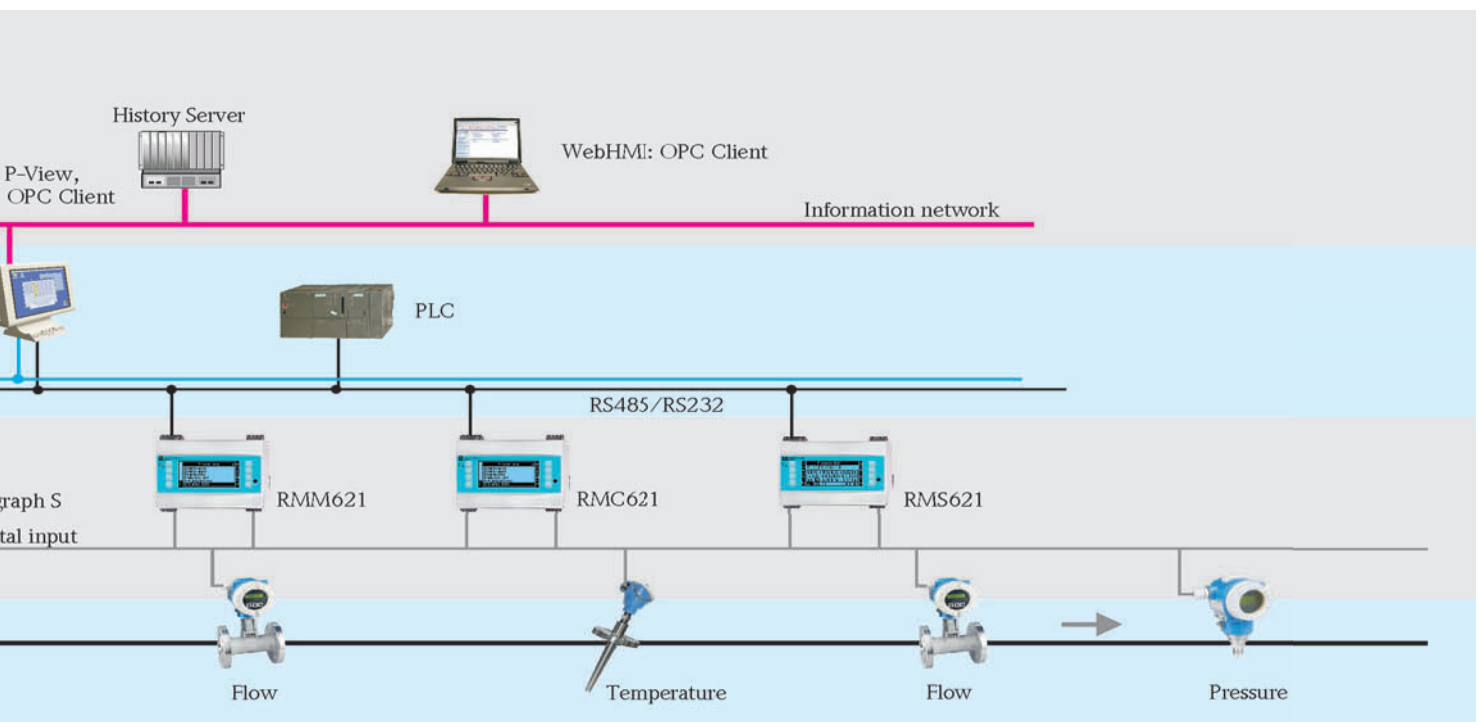
Housing versions
Further documentation

All recorders/paperless recorders are available as panel mounted devices. Additionally they can be delivered fitted into a desktop or field housing (special laboratory housing on request).

Memograph M is available with a pressure zinc diecasting IP65, NEMA4 bezel. The bezel enables front access to the integrated compact flash card.

Panel mounted devices
Measured values at a glance; easy front end access in the control panel.

Desktop housing
Portable version for laboratory and service application.

Field housing
Paperless recorder in a special housing (IP65), for remote and wall mounted application.

Further documentation
Order numbers for in-depth technical information can be found in the last line of the table on pages 4 and 5.

Validation documentation
In addition to the device functions of the Data Manager, the validation documentation is also a very important component in a FDA-relevant process.

All from one supplier
Endress+Hauser offers the complete comprehensive qualification items required, standard IQ/OQ templates, system integration solutions and comprehensive consultation within the total project life cycle.

Rear panel cover
The Memograph M is available with a lead-sealable terminal cover to prevent manipulation.

09.03/MMC

Endress+Hauser

People for Process Automation