



Thermocouple Technology, Inc.
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MESO-H / MESO-HX
Temperature
Transmitters

HART® Compatible Intelligent 2-wire In-head Transmitters



MESO-H is a *Smart* and universal, Isolated 2-wire In-head transmitter for temperature and other measurement applications.

MESO-HX is the Intrinsically Safe version for use in Ex-applications.

MESO-H and MESO-HX are *fully HART-compatible*, with communication through the HART protocol, directly on the 4-20 mA output loop, by using either a general hand-held HART Communicator or the PC software, MEPRO 2.

MEPRO 2 is a Windows based and user friendly software, which facilitates the access to and use of functions like transmitter configuration, documentation, monitoring and calibration.



Performance and design:

Excellent stability

- Long-term stability 0.1 %/year.

Enhanced total system accuracy

- Sensor error correction (compensates for known sensor errors).

Input-Output isolation 1500 VAC

- Eliminates measuring errors due to ground loops.

High load capacity

- Only 10 V voltage drop over the transmitter (MESO-H) allows for high loads.

Designed for harsh conditions

- Operation temperature: up to 85 °C / 185 °F (105 °C / 221 °F on request)
- Excellent EMC performance.
- Durable, shockproof design.

Simple mounting and connection

- For DIN B head or larger.
- Large center hole (dia. 7 mm / 0.28 inch).

5 year limited warranty

Functions:

Fully HART® Compatible

- True on-line communication with hand-held HART Communicator or Windows software MEPRO 2.

Input for RTDs, T/Cs, mV and resistance

- Reduced inventory costs.
- Simplified plant engineering.

Efficient customized 50-point linearization

- Any sensor characteristics can be matched.

Sensor diagnostics

- SmartSense detects low sensor isolation (essential for correct measurements).
- Selectable sensor break action.

Simplified loop check-up

- The transmitter works as an accurate current generator.

On-screen indications of input and output

- Valuable tools for temporary measurements.

Improved QA with data storage

- Vital information, such as TAG-No., maintenance record etc. can be stored in the nonvolatile memory.

ORDERING INFORMATION

Item	Part Number	Item	Part Number
Transmitter (Hart)	MESO-H	Factory Configuration	70CAL00001
Transmitter (Hart/FM)	MESO-HX	Surface Mounting Box	70ADA00008
Software	MEPRO SOFTWARE KIT	Rail Mounting Box	70ADA00009
Hart Modem RS232	70MEM00001	Rail Mounting Kit	70ADA00013

MESO-H / MESO-HX MAIN FEATURES

Accuracy and stability

MESO-H / MESO-HX are designed for applications with high demands on accuracy, also under severe operating conditions. To reach these demands, the following factors are essential:

Linearity and calibration errors – The combination of an efficient linearization function and the use of quality components and precision calibration equipment reduce these errors to $\pm 0.1\%$ of span.

Ambient temperature influence – The transmitters in the MESO family are compensated to reduce the ambient temperature influence to low levels.

High long-term stability – Internal “self calibration”, by means of continuous adjustment of important parameters after comparison with accurate built-in references, contributes to a stability of $\pm 0.1\%$ /year.

Measurements with RTDs and other resistances

MESO-H / MESO-HX accept inputs from standardized Platinum and Nickel RTDs like Pt10...Pt1000 acc. to IEC 751 ($\alpha=0.00385$), Pt100 acc. to JIS 1604 ($\alpha=0.003916$) and Ni100 / Ni1000 acc. to DIN 43760, as well as inputs from plain resistance sensors such as potentiometers.

3- or 4-wire connection can be chosen.

Measurements with thermocouples and plain voltage

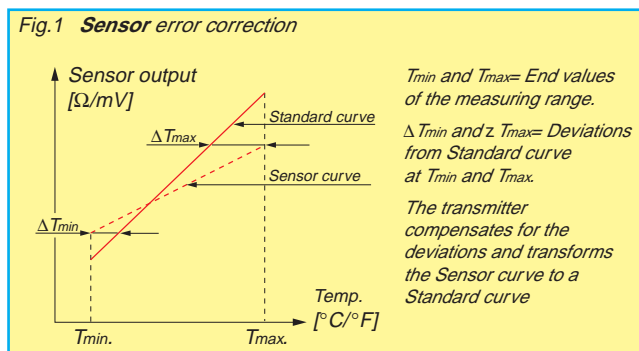
MESO-H / MESO-HX accept inputs from 11 types of standardized thermocouples as well as plain mV input.

For T/C input, the CJC (Cold Junction Compensation) is fully automatic, by means of an accurate measurement of the terminal temperature. Alternatively, the CJC can be disabled.

