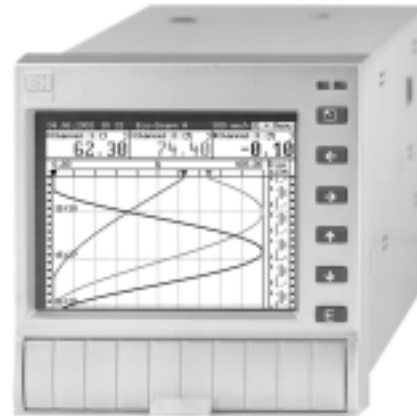
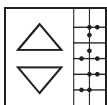
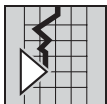
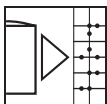


Advanced Paperless Recorder *eco-graph a*

User friendly paperless recorder, for recording analog signals, counter values and quantities. Swift overview using the integrated signal analysis.



Application

The "Advanced Paperless Recorder Eco-Graph A" is a compact measured value acquisition system with continuous savings thanks to the lack of replacement pens and paper costs.

Eco-Graph A records measured value processes, quantities, operating times, monitors set point violations and stores the data both internally and on diskette. A swift overview can be gained by using the integrated signal analysis giving intermediate, daily, monthly and yearly reports. The measured data can be read out, visualized and analyzed using the ReadWin® 2000 PC operating software. Unit and channel set-up can be done on the unit or using a PC.

Ideally suited for the water/waste water market, the Eco-Graph A can also be used in all other industrial branches for recording/monitoring processes and sequences.

Features and Benefits

- Electronic recording replaces pen and strip chart recorders, saves consumable costs
- Universal inputs measure most signal types for universal applications (mV, V, mA, RTD, TC)
- Digital inputs can be used as event inputs, operation time counters or impulse counters
- Quick set up and integrated operating manual provide fast commissioning, save set up time
- Flash memory ensures reliable archiving, kept safe even during power failure
- ReadWin® 2000 PC software package included with Eco-graph, saves software purchase costs
- Serial interface, Ethernet or modem communication
- Totalization (integration) of analog input signals as standard
- Minimum, maximum, average value recording
- Display of the last 7 analyses front end on unit
- Loop-power supply as an option
- ATEX (European) approval for Ex-Zone 2

Endress + Hauser

The Power of Know How



Function and system construction

Measurement Principle:	Electronic recording, plotting, analysis, and archiving of analog and digital input signals from measuring devices.
Measurement System:	All connected analog measurement points are measured in parallel every 250 ms. Galvanic isolation channel to channel is 500 V. Damping is presettable from 0 to 999.9 seconds per analog input. System basic damping can be ignored. Data storage is done in the internal memory (power failure secure via FLASH technology) and in the integrated diskette drive. Long term storage of data is done in the PC whereby the data can be transferred to the PC either by diskette or by using a serial interface. The ReadWin PC application software, provided free with the recorder, can configure the unit, display values real time, and display measured values.

Input signals

Current (mA)

Description	Measurement range limits / min. range	Accuracy
Current Range:	0 to 20 mA / 0.5 mA; linear/square 4 to 20 mA / 0.5 mA; linear/square -20 to +20 mA / 0.5 mA; linear Load tension Maximum 100 mA	± 20 µA ± 20 µA ± 44 µA ≤ 1 V

Voltage (mV)

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

Resistance thermometer (RTD)

Description	Measurement range limits / min. range	Accuracy
Pt 100:	-328° to +1562°F / 27°F (-200 to +850°C / 15 K)	± 0.8 K (2/3-wire) ± 0.5 K (4-wire)
Pt 100 (linearization to JIS, C1604-81),	-328° to + 1202°F / 27°F (-200 to +650°C / 15 K)	± 0.8 K (2/3-wire) ± 0.5 K (4-wire)
Pt 500:	-328° to +1562°F / 27°F (-200 to +850°C / 15 K)	± 0.8 K (2/3-wire) ± 0.5 K (4-wire)
Pt 1000:	-328° to +1562°F / 27°F (-200 to +850°C / 15 K)	± 0.8 K (2/3-wire) ± 0.5 K (4-wire)
Ni 100:	-76° to +356°F / 27°F (-60 to +180°C / 15 K)	± 0.4 K (2/3-wire) ± 0.4 K (4-wire)
Connections:	2/3 or 4-wire circuits, shielded cable	
Cable Compensation:	≤ 30 Ω per cable	
Measurement Current:	≤ 500 µA	
Open or closed circuit monitoring:	Indicates '-----' on display	

