



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

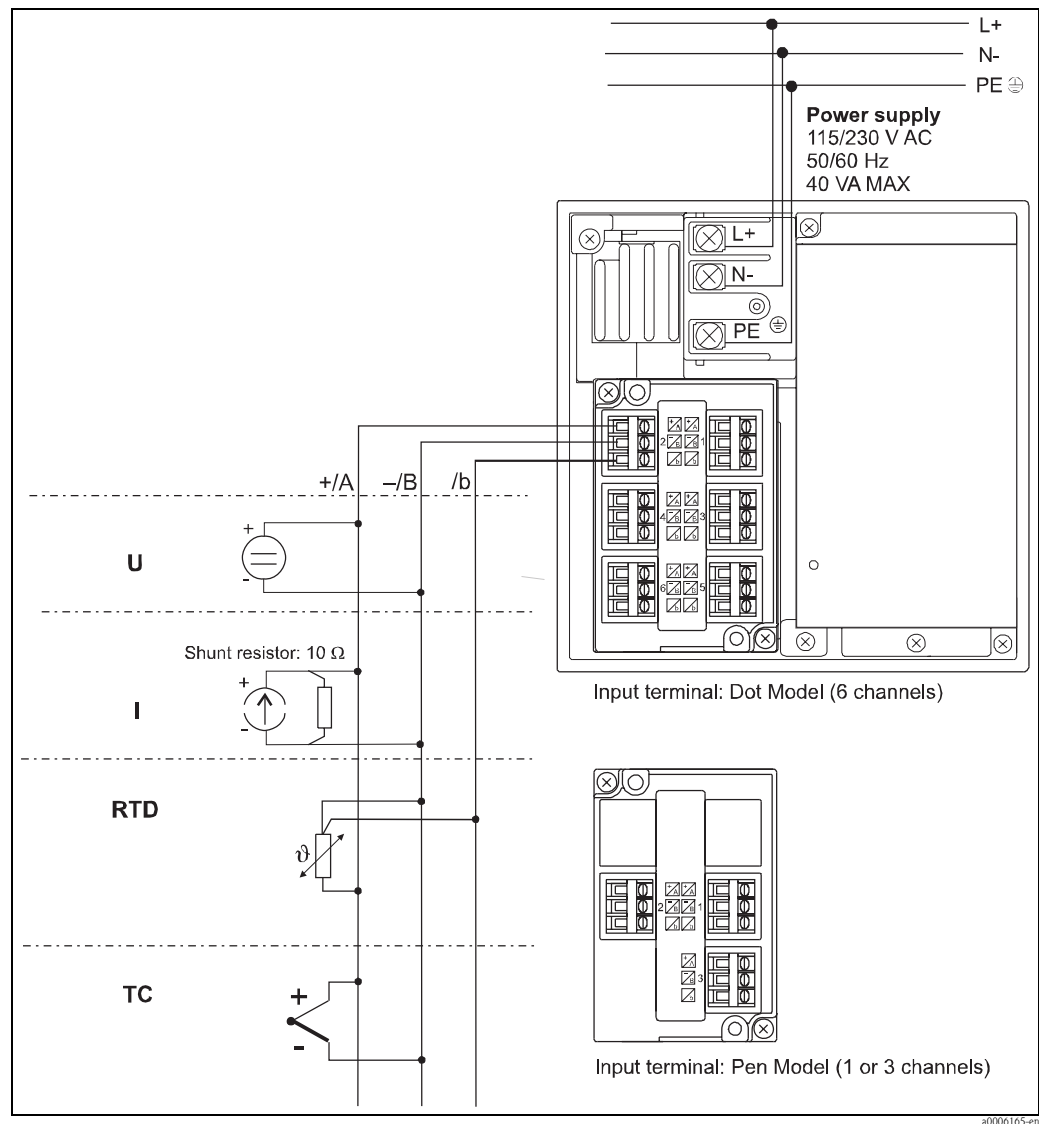
Recording method	6-color (dot matrix printer)
Recording color	Channel 1: violet Channel 2: red Channel 3: green Channel 4: blue Channel 5: brown Channel 6: black
Recording interval	AUTO or FIXED, adjustable AUTO: recording interval is synchronized automatically with the set paper feed FIXED: 10 s/6 channels, 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<sub>AC</sub>, 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"> <li>■ Line recorder: Dead band 0.25 % of recording range</li> <li>■ Dotting recorder: 0.1 mm (3.98 mil)</li> </ul>
	60 mV		10 µV		
	200 mV		100 µV		
	2 V <sup>1)</sup>		1 mV		
	6 V		1 mV		
	20 V <sup>1)</sup>		10 mV		
	50 V	±(0.1% of measuring range + 2 digit)	10 mV		
Thermocouple TC <sup>2)</sup>	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"> <li>■ Line recorder: Dead band 0.25 % of recording range</li> <li>■ Dotting recorder: 0.1 mm (3.98 mil)</li> </ul>
	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 <sub>DC</sub> voltage input: <ul style="list-style-type: none"> <li>■ ≤ 200 mV</li> <li>■ ≥ 2V</li> </ul>	+1 kΩ	<ul style="list-style-type: none"> <li>■ ±10 μV</li> <li>■ ±0.1% of measuring range</li> </ul>
Thermocouple TC		≤ ±10 μV
Resistance thermometer RTD	<ul style="list-style-type: none"> <li>■ 10 Ω per wire (resistance of all three wires must be the same)</li> </ul>	■ ≤ (±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**

