The selection is detailed on page 6

S30

Fieldbus Temperature Transmitter

Working principle

Temperature transmitter adopts thermocouple and thermal resistance as temperature measuring element, the output signal from the temperature measuring element is sent to the transmitter module, after voltage regulation filter, operation amplification, nonlinear correction, V/I conversion, constant current and reverse protection circuit processing, converted into a linear relationship with temperature 4-20mA current signal 0-5V/0-10V voltage signal. RS485 digital signal output.

Product application

Process industry
Machine building
Plant construction
General industrial application

Product description

The Model S30 Fieldbus temperature transmitter with FOUNDATION™ and PROFIBUS®PA fieldbus communication is suitable for resistance thermometers and thermocouples in temperature measurement.

In addition, resistance and mV measurements can be made with or without customer-specified linearization conditions.
Differential, average or redundant temperature measurement can be achieved.
The S30 comes with features available on the FOUNDATION™Fieldbus of LAS (link activity scheduler) and PID tuning.

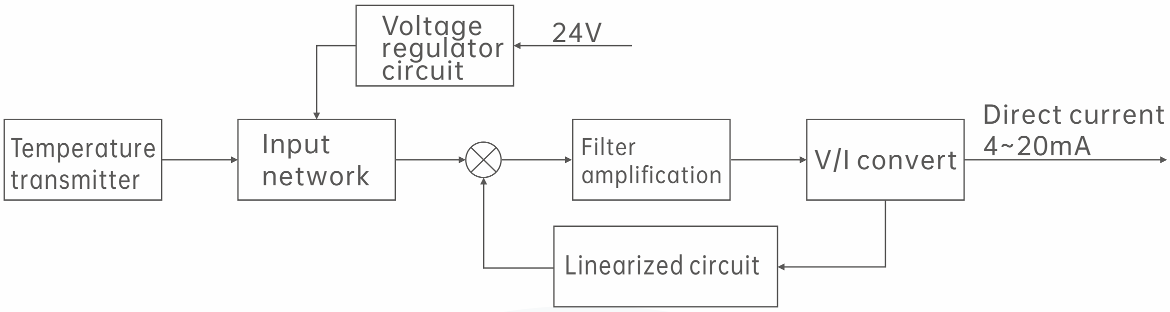
These features allow independence from host field instrument regulations.

Due to its small size, the Model S30 temperature transmitter is suitable for all DINB type connectors.

Functional characteristics

FOUNDATION™Fieldbus ITK version 4.61
PROFIBUS®PA configuration file
Automatically switch between protocols

