

# Resistance Thermometers, NEUMO BioControl™

## Model TR451, Immersed

## Model TR452, Flush

WIKA Data Sheet TE 60.27

### Application

- Bio and pharmaceutical industry
- Sterile process technology
- Food industry

### Special features

- NEUMO BioControl connection
- No dead space
- Hygienic-compatible design
- Materials and surface finish quality according to the guide lines and standards of the pharmaceutical industry



Fig. left: Resistance Thermometer Model TR451  
Fig. right: Resistance Thermometer Model TR452

### Description

Resistance thermometers for the sterile process technology with flange connection for the NEUMO BioControl system. The standard temperature range is -50 °C ... +150 °C.

#### Model TR451

These thermometers feature a thermowell that is immersed into the process. Insertion length and diameter of the thermowell match with the dimensions of the BioControl housing.

#### Model TR452

These thermometers feature a flush mounting connection. No thermowell is immersed into the process medium.

## Sensor

1 x Pt 100 with 2, 3 or 4 wire connection. The standard temperature range is -50 °C ... +150 °C.

### Sensor limiting error

- Class B to DIN EN 60 751
- Class A to DIN EN 60 751 (not with 2 wire connection)

### Basic values and limiting errors

Basic values and limiting errors for the platinum measuring resistors are laid down in DIN EN 60 751.

The nominal value of Pt 100 sensors is 100 Ω at 0 °C. The temperature coefficient α can be stated simply to be between 0 °C and 100 °C with:

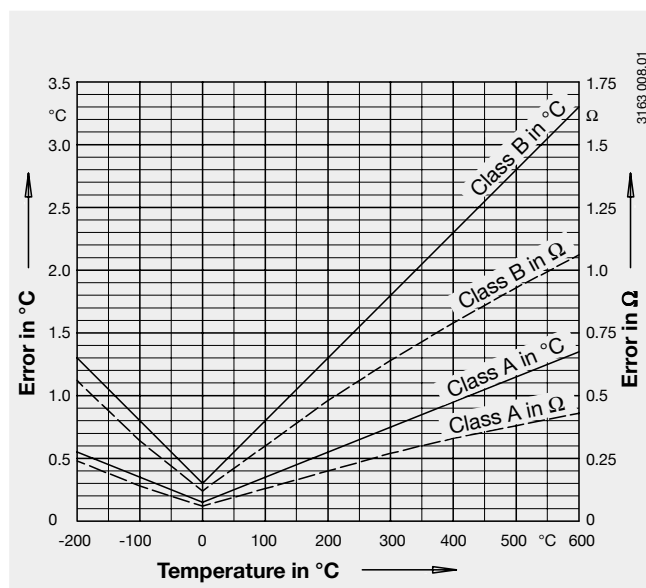
$$\alpha = 3.85 \cdot 10^{-3} \text{ } ^\circ\text{C}^{-1}$$

The relationship between the temperature and the electrical resistance is described by polynomes which are defined in DIN EN 60 751. Furthermore, this standard lays down the basic values in °C stages.

The limiting error is defined for two classes:

Class	Limiting error in °C
<b>A</b>	$0.15 + 0.002 \cdot  t $ <sup>1)</sup>
<b>B</b>	$0.3 + 0.005 \cdot  t $

1) |t| is the value of the temperature in °C without consideration to the prefix



Basic values and limiting errors for the platinum measuring resistors per DIN EN 60 751

Temperature (ITS 90) °C	Basic value Ω	Limiting error Class A		Class B	
		°C	Ω	°C	Ω
-50	80.31	± 0.25	± 0.09	± 0.55	± 0.21
0	100	± 0.15	± 0.06	± 0.3	± 0.12
50	119.40	± 0.25	± 0.09	± 0.55	± 0.21
100	138.51	± 0.35	± 0.13	± 0.8	± 0.30
150	157.33	± 0.45	± 0.17	± 1.05	± 0.39

## Documentation / Optimisation of the measuring deviation

The measuring deviation of these thermometers can be determined under close to real process conditions and supplied with a certificate. The standard testing temperature is 70 °C, others on request.

