



## OPTISWITCH 4000/5000

Technical Datasheet

Vibration level switches for liquids

- Operates up to 250°C / 480°F and 64 bar / 925 psi
- Pump dry-run detection
- High reliability due to permanent fault monitoring function



**KROHNE**

## Universal liquid level switches

OPTISWITCH 4000/5000 series is a level sensor that uses a vibrating fork for detecting level. It is designed for use in all liquids. It is not affected by foam and external vibration. It is also unaffected by variations of product properties such as  $\epsilon_r$ , viscosity etc.



① OPTISWITCH 4000  
② OPTISWITCH 5100  
③ OPTISWITCH 5200

## Highlights

- Output options: relay, transistor, NAMUR, contactless electronic switch and 2-wire
- 5000 series: Plastic, aluminium or stainless steel housings
- LED signal lamp for indicating the switching condition (with plastic housing only)
- 5000 series: Large choice of materials for wetted parts. This includes 316L, Hastelloy C4, enamel, ECTFE and PFA.
- 5000 series. Probe length: 53...6000 mm / 2...236"
- Repeatability: +/-2 mm
- Thread connections G/NPT 3/4; flange sizes from DN25 PN40; Triclamp 1" or 2" and other hygienic fittings

## Industries

- Chemicals
- Food & Beverage
- Water & Wastewater
- Oil & Gas

## Applications

- Reactors
- Hygienic and sanitary applications
- Process and storage tanks for liquids
- Dry-run and overflow protection

## Features and Options



### OPTISWITCH 4000 - The economical version

- Simple and robust measuring system, virtually unaffected by the chemical and physical properties of liquids
- Easily mountable in pipelines from DN 25, vessels and tanks
- Outputs: contactless electronic switch or transistor



### OPTISWITCH 5100, 5150 - The compact version

- Standard or HT version, large array of process fittings, housings and electronics
- Outputs: relay, transistor, 2wire, NAMUR or contactless electronic switch
- Process connection option for high temperature up to 250°C / 482°F
- With all relevant approvals (ATEX etc.)
- Version OPTISWITCH 5150 with polished tuning fork e.g. for food processing



### OPTISWITCH 5200, 5250 - The special version with probe extension

- Standard or HT version, large array of process fittings, housings and electronics
- Probe length up to 6000 mm / 236"
- Outputs: relay, transistor, 2wire, NAMUR or contactless electronic switch
- Process connection option for high temperature up to 250°C / 482°F
- With all relevant approvals (ATEX etc.)
- Version OPTISWITCH 5150 with polished tuning fork e.g. for food processing

## Technical data

### OPTISWITCH 4000 C

#### Function

|                       |                            |
|-----------------------|----------------------------|
| Measurement parameter | Level detection of liquids |
|-----------------------|----------------------------|

#### Measurement accuracy

|                  |                                                 |
|------------------|-------------------------------------------------|
| Hysteresis       | Approx. 2 mm / 0.08" with vertical installation |
| Integration time | Approx. 500 ms                                  |
| Frequency        | Approx. 1200 Hz                                 |

#### Operating conditions

|                                     |                                                     |
|-------------------------------------|-----------------------------------------------------|
| <b>Temperature</b>                  |                                                     |
| Ambient temperature on housing      | -40...+70°C / -40...+158°F                          |
| Storage and transport temperature   | -40...+80°C / -40...+176°F                          |
| <b>Process temperature</b>          |                                                     |
| Standard                            | -40...+100°C / -40...+212°F                         |
| High temperature version (optional) | -40...+150°C / -40...+302°F                         |
| Temperature shock                   | No limitation                                       |
| Process pressure                    | -1...64 bar / -14.5...928 psi                       |
| Viscosity (dynamic)                 | 0.1...10.000 mPa s (requirement: with SG=1)         |
| Density                             | >0.7 g/cm <sup>3</sup> / >0.025 lbs/in <sup>3</sup> |

#### Materials

|                          |                                            |
|--------------------------|--------------------------------------------|
| <b>Wetted parts</b>      |                                            |
| Process fitting – thread | 316L                                       |
| Gaskets                  | Klingersil C-4400                          |
| Vibrating element        | 316L                                       |
| <b>Non-wetted parts</b>  |                                            |
| Housing                  | 316L and plastic PEI                       |
| <b>Surface quality</b>   |                                            |
| Standard                 | Ra = approx. 3.2 µm / 1.26 <sup>-4</sup> " |
| Hygienic version         | Ra < 0.8 µm / 3.15 <sup>-5</sup> "         |

