



Level



Pressure



Flow



Temperature



Liquid
Analysis



Registration



Systems
Components



Services



Solutions

Technical Information

Chromalog T

Paper recorder

Multi channel strip chart recorder
with digital measured value display



Application

The device is an intelligent data recorder with a recording width of 100 mm (3.94 inch). The model series comprises a 1-channel and a 3-channel line recorder as well as a dot matrix printer with 6 channels which all have universal inputs. The input signals can be selected as voltage, current (via shunt resistor), resistance thermometer and thermocouples.

Deployed for reliable long-term recording and monitoring of analog signals and for quality control in the following areas:

- Chemical industry
- Pharmaceutical industry
- Environmental and climate measuring technology
- Energy supply
- Plant and apparatus engineering and construction

Your benefits

- Reliable: latest drive technology (step motor) for pens and print head
- Compact: front 144x144 mm (5.67x5.67 inch), IP54, installation depth only 220 mm (8.66 inch)
- Freely adjustable: feed rate
- Practice-oriented: Z-fold chart paper for rapid overview
- Transparent: measured value curve and digital value display
- Informative: status display with limit value violation identified
- Easy to configure: onsite operation
- Reliable: inputs are galvanically isolated



Function and system design

Measuring principle Electronic acquisition, display and paper recording of analog input signals.

Measuring system

- 100 mm paper recorder
- 1-channel line recorder, optional 3-channel line recorder or 6-channel dotting recorder
- Two 7-segment LED displays (2-digit and 5-digit)
- Two status LED displays (for recording and alarm)
- Galvanically isolated universal inputs (U, I, TC, RTD)
- 125 ms scan rate for all line channels, 2.5 s for all dot channels
- Alarm function: 2 limit value monitors for upper (H) and lower (L) limit value for every input channel. Hysteresis of 0.0% to 1.0% of the recording range.

Input

Measured variable Resistance thermometer (RTD) and thermocouple (TC), voltage, current (with external shunt resistance).

Measuring range

Measured variable	Measuring range
Resistance thermometer (RTD)	Pt100: -200 to 600 °C (-328 to 1112 °F) (IEC751)
Thermocouple (TC) according to IEC 584-1 (1995 and JIS C1602-1995)	Type R: 0 to 1760 °C (32 to 3200 °F) Type S: 0 to 1760 °C (32 to 3200 °F) Type B: 0 to 1820 °C (32 to 3308 °F) Type K: -200 to 1370 °C (-328 to 2498 °F) Type E: -200 to 800 °C (-328 to 1472 °F) Type J: -200 to 1100 °C (-328 to 2012 °F) Type T: -200 to 400 °C (-328 to 752 °F) Type N: 0 to 1300 °C (32 to 2372 °F)
according to DIN 43710	Type L: -200 to 900 °C (-328 to 1652 °F) Type U: -200 to 400 °C (-328 to 752 °F)
Voltage U	20 mV (-20 mV to 20 mV) 60 mV (-60 mV to 60 mV) 200 mV (-200 mV to 200 mV) 2 V (-2 V to 2 V) 6 V (-6 V to 6 V) 20 V (-20 V to 20 V) 50 V (-50 V to 50 V) 0 to 1 V 0 to 10 V
Current I	With external shunt resistance 10 Ω (contained in the scope of delivery)

Designation	Range
Max. input voltage	±10 V DC for inputs: U ≤ 200 mV, TC and RTD ±60 V DC for inputs: U ≥ 2 V DC
Input resistance	≥ 10 MΩ for inputs: U ≤ 200 mV and TC approx. 1 MΩ for inputs: U ≥ 2 V DC
Input source resistance	Voltage U, TC: ≤ 2 kΩ RTD input: ≤ 10 Ω per wire (The resistance of all three wires must be equal)

Number of input channels and scan interval

- Pen model:
1 or 3 input channels; scan interval: 125 ms
- Dot model:
6 input channels; scan interval: 2,5 s

Galvanic isolation All inputs are galvanically isolated from one another.