If a transmitter is mounted into the thermometer, a determined measuring deviation can be corrected using the "adaptation" feature of the transmitter configuration software.

## Transmitter

A transmitter can be directly mounted into the thermometer. In this case the transmitter is fastened instead of the connection socket. Possible transmitter models:

- Model T24, data sheet TE 24.01
- Model T32, data sheet TE 32.01
- Model T42, data sheet TE 42.01

With the configuration software of the transmitter static measuring errors that might occur can easily be corrected.

## Connection head

Model: BVA  
 Material: stainless steel, blank  
 Cable entry: cable gland, metal, M20 x 1.5  
 Ingress protection: IP 65  
 Cap: screwed cap

## Neck

Material: stainless steel, blank  
 Length: 50 mm, other on request  
 Diameter: Ø 15 mm, other on request

## BioControl connection

The flange connection is designed for assembling with the NEUMO BioControl system model 910.60.

BioControl connection: size 25, size 50, size 65  
 Material of wetted parts: stainless steel 1.4435  
 Surface of wetted parts: roughness  $R_a \leq 0.8 \mu\text{m}$ ,  
 optional: electropolished  
 Washer, optional: EPDM or FEP-FPM compound  
 (both materials are FDA approved)  
 Pressure rating: PN 16 for size 50 and size 65  
 PN 25 for size 25

## Thermowell, only with model TR451

Material: stainless steel 1.4435  
 Surface: roughness  $R_a \leq 0.8 \mu\text{m}$ ,  
 optional: electropolished  
 Insertion length:  $U_1$  see tables, other on request  
 Diameter:  $\varnothing F_2$  see tables, other on request

Insertion length and diameter of the thermowell match the dimensions of the BioControl housing type G. If the thermometer is assembled with a BioControl housing angled variant type U, a longer insertion length of the thermowell is possible.

### For assembling with BioControl connection size 25

Process connection DN	Thermowell dimensions in mm	
	$U_1$	$\varnothing F_2$
8	5	3
10	6	3
15	9	3
20	11	3

### For assembling with BioControl connection size 50

Process connection DN	Thermowell dimensions in mm	
	$U_1$	$\varnothing F_2$
25	15	6
40	20	6
50	25	6
65	35	6
80	45	6
100	55	6

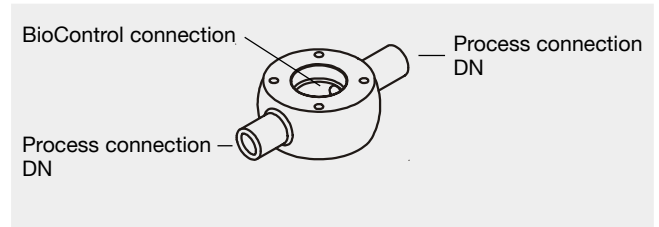
### For assembling with BioControl connection size 65

Process connection DN	Thermowell dimensions in mm	
	$U_1$	$\varnothing F_2$
40	20	6
50	25	6
65	35	6
80	45	6
100	55	6

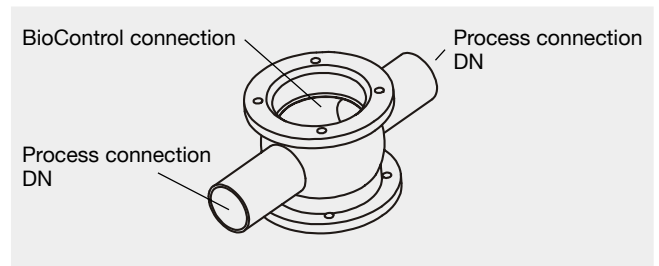
## BioControl housing

The housing of the NEUMO BioControl system is not part of the scope of delivery of the resistance thermometers described above. For a detailed description of these housings see data sheet CS 91.06.

