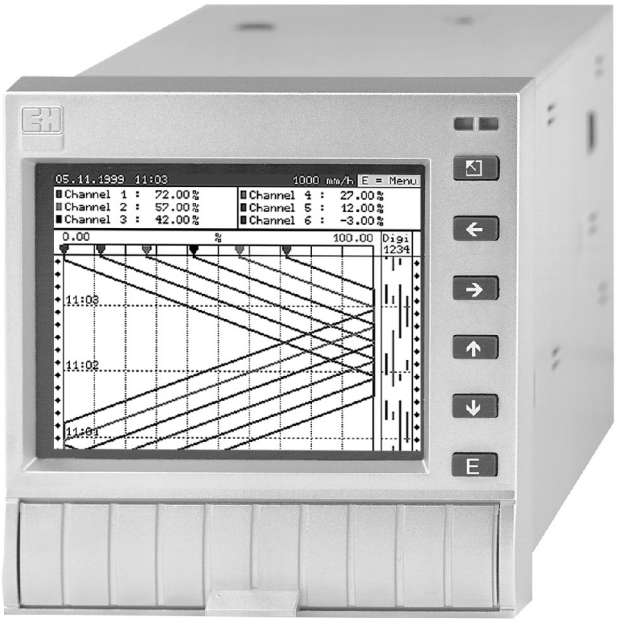
Technical information
TI075R/09/en
Mat. no.: 51001521

Paperless recorder
Ecograph

Economical and time saving recorder operates without the need for paper or pens and is unusually simple to operate



Application areas

- Technological and economical alternative to standard paper recorders
- Recording and monitoring processes and sequences in all industries
- Power failure and manipulation secure measurement archiving

Features and benefits

- Electronic recording replaces dotting and strip chart recorders saves consumables
- Universal inputs measure all signal types, guarantees universal application
- QUICK set up and integrated operating manual provides fast commissioning saves time
- FLASH memory, reliable archiving even on power failure
- ReadWin®2000 PC software package included in the delivery saves software costs
- Compact construction, fits everywhere eliminates need for expensive enclosures
- Optional with integrated loop power supply, simple operation of HART®-transmitter is possible

Endress+Hauser
The Power of Know How

Function and system construction

Measurement principle	Electronic recording, plot, evaluation and archiving analogue and digital input signals.
Measurement system	All connected analogue measurement points are measured parallel every 250 ms. Galvanic isolation channel - channel (testing voltage 500 V). Damping presettable 0...999.9 seconds per analogue input, System basic damping can be ignored. Data storage is done in an internal memory (power failure secure FLASH technology) and in the integrated diskette drive. Long term archiving is done in the PC, whereby the data can be transferred to the PC either by diskette or using a serial interface. Using the delivered PC software the units can be set up, read out and the measured data can be archived and displayed on screen.

Input signals

Current (mA)

Description	Measurement range limits / min. range	Accuracy
Current range	0...20 mA / 0.5 mA; linear/square 4...20 mA / 0.5 mA; linear/square -20...+20 mA / 0.5 mA; linear load tension max. 100 mA	± 20 µA ± 20 µA ± 44 µA ≤ 1 V

Voltage (mV)

Description	Measurement range limits / min. range	Accuracy
Voltage range	0...100 mV / 5 mV; linear 0...200 mV / 5 mV; linear 0... 1 V / 5 mV; linear/square 0... 10 V / 5 mV; linear/square -1... +1 V / 5 mV; linear -10... +10 V / 5 mV; linear Input impedance: > 1 MΩ (MR < 200 mV) > 530 kΩ (MR ≥ 200 mV)	± 80 µV ± 240 µV ± 1 mV ± 10 mV ± 20 mV ± 20 mV

Resistance thermometer (RTD)

Description	Measurement range limits / min. range	Accuracy
Pt 100 Pt 100 [1] Pt 500 Pt 1000 Ni 100 Linearisation to DIN, [1] Linearisation to JIS (C 1604-81)	-200...+850 °C / 15 K -200...+650 °C / 15 K -200...+850 °C / 15 K -200...+850 °C / 15 K -60...+180 °C / 15 K	± 0.8 K (2/3-wire) ± 0.5 K (4-wire) ± 0.8 K (2/3-wire) ± 0.5 K (4-wire) ± 0.8 K (2/3-wire) ± 0.5 K (4-wire) ± 0.8 K (2/3-wire) ± 0.5 K (4-wire) ± 0.4 K (2/3-wire) ± 0.4 K (4-wire)
Connections	2/3- or 4-wire circuits (with shielded cable)	
Cable compensation	≤ 30 Ω per cable	
Measurement current	≤ 500 µA	
Open or closed circuit monitoring: Indicates '——' in the display		