Schematic diagram



Technical parameter

Temperature transmitter input							
Sensor type	Input signal	Maximum configurable measurement Radius[1]	Standard	α value	Minimum range[14]	Typical measurement deviation[2]	Temperature coefficient per ℃ Type value[3]
Resistance sensor	Pt100	-200...+850℃	IEC 60751:2008	α = 0.00385	10 K or 3.8 Ω (whichever is larger)	≤±0.12 ℃[5]	≤±0.0094℃[6,7]
	Pt(x)4)	-200...+850℃	IEC 60751:2008	α = 0.00385		≤±0.12 ℃[5]	≤±0.0094℃[6,7]
	JPt100	-200...+500℃	JIS C1606:1989	α = 0.003916		≤±0.12 ℃[5]	≤±0.0094℃[6,7]
	Ni100	-60...+250℃	DIN 43760:1987	α = 0.00618		≤±0.12 ℃[5]	≤±0.0094℃[6,7]
	Resistance sensor	0...8,370Ω	-	-	4 Ω	≤±1.68 Ω[8]	≤±0.1584 Ω[8]
	Potentiometer 9)	0...100 %	-	-	10 %	≤0.50 %[10]	≤±0.0100 %[10]
The measured current at the time of measurement		Max. 0.3mA (Pt100)					
Connection mode		1 sensor 2-/4-/3- wire connection or 2 sensors 2- wire connection					
		(For more information, see "Naming Terminals")					
Maximum lead resistance		50Ω per wire, 3-/ 4-wire system					
Thermoelectric couple	Type J (Fe-CuNi)	-210...+1,200℃	IEC 60584-1: 1995		50 K or 2 mV (whichever is larger)	≤±0.91 ℃[11]	≤±0.0217℃[7,11]
	Type K (NiCr-Ni)	-270...+1,300℃	IEC 60584-1: 1995			≤±0.98 ℃[11]	≤±0.0238℃[7,11]
	L-type (Fe-CuNi)	-200...+900℃	DIN 43760: 1987			≤±0.91 ℃[11]	≤±0.0203℃[7,11]
	E type (NiCr-Cu)	-270...+1,000℃	IEC 60584-1: 1995			≤±0.91 ℃[11]	≤±0.0224℃[7,11]
	N-type (NiCrSi-NiSi)	-270...+1,300℃	IEC 60584-1: 1995			≤±1.02 ℃[11]	≤±0.0238℃[7,11]
	T-type (Cu-CuNi)	-270...+400℃	IEC 60584-1: 1995			≤±0.92 ℃[11]	≤±0.0191℃[7,11]
	Type U(Cu-CuNi)	-200...+600℃	DIN 43710: 1985			≤±0.92 ℃[11]	≤±0.0191℃[7,11]
	Type R (PtRh-Pt)	-50...+1,768℃	IEC 60584-1: 1995		150 K	≤±1.66 ℃[11]	≤±0.0338℃[7,11]
	Type S (PtRh-Pt)	-50...+1,768℃	IEC 60584-1: 1995		150 K	≤ ±1.66 ℃[11]	≤±0.0338℃[7,11]
	Type B (PtRh-Pt)	0...+1,820℃[15]	IEC 60584-1: 1995		200 K	≤ ±1.73 ℃[11]	≤±0.0500℃[7,12]
		-500...+1,800mV	-		4 mV	≤ ±0.33 mV[13]	≤±0.0311mV[7,13]
Connection mode		1 sensor or 2 sensors					
		(For more information, see "Naming Terminals")					
Maximum lead resistance		Each line is 5 kΩ					
Cold end compensation, configurable		Internal compensation or use Pt100 external compensation, with thermostat or off					

1) Other units can also be used (such as °F and K)
2) Measurement deviation (input + output) at 23℃ ±3 K ambient temperature, without considering the influence of lead resistance
3) Temperature coefficient per °C (input + output)
4) x is available in 10... The value between 1000 is configured
5) Based on 3-wire Pt100, Ni100, 150℃ MV
6) Based on 150℃ MV
7) At -40... +85 ° C ambient temperature range
8) Based on a sensor (Max. 5 kΩ)
9) Total resistance value Rtotal: 10... 100 kΩ
10) Based on 50% of the potentiometer value
11) Based on 400 ℃ MV, with cold end compensation error
12) Based on 1000 ℃ MV, with cold end compensation error
13) Based on 0... 1 V measuring range, 400 mV MV
14) Transmitters can be configured below these limits, but this is not recommended because of the loss of accuracy.
15) Specifications only apply to 450... Measuring range between 1820 ° C

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For more product information, please visit www.ludwig-schneider.com.cn

LUDWIG INSTRUMENT

User linearization

Specific sensor characteristics can be saved to the transmitter through software so that more other types of sensors can be used. Number of data points: minimum 2; Up to 30

Connect 2 sensors (dual sensors) for monitoring function

If an error occurs in one of the two sensors (sensor damage, lead resistance is too high, or out of sensor measurement range, etc.), the process value will depend only on the sensor that did not fail. After the error is corrected, the process value is re-calculated based on either the two sensors or sensor 1。

Aging control (Sensor drift monitoring)

If the temperature deviation between sensor 1 and sensor 2 is greater than the set value (which can be selected by the user), the output activates an error signal. Only when both sensor values are valid and the temperature difference is higher than the selected limit will the monitoring mechanism send a corresponding signal.
(Limits cannot be selected when using the Difference sensor function because the output signal represents the difference between the two).