Filter (only pen model)

- Signal damping (ON/OFF) switchable for each channel.
- Time constant selectable from 1 to 10 s (1 s steps).

Linear scaling

Computable input type: DC Voltage

- Mantissa: -19999 to 30000
- Displayable range: -19999 to 30000

Recording characteristic quantities

Line recorder

Recording function

Recording pen	Disposable felt-tip pen
Response time	Approx. 1 s (as per IEC 61143 measuring method)
Number of pens	1 or 3
Recording color	Channel 1: red Channel 2: green Channel 3: blue
Trend recording	Data updating with scan rate. Continuous recording.
Paper feed	10; 20; 60; 120; 300; 600; 1200 and 3600 mm/h (0.39; 0.79; 2.36; 4.72; 11.8; 23.6; 47.2 and 141.7 inch/h)

Dotting recorder

Trend recording

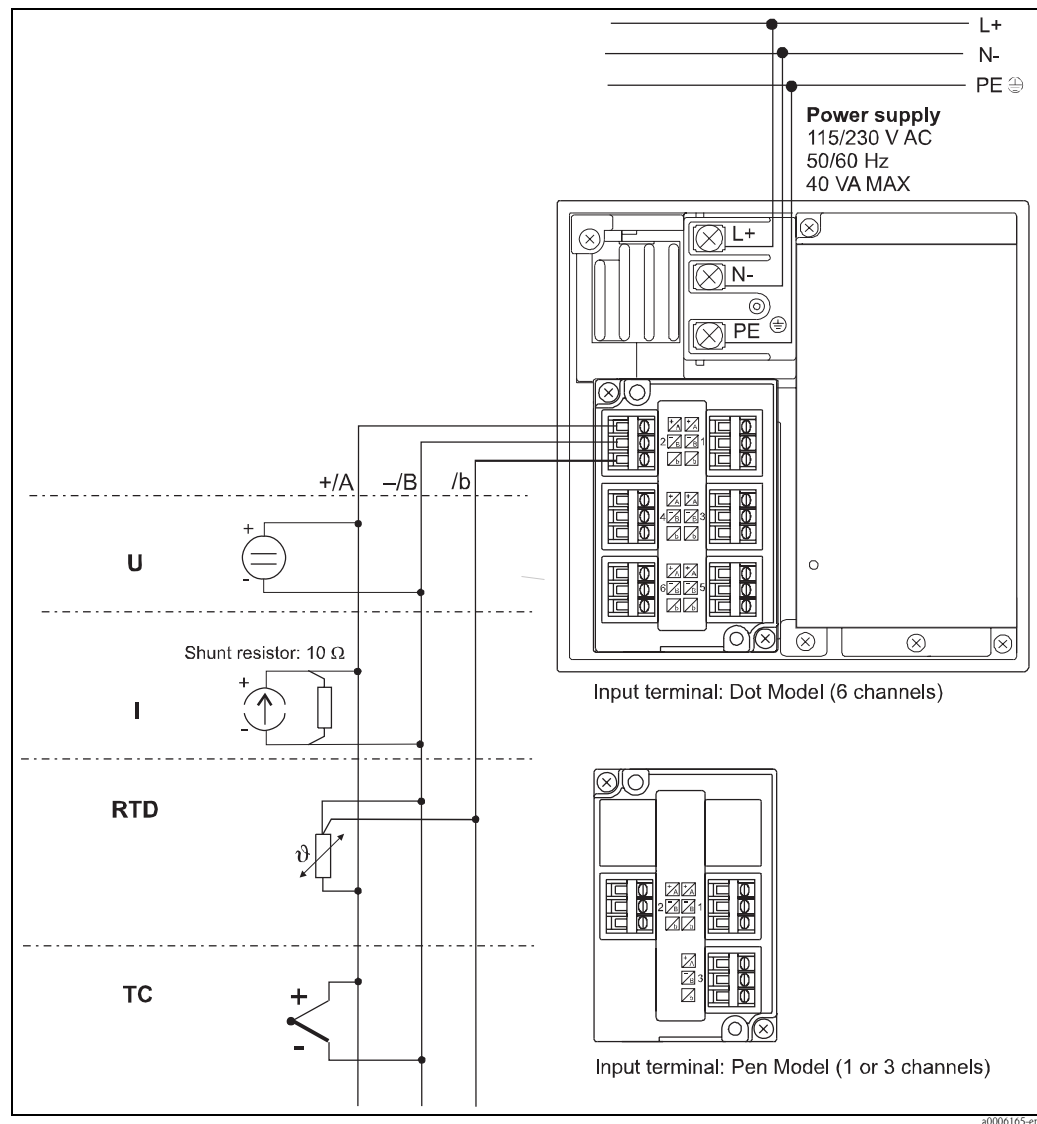
Recording method	6-color (dot matrix printer)
Recording color	Channel 1: violet Channel 2: red Channel 3: green Channel 4: blue Channel 5: brown Channel 6: black
Recording interval	AUTO or FIXED, adjustable AUTO: recording interval is synchronized automatically with the set paper feed FIXED: 10 s/6 channels, fastest recording interval
Paper feed	10; 20; 60; 120; 300; 600 and 1200 mm/h (0.39; 0.79; 2.36; 4.72; 11.8; 23.6 and 47.2 inch/h)
Recording ON/OFF	Recording can be switched on or off for every input channel.