#### Process connection

|                   |                                                                            |
|-------------------|----------------------------------------------------------------------------|
| Thread            | G¾ A; ¾ NPT; G1 A; 1 NPT                                                   |
| Hygienic fittings | Bolting DN 25 PN 40; bolting DN 40 PN 40; Tri-Clamp 1"; Tri-Clamp 1½"; SMS |

## Power Supply

|                                      |                                                             |
|--------------------------------------|-------------------------------------------------------------|
| <b>Transistor output</b>             |                                                             |
| Supply voltage                       | 10...55 VDC                                                 |
| Power consumption                    | Max. 0.5 W                                                  |
| <b>Contactless electronic switch</b> |                                                             |
| Supply voltage                       | 20...253 VAC, 50/60 Hz, 20...253 VDC                        |
| Power consumption                    | Approx. 3 mA (via load circuit)                             |
| <b>Operating elements</b>            |                                                             |
| Control lamp                         | Illuminated lens for indication of the switching condition. |
| Mode adjustment                      | Min./max. adjustment through electrical connection          |
| <b>Electromechanical data</b>        |                                                             |
| Plug connection                      | 1x plug M12x1 or 1x plug DIN 43650                          |
| Screwed terminals                    | For wire cross-section up to 1.5 mm <sup>2</sup>            |

## Output

|                                      |                                                                         |
|--------------------------------------|-------------------------------------------------------------------------|
| <b>Transistor output</b>             | Floating transistor output, overload and permanently shortcircuit-proof |
| Load current                         | Max. 250 mA                                                             |
| Voltage loss                         | Max. 1 V                                                                |
| Turn-on voltage                      | Max. 55 VDC                                                             |
| Blocking current                     | <10 µA                                                                  |
| Modes (adjustable)                   | Min. / max.                                                             |
| Delay time                           | When immersed: approx. 0.5 s; when uncovered: approx. 1 s               |
| <b>Contactless electronic switch</b> | Contactless electronic switch                                           |
| Modes (adjustable)                   | Min. / max.                                                             |
| Delay time                           | When immersed: approx. 0.5 s; when uncovered: approx. 1 s               |

## Approvals

|                                                     |                                                                                   |
|-----------------------------------------------------|-----------------------------------------------------------------------------------|
| <b>Protection category</b>                          |                                                                                   |
| Valve plug                                          | IP 65                                                                             |
| Valve plug with IDC method of termination           | IP 67                                                                             |
| M12x1 plug connection (only with transistor output) | IP 66/IP 67                                                                       |
| Overvoltage category                                | III                                                                               |
| <b>Protection class</b>                             |                                                                                   |
| Transistor output                                   | II                                                                                |
| Contactless electronic switch                       | I                                                                                 |
| <b>CE conformity</b>                                |                                                                                   |
| EMC (89/336/EEC)                                    | Emission EN 61326: 1997 (class B), immunity EN 61326: 1997/A1: 1998               |
| LVD (73/23/EEC)                                     | EN 61010-1: 2001                                                                  |
| SIL conformity                                      | OPTISWITCH fulfills the requirements of functional safety according to IEC 61508. |

## OPTISWITCH 5000 C series

### Function

|                       |                            |
|-----------------------|----------------------------|
| Measurement parameter | Level detection of liquids |
|-----------------------|----------------------------|

### Design

| Sensor length                   |                           |
|---------------------------------|---------------------------|
| OPTISWITCH 5100 C, 5150 C       | See chapter "Dimensions". |
| OPTISWITCH 5200 C, 5250 C       |                           |
| 316L, 2.4610 (Hastelloy C4)     | 80...6000 mm / 3...236"   |
| 2.4610 (Hastelloy C4) enamelled | 80...1500 mm / 3...59"    |
| 1.4435 (316L) ECTFE coated      | 80...3000 mm / 3...118"   |
| 1.4435 (316L) PFA coated        | 80...3000 mm / 3...118"   |

### Measurement accuracy

|                  |                                                 |
|------------------|-------------------------------------------------|
| Hysteresis       | Approx. 2 mm / 0.08" with vertical installation |
| Integration time | Approx. 500 ms                                  |
| Frequency        | Approx. 1200 Hz                                 |

