Technical Data Sheet

Theta 60R

Fig. 1 Theta R, 1 channel version, in housing S17 clipped on to a top - hat rail.

Fig. 2 Theta R, 2 channel version, in housing S17 hole mounting brackets pulled out.

The transmitter Theta 60R (Fig. 1 and 2) Converts the input variable-a signal from a resistance thermometer Pt 100- to a temperature linear output signal.

Special Features

- Measuring ranges configurable with DIP switch and potentiometer .
- Red LED's indicator : an open or short - circuit.
- Electric isolation between input & output 2.3 kV and power supply & all other circuits 3.7 kV - Fulfils EN 61 010.
- Provision for either snapping the transmitter onto top-hat rails or securing it with screws to a wall or panel.
- Housing only 17.5 mm wide (size S17) / low space requirement

Application

Theta 60R The transmitter Theta R (Fig. 1 and 2) Converts the input variable-a signal from a resistance thermometer Pt 100- to a temperature linear output signal.

The analogue output signal is either an impressed current or superimposed voltage which is processed by other devices for purposes of displaying, recording and / or regulating a constant.

Versions are available for two, three or four - wire connection.

DIP switches are provided for the coarse setting of the measuring range and the fine adjustment is accomplished using the potentiometers.

Red LED's signal an open or short-circuit feeler. In both cases, the output signal adopts its maximum value.

In the case of an current output, provision is made for switching between 0... 20 mA and 4... 20 mA.

The transmitter fulfil all the important requirements and regulations concerning electromagnetic compatibility EMS & safety (IEC 1010 resp. EN 61 010). It was developed & is manufactured & tested in strict accordance with the quality assurance standard & ISO 9001

Technical Specifications

Reference conditions	
Ambient temperature	23 °C, ± 2 K
Power supply	24 VDC ± 10% and 230 VAC ±10%
Output burden	Current: 0.5 . R_{ext} max. Voltage: 2 . R_{ext} min.
An external supply fuse must be provided for DC supply voltages supply > 125 V.	

Accuracy data (acc. to DIN/IEC 770)	
Basic accuracy	Max. error ≤ + 0.5% including linearity and repeatability errors for a standard range 0 ... 100 °C and for reference conditions.
Additional error (additive)	< ± 0.35 % for linearised characteristic.
Influence of lead resistance	− Two - wire connection Compensated by potentiometer − Three - wire connection : 0.15 K of measuring range per 10 Ω Lead resistance ≥ 0.375 K total − Four - wire connection : 0.1 K of measuring range per 10 Ω Lead resistance ≥ 0.375 K total
Selector switch for 0...20 / 4...20 mA	± 0.1%

Influencing factors	
Temperature	< ± 0.2 % per 10 K
Burden	< ± 0.1 % for current output < 0.2 % for voltage output, if R_{ext} > 2. R_{ext} min.
Long-term drift	< ± 0.3 % / 12 months
Switch-on drift	< ± 0.5 %

Measuring input resp. measuring inputs⊖	
Resistance thermometer	Type Pt 100 (DIN IEC 751)
Measuring current	< 1 mA
Input resistance	Ri > 4 MΩ
Lead resistance	Two - wire connection ≤ 25 Ω per lead (total 50 Ω Three - / four - wire connection ≤ 25 Ω per Lead
Temperature range	Two - wire connection -150 ... 800 °C Three - / four - wire connection -170 ... 800 °C
Min. span	50°C
Max. span	700°C
Example 1 : Range -150°C to 800°C	Lower side possible range is -150°C to 550°C (Span=700°C) Higher side possible range is 100°C to 800°C (Span=700°C)
Example 2 : Range 0°C to 45°C or -20°C to 10°C	These ranges are not possible because Min span required is 50°C whereas available span is less than 50°C
Max. initial value	Two - wire connection 400 °C Three-/four - wire connection 500 °C
Max. ratio between offset and span	$\frac{T_A}{T_E - T_A}$ < 10 (T_A and T_E in °C)
Measuring range settings	− Coarse setting with DIP switches − Fine adjustment with potentiometer "Zero" and "Span"
Potentiometer setting range	Dependent on temperature range, typical values : − Span, approx. ± 60% of full scale − Offset, approx. ± 100 °C (12 - turn helical potentiometer)

