

RISH Ducer PT 602, 1 or 2 channels **Configurable transmitter for Pt 100**

Data Sheet

Transducer for measuring
Temperature (Equivalent resistance)



Fig. 1 RISH Ducer PT 602, 1 channel version, in housing S17 clipped on to a top - hat rail.



Fig. 2 RISH Ducer PT 602, 2 channel version, in housing S17 hole mounting brackets pulled out.



Application

The transmitter RISH *Ducer* PT 602 (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

Features / Benefits

- Measuring ranges configurable with DIP switch and potentiometer .
- Non - Standard user - specific ranges available .
- 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.
- Universal (DC / AC) power supply.
- 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

Technical data

Measuring input resp. measuring inputs—⊖

Resistance thermometer	Type Pt 100 (DIN IEC 751)
Measuring current	< 1 mA
Input resistance	R _i > 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

$$\frac{T_A}{T_E - T_A} < 10 \quad (T_A \text{ and } T_E \text{ in } ^\circ\text{C})$$

Measuring range settings

— Coarse setting with DIP switches
— Fine adjustment with potentiometer "Zero" and "Span"
Dependent on temperature range, typical values :
— Span, approx. ± 60% of full scale
— Offset, approx. ± 100°C
(12 - turn helical potentiometer)

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

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%

Reference conditions

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

Influencing factors

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

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 $\pm 15\%$
85...230 V ¹ 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	$\leq 75\%$

Standard

Electromagnetic Compatibility	The standard DIN EN 50 081-2 & 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

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

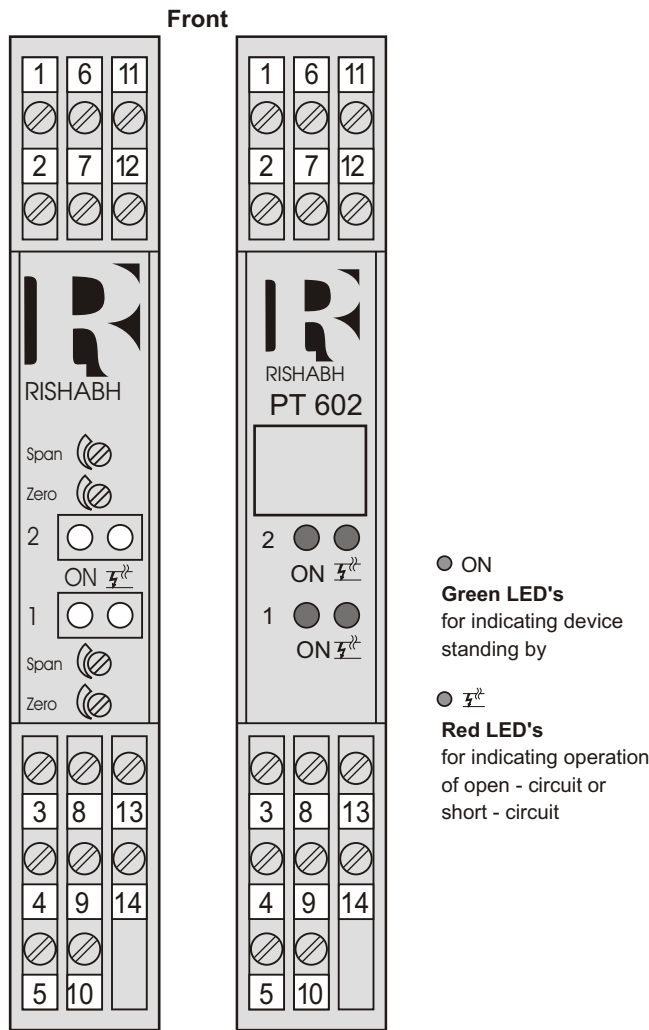
Installation Category

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.

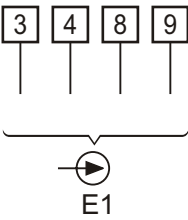
Installation Data

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 50 022 or 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 ² or 1 X 2.5 mm ²

Electrical connections



Without transparent cover



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

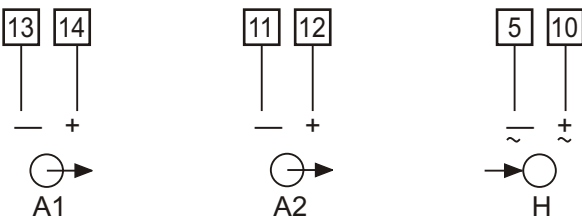


Table 4 : Connection of the measuring input leads E1 and E2

	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	

* RISH Ducer PT 602 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.