Thermocouples (TC)

Description	Measurement range limits / min. range	Accuracy
B (Pt30Rh-Pt6Rh)	0 . . .+1820 °C / 500 K	± 0,15% from +400 °C
E (NiCr-CuNi)	-270 . . .+1000 °C / 100 K	± 0,1% from -80 °C
J (Fe-CuNi)	-210 . . .+1200 °C / 100 K	± 0,1% from -100 °C
K (NiCr-Ni)	-200 . . .+1372 °C / 100 K	± 0,1% from -80 °C
L (Fe-CuNi)	-200 . . . +900 °C / 100 K	± 0,1%
N (NiCrSi-NiSi)	-270 . . .+1300 °C / 100 K	± 0,1% from -80 °C
R (Pt13Rh-Pt)	-50 . . .+1768 °C / 500 K	± 0,15% from 0 °C
S (Pt10Rh-Pt)	50 . . .+1768 °C / 500 K	± 0,15% from 0 °C
T (Cu-CuNi)	-270 . . . +400 °C / 100 K	± 0,1% from -150 °C
U (Cu-CuNi)	-200 . . . +600 °C / 100 K	± 0,1% from -150 °C
W3 (W3Re/W25Re)	0 . . . +2315 °C	± 0,1%
W5 (W5Re/W26Re)	0 . . . +2315 °C	± 0,1%
Measurement current	≤ 500 µA for open circuit monitoring	

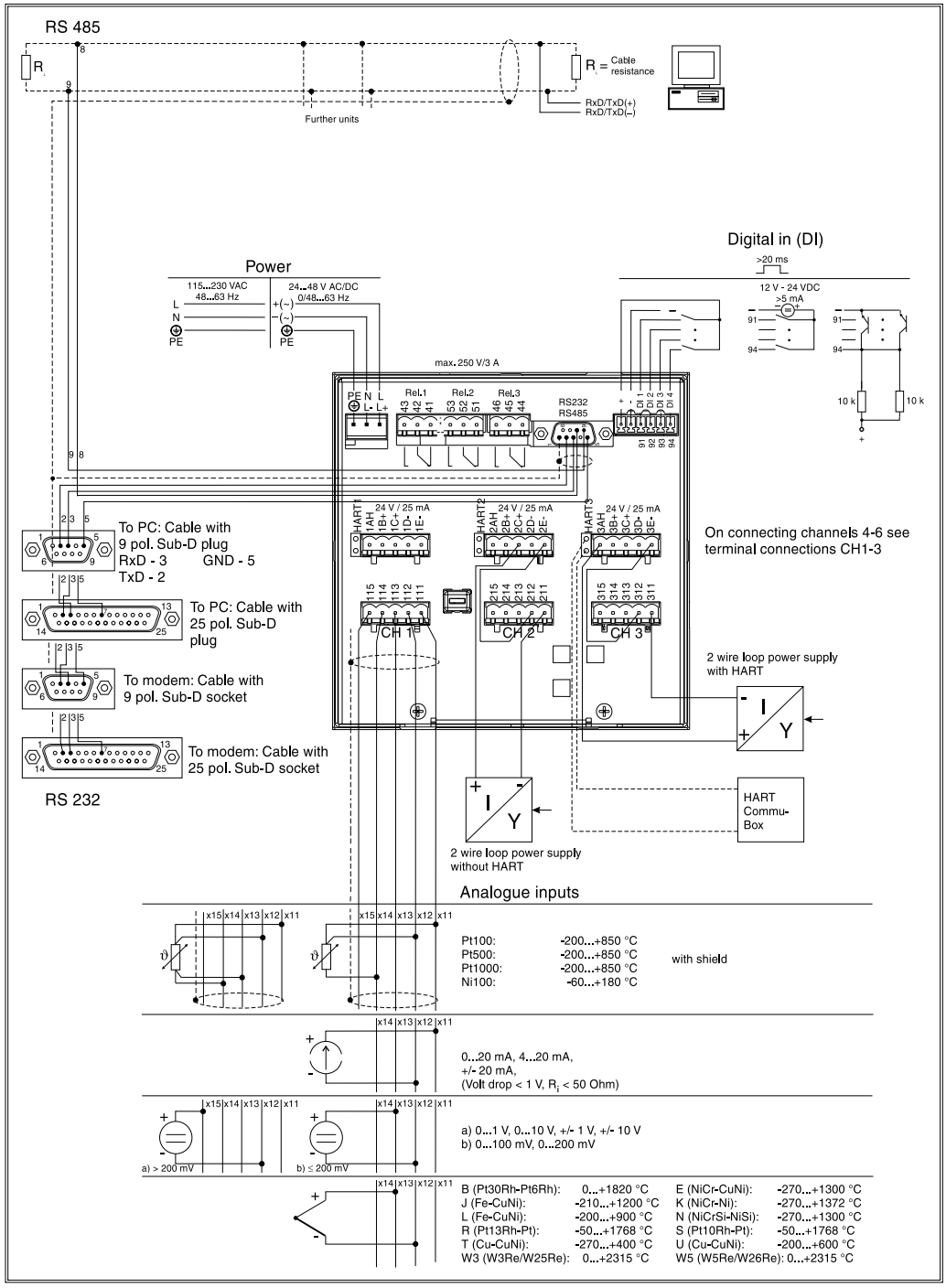
Input signals (continued)