Thermocouples (TC)

Description	Measurement range limits / min. range	Accuracy
B (Pt30Rh-Pt6Rh):	+32 to +3308°F / 900°F (0 to +1820°C / 500 K)	± 0.15% from +752°F (± 0.15% from +400°C)
E (NiCr-CuNi):	-454 to + 1832°F / 180°F (-270 to +1000°C / 100 K)	± 0.1% from -112°F (± 0.1% from -80°C)
J (Fe-CuNi):	-346 to +2192°F / 180°F (-210 to +1200°C / 100 K)	± 0.1% from -148°F (± 0.1% from -100°C)
K (NiCr-Ni):	-328 to +2502°F / 180°F (-200 to +1372°C / 100 K)	± 0.1% from -112°F (± 0.1% from -80°C)
L (Fe-CuNi):	-328 to +1652°F / 180°F (-200 to +900°C / 100 K)	± 0.1% (± 0.1%)
N (NiCrSi-NiSi):	-454 to +2372°F / 180°F (-270 to +1300°C / 100 K)	± 0.1% from -112°F (± 0.1% from -80°C)
R (Pt13Rh-Pt):	-58 to +3215°F / 900°F (-50 to +1768°C / 500 K)	± 0.15% from 32°F (± 0.15% from 0°C)
S (Pt10Rh-Pt):	-58 to +3215°F / 900°F (-50 to +1768°C / 500 K)	± 0.15% from 32°F (± 0.15% from 0°C)
T (Cu-CuNi):	-454 to + 752°F / 180°F (-270 to +400°C / 100 K)	± 0.1% from -238°F (± 0.1% from -150°C)

Thermocouples continued top of page 3.

Input signals (continued)