Paper

Visible recording width	100 mm (3.94 inch)
Paper type	Z-fold chart paper, length: 16 m (52.5 ft)
Feed accuracy	± 0.1 % (for recorded material longer than 1000 mm (3.28 ft) in relation to the grid of the paper used)

Power supply

Electrical connection (Wiring diagram)



Supply voltage

Normal voltage power supply board: 115/230 V_{AC}, 50/60 Hz

Power consumption

max. 70 VA, typ. 36 VA

Isolation

- Insulation resistance:
Each terminal to ground terminal: $\geq 20 \text{ M}\Omega$ (at 500 V DC)
- Dielectric strength:
Power supply to ground terminal: 1500 V AC (50/60 Hz), 1 min.
Measuring input terminal to ground terminal: 1000 V AC (50/60 Hz), 1 min.
Between measuring input terminals: 1000 V AC (50/60 Hz), 1 min. (except for RTD input terminal)
- Grounding:
Grounding resistance: $\leq 100 \Omega$

Performance characteristics

Reference operating conditions

- Power supply: 90 to 132 or 180 to 264 V AC
- Ambient temperature: $23 \text{ }^\circ\text{C} \pm 2 \text{ K}$ ($73.4 \text{ }^\circ\text{F} \pm 9 \text{ }^\circ\text{F}$)
- Air humidity: $55 \% \pm 10 \% \text{ RH}$

Warm-up time Min. 30 minutes

Maximum measured error

Input		Measurement (digital display)		Recording (analog)	
		Performance characteristics	Signal resolution	Accuracy	Resolution
Voltage U	20 mV	±(0.1% of measuring range + 2 digit)	10 µV	± (0.3% of recording range)	<ul style="list-style-type: none"> ■ Line recorder: Dead band 0.25 % of recording range ■ Dotting recorder: 0.1 mm (3.98 mil)
	60 mV		10 µV		
	200 mV		100 µV		
	2 V ¹⁾		1 mV		
	6 V		1 mV		
	20 V ¹⁾		10 mV		
	50 V	±(0.1% of measuring range + 2 digit)	10 mV		
Thermocouple TC ²⁾	Type R, S, B	±(0.15% of measuring range + 1 °C) Barring R,S: 0 to 100 °C: ± 3.7 °C (32 to 212 °F: ± 6.7°F) 100 to 300 °C: ± 1.5 °C (212 to 572 °F: ± 2.7 °F) B: 400 to 600 °C: ± 2 °C (752 to 1112 °F: ± 3.6 °F) Accuracy for values ≤ 400 °C (752 °F) not guaranteed	0.1 °C (0.2 °F)	± (0.3% of recording range)	<ul style="list-style-type: none"> ■ Line recorder: Dead band 0.25 % of recording range ■ Dotting recorder: 0.1 mm (3.98 mil)
	Type K	±(0.15% of measuring range + 0.7 °C / 1.3 °F) Barring ±(0.15% of measuring range + 1 °C/1.8 °F) For -200 to -100 °C (-328 to -148 °F)			
	Type E	±(0.15% of measuring range + 0.7 °C / 1.3 °F)			
	Type J, T, N, L, U	±(0.15% of measuring range + 0.5 °C / 0.9 °F)			
Resistance thermometer RTD	Pt100	±(0.15% of measuring range + 0.3 °C/0.5 °F)			