### Operating conditions

| Temperature                                  |                                                                                                                                                   |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Ambient temperature on housing               | -40...+70°C / -40...+158°F                                                                                                                        |
| Storage and transport temperature            | -40...+80°C / -40...+176°F                                                                                                                        |
| Process temperature                          |                                                                                                                                                   |
| 316L / Hastelloy C4 (2.4610)                 | -50...+150°C / -58...+302°F                                                                                                                       |
| Process temperature with temperature adapter | Option                                                                                                                                            |
| 316L / Hastelloy C4 (2.4610)                 | -50...+250°C / -58...+482°F                                                                                                                       |
| enamelled                                    | -50...+200°C / -58...+392°F                                                                                                                       |
| with ECTFE coating                           | -50...+150°C / -58...+302°F                                                                                                                       |
| with PFA coating                             | -50...+150°C / -58...+302°F                                                                                                                       |
| Temperature shock                            | No limitation                                                                                                                                     |
| Process pressure                             | -1...64 bar / -14.5...928 psi                                                                                                                     |
| Viscosity (dynamic)                          | 0.1...10.000 mPa s (requirement: with SG=1)                                                                                                       |
| Density                                      | 0.7...2.5 g/cm <sup>3</sup> / 0.025...0.09 lbs/in <sup>3</sup> ; 0.5...2.5 g/cm <sup>3</sup> / 0.018...0.09 lbs/in <sup>3</sup> by switching over |

## Materials

|                                                             |                                                                                                              |
|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| <b>Wetted parts</b>                                         |                                                                                                              |
| Process fitting – thread                                    | 316L; 2.4602 (Hastelloy C4)                                                                                  |
| Process fitting – flange                                    | 316L; 316L with Hastelloy C4 coating; steel enamelled; 316L with ECTFE coating; 316L with PFA coating        |
| Gaskets                                                     | Klingersil C-4400                                                                                            |
| Tuning fork                                                 | 316L / 2.4610 (Hastelloy C4)                                                                                 |
| Extension tube $\varnothing 21.3$ mm / $\varnothing 0.84$ " | 316L; 2.4610 (Hastelloy C4); 2.4610 (Hastelloy C4) enamelled; 316L with ECTFE coating; 316L with PFA coating |
| <b>Non-wetted parts</b>                                     |                                                                                                              |
| Housing                                                     | Plastic PBT (Polyester), Alu-die casting powder-coated, 316L                                                 |
| Gasket ring between housing and housing cover               | NBR (stainless steel housing), silicone (Alu / plastic housing)                                              |
| Peephole in housing cover                                   | PMMA (Makrolon)                                                                                              |
| Ground terminal                                             | 316L                                                                                                         |
| Temperature adapter (Option)                                | 316L                                                                                                         |
| Gastight leadthrough (Option)                               | 316L / glass                                                                                                 |
| <b>Surface quality</b>                                      |                                                                                                              |
| Standard (OPTISWITCH 5100 C, 5200 C)                        | Ra = approx. $3.2 \mu\text{m}$ / 1.26-4"                                                                     |
| Hygienic version (OPTISWITCH 5150 C, 5250 C)                | Ra < $0.8 \mu\text{m}$ / 3.15-5"                                                                             |
| <b>Coatings</b>                                             |                                                                                                              |
| ECTFE                                                       | Approx. 0.5...0.8 mm / 0.02...0.03"                                                                          |
| PFA                                                         | Approx. 0.3...0.5 mm / 0.01...0.02"                                                                          |
| Enamel                                                      | Approx. 0.8 mm / 0.03"                                                                                       |

## Process connection

|                                               |                                                                                                             |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| Thread                                        | G $\frac{3}{4}$ A; $\frac{3}{4}$ NPT; G1 A; 1 NPT                                                           |
| Flanges                                       | DIN: $\geq$ DN25; ANSI: $\geq$ 1"                                                                           |
| Hygienic fittings (OPTISWITCH 5150 C, 5250 C) | Bolting DN 40 PN 40; Tri-Clamp 1"; Tri-Clamp 1½" PN 10; cone DN 25 PN 40; Tuchenhausen Varivent DN 50 PN 10 |