Technical Specifications

Measuring output resp. measuring outputs

DC current	0 / 4 ... 20 mA switchable by plug - in jumper
Burden voltage	10 V
Open-circuit voltage	< 20 V
External resistance	R_{ext} max.≤ 500 Ω
Residual ripple	< 1.5% p.p., DC...10 kHz
DC voltage	0...10 V
Short-circuit current	≤ 40 mA
Load capacity	R_{ext} min. ≥ 2 kΩ
Residual ripple	< 1.5% p.p., DC...10 kHz
Response time	≤ 500 ms

Open-circuit sensor circuit and short-circuit supervision

Pick-up level	– At open - circuit approximately 1 to 400 kΩ – At short - circuit approximately 0...30 Ω
Fault signaling mode	– Frontplate signals Red LED for signaling fault – Output signal at 0 / 4...20 mA, output approx. 25 mA at 0...10V, output approx. 12.5 V

Standard

Electromagnetic	The standard DIN EN 50 081-2 &
Compatibility	DIN EN 50 082-2 are observed
Protection (acc. to IEC 529 resp. EN 60 529)	Housing IP 40 Terminals IP 20
Electrical standards	Acc. to IEC 1010 resp. EN 60 010
Operating voltages	< 300 V between all insulated circuit
Pollution degree	2

Installation Category

acc. to IEC 664	III for power supply II for measuring input and measuring output
Double insulation	– Power supply versus all circuits – Measuring input versus measuring output
Test voltage	Power supply versus: –all 3.7 kV, 50 Hz, 1 min. Measuring inputs versus: – measuring outputs 2.3 kV, 50 Hz, 1 min. Measuring input 1 versus: – measuring input 2 2.3 kV, 50 Hz, 1 min. Measuring output 1 versus: – measuring output 2 2.3 kV, 50 Hz, 1 min.

Power supply H

AC/DC power pack (DC and 45...400 Hz)

Table 3: Rated voltages and permissible variations

Nominal voltages U_N	Permissible variation
24... 60 V DC / AC	DC -15... + 33% AC ± 15%
85...230 V DC / AC	

Power consumption

1 Channel version

≤ 1.2 W respectively ≤ 2.3 VA

2 channel version

≤ 1.8 W respectively ≤ 3.4 VA

Environmental Conditions

Commissioning temperature	-10 to + 55 °C
Operating temperature	-25 to + 55 °C
Storage temperature	-40 to + 70 °C
Annual mean relative humidity	≤ 75%

Electrical insulation

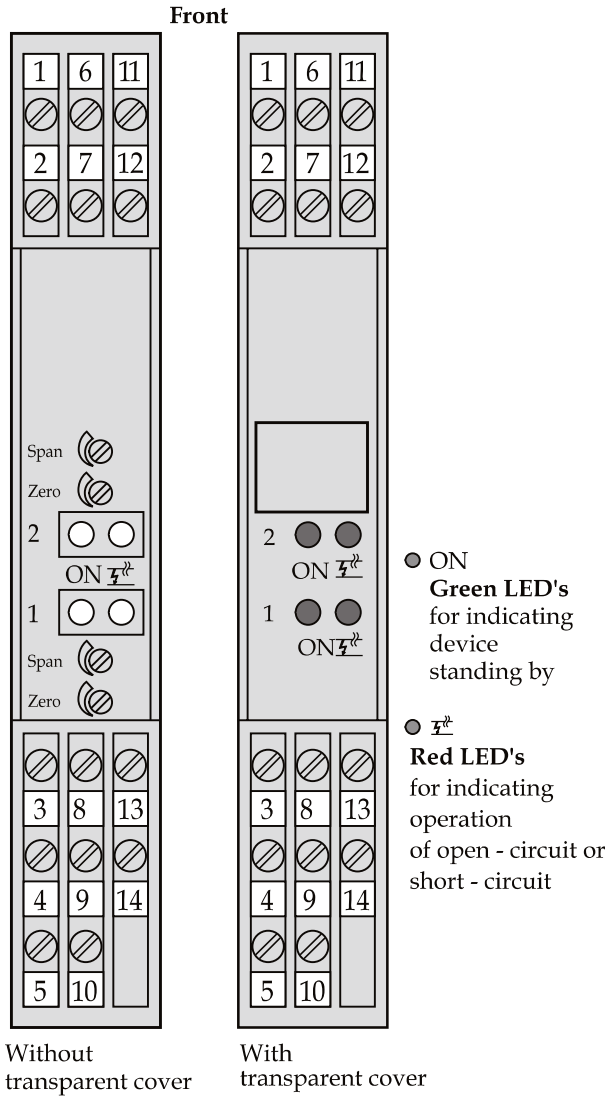
All circuits (measuring inputs / measuring outputs / power supply) are electrically insulated