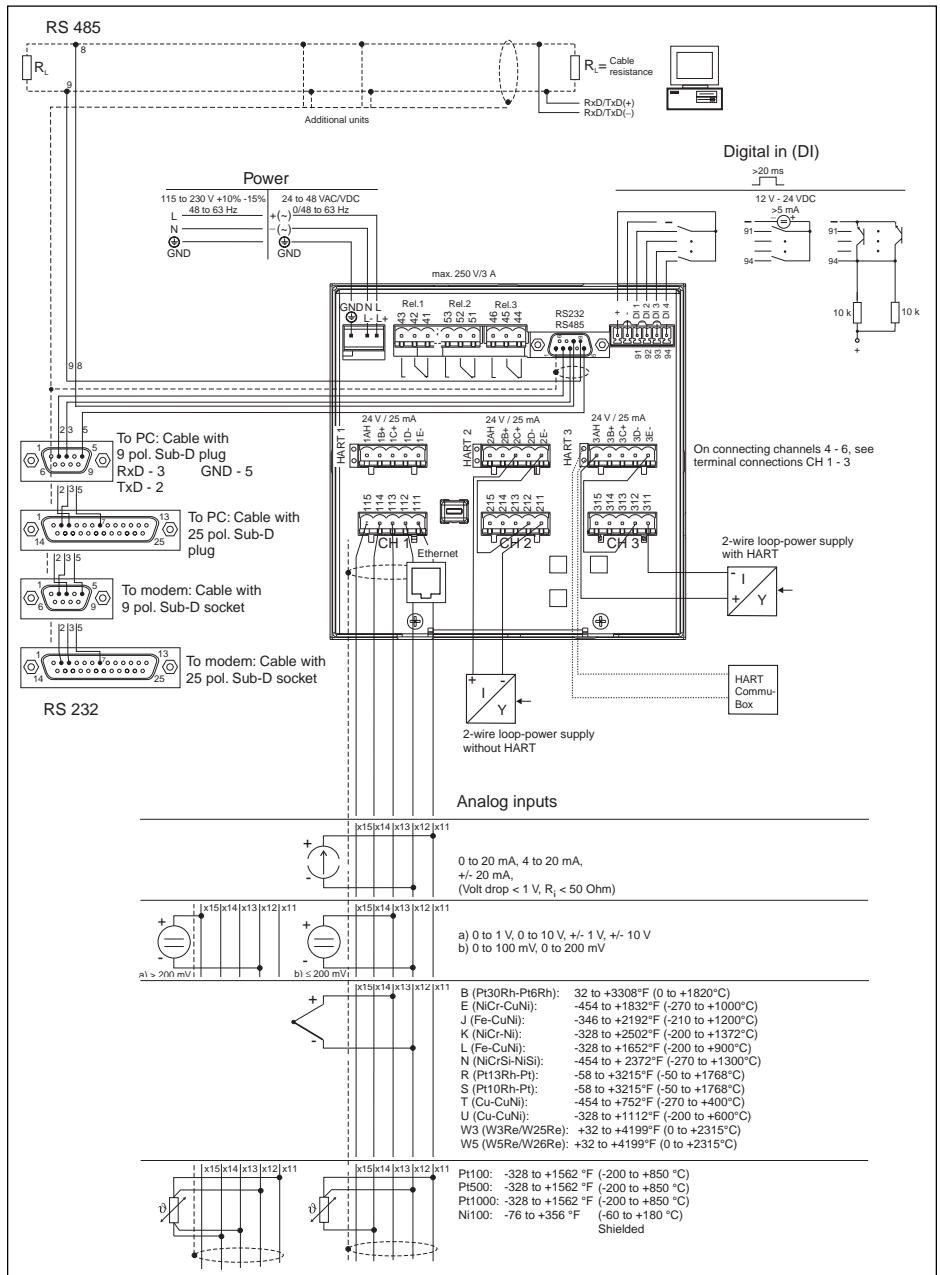
Thermocouples (TC), continued

Description	Measurement range limits / min. range	Accuracy
U (Cu-CuNi):	-328 to + 1112°F / 180°F (-200 to +600°C / 100 K)	± 0.1% from -238°F (± 0.1% from -150°C)
W3 (W3Re/W25Re):	+32 to +4199°F (0 to +2315°C)	± 0.1% (± 0.1%)
W5 (W5Re/W26Re):	32 to +4199°F (0 to +2315°C)	± 0.1% (± 0.1%)
Measurement Current:	≤ 500 µA for open circuit monitoring	
Comparison Point:	Comparison points "CJC" (to IEC 60 584) selectable - internal compensation of the terminal temperature - external, 32, 68, 122, 140, 158, 176°F (0, 20, 50, 60, 70, 80°C)	
Comparison Point Accuracy:	± 1.8°F (± 1.0K) (can be calibrated front end)	
Input Resistance:	900 kΩ	
Open Circuit Monitor:	Cable open circuit indicates "-----" in the display	

Accuracy

Reference Conditions:	Ambient temperature 77°F ± 9°F (25°C ± 5°C) Air humidity: 55 ± 10% rh
Measurement Accuracy:	Refer to page 2/3, input type
Warm Up Time:	> 0.5 hour
Ambient Temp. Influence:	0.01%/K of FSD

Electrical connections (terminal and socket layout) with optional loop-power supply



Power Supply

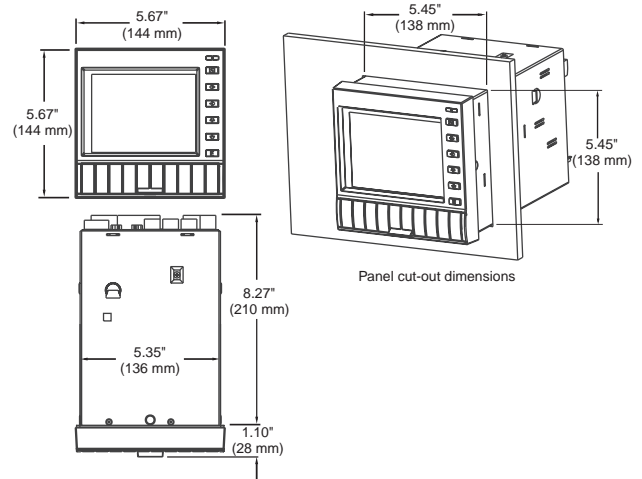
Input Power:	Standard, 115 to 230 VAC; +10% -15%; 48 to 63 Hz Low voltage, 24 to 48 VAC / VDC; +10%, -15%; 0/48 to 63 Hz
Power Consumption:	22 VA
Electrical Safety:	EN 61 010-1, protection class I; standard voltage, over voltage category II; low voltage, over voltage category III