## Power Supply

|                                      |                                                                                                       |
|--------------------------------------|-------------------------------------------------------------------------------------------------------|
| <b>Relay output</b>                  |                                                                                                       |
| Supply voltage                       | 20...253 VAC, 50/60 Hz, 20...72 VDC (at U > 60 VDC, the ambient temperature can be max. 50°C / 122°F) |
| Power consumption                    | 1...8 VA (AC); ca. 1.3 W (DC)                                                                         |
| <b>Transistor output</b>             |                                                                                                       |
| Supply voltage                       | 10...55 VDC                                                                                           |
| Power consumption                    | Max. 0.5 W                                                                                            |
| <b>Contactless electronic switch</b> |                                                                                                       |
| Supply voltage                       | 20...253 VAC, 50/60 Hz, 20...253 VDC                                                                  |
| Power consumption                    | Approx. 3 mA (via load circuit)                                                                       |

|                                                                                                                  |                                                                                                                                                                           |
|------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Two-wire output</b>                                                                                           |                                                                                                                                                                           |
| Supply voltage                                                                                                   | 10...36 VDC (via the signal conditioning instrument)                                                                                                                      |
| <b>NAMUR output</b>                                                                                              |                                                                                                                                                                           |
| Supply voltage (standard characteristics)                                                                        | For connection to amplifier according to NAMUR IEC 60947-5-6, approx. 8.2 V                                                                                               |
| Open-circuit voltage                                                                                             | $U_0$ approx. 8.2 V                                                                                                                                                       |
| Shortcircuit current                                                                                             | $I_U$ approx. 8.2 mA                                                                                                                                                      |
| Operating elements                                                                                               |                                                                                                                                                                           |
| Control lamp                                                                                                     | Control lamp (LED) for indication of the switching condition.                                                                                                             |
| Density switch (electronics versions: relay, transistor, contactless electronic switch, two-wire, NAMUR outputs) |                                                                                                                                                                           |
| 0.5                                                                                                              | 0.5...2.5 g/cm <sup>2</sup> / 0.018...0.9 oz/in <sup>2</sup>                                                                                                              |
| 0.7                                                                                                              | 0.7...2.5 g/cm <sup>2</sup> / 0.025...0.9 oz/in <sup>2</sup>                                                                                                              |
| Mode switch (electronics versions: relay output, transistor output, contactless electronic switch)               |                                                                                                                                                                           |
| A                                                                                                                | Max. detection or overfill protection                                                                                                                                     |
| B                                                                                                                | Min. detection or dry run protection                                                                                                                                      |
| Characteristics reversal (electronics version: NAMUR output)                                                     |                                                                                                                                                                           |
| Max.                                                                                                             | Falling characteristics (Low current when immersed)                                                                                                                       |
| Min.                                                                                                             | Rising characteristics (High current when immersed)                                                                                                                       |
| Electromechanical data                                                                                           |                                                                                                                                                                           |
| Cable entry/plug (dependent on the version) - Single chamber housing                                             | 1x cable entry M20x1.5 (cable ø5...9 mm), 1x blind stopper M20x1.5; attached 1x cable entry M20x1.5 or 1x cable entry ½ NPT, 1x blind stopper ½ NPT, 1x cable entry ½ NPT |
| Screwed terminals                                                                                                | For wire cross-section up to 1.5 mm <sup>2</sup>                                                                                                                          |

## Output

|                                      |                                                                         |
|--------------------------------------|-------------------------------------------------------------------------|
| <b>Relay output</b>                  | Relay output (DPDT), 2 floating spdts                                   |
| Turn-on voltage                      | Min.: 10 mV; max.: 253 VAC/DC                                           |
| Switching current                    | Min.: 10 µA; max.: 5 A AC, 1 A DC                                       |
| Breaking capacity                    | Max.: 1250 VA, 50 W                                                     |
| Contact material (relay contacts)    | AgCdO and Au plated                                                     |
| Modes (adjustable)                   | Min. / max.                                                             |
| Delay time                           | When immersed: approx. 0.5 s; when uncovered: approx. 1 s               |
| <b>Transistor output</b>             | Floating transistor output, overload and permanently shortcircuit proof |
| Load current                         | Max. 400 mA                                                             |
| Voltage loss                         | Max. 1 V                                                                |
| Turn-on voltage                      | Max. 55 VDC                                                             |
| Blocking current                     | <10 µA                                                                  |
| Modes (adjustable)                   | Min. / max.                                                             |
| Delay time                           | When immersed: approx. 0.5 s; when uncovered: approx. 1 s               |
| <b>Contactless electronic switch</b> | Contactless electronic switch                                           |
| Modes (adjustable)                   | Min. / max.                                                             |
| Delay time                           | When immersed: approx. 0.5 s; when uncovered: approx. 1 s               |