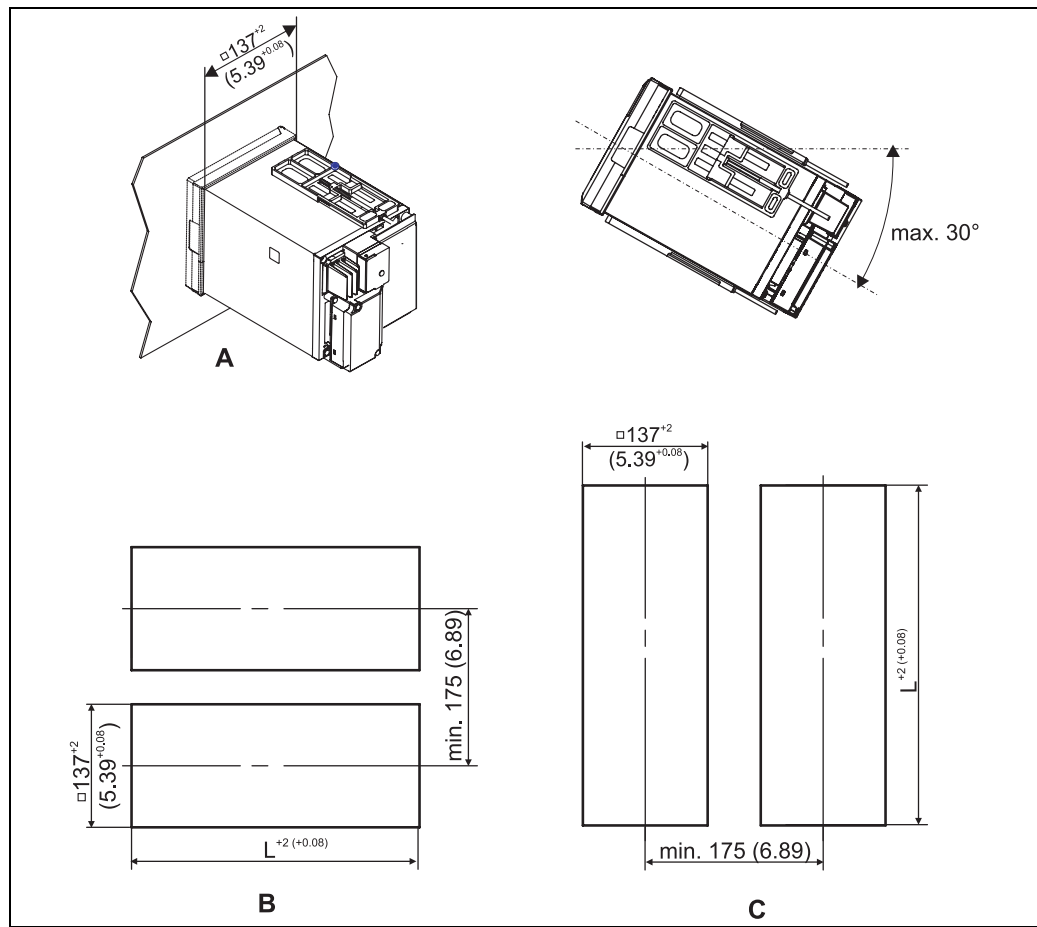
For frequencies of 10 Hz to 60 Hz and an acceleration of 0.2 m/s<sup>2</sup> (0.66 ft/s<sup>2</sup>):

- 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!