Application conditions

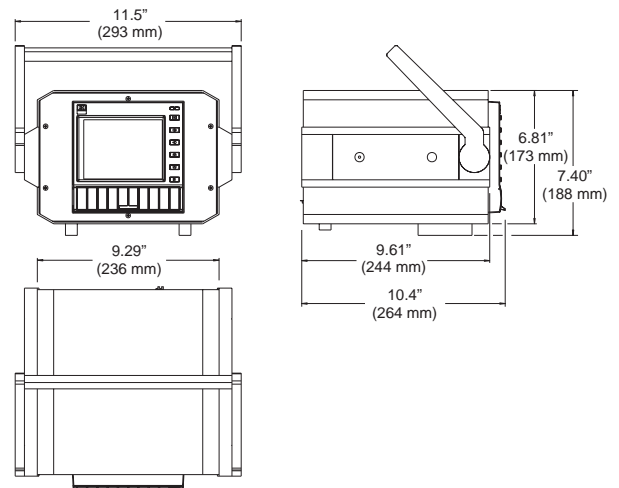
Installation conditions

Installation Angle:	Usage angle to DIN 16 257, NL 90 ± 30°
Installation Hints:	<p>General</p> <p>Terminal strips are keyed, screw terminals for cable size maximum AWG 14 (with ferrules)</p> <p>Panel mounted:</p> <p>Installation depth, approximately 8.3" (210 mm) including terminals</p> <p>Panel thickness, 0.08" to 1.57" (2 to 40 mm)</p> <p>Attachment to DIN 43 834</p>

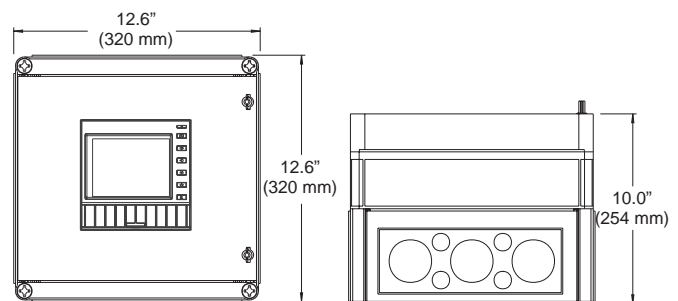
Dimensions and Mounting Details, Panel Mounted



Desk Top Version



NEMA 4 (IP 65) Field Housing



Operating Conditions

Ambient Temperature:	+32° to +120°F (0° to +50°C)
Storage Temperature:	-5° to +160°F (-20° to +70°C), 10 to 75% rh, without condensation
Climatic Class:	To IEC 60 654-1: B1
Ingress Protection:	Front, NEMA 3 (IP 54, EN 60 529, Cat. 2) Rear, no protection, IP 20 (EN 60 529, Cat. 2) Field housing, NEMA 4 (IP 65)
Electromagnetic Compatibility:	Immunity: EN 61 326-1 NAMUR recommendation NE 21: - 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 < 0.4% additional deviation on channel 4: 2% at approx. 460 MHz - Burst (fast transients), EN 61 000-4-4, Level 3 (2/1 kV) - 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 magnetic fields EN 61 000-4-8, 30 A/m - Power failures EN 61 000-4-11, > 20 ms
Normal Mode Noise Rejection (EN 61298-3):	40 dB on measurement range / 10 (50/60 Hz ± 0.5 Hz), at voltage input
Common Mode Noise Rejection (EN 61298-3):	80 dB (50/60 Hz ± 0.5 Hz) at voltage input
RF Protection:	To EN 61 326, Class A (operation in industrial environment)

Construction

Material:	Panel mount: Front bezel / door from die cast metal, matt chromed. Casing and rear panel, galvanized sheet steel. Desktop (portable): Unit is installed inside a varnished sheet steel housing. Wall mount: Unit is installed inside a hardened plastic NEMA 4 (IP 65) housing.
Weight:	Panel mount, approximately 7.7 pounds (3.5 kg) Desk top version, approximately 14.1 pounds (6.4 kg)