|                                                                      |                                                                                                                      |
|----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>Two-wire output</b>                                               |                                                                                                                      |
| Suitable signal conditioning instruments                             | SU 501                                                                                                               |
| Output signal                                                        |                                                                                                                      |
| Min. mode                                                            | Vibrating element uncovered: 16 mA $\pm$ 1 mA; vibrating element covered: 8 mA $\pm$ 1 mA                            |
| Max. mode                                                            | Vibrating element uncovered: 8 mA $\pm$ 1 mA; vibrating element covered: 16 mA $\pm$ 1 mA                            |
| Fault signal                                                         | <2 mA                                                                                                                |
| Modes (adjustable)                                                   | Min. / max. (changeover with the signal conditioning instrument)                                                     |
| Delay time                                                           | When immersed: approx. 0.5 s; when uncovered: approx. 1 s                                                            |
| <b>NAMUR output</b>                                                  |                                                                                                                      |
| Two-wire NAMUR output                                                |                                                                                                                      |
| Current consumption                                                  |                                                                                                                      |
| Falling characteristics                                              | $\geq 2.2$ mA uncovered / $\leq 1$ mA covered                                                                        |
| Rising characteristics                                               | $\leq 1$ mA uncovered / $\geq 2.2$ mA covered                                                                        |
| Fault signal                                                         | $\leq 1$ mA                                                                                                          |
| Necessary processing system                                          | NAMUR processing system according to IEC 60947-5-6 (EN 50227/DIN 19234)                                              |
| Modes (NAMUR output adjustable to falling or rising characteristics) | Min.: rising characteristics (High current when immersed); max.: falling characteristics (Low current when immersed) |

## Approvals

|                                                  |                                                                                   |
|--------------------------------------------------|-----------------------------------------------------------------------------------|
| ATEX                                             | ATEX II 1G, 1/2G, 2G EEx ia IIC T6 ❶                                              |
|                                                  | ATEX II 1/2G, 2G EEx d IIC T6 ❷                                                   |
|                                                  | ATEX II 1/2D IP6X T                                                               |
| Ship approval                                    | GL & LR                                                                           |
| WHG                                              | German Federal Water Act ❸                                                        |
| Protection category                              | IP 66/IP 67                                                                       |
| Overvoltage category                             | III                                                                               |
| <b>Protection class</b>                          |                                                                                   |
| Transistor output, two-wire output, NAMUR output | II                                                                                |
| Relay output, contactless electronic switch      | I                                                                                 |
| <b>CE conformity</b>                             |                                                                                   |
| EMC (89/336/EEC)                                 | Emission EN 61326/A1: 1998 (class B), susceptibility EN 61326: 1997/A1: 1998      |
| LVD (73/23/EEC)                                  | EN 61010-1: 1993                                                                  |
| SIL conformity                                   | OPTISWITCH fulfills the requirements of functional safety according to IEC 61508. |

❶ this approval is for 2-wire and NAMUR electronics. It can be combined with either WHG or with ship approval.