- 1) The accuracy of the 0-1 V (0-10 V) input corresponds to that of the 2 V (20 V) input
- 2) Barring accuracy of cold junction

Influence of ambient temperature

In the event of temperature change of 10 °C (18 °F)

- Maximum measured error: ±(0.1% of measured range + 1 digit)
- Recording: measured error (digital display) + max. ±0.2% of recording range. Barring errors in cold junction compensation

Compensation of terminal temperature

Over 0 °C (32 °F) with adjusted terminal temperature (60 minutes after start procedure)

- Type R, S, B: ± 1.0 °C (1.8 °F)
- Type K, J, E, T, N, L, U: ± 0.7 °C (1.3 °F)

Influence of supply voltage

±(0.1% of measured value + 1 digit)

Influence of magnetic field

AC (50/60 Hz) and DC 400 A/m fields: ±(0.5% of measured range + 10 digit)

Influence of input impedance

Input	Measuring range change	Deviation
U _{DC} voltage input: <ul style="list-style-type: none"> ■ ≤ 200 mV ■ ≥ 2V 	+1 kΩ	<ul style="list-style-type: none"> ■ ±10 μV ■ ±0.1% of measuring range
Thermocouple TC		≤ ±10 μV
Resistance thermometer RTD	<ul style="list-style-type: none"> ■ 10 Ω per wire (resistance of all three wires must be the same) 	■ ≤ (±0.1% of measuring range + 1 digit)

Influence of orientation

For an angle of inclination (backwards) ≤ 30 °: ≤ (± 0.1% of measuring range + 1 digit)

Vibrations effects

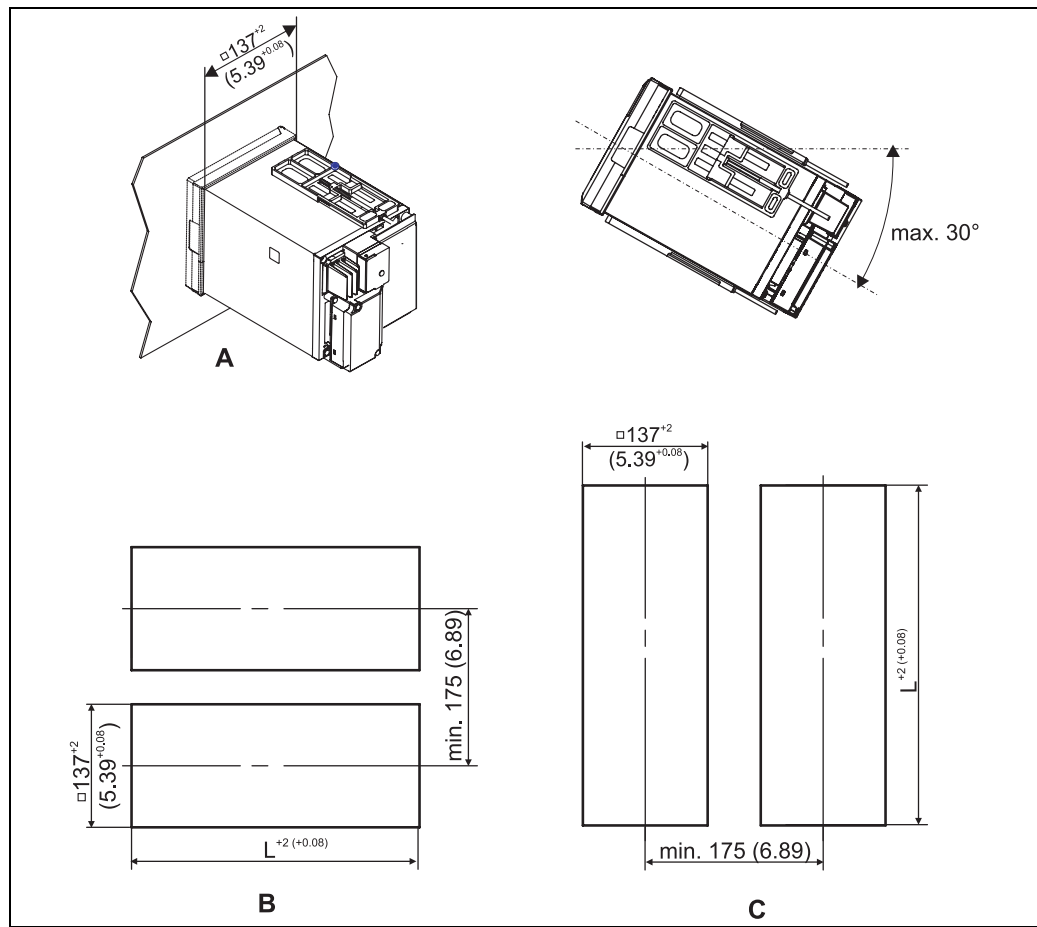
For frequencies of 10 Hz to 60 Hz and an acceleration of 0.2 m/s² (0.66 ft/s²):