Comparison point	Comparison points “CJC” (to IEC 60 584) selectable: - internal compensation of the terminal temperature - external: 0, 20, 50, 60, 70, 80 °C
Comparison point accuracy	± 1.0 K (can be calibrated front end)
Input resistance	900 kΩ
Cable open circuit monitor: Indicates “——” in the display	

Accuracy

Reference conditions	Ambient temperature: 25 °C ± 5 °C Air humidity: 55 ± 10 % rh.
Measurement accuracy	see page 2, input type
Switch on drift/warm up time	> 0.5 h
Ambient temperature influence	0.01 % / K from the measuring range

Electrical connections (terminal and socket layout) with option ‘loop power supply’

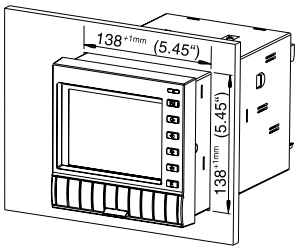
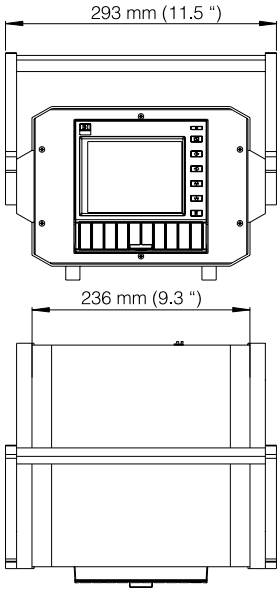
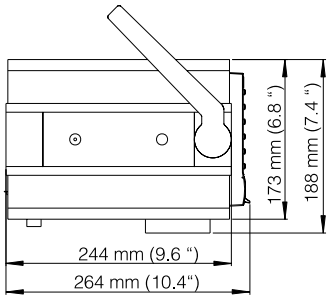
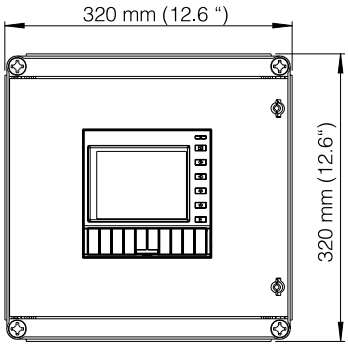
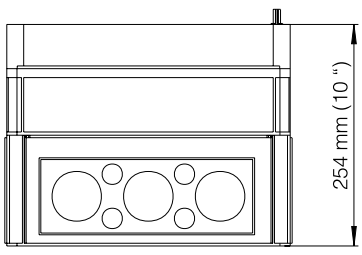


Power supply

	Standard voltage	Low voltage
Power supply	115...230 V AC; (-15%, +10%)	24...48 V AC/DC (-15%, +10%)
Frequency	48...63 Hz	48...63 Hz
Power consumption	22 VA	22 VA
Electrical safety	EN 61 010-1, Protection class I Standard voltage: Over voltage category II Low voltage: Over voltage category III	