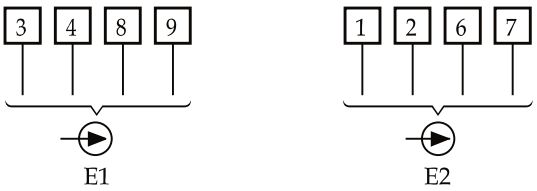
Permissible vibrations	2 g acc. to EN 60 068-2-6
Shock	50 g 3 shocks each in 6 directions acc. to EN 60 068 - 2 - 27
Weight	1 channel approximately 180 g 2 channel approximately 200 g

Installation Data

Mechanical design	Housing S17 Refer to Section "Dimensional drawings" for dimensions
Material of housing	Lexan 940 (Polycarbonate) Flammability class V-0 acc. to UL 94, self - extinguishing, non - dripping, free of halogen
Mounting	For snapping onto top - hat rail (35X15 mm or 35X7.5 mm) acc. to EN 50 022or directly onto a wall or panel using the pull - out screw hole brackets
Mounting position	Any
Terminals	DIN / VDE 0609 Screw terminals with wire guards for light PVC wiring and max. 2 X 0.75 mm^2or 1 X 2.5 mm^2

Electrical connections





E1 = Measuring input 1 } Terminal allocation acc. to
E2 = Measuring input 2 } Connection mode, see Table 4
A1 = Measuring Output 1
A2 = Measuring Output 2
H = Power supply

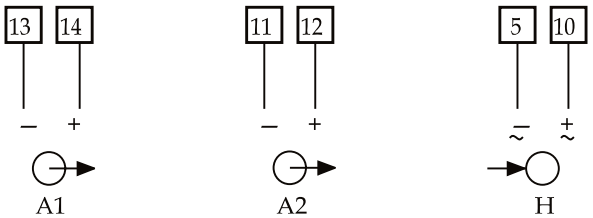
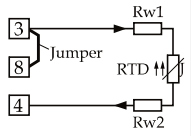
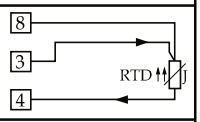
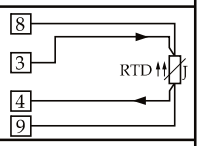
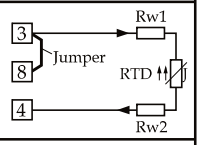
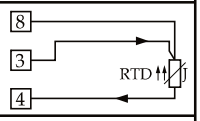
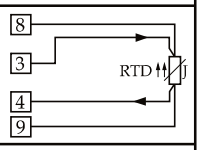
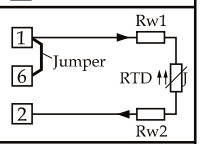
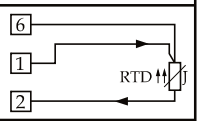
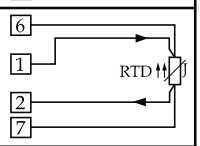


Table 4 : Connection of the measuring input leads E1 and E2

	Measuring inputs	Connection mode*	Wiring diagram Terminal arrangement
Version with 1 input	Measuring input E1	Two-wire connection	
		Three-wire connection	
		Four-wire connection	
Version with 2 inputs	Measuring input E1	Two-wire connection	
		Three-wire connection	
		Four-wire connection	
	Measuring input E2	Two-wire connection	
		Three-wire connection	
		Four-wire connection	

* Theta R units with type designations 602-1XX 1 and 602-1XX 2 can operate with either two or three-wire connections, but units with the type designation 602-1XX 3 only operate with a four-wire connection.