Remark

Transmitters can be configured below these limits, but this is not recommended to avoid loss of accuracy.

Difference value

4... The 20mA output signal transmits the difference between sensor 1 and sensor 2. If one sensor fails, an error signal is activated.

Connect 2 sensors (dual sensors) for monitoring function - Sensor 1, Sensor 2 redundancy

4... The 20mA output signal transmits the process value of sensor 1. If sensor 1 fails, the process value of sensor 2 is output (sensor 2 is a redundant sensor).

Mean value

4... The 20mA output signal transmits the average value of sensor 1 and sensor 2. If a sensor fails, the process value of the sensor that did not fail is output.

Minimum value

4... The 20mA output signal transmits the minimum values in Sensor 1 and Sensor 2. If a sensor fails, the process value of the sensor that did not fail is output.

Maximum value

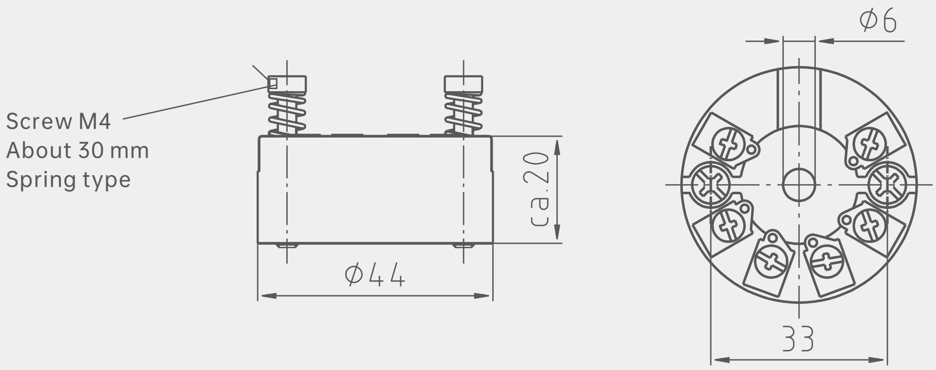
4... The 20mA output signal transmits the maximum value in sensor 1 and Sensor 2. If a sensor fails, the process value of the sensor that did not fail is output.

Analog output, output limit, prompt signal		
Analog output, configurable	Linear with temperature (IEC 60751, JIS C1606, DIN 43760, resistive sensors) or linear with temperatureRelation (IEC 584 / DIN 43710 standard, thermocouple)	
	4... 20 mA or 20... 4 mA, 2 wire system	
Output limits, configurable	Lower limit value	Upper limit value
▪ NAMUR NE43 Standard	3.8mA	20.5mA
▪ Can be adjusted according to user specific requirements	3.6 ... 4.0 mA	20.0 ... 21.5 mA
▪ SIL Options	3.8 ... 4.0 mA	20.0 ... 20.5 mA
Output limits, configurable	Cut down	expand
▪ NAMUR NE43 Standard	< 3.6mA (3.5mA)	> 21.0mA (21.5mA)
▪ Set range	3.5 ... 3.6 mA	21.0 ... 23.0 mA
▪ PV (Primary value; Digital HART® measurements)	The default value indicates that the sensor sends signals and hardware errors	
In analog mode, independent of the input signal, the analog value can be 3.5... The configuration is performed in the 23.0 mA range		
▪ Load RA (without HART®)	RA ≤ (UB -10.5 V) / 0.023 A, The unit of RA is Ω, and the unit of UB is V	
▪ Load RA (with HART®)	RA ≤ (UB -11.5 V) / 0.023 A, The unit of RA is Ω, and the unit of UB is V	
▪ Insulation voltage	AC 1200 V, (50 Hz / 60 Hz); 1s	

Rise time, damping, measurement frequency	
Rise time t_{90}	About 0.8 seconds
Damping, configurable	Close; It can be configured in 1 to 60 seconds
Start-up time	Startup time (time required to obtain the first measurement)
Typical measurement frequency	Measurements are updated approximately 6 times per second

