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# Temperature transmitter GV4 MiniTherm

## for installation in a separate thermowell
## Type series GV4730



## Features

- Compact case of stainless steel in hygienic design according to recommendations from EHEDG and 3A, degree of protection IP 65/67
- High-resolution graphic display with intuitive operation and backlight
- Quick access to device data
- Accuracy ≤ 0.25 K
- Temperature range: -50...200 °C
- Output signal 4…20 mA with HART® protocol
- Digital communication via PDM/EDD and FDT/DTM
- Measuring resistor Pt100, class A
- Measuring insert spring loaded
- Fast response

### Options

- Function package self-monitoring, enables:
  - Drift detection
  - Redundancy
  - Drift-/failure warning
- 2 measuring resistors Pt100 oppositely drifting (upon request)
- Approvals/Certificates
  - UL 61010-1 and CAN/CSA-C22.2 no. 61010-1
  - Calibration certificate per EN 10204-3.1
- As per UKCA regulations
- Degree of protection IP 69K
- Case and front cover of stainless steel 316L

## Application area

- Pharmaceutical industry
- Food industry
- Biotechnology

Suitable thermowells for the GV4730 can be found in data sheet DB_T5-051 (thermowells for MiniTherm).
The HIT thermowell systems (data sheet DB_T5-050 and DB_T5-052) are also available on request.

## Application

The temperature transmitter GV4730 MiniTherm is designed for the installation in a separate thermowell. Due to the design the transmitter is suitable for highest requirements. The 4 operation buttons allow an easy and fast parameterisation.

Optionally, the GV4730 can be supplied with the function package self-monitoring. These devices are equipped with two measuring sensors that monitor each other and offer the possibility of temperature measurement with drift detection, redundancy and drift/failure warning.

In a further option, the self-monitoring can now also be carried out via two measuring resistors which, due to their physical structure, ensure opposite drift behaviour, for example in the event of ageing processes. This means that a continuous drift monitoring is also possible between the calibration cycles of a system and over the entire temperature range. The customer can set the permissible drift individually.

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# Technical data

## Constructional design

| | |
|---|---|
| Design: | Hygienic case of stainless steel, continuously rotatable by ± 170° |
| Material case and front cover: | Process connection back:<br>Stainless steel mat.-no. 1.4305 (303)<br>Option: stainless steel mat.-no. 1.4404 (316L)<br>Process connection bottom:<br>Stainless steel mat.-no. 1.4301 (304)<br>Option: stainless steel mat.-no. 1.4404 (316L) |
| Gasket: | Silicone<br>EPDM / FKM (if degree of protection IP 69K) |
| Degree of protection per EN 60529: | IP 65 / IP 67<br>Option: IP 69K |
| Climatic category: | 4K4H per EN 60721 3-4 |
| Material window: | Polycarbonate<br>Option: Non-splintering glass |
| Electrical connection: | Circular connector M12<br>Option: Cable glands<br>■ M16 x 1.5, PA black<br>■ M16 x 1.5, brass nickel-plated<br>■ M16 x 1.5, stainless steel<br>■ M20 x 1.5, PA black<br>■ M20 x 1.5, brass nickel-plated<br>■ M20 x 1.5, stainless steel<br>■ 1/2" NPT, PA black<br>Further connections upon request |
| Terminal blocks: | Spring clamp terminals up to 2 mm$^2$ |
| Type plate: | Adhesive label |

## Measuring system

| | |
|---|---|
| Design: | Measuring insert Ø 3 mm, spring loaded and union nut M16 x 1.5 |
| Material: | Measuring insert:<br>stainless steel mat.-no. 1.4404 (316L)<br>Union nut:<br>stainless steel mat.-no. 1.4301 (304) |
| Length measuring insert: | See order code |
| Measuring resistor: | Pt100 per EN 60751, class A |
| Instrument connection: | Union nut M16 x 1.5 |

## Accuracy

| | |
|---|---|
| Accuracy: | ≤ 0.25 K |
| Temperature influence case: | typ. 0.1 K/10 K |

Response time per EN 60751 (with flowing water):

For measuring insert Ø 3 mm: $t_{90}$ = 3s

For further information see the data sheets of the thermowells.

We recommend the use of heat sink compound.