- Measured error: max. ±(0.1% of measuring range + 1 digit)
- Recording: max. ±0.2% of recording range

Installation conditions

Orientation

Panel mounting horizontally, max. 30° incline backwards (see figure below)

Installation instructions

Mounting panel cutout - dimensions in mm (inch)

Pos. A: Installation single device

Pos. B: Installation of multiple devices (side-by-side mounting horizontally)

Pos. C: Installation of multiple devices (side-by-side mounting vertically)

L = Length panel cutout

Number of units	2	3	4	5	6	7	8	9	10	n
L in mm (inch)	282 (11.1)	426 (16.8)	570 (22.4)	714 (28.1)	858 (33.8)	1002 (39.5)	1146 (45.1)	1290 (50.8)	1434 (56.5)	(144 x n) - 6 (5.67 x n) - 0.24

- Installation depth: approx. 220 mm (8.66 inch) (incl. connection terminals and mounting brackets)
- Mounting panel cutout: $137^{+2} \times 137^{+2}$ mm ($5.39^{+0.08} \times 5.39^{+0.08}$ inch)
- Mounting panel thickness: 2 to 26 mm (0.08 to 1.02 inch)



Note!

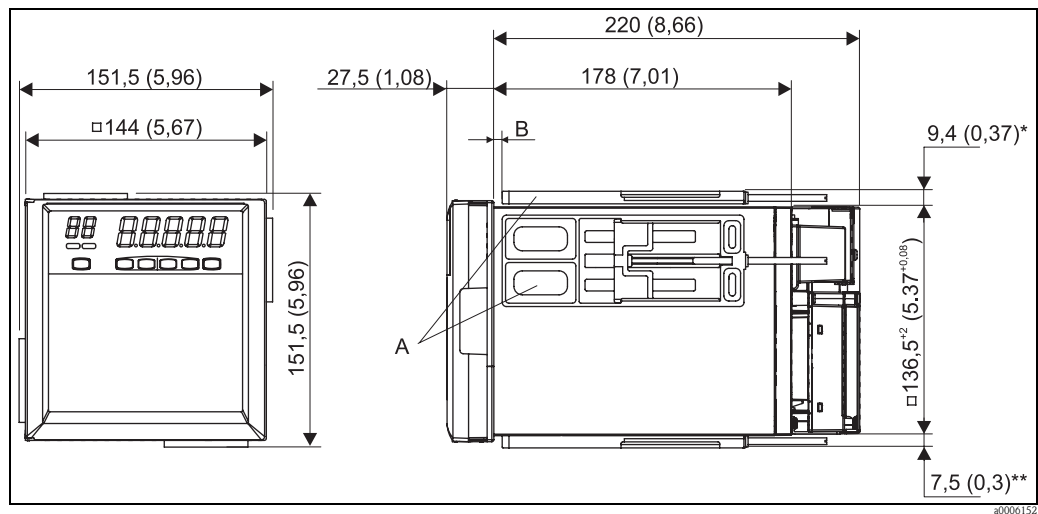
Max. 3 devices can be mounted side-by-side vertically.