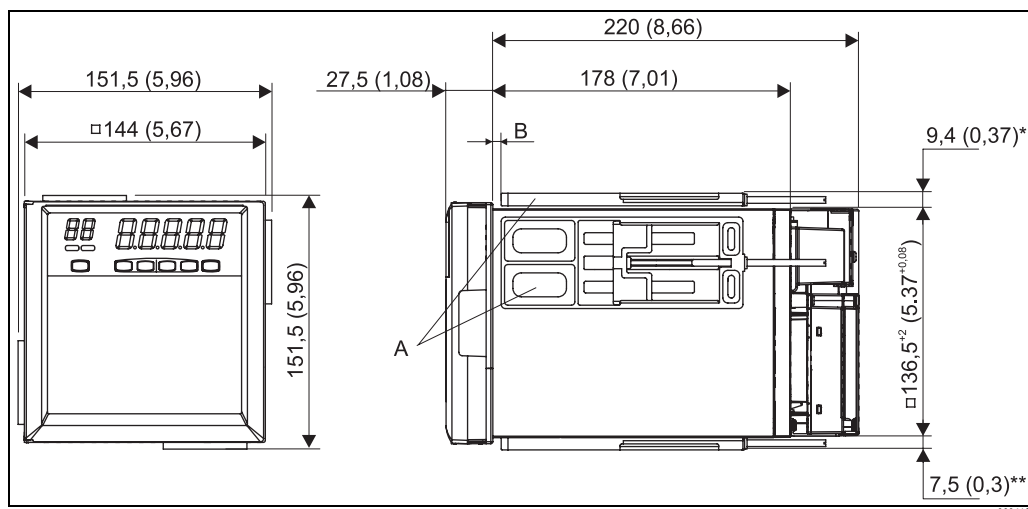
Max. 3 devices can be mounted side-by-side vertically.

## Environment

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

## Mechanical construction

### Design, dimensions



Dimensions in mm (inch), unless otherwise specified, tolerance is  $\pm 3\%$ .  
Tolerance =  $\pm 0.3$  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

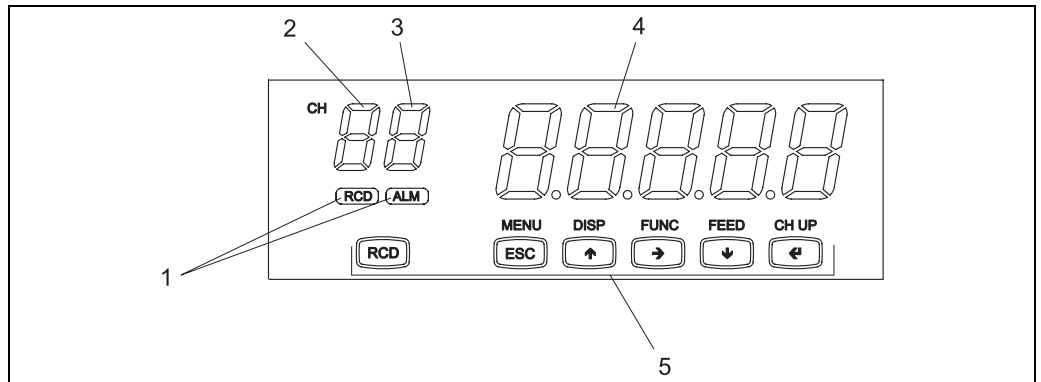
- Front door/cover: aluminum die-cast
- Case: Drawn steel

### Terminals

- Wire cross-section input terminals: max. 0.5 mm<sup>2</sup> (20 AWG) (screw terminals)
- Wire cross-section power supply terminals: 0.5 to 1.5 mm<sup>2</sup> (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><b>Status displays, dimensions approx. 2.5 x 7.5 mm (0.1 x 0.3 inch)</b></p> <ul style="list-style-type: none"> <li>■ <b>RCD:</b> Lit green = recording Is not lit = recording finished or interrupted</li> <li>■ <b>ALM:</b> Lit red = alarm (limit value violation) Is not lit = limit value violation overridden</li> </ul>
2	<p><b>Channel display</b> 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><b>Alarm display (limit value monitoring)</b> 7-segment LED, lit orange, displays the limit value violations <b>H</b> (upper limit value) and <b>L</b> (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><b>Measured value display</b> 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><b>Keyboard:</b> 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/C<sup>1)</sup>) 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

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