## Indication

| | |
|---|---|
| Display: | - High-resolution graphic display with backlight<br>- 4-button operation<br>- Freely configurable display modes<br>- Continuously rotatable<br>- Removable under voltage |

## Output

| | | |
|---|---|---|
| Signal: | 2-wire technology | 4…20 mA |
| | Lower limit | 3.8…4 mA |
| | Upper limit | 20…21 mA |
| | Lower alarm current | < 3.6 mA |
| | Upper alarm current | > 21 mA |
| | Current limitation | 22 mA |
| | Digital communication | HART®-protocol, version 7 |

Device driver:

■ EDD for SIMATIC PDM
■ DTM for PACTware or compatible systems (FDT compliance)

| | |
|---|---|
| Resolution: | ≤ 1 µA |
| Current sensing function: | 3.55…21.5 mA selectable in steps of 0.001 mA |
| Load R: | R ≤ (U-12V DC)/0.022 A [Ω]<br>U = supply voltage<br>for HART®communication R ≥ 230 Ω |

## Supply voltage

| | |
|---|---|
| Functional range: | 12...30 V DC,<br>protected against polarity reversal<br>For UL/CSA:<br>12...30 V DC, protected against polarity reversal, PELV<br>Further informations see Operating Instruction BA_085. |
| Ripple: | < 5 % |

## Temperature ranges

| | |
|---|---|
| Ambient: | -20...80 °C |
| | Option: |
| | -40…80 °C |
| | (Display visibility is limited at temperatures below - 30 °C) |
| | For UL/CSA: |
| | 5...40 °C |
| Media: | -50...200 °C |
| Storage: | -40...80 °C |

## Ambient conditions for UL/CSA

- Exclusively for indoor use
- Altitude up to 2000 m
- Maximum relative humidity 80 % for temperatures up to 31 °C, decreasing linearly to 50 % relative humidity at 40 °C
- Pollution degree 2

## Tests and certificates

| | |
|---|---|
| UL/CSA : | per UL 61010-1 and CAN/CSA-C22.2 no. 61010-1 |
| | UL certificate no. E536236 |

# Parameterisation

## Parameterisation

| Parameter | Values | Default setting |
|---|---|---|
| **Device** | | |
| device ID | 16 digits, freely selectable | ID:GV4 MiniTherm |
| **Display and control unit** | | |
| temperature unit | °C, °F. °R, K | °C |
| lighting | on, off | on |
| language | English, German, Chinese | German |
| decimal point | auto, x.xxxx, xx.xxx, xxx.xx, xxxx.x, xxxxx | auto |
| display mode | four values, three values, two values, big display | three values |
| main value | temperature, current (%), current (mA) | temperature |
| secondary values | temperature, current (%), current (mA), device ID, Bargraph, HART-TAG, HART descriptor, <empty> | device ID, Bargraph |
| **Current output** | | |
| output function | linear, invers | linear |
| lower range value | at any value within nominal range | 0 °C |
| upper range value | at any value within nominal range | 150 °C |
| lower current limit | 3.8…4.0 mA | 3.8 mA |
| upper current limit | 20…21 mA | 20.5 mA |
| alarm current | low (< 3.6 mA), high (> 21.0 mA) | low (< 3.6 mA) |
| **HART® data** | | |
| HART® address | 0…63 | 0 |
| number of response preambels | 5…20 | 5 |
| current mode | proportional, constant | proportional |

## Diagnostic functions

| loop-test | setting of a fixed current value at the output | 3.55…21.5 mA |
|---|---|---|
| temperature simulation | setting a fixed temperature value | nominal range |
| min/max values | for temperature | / |

## Adjustment

| Adjustment type | Description |
|---|---|
| lower adjustment | adjusts reading of mounted device at ambient temperature (affects zero and span) |
| upper adjustment | adjusts reading to applied temperature (affects span only) |
| current adjustment | adjusts current output to achieve 4 resp. 20 mA at the end of the measurement chain |

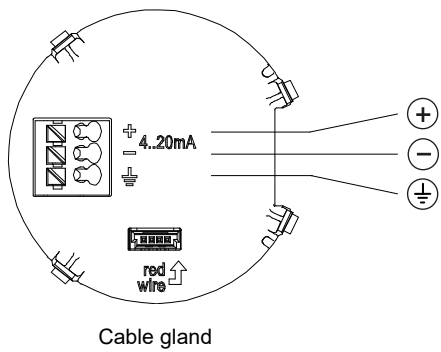## Additional possibilities of parameterisation for devices with self-monitoring