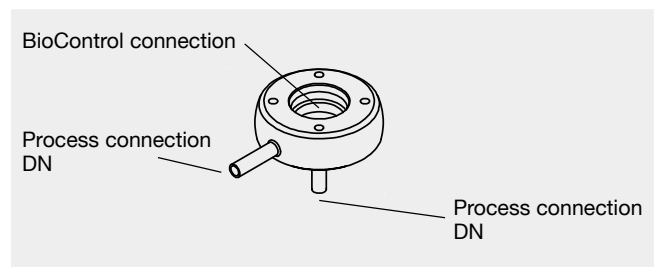
### Housing type G, size 25



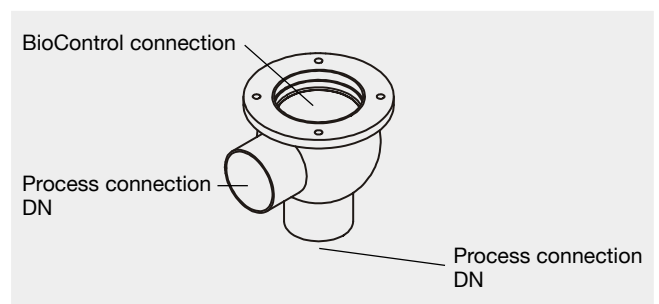
### Housing type G, size 50 and size 65



### Housing, angled variant type U, size 25

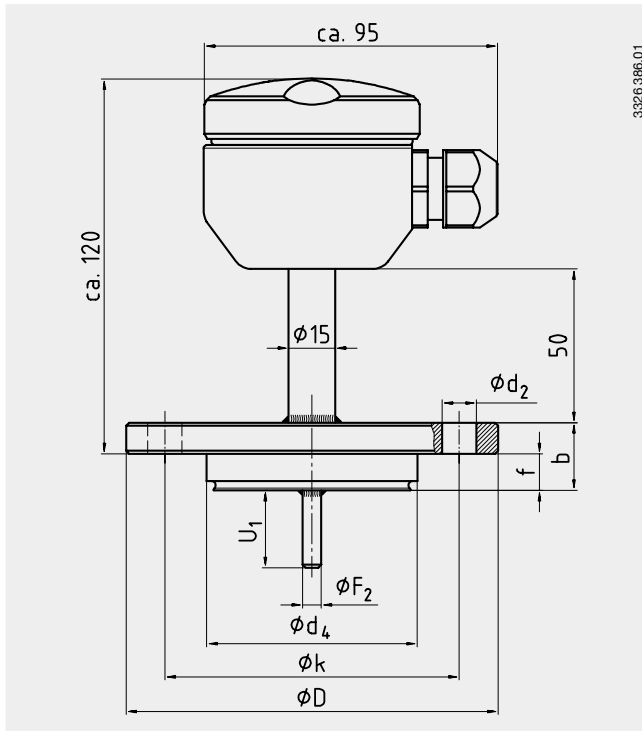


### Housing, angled variant type U, size 50 and size 65

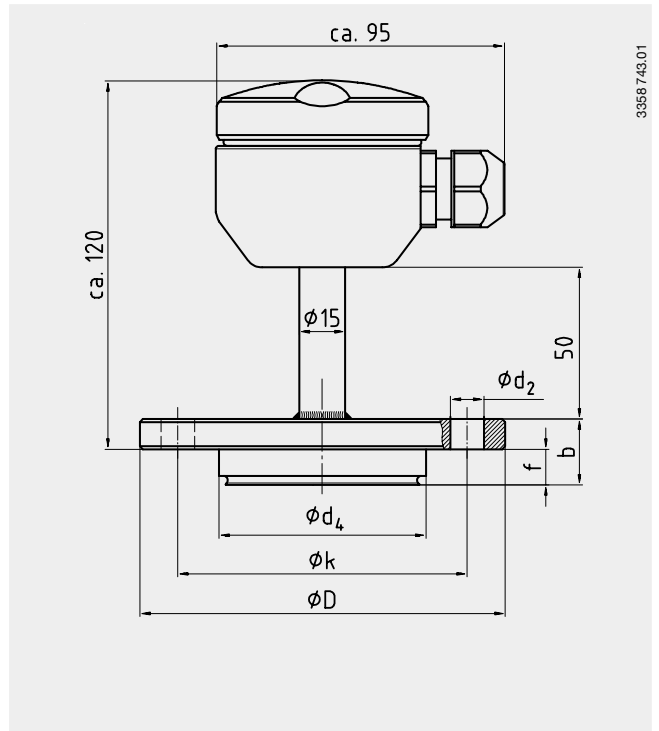


## Dimensions in mm

Standard version, Model 451, immersed



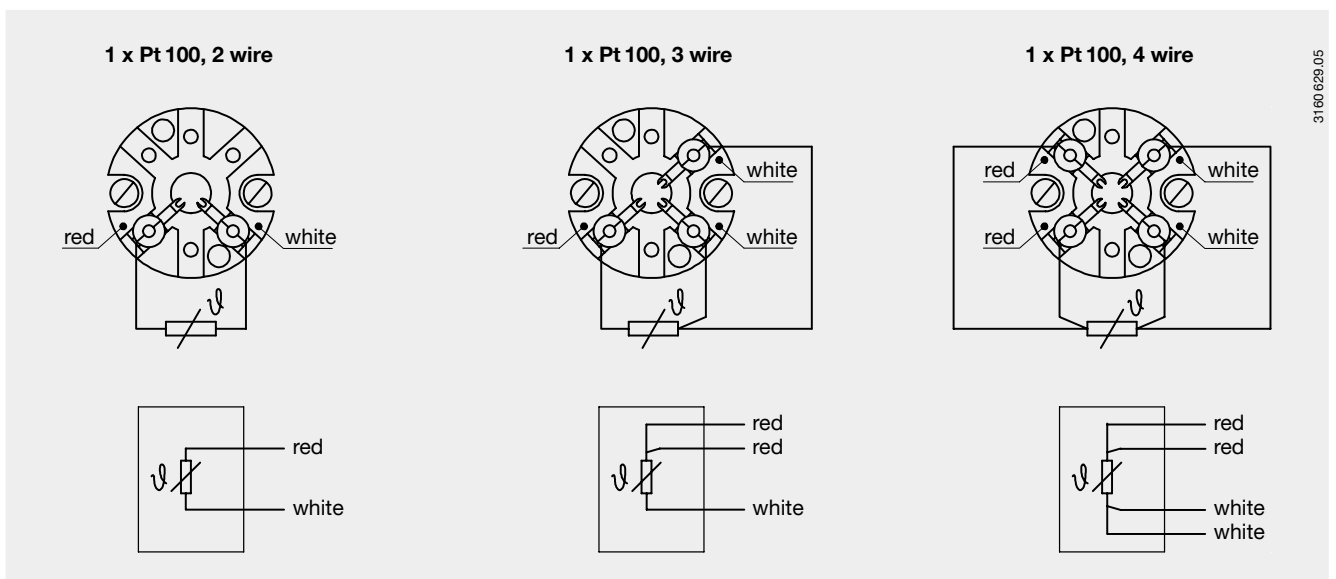
Standard version, Model 452, flush



BioControl connection	Dimensions in mm						Weight in kg
	$\varnothing d_2$	$\varnothing d_4$	$\varnothing D$	f	b	$\varnothing k$	
<b>size 25</b>	4 x $\varnothing 7$	30.5	64	11	20	50	1.0
<b>size 50</b>	4 x $\varnothing 9$	50	90	17	27	70	1.4
<b>size 65</b>	4 x $\varnothing 11$	68	120	17	27	95	2.0

Thermowell dimensions  $U_1$  and  $\varnothing F_2$  see tables in section thermowell.