Sensor error connection

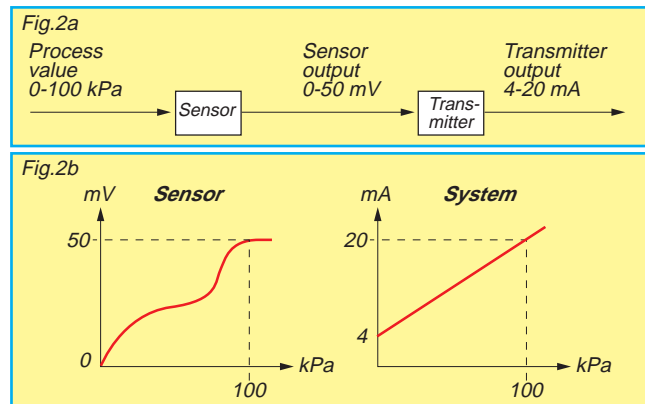
MESO-H / MESO-HX offer a way of improving the measurement with temperature sensors:

Known sensor errors compared to the standard curve, e.g. for a calibrated sensor, are entered, and the transmitter automatically corrects for the sensor errors. Fig. 1.



Customized linearization and Engineering units

The accurate and versatile 50-point *Customized linearization* can be used to create almost any type of linearization curve for RTD, T/C, resistance and mV inputs. By combining *Customized linearization* with the use of *Engineering units*, the transmitters can be programmed to give a linear output corresponding to a specific measuring range expressed in the primary process value.



Example of a system (sensor + transmitter) with an output **linear** to the process value, in spite of a **non-linear** sensor.

The sensor characteristics are described by either up to 50 data pairs or a third order polynomial. Fig. 2a and 2b.

SmartSense – Sensor isolation monitoring

SmartSense continuously monitors the isolation resistance of thermocouples and 3-wire connected RTDs as well as the cabling between sensor and transmitter. The transmitter will react by forcing the output to a user defined level if the isolation level is too low. SmartSense requires an extra lead inside the thermocouple or RTD.

For detailed information, contact TTEC.

Sensor break monitoring

MESO-H / MESO-HX monitor sensor break and force the output signal to a user defined level, when any sensor lead is broken or disconnected. The sensor break monitoring can be switched off. The monitoring is furnished with a *pulsed excitation current*. This eliminates the voltage drop in the lead wires (giving a measuring error), caused by a standard DC excitation current.

Controlled output for instrument calibration

With MEPRO 2, MESO-H / MESO-HX can be set to automatically provide the recurring output values of 4, 12, 20, 12, 4 mA in a periodical scheme. Each level will last 15 seconds. The total time for controlled output is adjustable up to 30 minutes. With the handheld Hart Communicator model 275, a constant transmitter output can be set at any level between 4 and 20 mA.



MESO-H / MESO-HX Specifications

Input

RTD's and Resistance

Pt100 (IEC751, $\alpha = 0.00385$)	3-, 4-wire connection	-200 to +1000 °C / -328 to +1832 °F
Pt1000 (IEC751, $\alpha = 0.00385$)	3-, 4-wire connection	-200 to +200 °C / -328 to +392 °F
PtX $10 \leq X \leq 1000$ (IEC751, $\alpha = 0.00385$)	3-, 4-wire connection	Upper range depending on X-value
Ni100 (DIN 43760)	3-, 4-wire connection	-60 to +250 °C / -76 to +482 °F
Ni1000 (DIN 43760)	3-, 4-wire connection	-60 to +150 °C / -76 to +302 °F
D100 (Pt 100 acc.to JIS1604, $\alpha = 0.003916$)	3-, 4-wire connection	-200 to +1000 °C / -328 to +1832 °F
Potentiometer/resistance	3-, 4-wire connection	0 to 2000 Ω
Sensor current		~ 0.4 mA
Maximum sensor wire resistance		25 Ω /wire

Thermocouples and Voltage

T/C	Type: AE, B, E, J, K, L, N, R, S, T, U	Ranges according to users manual
Voltage input		-10 to +500 mV
Input impedance		>10 M Ω
Maximum sensor wire resistance		500 Ω (total loop)

Monitoring

Sensor break monitoring	User definable output	3.6 to 22.8 mA
SmartSense, sensor isolation monitoring	User definable output	3.6 to 22.8 mA

Adjustments

Zero adjustment	All inputs	Any value within range limits
Minimum spans	Pt100, Pt1000, Ni100, Ni1000	10 °C / 18 °F
	Potentiometer	10 Ω
	T/C, mV	2 mV

Output

Straight, reversed or any intermediate value		4-20/20-4 mA
Resolution		5 μ A
Minimum output signal		~ 3.6 mA
Maximum output signal		~ 23 mA
Permissible load	MESO-H	610 Ω @ 24 VDC, 23 mA ¹⁾
	MESO-HX	520 Ω @ 24 VDC, 23 mA ¹⁾