Environment

Ambient temperature range	0 to 50 °C (32 to 122 °F)
Storage temperature	-25 to +60 °C (-13 to 140 °F)
Relative air humidity	at 5 to 40 °C (41 to 104 °F), 20 to 80 % without condensation
Degree of protection	<ul style="list-style-type: none"> ■ front-panel IP54 (IEC 60529, Cat. 2) NEMA 3S ■ rear-panel IP20
Electrical safety	IEC 61010-1, low voltage: overvoltage category II Environment < 2000 m (< 6562 ft) above MSL (mean sea level)
Shock resistance	Environment must be shock-free
Vibration resistance	10 to 60 Hz, $\leq 0.2 \text{ m/s}^2$ (0.66 ft/s ²)
Magnetic field	$\leq 400 \text{ A/m}$ (DC and 50/60 Hz)
Electromagnetic compatibility (EMC)	according to IEC 61326-1 (Emmission: Class A, Immunity: industrial environment)
Common mode noise rejection	120 dB (50/60 Hz $\pm 0.1\%$)
Normal mode noise rejection	$\geq 40 \text{ dB}$ (50/60 Hz $\pm 0.1\%$)

Mechanical construction

Design, dimensions



Dimensions in mm (inch), unless otherwise specified, tolerance is $\pm 3\%$.
Tolerance = ± 0.3 mm (0.01 inch) when below 10 mm (0.39 inch)

* Dimensions before attaching the mounting bracket

** Dimensions after attaching the mounting bracket

Pos. A: Mounting bracket

Pos. B: Mounting panel thickness 2 to 26 mm (0.08 to 1.02 inch)

Weight

- 1-channel pen recorder: approx. 2.1 kg (4.63 lb)
- 3-channels pen recorder: approx. 2.3 kg (5.07 lb)
- 6-channels dot recorder: approx. 2.5 kg (5.51 lb)

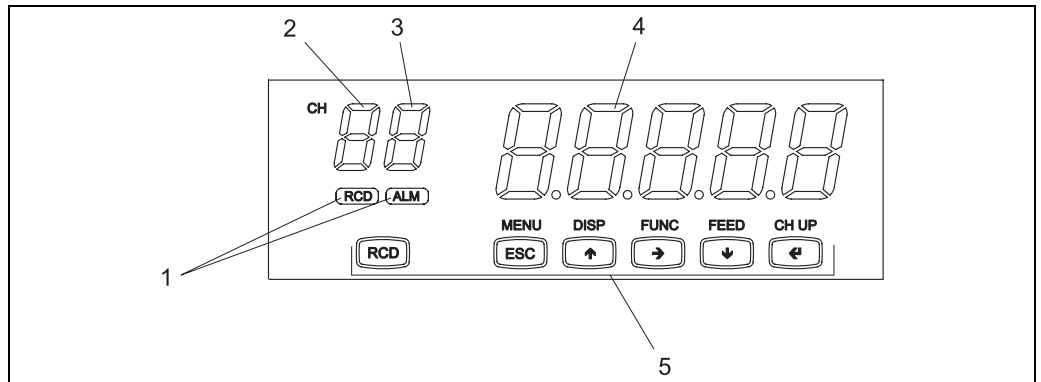
Material

- Front door/cover: aluminum die-cast
- Case: Drawn steel

Terminals

- Wire cross-section input terminals: max. 0.5 mm² (20 AWG) (screw terminals)
- Wire cross-section power supply terminals: 0.5 to 1.5 mm² (20 to 16 AWG) with crimp-on lugs (screw terminals)

