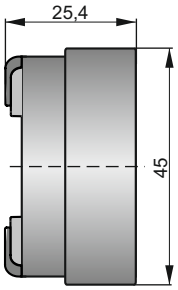
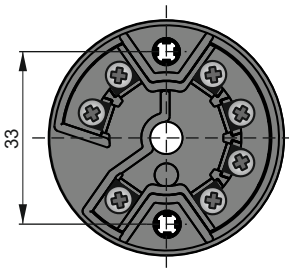
Smart temperature transmitters
LI-24G, LI-24G/AL, LI-24L

HART COMMUNICATION PROTOCOL

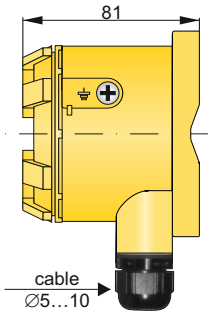
- ✓ Output signal 4…20mA with Hart protocol
- ✓ Galvanic insulation (In, Out)
- ✓ Programmable sensor type
- ✓ Programmable measuring range
- ✓ Thermoresistance line compensation
- ✓ Compensation of thermocouple cold junction
- ✓ Autodiagnostic system
- ✓ Intrinsic safety certificate (ATEX, IECEx)
- ✓ Explosion proof certificate (ATEX, IECEx)
- ✓ Safety version SIL2/SIL3

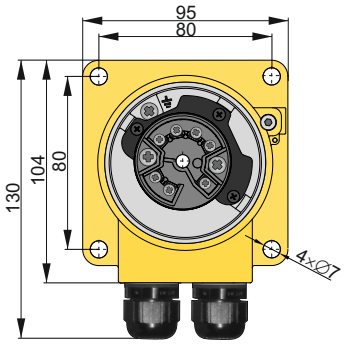
Head-mounted smart temperature transmitter LI-24G



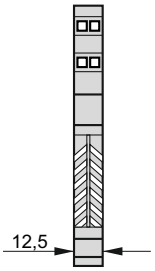


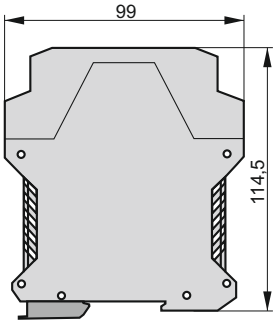
Wall-mounted smart temperature transmitter LI-24G/AL





Rail-mounted smart temperature transmitter LI-24L





Application and function

The LI-24L and LI-24G temperature transmitters are designed to convert a measurement signal from resistance temperature detectors (RTDs) or thermoelectric sensors (thermocouples) into a 4–20 mA current signal. The transmitters can be configured for one or two measurement channels. When configured for two channels, it is possible to measure the difference, average, average with redundancy, minimum, or maximum temperature.
The transmitters feature compensation of ambient temperature influence on measurement error as well as cold-junction compensation for thermocouples using an internal sensor, an external sensor (Pt100), or a fixed reference temperature.The transmitters provide continuous monitoring of memory integrity, correctness of sensor connections, and proper operation of internal components.
In the LI-24L transmitter, detected abnormalities are indicated by a change in color of the LED indicator located on the front of the housing.
Galvanic isolation between input and output allows cooperation with any signal source and ensures reliable operation of the transmitters in industrial environments. Electrical connections can be made using wires with a cross-section of up to 1.75 mm².
The standard communication interface enabling data exchange with the transmitter is the HART protocol.
If the user specifies the sensor type and measurement range when placing an order, Aplisens will supply the transmitter configured according to the order. Configuration changes can be commissioned to Aplisens or performed by the user using a PC, a HART/USB converter, and the RAPORT 2 configuration software.
In addition to changing the measurement range and sensor type, communication with the transmitter allows, among other things, configuration of transmitter behavior in the event of sensor circuit break, transmitter calibration, time constant adjustment, piecewise correction of the output characteristic, offsetting the characteristic by a constant value, and entry of a 60-point user-defined characteristic, which enables adaptation to virtually any sensor.