Accuracy

Linearity	RTD Potentiometer, mV	± 0.1 % ¹⁾
	T/C	± 0.1 % ¹⁾
Calibration	RTD	Max. of ± 0.2 °C / ± 0.4 °F or ± 0.1 % ¹⁾
	Potentiometer	Max. of ± 0.1 Ω or ± 0.1 % ¹⁾
	mV, T/C	Max. of ± 20 μ V or ± 0.1 % ¹⁾
Cold Junction Compensation (CJC)	T/C	± 0.5 °C / ± 0.9 °F
Temperature influence ⁴⁾	All inputs	Max. of ± 0.25 °C/25 °C or ± 0.25 %/25 °C ^{1) 3)}
		Max. of ± 0.5 °F/50 °F or ± 0.28 %/50 °F ^{1) 3)}
Temperature influence CJC ⁴⁾	T/C	± 0.5 °C/25 °C / ± 1.0 °F/50 °F
Instrument calibration output	4-20 mA	± 8 μ A
Sensor wire resistance influence	RTD, Potentiometer, 3-wire	Negligible ²⁾
	RTD, Potentiometer, 4-wire	Negligible
	mV, T/C	Negligible
Load influence		Negligible
Power supply influence		Negligible
RFI influence, 0.15-1000 MHz, 10 V or V/m		± 0.2 % ¹⁾ (typical)
Long-term stability		± 0.1 % ¹⁾ /year

¹⁾ Of input span

²⁾ With equal wire resistance for RTD

³⁾ If zero-deflection > 100% of input span: add 0.125% of input span/25 °C or 0.14% of input span/50 °F per 100% zero-deflection

⁴⁾ Reference temperature 23 °C / 73°F



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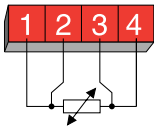
IPAQ-H / IPAQ-HX
MESO-H / MESO-HX
 Temperature Transmitters

IPAQ-H / IPAQ-HX & MESO H / HX Wiring Diagram

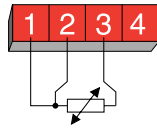
INPUTS (IPAQ-H / HX & MESO-H / HX)

RTD

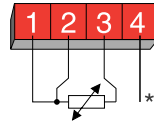
Pt100, Pt1000, Ni100, Ni1000, PtX, D100
 4-wire connection



3-wire connection

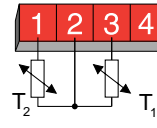


Pt100, D100
 3-wire connection



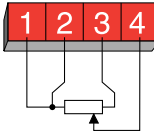
* SmartSense lead

Pt100
 Diff temperature $T_1 > T_2$

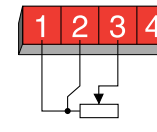


Potentiometer

4-wire connection

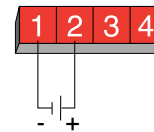


3-wire connection



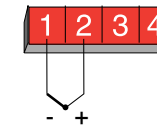
Voltage

millivolt



Thermocouple

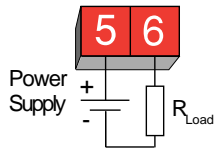
AE,B,E,J,K,L,N,R,S,T,U
 or customer specific



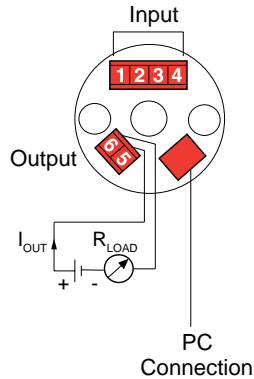
* SmartSense lead

OUTPUT IPAQ-H / HX

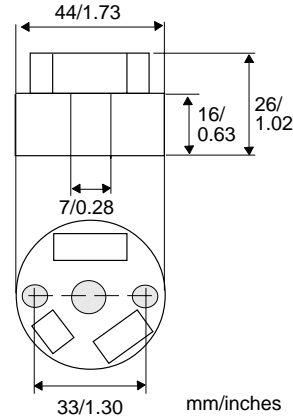
4-20 mA Output



Connections

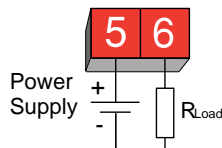


Dimensions

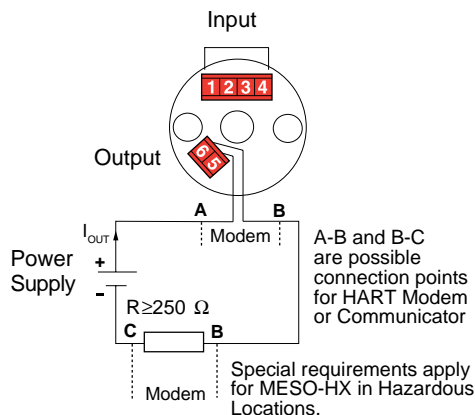


OUTPUT MESO-H / HX

4-20 mA Output



Connections



Dimensions