## Electrical connection



## Ordering information

Field No.	Code	Features
		<b>Model</b>
1	TR451	TR451, immersed
	TR452	TR452, flush
		<b>Type and number of sensors</b>
2	T	1 x Pt100, application range -50 °C ... +150 °C
	?	other <i>please state as additional text</i>
		<b>Sensor method of connection</b>
3	2	2 wire
	3	3 wire
	4	4 wire
		<b>Sensor limiting error</b>
4	B	Class B to DIN EN 60751
	H	Class A to DIN EN 60751 <i>not with 2 wire connection</i>
	?	other <i>please state as additional text</i>
		<b>BioControl connection</b>
5	A	size 25
	B	size 50
	C	size 65
		<b>Insertion length</b>
6	005	5 mm, diameter 3 mm, for nominal size DN 8 <i>not with Model TR452</i>
	006	6 mm, diameter 3 mm, for nominal size DN 10 <i>not with Model TR452</i>
	009	9 mm, diameter 3 mm, for nominal size DN 15 <i>not with Model TR452</i>
	011	11 mm, diameter 3 mm, for nominal size DN 20 <i>not with Model TR452</i>
	015	15 mm, diameter 6 mm, for nominal size DN 25 <i>not with Model TR452</i>
	020	20 mm, diameter 6 mm, for nominal size DN 40 <i>not with Model TR452</i>
	025	25 mm, diameter 6 mm, for nominal size DN 50 <i>not with Model TR452</i>
	035	35 mm, diameter 6 mm, for nominal size DN 65 <i>not with Model TR452</i>
	045	45 mm, diameter 6 mm, for nominal size DN 80 <i>not with Model TR452</i>
	055	55 mm, diameter 6 mm, for nominal size DN 100 <i>not with Model TR452</i>
	050	50 mm, diameter 3 mm, for all nominal sizes <sup>1)</sup>
	075	75 mm, diameter 6 mm, for nominal size from DN 25 upwards <sup>1)</sup>
	000	0 mm, flush, for all nominal sizes <i>not with Model TR451</i>
	???	other <i>please state as additional text</i>
7	A2	stainless steel 1.4435
	B2	stainless steel 1.4435, electropolished
		<b>Washer</b>
8	Z	without
	H	EPDM <i>FDA approved</i>
	P	FEP-FPM compound <i>FDA approved</i>
		<b>Neck length / diameter</b>
9	050	50 mm / 15 mm
	???	other <i>please state as additional text</i>
		<b>Connection head</b>
10	8	BVA (stainless steel)
	?	other <i>please state as additional text</i>
		<b>Cable entry to connection head</b>
11	4	M20 x 1.5
	?	other <i>please state as additional text</i>

1) Not with Model TR451 assembled with BioControl housing, angled variant type U.

**Ordering information, continued**

Field No.	Code	Features
		<b>Transmitter</b>
	<b>ZZ</b>	without
	<b>H0</b>	model T24, analogue, configurable, 4...20 mA <i>not with 4wire connection</i>
	<b>E0</b>	model T32, digital, configurable, HART protocol, 4...20 mA
	<b>F0</b>	model T42, digital, configurable, PROFIBUS PA
12	<input type="checkbox"/>	<b>??</b> other <i>please state as additional text</i>
		<b>Transmitter measuring range</b>
	<b>ZZ</b>	without
	<b>KK</b>	configurable transmitter (4...20 mA), customer's specification <sup>1) 2)</sup>
13	<input type="checkbox"/>	<b>PK</b> PROFIBUS PA transmitter, customer's specification <sup>1) 2)</sup> <i>please state as additional text</i>
		<b>Documentation / Optimisation of the measuring deviation</b>
	<b>ZZ</b>	without
	<b>70</b>	determination of measuring deviation at 70 °C
	<b>J1</b>	determination of measuring deviation at 70 °C and transmitter adaption for correction <sup>3)</sup>
14	<input type="checkbox"/>	<b>??</b> other <i>please state as additional text</i>
		<b>Additional order info</b>
	<b>YES</b>	<b>NO</b>
15	<input type="checkbox"/>	<b>1</b> <b>Z</b> quality certificates <i>see pricelist</i>
16	<input type="checkbox"/>	<b>T</b> <b>Z</b> additional text <i>Please state as clearly understandable text!</i>

- 1) Please pay attention to the limits of measuring ranges, see pricelist or data sheet of respective transmitter.
- 2) Please state the configuration corresponding to the page Ordering Assistance, see pricelist.
- 3) Only available with mounted transmitter.

**Order code:**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<input type="text"/>	-	<b>Z</b>	-	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	-	<input type="text"/>

**Additional text:** \_\_\_\_\_

Specifications and dimensions given in this leaflet represent the state of engineering at the time of printing. Modifications may take place and materials specified may be replaced by others without prior notice.

