Smart Multichannel Thermometer System

- **Twelve channel temperature measurement**
- **Integrated scanner**
- **Smart probe support**
- **RS-232 and TCP/IP communication**
- **Internal reference resistors**
- **PC software for system control and data acquisition**

Typical applications:

- **Climatic chamber validation**
- **Temperature calibration**
- **Energy performance testing**
- **Sensor production calibration systems**

ISO/IEC 17025
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SCS 0125

Thermometer T12

Multi-Channel Reference Thermometer

The T12 is a precise and stable platinum resistance thermometer (PRT) multi-channel temperature measurement system. Based on a high precision resistance bridge, 22 bit analog to digital converter and multiplexor sampling, the T12 provides twelve channels of low uncertainty temperature data for calibration, validation, development and test engineers.

Using one of three user selectable current settings, the T12 scans all 12 channels in a continuous cycle. Polarity related errors inherent with DC measuring techniques are eliminated by the use of current reversal in every measurement cycle, and precision is optimised by the inclusion of high stability internal reference resistors.

Smart Probes

Smart probes with a memory chip in the connector are automatically detected and can be read and configured by the system. This allows for the storage of all the probe parameters such as the calibration coefficients, date and validity, certificate reference and more.

the instrument shown is the T12-S, other models may have different features and appearance

Digital Communication

The T12-S and SE versions communicate over RS232 and TCP/IP. Measurement data is broadcasted either in a JSON protocoll or in the classical ASCII request - response method.

Internal Reference Resistors

During each measurement cycle, the T12 measures low and high range reference resistance values to confirm linearity and quantify any thermal effects on the measurement circuit. This means that for all measurement and operational conditions, the uncertainty component for linearity and temperature coefficients is minimized.

Specifications:	Thermometer T12-S	Thermometer T12-SE	Thermometer T12	Thermometer T12-E
Measuring Ranges				
Temperature	-200 … 249 °C	-200 … 249 °C	-200...800 °C	-200...800 °C
Resistance	1 … 194 Ω	1 … 194 Ω	1...380 Ω	1...380 Ω
Excitation currents	1 mA	1 mA	0.33, 0.66 mA	0.33, 0.66 mA
Performance (measured)				
Range	-200...250 °C	-200...250 °C	-200...250 °C	-200...250 °C
Resolution	0.12 mK	0.12 mK	0.12 mK	0.12 mK
Accuracy (at 23°C)	≤ ± 5 mK	≤ ± 20 mK	≤ ± 2 mK	≤ ± 20 mK
Temperature coefficient	0.1 mK / °C	0.1 mK / °C	0.1 mK / °C	0.1 mK / °C
Performance (extended range)				
Range			-200...850 °C	
Resolution			0.25 mK	
Standard Features				
Available inputs	12 channels, DC-reverse-current			
Input type	Platinum Resistance Thermometer (PRT), 4-wire, shielded			
Supported coefficients	ITS-90, Callendar-Van Dusen			
Reference resistors	2 internal, low and high end of Ω range			
Interface Features				
Probe connector	Lemo-B Series, 6 Pin, Smart		Lemo-B Series, 5 Pin	
Communication	USB, Ethernet, RS-232		RS-232	
Control and data acquisition	TCP/IP communication, RS-232		Serial (over RS-232)	
Communication protocoll	JSON, plain ASCII		Binary	
Smart probes	Supported		Not supported	
Other Features				
Software	MBW Gecko R2			
Logging intervals	User programmable from 5 seconds to 60 minutes			
Sampling rate	< 0.5 seconds per channel			
Enclosure type	Aluminum			
Power supply	External AC/DC power supply with 1.5 m cable (indoor use only)			
Operating instructions	English			
Factory calibration certificate	Resistance calibration			
CE compliance	Safety and EMC			
Accessories				
Probes	Calibrated and uncalibrated PRT's available, see seperate datasheet			
Connectors	Lemo plugs, Smart Probe Memory Chips			
Additional Information				
Digital I/O	Bi-directional RS-232			
AC power	Power supply 110-230 V, 50/60 Hz			
DC power	12 V, 0.3 A			
Maximum operating conditions	0 °C...+50 °C, maximum 98 %rh, non-condensing			
Storage temperature	-20 °C...+50 °C			
Weight & Dimensions	Instrument			
Width x Height xDepth	235 mm x 40 mm x 180 mm			
Weight	< 2 kg			

T12 V4.0 08.2020 We reserve the right to change design or technical data without notice.

Ordering Information

Description		Order code
Thermometer T12	2mK (12 channel, 4-wire PRT, incl. PC software, serial cable, USB adapter, transport case)	104158
Thermometer T12-E	20mK (12 channel, 4-wire PRT, incl. PC software, serial cable, USB adapter, transport case)	141678
Thermometer T12-S	5mK, smart (12 channel, 4-wire PRT, incl. PC software, serial cable, USB adapter, transport case)	142526
Thermometer T12-SE	20mK, smart (12 channel, 4-wire PRT, incl. PC software, serial cable, USB adapter, transport case)	142527

Options		
T12-Upgrade to SCS accredited calibration (ISO 17025), up to 12 probes, 7 temp points in the range -100…+100 °C		105092
PRT coefficient determination, user supplied PRT, including annealing if required		142528

Accessories		
Lemo B-Series 5-pin connector (for users to fit own PRTs to T12/T12-E)		103993
Lemo B-Series 6-pin connector with smart chip (for users to fit own PRTs to T12-S/SE)		142529
Lemo B-Series 6-pin connector with smart chip including MBW fitting to user supplied PRTs to T12-S/SE)		142530
Temperature probe, Pt-100, Ø3 x 40 mm, with 3 m cable and Lemo connector (T12/T12-E)		105042
Temperature probe, Pt-100, Ø3 x 40 mm, with 3 m cable and Lemo connector with smart-chip (T12-S/SE)		142531
Temperature probe, Pt-100, Ø3 x 40 mm, calibrated -50 ... +100 °C, with 3 m cable and Lemo connector *		105043
Temperature probe, Pt-100, Ø3 x 40 mm, calibrated -50 ... +100 °C, with 3 m cable and Lemo con. and smart-chip (T12-S)*		142532
Additional 1 year warranty upgrade (max. 3 years)		103632

* Calibrated together with T12 when ordered at the same time
** 305 FGG.1B CLAD52 for 5-pin, 306 for 6-pin version

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