## Parameterisation

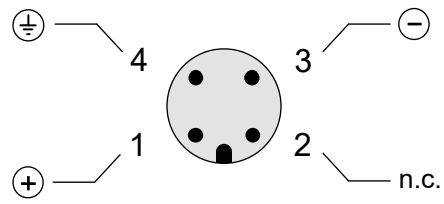| Parameter | Values | Default setting |
|---|---|---|
| **drift/redundancy** | | |
| measured value mode | mean value, min value, max value | mean value |
| permissible drift | 0.1...9.9 K | 9.9 K |
| current value drift-/failure warning | 3.55...21.5 mA | 21.5 mA |
| Pulse duration drift-/failure warning | 0...60 sec | 0 sec |

## Diagnostic functions

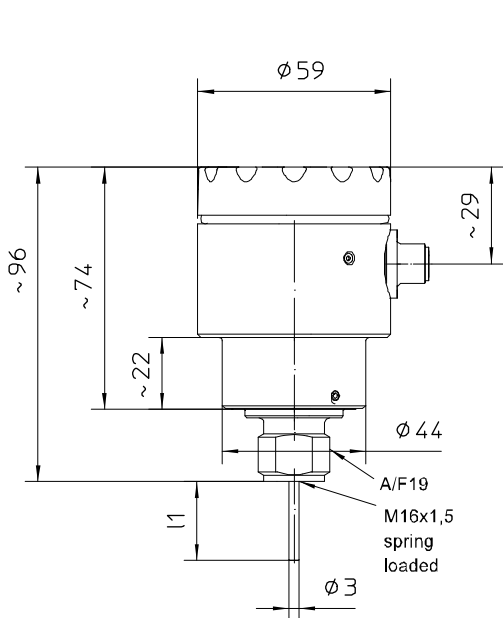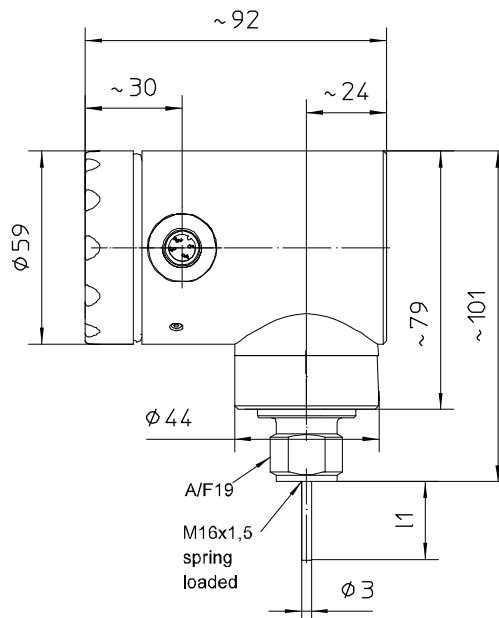| Simulation type | Description | Value range |
|---|---|---|
| drift-/failure | Simulation of the current pulse in case of drift or failure of a sensor | on/off |