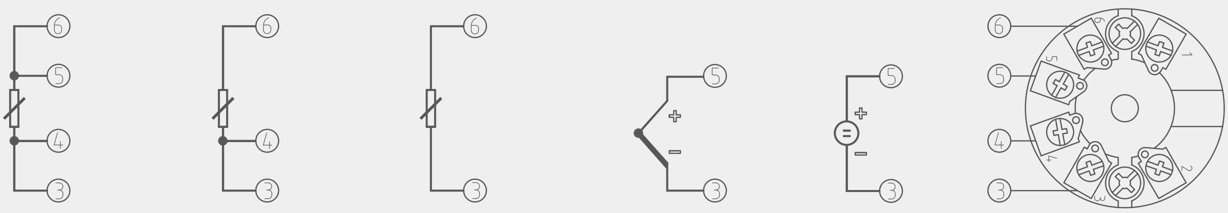
Measurement deviation, temperature coefficient, long-term stability				
Load effect	immeasurable			
Power effect	immeasurable			
Preheating time	After about 5 minutes, the instrument will reach the requirements of the specification parameters (accuracy).			
Input	Measurement deviations under reference conditions (DIN EN 60770, NE 145 standard), suitable for 23 ° C ±3K	- 40... +85℃ ambient temperature changes every 10 K Should be the average temperature coefficient (TC)[1]	Lead resistance effect	Long-term stability after 1 year
Thermal resistance thermometer	-200 °C ≤ MV ≤ 200 °C: ±0.10 K	±(0.06K+0.015% MV)	4-wire system: No effect (perThe lines are 0 to 50Ω) 3-wire system: ±0.02Ω/10Ω (Each line is0 to 50Ω) 2-wire system: lead connection Resistance of[4]	±60mΩ or MV value0.05% of (whichever is larger)
Pt1002)/JPt100/ Ni100	MV > 200 °C:			
	±(0.1 K + 0.01 % |MV-200 K|)[3]			
Resistance sensor[5]	≤ 890 Ω: 0.053 Ω [6] or 0.015 % MV[7]	±(0.01Ω+0.01% MV)		
	≤ 2140 Ω: 0.128 Ω [6] or 0.015 % MV[7]			
	≤ 4390 Ω: 0.263 Ω [6] or 0.015 % MV[7]			
	≤ 8380 Ω: 0.503 Ω [6] or 0.015 % MV[7]			
potentiometer[5]	R_{part}/R_{total} Max ±0.5 %	±(0.1% MV)	-	±20 µV or MV 0.05% of the value (Whichever is greater)
Thermoelectric couple	-150 °C < MV < 0 °C:	E type:	6 µV/1,000Ω[8]	
E and J types	±(0.3 K + 0.2 % |MV|)	MV>-150°C: ±(0.1K+0.015% |MV|)		
	MV > 0 °C:	J type:		
	±(0.3 K + 0.03 % MV)	MV>-150°C:±(0.07K+0.02% |MV|)		
T and U shapes	-150 °C < MV < 0 °C:	-150°C<MV<0°C:		
	±(0.4 K + 0.2 % |MV|)	±(0.07K+0.04% MV)		
	MV > 0 °C:	MV>0°C:		
	±(0.4 K + 0.01 % MV)	±(0.07K+0.01% MV)		
R and S	50 °C < MV < 400 °C:	R type: 50°C<MV<1,600°C:		
	±(1.45 K + 0.12 % |MV - 400 K|)	±(0.3K+0.01% |MV-400K|)		
	400 °C < MV < 1600 °C:	S type: 50°C<MV<1600 °C:		
	±(1.45 K + 0.01 % |MV - 400 K|)	±(0.3K+0.015% |MV-400K|)		
B type	450 °C < MV < 1,000 °C:	450°C<MV<1,000°C:		
	±(1.7 K + 0.2 % |MV - 1,000 K|)	±(0.4K+0.02% |MV - 1,000 K|)		
	MV > 1,000 °C:	MV>1,000°C:		
	±1.7 K	±(0.4K+0.005% (MV-1,000K)		
K type	-150 °C < MV < 0 °C:	-150°C<MV<1,300°C:		
	±(0.4 K + 0.2 % |MV|)	±(0.1K+0.02% |MV|)		
	0 °C < MV < 1,300 °C:	-		
	±(0.4 K + 0.04 % MV)	-		
L type	-150 °C < MV < 0 °C:	-150°C<MV<0°C:		
	±(0.3 K + 0.1 % |MV|)	±(0.07K+0.02% |MV|)		
	MV > 0 °C: ±(0.3 K + 0.03 % MV)	MV>0°C: ±(0.07K+0.015 % MV)		
N type	-150 °C < MV < 0 °C:	-150°C<MV<0°C:		
	±(0.5 K + 0.2 % |MV|)	±(0.1K+0.05% |MV|)		
	MV > 0 °C: ±(0.5 K + 0.03 % MV)	MV>0°C: ±(0.1K+0.02% MV)		
mV sensor[5]	≤1,160 mV: 10 µV + 0.03 % |MV|	2µV+0.02% |MV|		
	>1,160 mV: 15 µV + 0.07 % |MV|	100µV+0.08% |MV|		
Cold end[9]	±0.8 K	±0.1K	-	±0.2 K
Exportation	±0.03 % range	±0.03% range	-	±0.05% range

