Data Sheet

050.7e

Transducers for Temperature (Pt 100)

PTU 2.0 L

WEIGEL

Application

The **PTU 2.0 L** transducers are designed for use on platinum (Pt 100) RTD's converting the temperature inputs into load independent DC output signals. These signals can be transmitted over a considerable distance and fed into indicators, recorders, data loggers, computers and/or control systems etc.

It is possible to connect more than one measuring or control device to the output circuit provided the total impedance does not exceed the rating.

The PTU 2.0 L transducers require an auxiliary power supply. Inputs and output are **electrically isolated** from the auxiliary supply. The output is **short - circuit proof** and **safe against idling**.

The transducers are designed to be mounted in machines/systems. Regulations for installation of electrical systems and equipment have to be observed.

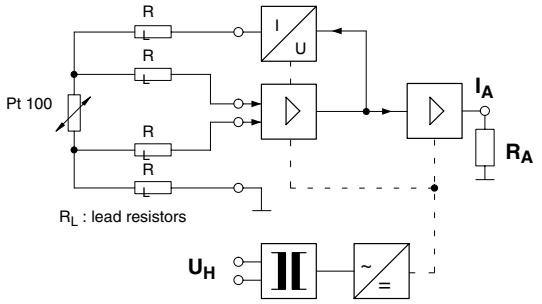
Operating Principle

The PTU 2.0 L transducers convert the varying resistance of a Pt 100 sensor into a standardized electrical signal proportional to the applied temperature.

A differential input stage amplifies the reference DC voltage supplied by the RTD. The sensor can be connected in a 2–, 3– or 4–wire system. The output stage produces a load independent DC current.

The transducers provide a constant excitation current output for the RTD.

Block Circuit Diagram



(4–wire system, standard version)

General Technical Data

case details	projecting case clamping to TH 35 DIN rail according to DIN EN 60 715
material of case	ABS/PC black self - extinguishing to UL rating 94 V–0
terminals	screw - terminals
wire cross - section	4 mm^2 max.
enclosure code	IP 40 case IP 20 terminals
dielectric test	2210 V all circuits to case, 3536 V measuring circuit to auxiliary voltage
class of protection	II
measurement category	CAT III
pollution level	2
dimensions WxHxL	22.5 mm x 80 mm x 115 mm
weight	approx. 0.12 kg

Inputs

input quantity: temperature (for RTD Pt 100)

Initial Temperature T_{E1}	**Spans** ΔT
–200 °C	100 K
–150 °C	150 K
–100 °C	200 K
– 50 °C	300 K
0 °C	400 K
+ 50 °C	500 K
+100 °C	600 K
+150 °C	700 K (for $T_{E1} \leq$ 100°C only)
+200 °C	800 K (for $T_{E1} \leq$ 0°C only)
➧	900 K (for $T_{E1} \leq$ –100°C only)
	1000 K (for T_{E1} = –200°C only)
	➧

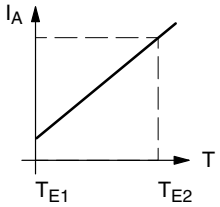
measuring range	T_{E1} ... $T_{E2} = T_{E1} + \Delta T$
input	potential–free differential input
connection	2–, 3– or 4–wire system
in a 2–wire system	The sum of lead resistances shall not exceed 200 mΩ. Lead resistances >200 mΩ will directly influence the measuring result.
in a 3–wire system	The lead resistances have to be equal. Up to 100 Ω maximum for each lead, the error thereof is negligible.
in a 4–wire system	maximum lead resistance for each lead 100 Ω. The individual lead resistances may have different values.

Outputs

current output

output current	I_A	load independent DC current
rated current	I_{AN}	4 ... 20 mA
load range	R_A	0 ... 500 Ω (based on 20 mA)
load error		≤ 0.1% based on 50% load change
residual ripple		≤ 1%$_{rms}$ of I_{AN} with load R_{AN}
idling voltage		≤ 16 V
response time		≤ 1 s based on $R_{A\,max}$

Conversion Characteristics



input T_{E1} ... T_{E2}
output 4 ... 20 mA

➧ for other ratings refer to **Extras**

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Transducers for Temperature (Pt 100)

Auxiliary Supply

auxiliary voltage U_{HN}	230 V AC (195 ... 253 V), 48 ... 62 Hz
power consumption	< 5.5 VA

Input and output are electrically isolated from the auxiliary supply.