Technical information

RTD sensors

Thermal resistance sensors	2, 3 or 4 wires connection
Sensor current	~250 µA
Maximum wires resistance	25 Ω

Sensor type	Basic range (FSO)	Min. range span
	°C	K
Pt100	-200÷850	10
Pt200	-200÷850	10
Pt500	-200÷850	10
Pt1000	-200÷266	10
Ni100	-60÷180	10
Cu100	-50÷180	10

Resistance (resistor, potentiometer)

	Ω	Ω
Measuring range No.1	0÷400	10
Measuring range No. 2	0÷2000	10

Thermocouples

Input impedance	>10MΩ
Maximum wires resistance	500 Ω (wires + thermocouple)
Cold junctions compensation	Internal sensor, external sensor Pt100, constant value

Sensor type	Basic range (FSO)	Min. range span
	°C	K
B	500÷1820	50
E	-150÷1000	50
J	-210÷1200	50
K	-150÷1372	50
N	-150÷1300	50
R	50÷1768	50
S	50÷1768	50
T	-150÷400	50
Internal sensor CJC	-40÷80 (Safety -40÷85)	-

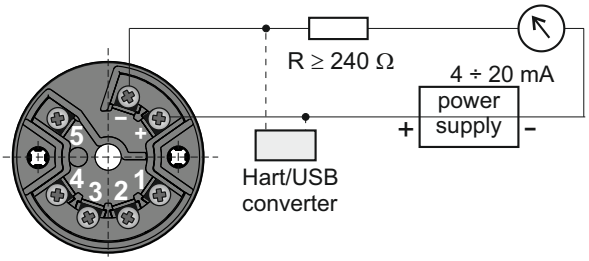
Voltage

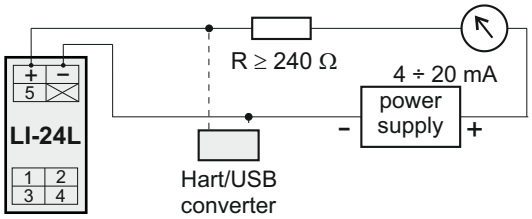
	mV	mV
Measuring range No.1	-10÷100	10
Measuring range No. 2	-100÷1000	10

Input signal	Resistance: Pt100,Ni100 Voltage: K, J,S,B,N,T, R, E
Limit process	-10mV< E<100mV or -100mV< E<1000mV 0Ω<R<400Ω or 0Ω<R<2000Ω
Min. measuring range	10mV or 10Ω or 10K
Output signal	4 - 20 mA + Hart
Power supply	10…36 VDC Ex: 10…30 VDC
Base error	±0,1%
Alarm signal	3,75 mA / 21,6 mA (NORMAL) 3,6 mA / 21 mA (NAMUR NE89)
Time constant	0,2…1s
Additional electronic damping	0...30s
Ambient temperature	-40…+85°C Ex: -40…+70°C
Load resistance	standard: $R[\Omega] \le \frac{U_{SUP.}[V]-10V}{0,0235A}$ Safety version: $R[\Omega] \le \frac{U_{SUP.}[V]-10V}{0,02082A}$

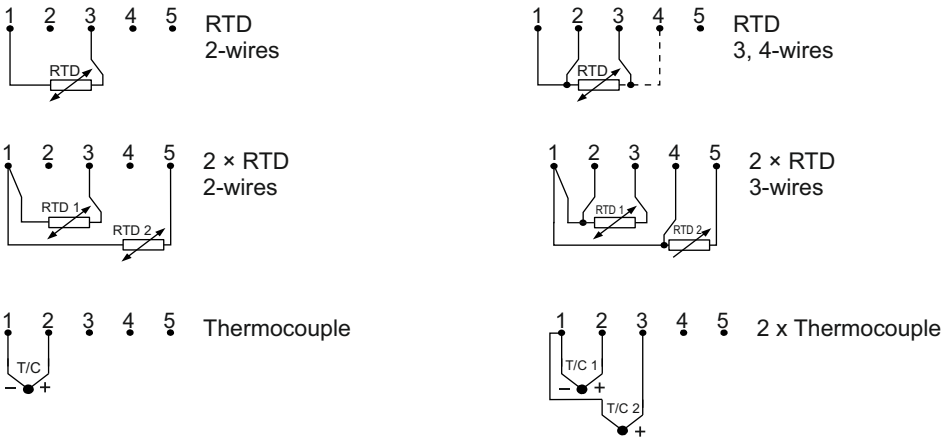
Factory settings
Sensor type: **Pt100**
No. of wires: **3-wires**
Measuring range: **0÷100°C**