Application conditions

Installation conditions

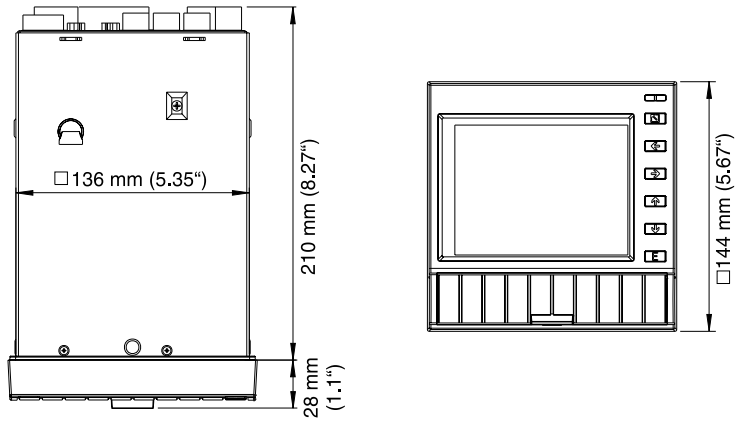
Installation angle	Usage angle to DIN 16 257, NL 90 ± 30 °
Installation hints	- General Keyed screw plug on terminal strips Cable size max. 2.5 mm² (with ferrules) - Panel mounted  • Installation depth approx. 210 mm incl. terminals • Panel cut-out 138^{+1} x 138^{+1} mm • Panel thickness 2...40 mm • Fixing to DIN 43 834 - Desk top version   - Field housing IP 65  

Application conditions (continued)

Ambient conditions

Ambient temp.	0...+50 °C
Storage temp.	-20...+70 °C
Climatic class	To EN 60 654-1: B1 (10...75 % rh., without condensation)
Electrical safety	To IEC 61010-1: Environment < 2000 m height above MSL
Ingress protection	front IP 54 (EN 60 529, Cat. 2) rear IP 20 (EN 60 529, Cat. 2) field housing IP 65
Electromagnetic compatibility (immunity) (EMV),	Immunity: EN 61 326-1 NAMUR recommendation NE21: - ESD (electrostatic discharge): EN 61 000-4-2 Level 3 (6/8 kV) - electromagnetic fields: EN 61 000-4-3: Level 3 (10 V/m) additional deviation < 0.3% (additional deviation Channel 4 2% (at ~460MHz) - Burst (fast transients): EN 61 000-4-4 Level 3 (1kV signal, 2kV power) - Surge on power cable: EN 61 000-4-5: 2 kV asymmetrical, 1 kV symmetrical - Surge on signal cable: EN 61 000-4-5: 1 kV asymmetrical with external protection - HF cable fed: EN 61 000-4-6: 10 V additional deviation < 0.3% - 50 Hz Magnet fields EN 61 000-4-8: 30 A/m - Power failures EN 61 000-4-11: ≤ 20 ms
Normal mode noise rejection EN61298-3	40 dB on measurement range/10 (50/60 Hz ± 0.5 Hz) at voltage input
Common mode noise rejection EN61298-3	80 dB (50/60 Hz ± 0.5 Hz) at voltage input
RF protection to EN 61 326	Class A (operation in industrial environment)

Construction

Dimensions	
Weight	Panel version: approx. 3.5 kg Desk top version: approx. 6.4 kg
Material	Front bezel / door from die cast metal, matt chromed Casing/rear panel: galvanised sheet steel Glass display protection

Display and operating surface

Operating elements	Selectable operation using 6 front mounted push buttons interactive with on screen dialogue. Integrated operating manual (push button operation). QUICK set up: Setting up date, time, feed rate Selection of signal type, measurement type, engineering units and measurement range (per channel). Automatic signal recognition and setting.
Display elements	Display: STN colour graphic display with 126 mm screen diagonal (5"), 76.800 dots (320 x 240 Pixel) Display modes: Curves/sequences, Curves in zones, digital display, event list (alarm conditions/power failures, condition display, historical display in curve plot form with display of the digital values, date and time
Real time clock	Switchable summer/normal time automatic Buffer ≥ 4 years (at ambient temp. 15...25 °C)
Remote operation	Setting up and archiving unit parameters per diskette or using the rear mounted serial interface (only with the "Digital I/O" option, see option) RS 232 (e.g. modem) or RS 485 with the ReadWin®2000 PC software.