Operation and Display

Operating Elements:	Selectable operation using 6 front mounted push buttons interactive with on screen dialog. 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:	Color graphic with 5 inch (126 mm) diagonal screen, 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 temperature 59 to 77°F (15 to 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, refer to option, page 6) RS 232 (e.g. modem) or RS 485 with the ReadWin® 2000 PC software from Endress+Hauser

Measurement storage

Data Security:	Selectable recording speeds ("Feed rate") 0, 0.2, 0.4, 0.8, 1.2, 2.4, 4.8, 10.0, 12.0, 24.0, 40.0 ft/h (0, 5, 10, 20, 30, 60, 120, 240, 300, 600, 1000 mm/h) Buffer ≥ 10 years for program/measured value memory (flash memory, non volatile, internal memory 1024 kSRAM or 2048 kSRAM) Cyclic copy of measured data to 3-1/2" diskette for archiving 1.44 MB; resolution is dependent on the preset feed rate (refer to feed rate chart, top of page 6) Permanent storage of the preset unit parameters in the Flash memory (non volatile)
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Measurement storage (con't)

Comparison Feed Rate to Storage Interval:	Function principle of the display and recording/storage: Data is stored in defined intervals, dependent on the selected feed rate (it is possible to define a different feed rate/storage interval in alarm conditions).		
	Feed rate inch/h	Feed rate mm/h	Storage cycle in seconds
	0.2	5	240
	0.4	10	120
	0.8	20	60
	1.2	30	30
	2.4	60	20
	4.8	120	10
	10.0	240	4
	12.0	300	3
24.0	600	2	
40.0	1000	1	

Typical memory availability

Conditions for the following table: - No alarm violations / event storage - No digital inputs					
Analog Channels	Feed rate 5 mm/h (4 min)	Feed rate 20 mm/h (1 min)	Feed rate 60 mm/h (20 sec)	Feed rate 120 mm/h (10 sec)	Feed rate 1000 mm/h (1 sec)
Internal memory 1024 kB					
1	362 days, 23 h	90 days, 17 h	30 days, 5 h	15 days, 2 h	1 day, 12 h
3	217 days, 18 h	54 days, 10 h	18 days, 3 h	9 days, 1 h	21 h
6	136 days, 2 h	34 days	11 days, 8 h	5 days, 10 h	13 h
Internal memory 2048 kB					
1	848 days, 10 h	212 days, 2 h	70 days, 16 h	35 days, 8 h	3 days, 12 h
3	509 days, 1 h	127 days, 6 h	42 days, 10 h	21 days, 5 h	2 days, 2 h
6	318 days, 3 h	79 days, 12 h	26 days, 12 h	13 days, 6 h	1 day, 7 h
Diskette, 1.44 MB					
1	677 days, 23 h	169 days, 11 h	56 days, 11 h	28 days, 5 h	2 days, 19 h
3	406 days, 19 h	101 days, 16 h	33 days, 21 h	16 days, 22 h	1 day, 16 h
6	254 days, 5 h	63 days, 13 h	21 days, 4 h	10 days, 14 h	1 day, 1 h

Options

Digital I/O

4 Digital Inputs:	To DIN 19 240: Logical "0" = -3 to +5 V, Active with logical "1" = +12 to +30 V, maximum 25 Hz, maximum 32 V, input current approximately 1.5 mA
Auxiliary Voltage Output:	For powering digital inputs with potential free contacts, 24 VDC maximum 30 mA, short circuit protected, unstabilized
3 Relays:	Changeover contact, max. 230 VAC / 3 A, for alarm condition transmission, at desktop version: maximum 30 V _{eff} / 60 VDC
Serial Interfaces:	Type (RS 232 / RS 485) and unit address can be selected Maximum cable length using shielded cable: 50 ft (15 m) for RS 232; 3280 ft (1000 m) for RS 485, galvanically isolated from the system