Dimensional Drawings

(All dimensions are in mm)

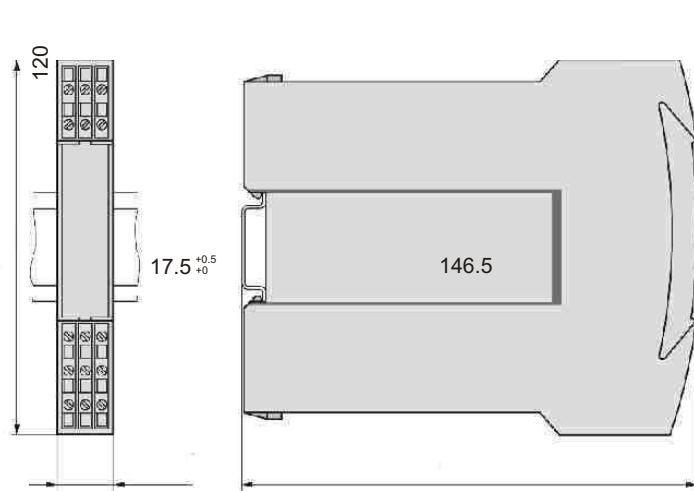


Fig. 3 **RISH Ducer** PT 602 in housing S 17 clipped onto a top-hat rail (35 X 15 mm or 35 X 7.5 mm, acc. to EN 50 022).

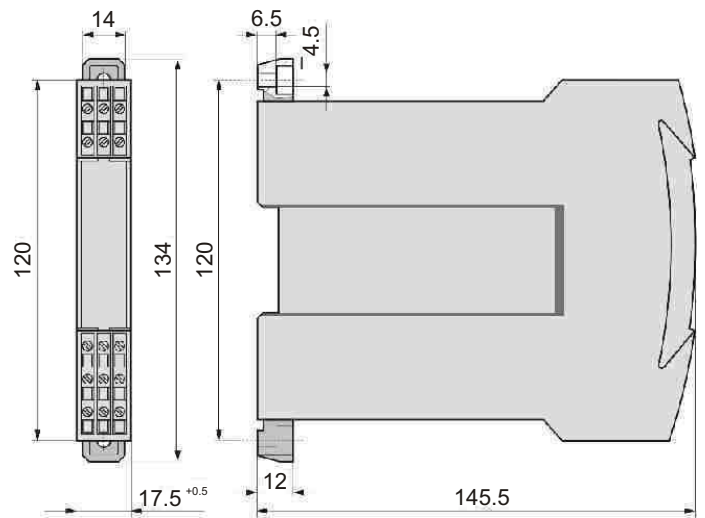


Fig. 4 **RISH Ducer** PT 602 in housing S 17 with screw hole brackets pulled out for wall mounting.

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	24... 60 V
	$R_{ext.} \leq 500 \Omega$	85...230V





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	24...60 V
	$R_{ext.} \leq 500 \Omega$	85...230V

Standard accessories

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

Table 5 : Ordering Information (See also Table 1 and 2 : "Standard Version")

DESCRIPTION	MARKING
1. Mechanical design Housing S17 for rail and wall mounting	602 - 1
2. Number of measuring inputs / measuring ranges 1) With 1 measuring input / measuring range 2) With 2 measuring inputs / measuring ranges	1 2
3. Version / Power supply 1) Standard, / 24 ... 60 V DC/AC 2) Standard, / 85 ... 230 V DC/AC	1 2
4. Connection mode (applies to inputs 1 and 2) 1) Two-wire connection RL1 [Ω]  RL2 [Ω]  2) Three-wire connection 3) Four-wire connection	1 2 3
5. Measuring input 1 1) Measuring range 0...100°C 9) Measuring range [°C]  Line 1: Measuring ranges configurable, see Operating Instructions Line 9: —170 to + 800 °C, span min. 50 °C, max. 700 °C, see technical data	1 9
6. Measuring input 2 0) Measuring input 2 not used 1) Measuring range 0...100°C 9) Measuringrange2 [°C]  Line 1: Measuring ranges configurable, see Operating Instructions Line 9: Possible measuring ranges see measuring input 1	0 1 9
7. Measuring outputs 1 or 2 (applies to outputs 1 and 2) 1) Output 0/4 ... 20 mA (configurable by plug-in jumper(s), set to 4 ... 20 mA) 2) Output 0 ... 10 V 3) Output 4/0 ... 20 mA (configurable by plug-in jumper(s) set to 4...20mA)	1 2 3
8. Certificate 0) Without test certificate 1) With test certificate	0 1

Possible special Version, e.g. increased climatic rating on inquiry.

