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Data Sheet 050.4e

Transducers for Temperature (Pt 100)

PTU 2.0 L

the New Generation

Type: PTU 2.0 L
0.5
Nr.: 24000001
0...200 °C
Pt 100
4...20 mA
UH (48...62 Hz)
195...253 V
P < 5,5 VA

CE

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 (complying with DIN 43 760 resp. DIN IEC 751) 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
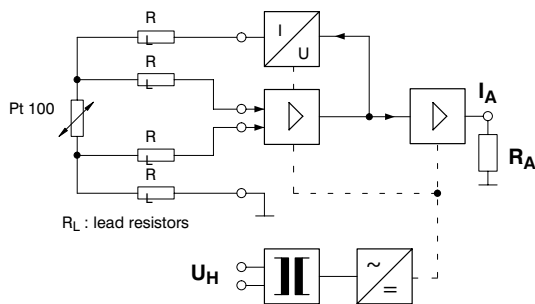
(4−wire system, standard version)

General Technical Data

case details	projecting case clamping to DIN mounting rail (to DIN EN 50 022 − 35)
material of case	Lexan 500 R 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	2.2 kV all circuits to case, 3.7 kV measuring circuit to auxiliary voltage
class of protection	II
excess voltage category	II
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
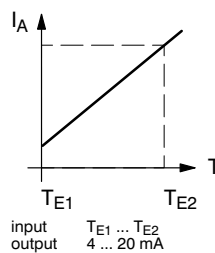
➧ for other ratings refer to **Extras**

Data Sheet 050.4e
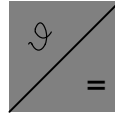
Transducers for Temperature (Pt 100)

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 $\pm 0.5\%$ referred to the span ΔT
temperature coefficient $\leq 0.03\%$/K
valid for standard products and a life−period of 1 year maximum

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

Environmental

climatic suitability   climatic class 3 to VDE/VDI 3540
operating temperature range $-10 ... +55°C$
storage temperature range $-25 ... +65°C$
relative humidity $\leq 75\%$ annual average, non‑condensing

Rules and Standards

DIN EN 50 022	mounting rails
DIN EN 50 081‑1	mains feedback
DIN EN 50 082‑2	electromagnetic compatibility (EMC), interference immunity
DIN EN 55 011	limits and measuring procedures for radio‑interference of industrial, scientific and medical high‑frequency equipment
DIN EN 61 010	safety requirements for electrical measuring‑, control‑ and laboratory equipment
DIN VDE 0470‑1	enclosure codes through housings (IP‑code)
VDE/VDI 3540 sheet 2	reliability of measuring and control equipment (classification of climates)

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
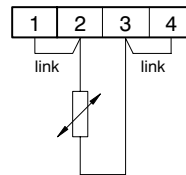 24 V DC (18 ... 36 V)
  wide‑range supply
  20 ... 100 V DC resp. 15 ... 70 V AC,
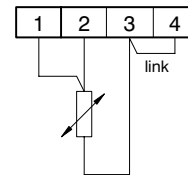 90 ... 357 V DC resp. 65 ... 253 V AC
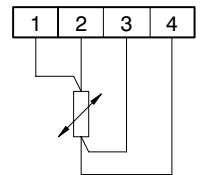
Connections

input
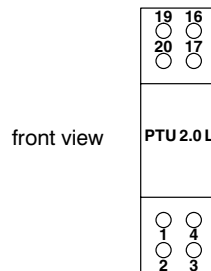2−wire system   3−wire system   4−wire system

outputs
current output   terminal 19 (+), terminal 20 (−)

auxiliary supply
AC voltage   terminal 16 (L1), terminal 17 (N)
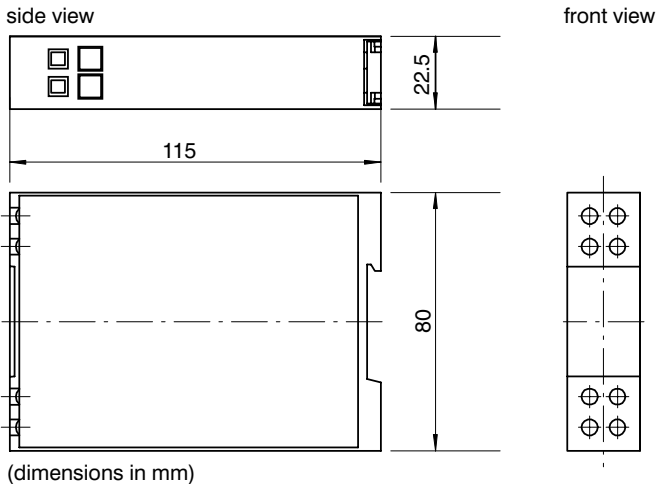DC voltage   terminal 16 (+), terminal 17 (−)

Terminals

front view   PTU 2.0 L

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

– specifications subject to change without notice; date of issue 08/05 –