Measurement storage

Data security	- Selectable recording speeds ("Feed rate") 0 / 5 / 10 / 20 / 60 / 120 / 240 / 300 / 600 / 1000 mm/h - Buffer ≥ 10 years for programme/measured value memory (Flash memory, non volatile) - Cyclic copy of measured data to 3 ½diskette for archiving 1.44 MB; Resolution is dependent on the preset feed rate - Permanent storage of the preset unit parameters in the Flash memory (non volatile)		
Typical recording length	Number of channels:	Recording length approx. to...	
		internal memory:	floppy disc:
	1	89 m	71 m
	2	68 m	54 m
	3	54 m	43 m
	4	44 m	35 m
	5	37 m	30 m
	6	33 m	26 m
Calculation of the recording time	$\frac{\text{Feed rate factor} * \text{Recording length (in meter)}}{\text{Feed rate (in mm/h)}}$		
	Feed rate factor for feed rate 5 / 10 / 20 / 60 / 120 / 600 mm/h: 1139 Feed rate factor for feed rate 240 mm: 911 Feed rate factor for feed rate 30 / 300 mm: 854 Feed rate factor for feed rate 1000 mm: 949		

Option

Digital I/O

4 digital inputs	To DIN 19 240; Logical “0" equals -3...+5 V, Active with logical ”1" equals +12...+30 V, max. 25 Hz, max. 32 V, Input current approx. 1.5 mA
Auxiliary voltage output	for powering digital inputs with potential free contacts 24 V DC, max. 30 mA, short circuit protected, unstabilised
3 relays	Changeover contact, 230 V AC / 3 A, for alarm condition transmission; at desktop version: max. 30 V_{eff} / 60 V DC.
Serial interfaces	Type (RS 232 / RS 485) and unit address can be selected Max. cable length using screened cable: 15 m (RS 232) / 1000 m (RS 485), Galvanically isolated from the system

Loop power supply

Outputs	24 V ± 20% max. 25 mA (internal current limiter)
Communication resistance	The resistors for HART®commmunication are built in (250 Ω); ∅ 2 mm sockets
Galvanic isolation	500 V (testing voltage) to all other circuits

Certification

CE mark	The unit complies to the legal requirements from the EU directives.

Technical alterations reserved.

Accessories

The following accessories are included with the delivery:
Unit plug on screwed terminals for power supply and signal inputs
Panel mounting jack screws, operating manual, ReadWin®2000 software package for PC

Accessories:

RS 232 connection cable for PC operation	RSG20A-S1
RS 232 interface cable for connection to modem	RSG20A-S2
RS 485 <-> RS 232 adapter set, with 230 V power supply	RSG20A-S3
RS 485 <-> RS 232 adapter set, with 115 V power supply	RSG20A-S5
Connection set for connection to adapter set RS 232 <-> RS 485 and RS 232 modem	RSG20A-S4

Further documentation

Operating manual Ecograph	BA097R/09/a6
Brochure: Recorder and data acquisition technology	FA014R/09/en

How to order

Paperless recorder Ecograph

Input Signal
3 3 x Universal (U, I, TC, RTD)
4 3 x Universal (U, I, TC, RTD) with integration
6 6 x Universal (U, I, TC, RTD)
7 6 x Universal (U, I, TC, RTD) with integration
8 3 x Universal + 3 x loop power supply
9 3 x Universal + integration + 3 x loop power supply

Power Supply
1 115...230 V AC
2 24 ... 48 V AC/DC

Interface; Digital Input, Output
A not used
B RS232/485, 4 x control in, 3 x relay, w/o RS232 cable
C RS232/485, 4 x control in, 3 x relay, + RS232 cable
D Ethernet, w/o RS232/485, w/o control in, w/o relay
E Ethernet + RS232/485, 4 x control in, 3 x relay, w/o RS232 cable
F Ethernet + RS232/485, 4 x control in, 3 x relay, + RS232 cable

Internal Memory
B Memory for max. 700,000 values (approx. 60 m record length at 3 ch.)
D Works calibration certif.

Housing
1 Panel 144x144 mm, IP 54
2 Desk top, connection cable with Euro plug
3 Desk top, connection cable with US plug
4 Desk top, connection cable with Swiss plug
5 Field housing, IP 65

Language
A German
B English
C French
D Italian
E Spanish
F Dutch
G Danish
H American
L Swedish
M Polish
N Russian
O Slovak

Additional Option
A Basic version
B Neutral version (without E+H Logo)
C Floppy drive lock
D Neutral version + Floppy drive lock
F Zone 2, ATEX II3G EEx nP IIC T4
without floppy drive
(only when installed in simple pressurized housing as per IEC 60079-2)

RSG20-								← Order code

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