Loop-power supply

Outputs:	24 V ± 20%, maximum 25 mA (internal current limiter)
Communication Resistance:	The resistors for HART® communication are built in (250Ω); 2 mm diameter sockets
Galvanic Isolation:	500 V test voltage to all other circuits

Ethernet interface (in preparation)

Ethernet Interface:	Internal Ethernet interface 10BaseT, connectro type RJ45, shielded cable, allocation of the IP address in the Eco-Graph A setup menu
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Certificates

CE Mark:	By attaching the CE mark, Endress+Hauser confirms that the instrument fulfills all the requirements of the relevant EC directives.
ATEX:	EU-Richtlinie 94/9/EG II3G EEx nP IIC T4 (option)

Accessories

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

Optional Accessories	Order Code
RS 232 operating cable for PC connection	RSG22A-S1
RS 232 interface cable for modem connection	RSG22A-S2
RS 485 <-> RS 232 adapter set, with 115 VAC power supply in compact housing, no galvanic isolation	RSG22A-S5
Connection kit for RS 232 <-> RS 485 adapter set and RS 232 modem	RSG22A-S4
Shielded signal cable shielded connection strip for 3 channel unit	RSG22A-A1
Shielded signal cable shielded connection strip for 6 channel unit	RSG22A-A2
RS 232 / Ethernet interface 115 VAC for DIN top hat rail, including interface cable, approximately 6 ft (2 m)	RSG22A-E3
RS 485 / Ethernet interface 115 VAC for DIN top hat rail	RSG22A-E5
NEMA 4 (IP 65) field housing	RSG22A-H1
Lock retro-fitting kit, complete	RSG22A-LA
Lock retro-fitting kit, neutral	RSG22A-LB
RS 232 / RS 485 adapter set for DIN top hat rail, 24 VDC supply voltage, including 115 VAC power adapter with galvanic isolation and PC / modem interface cable	RSG22A-S7
Plug-on 3-pole terminal strip for power supply	50078843
Plug-on 3-pole terminal strip for relays	51001393
Plug-on 5-pole terminal strip for analog input	51001351
Plug-on 6-pole terminal strip for digital inputs	51000719

Ordering Information

Paperless recorder Eco-Graph A

RSG22-

- 1 Signal Inputs
 - 3 3 universal inputs (mV, V, mA, RTD, TC)
 - 6 6 universal inputs (mV, V, mA, RTD, TC)
 - 8 3 universal inputs + 3 integrated loop-power supply
- 2 Power Supply
 - 1 115 to 230 VAC
 - 2 24 to 48 VAC / VDC
- 3 Digital In/Outputs / Interface
 - A Digital in/outputs / interface not required
 - D Digital in/outputs not required / with Ethernet interface (in preparation, consult factory)
 - E 4 impulse/count inputs, 3 relays / RS 232/485/485 interface
 - F 4 impulse/count inputs, 3 relays / Ethernet + RS 232/485 interface (in preparation, consult factory)
- 4 Internal Memory / Recording Length
 - A Memory for maximum 1 MB / approximately 100 ft (30 m) recording length for 3 channels
 - B Memory for maximum 2 MB / approximately 200 ft (60 m) recording length for 3 channels
 - C Factory calibration certificate / Memory for maximum 1 MB
 - D Factory calibration certificate / Memory for maximum 2 MB
- 5 Additional equipment
 - 1 Panel mounting, 5.7" x 5.7" (144 x 144 mm) front bezel, NEMA 3 (IP 54) ingress protection
 - 3 Desk top housing, power cable with US plug
 - 5 Field housing, NEMA 4 (IP 65)
- 6 Operating version
 - H American
 - E Spanish
- 7 Model
 - A Standard equipment without disk lock
 - B Neutral version (without E+H logo)
 - C Standard equipment with disk lock
 - D Neutral version (without E=H logo) with disk lock
- 8 Software
 - A Standard software
- 9 Certification
 - 1 No certification
 - A ATEX II3G EEx nP IIC T4 without diskette drive

Supplemental documentation

- Eco-Graph A Operating manual
- ATEX Safety instructions

BA 132R/09
XA 024R/09/a3

For application and selection assistance,
in the U.S. call 888-ENDRESS

For total support of your installed base, 24 hours
a day, in the U.S. call 800-642-8737

Visit us on our web site, www.us.endress.com

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