Accuracy at Reference Conditions

accuracy	±0.5% referred to the span ΔT
temperature coefficient	≤ 0.03%/K

valid for standard products and a life–period of 1 year maximum

reference conditions

auxiliary voltage	U_{HN} ±1%, 48 ... 62 Hz
load	0.5 $R_{A\ max}$ ±1%
ambient temperature	23°C±1K
warm–up	≥ 15 min

Environmental

climatic suitability	climatic class 3 to VDE/VDI 3540 sheet 2
operating temperature range	–10 ... +55°C
storage temperature range	–25 ... +65°C
relative humidity	≤ 75% annual average, non-condensing

Rules and Standards

DIN EN 60 529	Enclosure codes by housings (IP-code)
DIN EN 60 688	Electrical measuring transducers converting AC quantities into analog or digital signals
DIN EN 60 715	Dimensions of low voltage switching devices: standardized DIN rails for mechanical fixation of electrical devices in switchgears
DIN EN 61 010-1	Safety requirements for electrical measuring, control and laboratory equipment Part 1: General requirements
DIN EN 61 326-1	Electrical equipment for measurement, control and laboratory use – EMC requirements Part 1: General requirements
	(IEC 61 000-4-3 evaluation criterion B)
	(DIN EN 55011 Class A)
VDE/VDI 3540 sheet 2	Reliability of measuring and control equipment (classification of climates for equipment and accessories)

Extras

input ratings

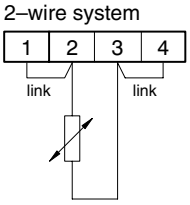
The measuring range has to be between –200°C and +800°C.

initial temperature T_{E1}	other than standard values (on request)
measuring span ΔT	other than standard values in the range of 100 ... 1000 K (on request)
auxiliary voltage U_{HN}	115 V AC (85 ... 126 V), 48 .. 62 Hz 24 V DC (18 ... 36 V)
	wide-range supply 20 ... 100 V DC resp. 15 ... 70 V AC, 90 ... 357 V DC resp. 65 ... 253 V AC

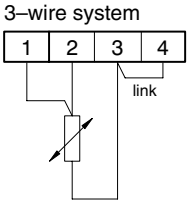
Connections

input

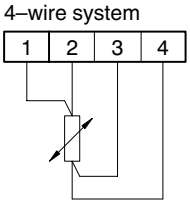
2–wire system



3–wire system



4–wire system



outputs

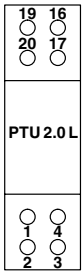
current output	terminal 19 (+), terminal 20 (–)

auxiliary supply

AC voltage	terminal 16 (L1), terminal 17 (N)
DC voltage	terminal 16 (+), terminal 17 (–)

Terminals

front view

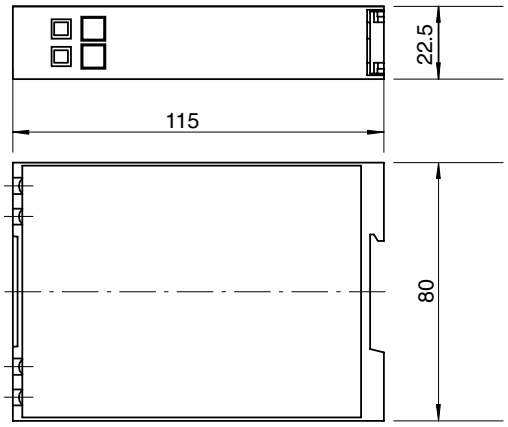


terminal	PTU 2.0 L
1	Pt 100
2	Pt 100
3	Pt 100
4	Pt 100
16	U_H L1(+)
17	U_H N (–)
19	I_A (+)
20	I_A (–)

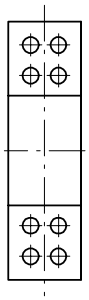
Pt 100 resistance temperature detector (RTD)
I_A current output
U_H auxiliary voltage input

Dimensions

side view



front view



(dimensions in mm)

Ordering Guide

type	transducer
	physical quantity
PTU 2.0 L	temperature (for RTD Pt 100)
	initial temperatures
10	–200 ˚C
11	–150 ˚C
12	–100 ˚C
13	– 50 ˚C
14	0 ˚C
15	+ 50 ˚C
16	+100 ˚C
17	+150 ˚C
18	+200 ˚C
19	to be specified **)
	measuring spans
31	100 K
32	150 K
33	200 K
34	300 K
35	400 K
36	500 K
37	600 K
38	700 K (for initial temperatures ≤ 100 ˚C only)
39	800 K (for initial temperatures ≤ 0 ˚C only)
40	900 K (for initial temperatures ≤ –100 ˚C only)
41	1000 K (for initial temperature –200 ˚C only)
49	to be specified **)
	output signal range
4	4 ... 20 mA
	auxiliary supply
H1	AC 230 V (195 ... 253 V), 48 ... 62 Hz *)
H2	AC 115 V (85 ... 126 V), 48 ... 62 Hz
H3	DC 24 V (18 ... 36 V)
H4	DC 20 ... 100 V / AC 15 ... 70 V
H5	DC 90 ... 357 V / AC 65 ... 253 V

*) standard
**) on request, please clearly add the desired specifications.

ordering example

PTU 2.0 L	13	33	4	H1

temperature transducer, initial temperature –50˚C,
measuring span 200 K, (temperature range –50 ... +150˚C),
output 4 ... 20 mA, auxiliary supply AC 230 V

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– specifications subject to change without notice; date of issue 12/10 –