Electrical connection



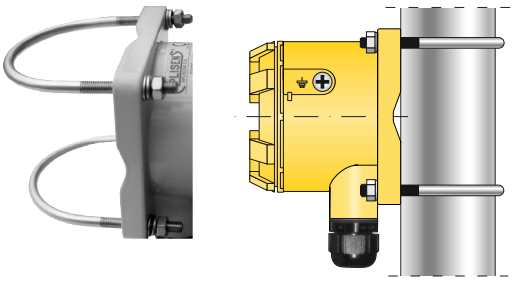


Sensor connection diagrams



*Other sensor connection diagrams are given in the LI-24L and LI-24G transmitter operation manual

Accessories



Mounting bracket UWW
for fitting the transmitter LI-24G/AL on a pipe ∅35...∅65

Ordering procedure

Model	Code		Description
LI-24G			Smart head-mounted temperature transmitter
Certificates, options* * more than one option is available	[without marking].....		Standard version
	/Safety.....		Functional Safety certificate according to PN-EN 61508:2010 parts 1 ÷ 7; - PN-EN 61511-1:2017 + PN-EN 61511-1:2017/A1:2018-03; - PN-EN 62061:2008 + PN-EN 62061:2008/A1:2013-06 + PN-EN 62061:2008/A2:2016-01
	/Exia.....		I M1 Ex ia I Ma II 1G Ex ia IIC T5/T6 Ga II 1D Ex ia IIIC T105°C Da Ex ia I Ma **IECEx** Ex ia IIC T5/T6 Ga Ex ia IIIC T105°C Da
Configuration/programming (optional)**	/.....		type of element, element class, no. of wires, set range, alarm

**factory setting PT100, 0…100 degC, 3-wires, A-class

Model	Code		Description
LI-24G/AL			Smart wall-mounted temperature transmitter
Certificates, options* * more than one option is available	[without marking].....		Standard version
	/Safety.....		Functional Safety certificate according to PN-EN 61508:2010 parts 1 ÷ 7; - PN-EN 61511-1:2017 + PN-EN 61511-1:2017/A1:2018-03; - PN-EN 62061:2008 + PN-EN 62061:2008/A1:2013-06 + PN-EN 62061:2008/A2:2016-01
	/Exia.....		II 1G Ex ia IIC T5/T6 Ga **IECEx** Ex ia IIC T5/T6 Ga
	/Exia(Da).....		II 1G Ex ia IIC T5/T6 Ga II 1D Ex ia IIIC T105°C Da **IECEx** Ex ia IIC T5/T6 Ga Ex ia IIIC T105°C Da
	/Exd.....		II 2G Ex db IIC T5 Gb II 2D Ex tb IIIC T110°C Db **IECEx** Ex db IIC T5 Gb Ex tb IIIC T110°C Db
	/Exia/Exd.....		Double certified temperature transmitter
Configuration/programming (optional)**	/.....		type of element, element class, no. of wires, set range, alarm
Accessories	/UWW.....		Mounting bracket UWW for fitting the transmitter LI-24G/AL on a pipe ∅35... ∅65

**factory setting PT100, 0…100 degC, 3-wires, A-class

Model	Code		Description
LI-24L			Smart wall-mounted temperature transmitter
Certificates, options* * more than one option is available	[without marking].....		Standard version
	/Safety.....		Functional Safety certificate according to PN-EN 61508:2010 parts 1 ÷ 7; - PN-EN 61511-1:2017 + PN-EN 61511-1:2017/A1:2018-03; - PN-EN 62061:2008 + PN-EN 62061:2008/A1:2013-06 + PN-EN 62061:2008/A2:2016-01
	/Exia.....		II 2G Ex db IIC T5 Gb II 2D Ex tb IIIC T110°C Db Ex db IIC T5 Gb **IECEx** Ex tb IIIC T110°C Db
Configuration/programming (optional)**	/.....		type of element, element class, no. of wires, set range, alarm

**factory setting PT100, 0…100 degC, 3-wires, A-class