Size mm

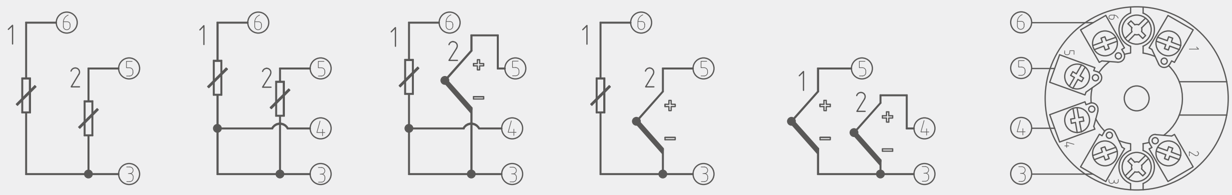


Name of the connection terminal

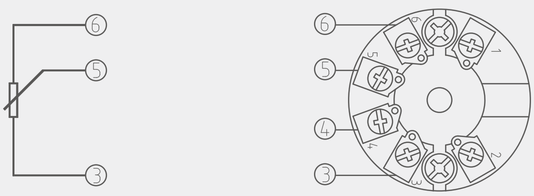
1 sensor



1 sensor



Potential sensor



Terminals 1 and 2: Connect FOUNDATION™ Fieldbus or PROFIBUS® PA (Anti-polarity)

✆ 400-860-9760

S30-Selection composition

Selection example **S30** S / A / L / 0-400
1 2 3 4

Item	Code	Description
1.Output signal	S	4-20mA+FOUNDATION
	O	4-20mA+PROFIBUS®PA
	T( )	Other output signals
2.Input signal	A	Pt100, Grade B
	B	Pt100, Grade A
	C	Pt1000,Grade B
	D	Pt1000, Grade A
	E	K(NiCr-Ni)
	F	E(NiCr-CuNi)
	G	N(NiCrSi-NiSi)
	H	J(Fe-CuNi)
	I	J(T-CuNi)
	T( )	Other measuring elements
3.Wire system	L	2Wire system
	M	3Wire system
	N	4Wire system
4.Temperature range	C( )	Set temperature range (unit: ℃)
	F( )	Set temperature range (unit: ℉)
5.Additional order information	X	Additional information
	N	There is no

Instructions:

Indicates that the S30 temperature transmitter output 4-20mA+FOUNDATION, input Pt100,B, 2-wire system, temperature range 0-400℃, the fifth item is not required.

Product Certification

Compliance and approval; Rodeweig pressure gauges meet key standards and certifications for process measurement technology;
Thus guaranteeing the highest reliability in such Settings;