Dimension Details

(All dimensions are in mm)

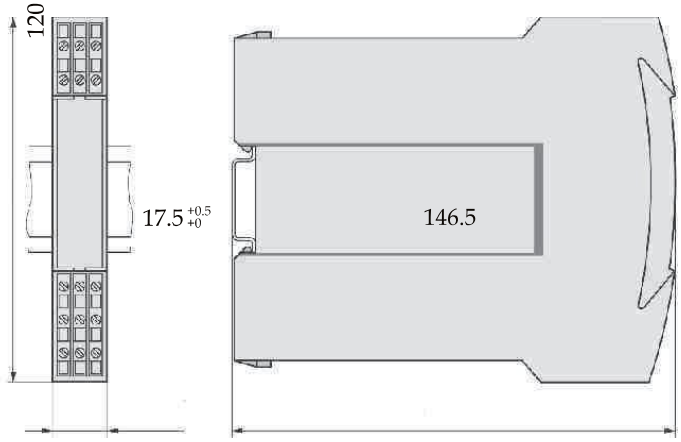


Fig. 3 Theta R in housing S 17 clipped onto a top -hat rail (35 X 15 mm or 35 X 7.5 mm, acc. to EN 50 022).

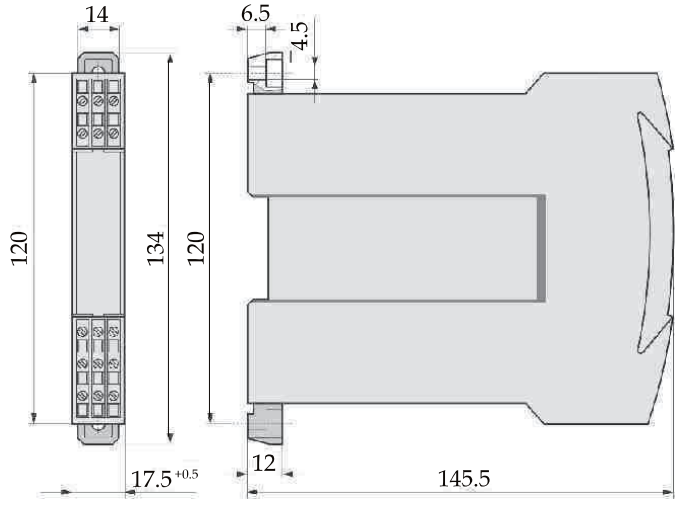


Fig. 4 Theta R in housing S 17 with screw hole brackets pulled out for wall mounting.

Standard Versions

Inputs (s) set to a range of 0...100 °C and output (s) to a range of 4... 20 mA. Configured for three - wire connection. DIP switches enable the temperature range to be configured between a minimum of -170 °C to a maximum of + 800 °C; potentiometer for fine calibration of " Zero " and " Span ".

Table 1: Standard version with 1 input 1 output

Input	Output	Power supply DC/AC
0...100 °C configurable	0/4...20 mA $R_{ext.}$ ≤500 Ω	24... 60 V
		85...230 V

Table 2: Standard version with 2 input 2 output

Inputs 1 & 2	Outputs 1 & 2	Power supply DC/AC
0...100 °C configurable	0/4...20 mA $R_{ext.}$ ≤500 Ω	24... 60 V
		85...230 V

Standard accessories : 1 Operating Instructions 2 Pull out clamp S17 (for opening the housing) 3 Front label

Ordering Information

Product Code	TT61-	X	X	XX	X	00000000
Channel	1 Channel 1CH	1				
	2 Channel 2CH	2				
Connection Mode	2/3 Wire 2/3W		1			
	4 Wire 4W		2			
1 O/P Range	4/0-20mA			61		
	0-10V			5H		
Power Supply	24-60U				F	
	85-230U				J	

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