Human interface



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Display and operating elements

Item No.	Display functions
1	<p>Status displays, dimensions approx. 2.5 x 7.5 mm (0.1 x 0.3 inch)</p> <ul style="list-style-type: none"> ■ RCD: Lit green = recording Is not lit = recording finished or interrupted ■ ALM: Lit red = alarm (limit value violation) Is not lit = limit value violation overridden
2	<p>Channel display 7-segment LED, dimensions approx. 12.6 x 6.8 mm (0.5 x 0.27 inch), lit orange, displays the channel number in question: 1, 2, 3, 4, 5 or 6 The channel display is permanently set for one channel or can be switched automatically between the channels every 2 seconds.</p>
3	<p>Alarm display (limit value monitoring) 7-segment LED, lit orange, displays the limit value violations H (upper limit value) and L (lower limit value) of the channel in question. Adjustable alarm hysteresis, from 0.0 to 1.0% of the recording range (in increments of 0.1%)</p>
4	<p>Measured value display 5 x 7-segment LED, dimensions approx. 18.0 x 9.7 mm (0.71 x 0.38 inch), lit green, displays the measured value of the configured channel or additional status messages, e.g. ERROR in the event of an error message. Display range from -19999 to 30000, decimal position can be set as required.</p>
5	<p>Keyboard: Operation and configuration via 6 operating keys on the front interacting with the LED displays.</p>

Memory backup

A built-in lithium battery backs up the setup parameters (battery life: approx. 10 years at room temperature).

Certificates and approvals

CE-Mark

The device meets the legal requirements of the EC directives. Endress+Hauser confirms that the device has been successfully tested by applying the CE mark.

CSA

Certified by CSA22.2 No. 61010-1 (NRTL/C¹⁾) installation category II, pollution degree 2

1) 'C' and 'US' are on the left and right side of the CSA mark respectively.

Ordering information

Product structure

Chromalog T Paper recorder z-fold paper 16 m; Universal input U, I, TC, RTD; Channel display + status display; Measurement value recording, analog; Input galvanically insulated; Approval: CSA

Version:	
1	1-channel strip chart recorder; Recording speed adjustable: 10...3600 mm/h (0.39...141.7 inch/h)
3	3-channel strip chart recorder; Recording speed adjustable: 10...3600 mm/h (0.39...141.7 inch/h)
6	6-channel dotting recorder; Recording speed adjustable: 10...1200 mm/h (0.39...47.2 inch/h)
Power supply:	
1	115/230 V AC, 50/60 Hz
Display:	
A	LED, 5-digit
Housing:	
A	Panel 144 x 144 mm (5.67 x 5.67 inch), depth 220 mm (8.66 inch)
Operation manual:	
A	German
B	English
RSL30-	1 A A ⇒ Order code

Accessories

The following accessories are available:

Order-No.	Accessory
71022956	3x Felt tip pen channel 1 red
71022957	3x Felt tip pen channel 2 green
71022958	3x Felt tip pen channel 3 blue
71022955	Color ribbon band (6-colors)
71022960	10x Z-fold paper neutral (item no.: B956ACL) Grid 0 to 100 % linear; length 16 m (52.5 ft)
71028635	10x Z-fold paper 20 mm/h (item no.: B956ACL-T) Grid 0 to 100% linear; length 16 m (52.5 ft)

Accessories included in the delivery:

1 Operating instructions, Shunt Resistor (10 Ω) per input channel, 2 Mounting brackets, 1 disposable felt pen per input channel, 1 ribbon cassette for the dot recorder, z-fold chart paper neutral and 20 mm/h-time scale.

Documentation

- Brochure Field of activities - Recorders and data acquisition technology (FA014R/09/en)
- Operating instructions Chromalog T (BA232R/09/en)

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