# Connection diagram



Cable gland



Circular connector M12 x 1
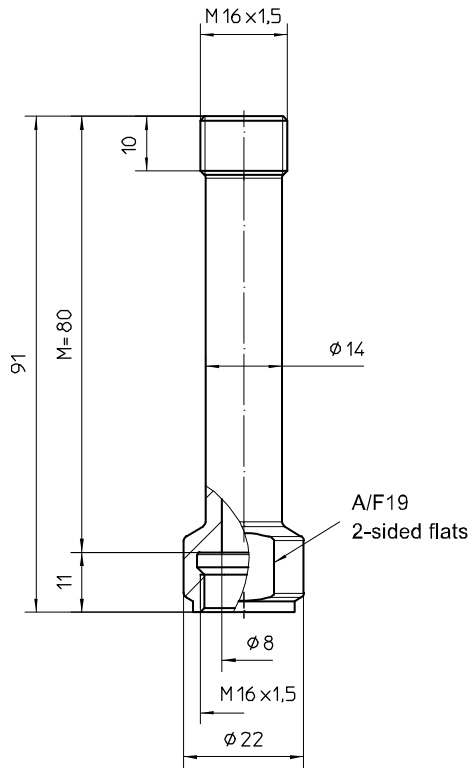
# Dimensions

## Case and temperature sensor



process connection back



process connection bottom

All dimensions are in mm

**Neck tube**

M 16 ×1,5

10

91

M= 80

⌀ 14

11

A/F 19
2-sided flats

⌀ 8

M 16 ×1,5

⌀ 22

# Order details

| Temperature transmitter GV4 MiniTherm for installation in a separate thermowell | | | |
|---|---|---|---|
| GV4730 | temperature transmitter GV4 MiniTherm | | |
| R70 | position process connection | back | |
| R71 | | bottom | |
| F1 | parameterisation | standard according to data sheet (see parameterisation table) | |
| F9 | | as per customer's specification (pls. specify) | |
| Q1 | accuracy | ≤ 0.25 K | |
| H21 | output signal | 4...20 mA, with HART®-protocol | |
| Y14 | material case/window | stainless steel mat.-no.1.4301/1.4305 (304/303) | window polycarbonate |
| Y15 | | | window polycarbonate, UL case design |
| Y12 | | | window non-splintering glass |
| Y13 | | | closed, without window |
| Y24 | | stainless steel mat.-no. 1.4404 (316L) | window polycarbonate |
| Y25 | | | window polycarbonate, UL case design |
| Y22 | | | window non-splintering glass |
| Y23 | | | closed, without window |
| T1 | case degree of protection | IP 65 / IP 67 | |
| T4 | | IP 69K [1] | |
| | display | High-resolution graphic display with backlight, intuitive 4-button operation, quick-setup function | default language |
| M21.1 | | | English |
| M21.2 | | | German |
| M21.3 | | | Chinese |
| M1 | | without display | |
| T20 | electrical connection | cable gland M16 x 1.5 | polyamide for cable Ø 4.5-10 mm [2] |
| T21 | | | brass nickel plated for cable Ø 5-10 mm |
| T22 | | | stainless steel mat.-no. 1.4404 (316L) for cable Ø 5-9 mm [2] |
| T15 | | cable gland M20 x 1.5 | polyamide for cable Ø 7-13 mm [2] |
| T16 | | | brass nickel plated for cable Ø 7-13 mm |
| T17 | | | stainless steel mat.-no. 1.4404 (316L) for cable Ø 8-13 mm [3] |
| T27 | | cable gland 1/2" NPT | polyamide for cable Ø 5-12 mm [4] |
| T30 | | circular connector M12x1 (4 pin) [2] | |
| A12 | instrument connection | union nut  M16 x 1.5 | |
| A99 | | as in writing | |
| C3 . . . | temperature sensor | Ø 3 mm | |
| 998 | insertion length l1 | suitable for thermowell U1 ≤ 250 mm | |
| 028 | | 28 mm | |
| 038 | | 38 mm | |
| 060 | | 60 mm | |
| 084 | | 84 mm | |
| 161 | | 161 mm | |
| . . . | | required insertion length up to 250 mm can directly be ordered, e.g. l1: 100 mm, order code 100 | |
| U1 | ambient temperature | -20...80 °C [3] | |
| U7 | | -40...80 °C [3] | |
| U12 | | 5...40 °C | |

| Additional features (to be indicated in case of need, only) | | |
|---|---|---|
| **K2** | function package self-monitoring (drift detection, redundancy, drift-/failure warning) [5] | |
| **L1** | measuring resistor 2 x Pt100 [6] | |
| **L2** | measuring resistor 2 x Pt100 oppositely drifting [6] | |
| **V2080** | neck tube (M16 x 1.5) | length of neck tube M = 80 mm |
| **V2999** | | length of neck tube M (in mm) |
| **W1204** | calibration certificate | per EN 10204-3.1, 3 measuring points |
| **W1201** | | per EN 10204-3.1, 5 measuring points |
| **W2660** | as per UKCA regulations | |
| **W2680** | approval per UL 61010-1 and CAN/CSA-C22.2 no. 61010-1 [7] | |

**Order code (example):  GV4730 - R70 - F1 - Q1 - H21 - Y13 - T1 - M1 - T22 - A12 - C3084 - U1**

[1] only possible with window of polycarbonate, gasket made of EPDM/FKM and selected electrical connections (see footnote 2)

[2] suitable for degree of protection IP 69K

[3] not possible for UL/CSA

[4] for UL/CSA upon request

[5] in combination with thermowell HP1100/HP1110 and thermowell HP1200 a higher measuring deviation than class A is to be expected for insertion lengths U1 < 40 mm

[6] only available in combination with function package self-monitoring (order code K2)

[7] only in combination with UL/CSA case design (order code Y15 oder Y25) or with closed case without window (order code Y13 and Y23) and at a fixed ambient temperature (order code U12)