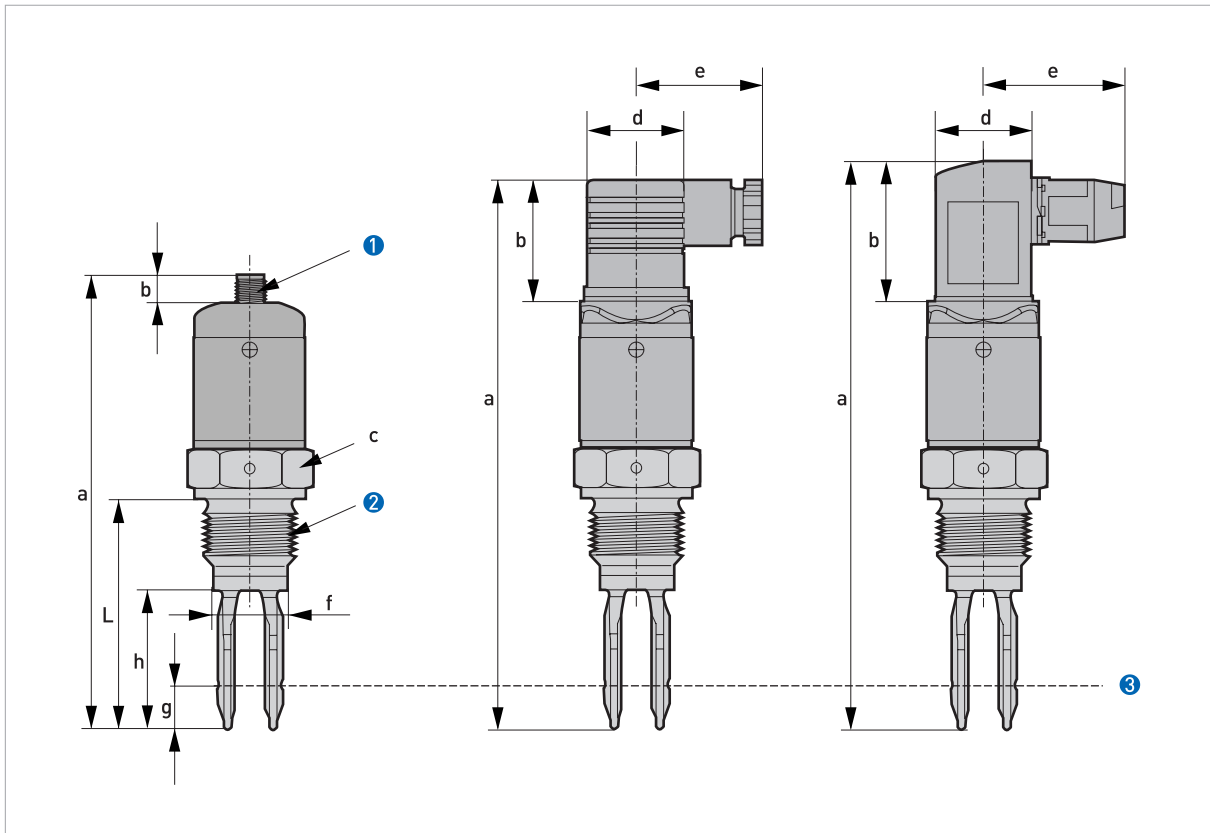
❷ only for the plastic-coated aluminium housing with a ½ NPT cable gland. An optional temperature adapter can be used without a gas-tight bushing.

❸ only for contactless electronic switch, relay and transistor electronics.

## Dimensions and Weights

### OPTISWITCH 4000 - Standard version:

From left to right: thread (M12x1, valve plug DIN 43650 and valve plug DIN 43650 with IDC method of termination)



- ① M12x1
- ② Thread G $\frac{3}{4}$  A, G1 A,  $\frac{1}{4}$  NPT, 1 NPT
- ③ Switching point

### Dimensions in mm

|                                                                                                                  | a     | b    | c     | d    | e    | f    | g    | h    | L   |
|------------------------------------------------------------------------------------------------------------------|-------|------|-------|------|------|------|------|------|-----|
|                                                                                                                  | [mm]  |      |       |      |      |      |      |      |     |
| Thread G $\frac{3}{4}$ A, G1 A, $\frac{3}{4}$ NPT or 1 NPT (M12x1)                                               | 132.5 | 10.0 | WS 32 | -    | -    | 21.3 | 13.0 | 40.0 | L ① |
| Thread G $\frac{3}{4}$ A, G1 A, $\frac{3}{4}$ NPT or 1 NPT (valve plug DIN 43650)                                | 158.0 | 35.0 | -     | 27.0 | 36.0 | -    | -    | -    | -   |
| Thread G $\frac{3}{4}$ A, G1 A, $\frac{3}{4}$ NPT or 1 NPT (valve plug DIN 43650 with IDC method of termination) | 165.0 | 42.0 | -     | 28.0 | 42.0 | -    | -    | -    | -   |

① with G $\frac{3}{4}$  A,  $\frac{3}{4}$  NPT: 66 mm; with G1 A, 1 NPT: 69 mm

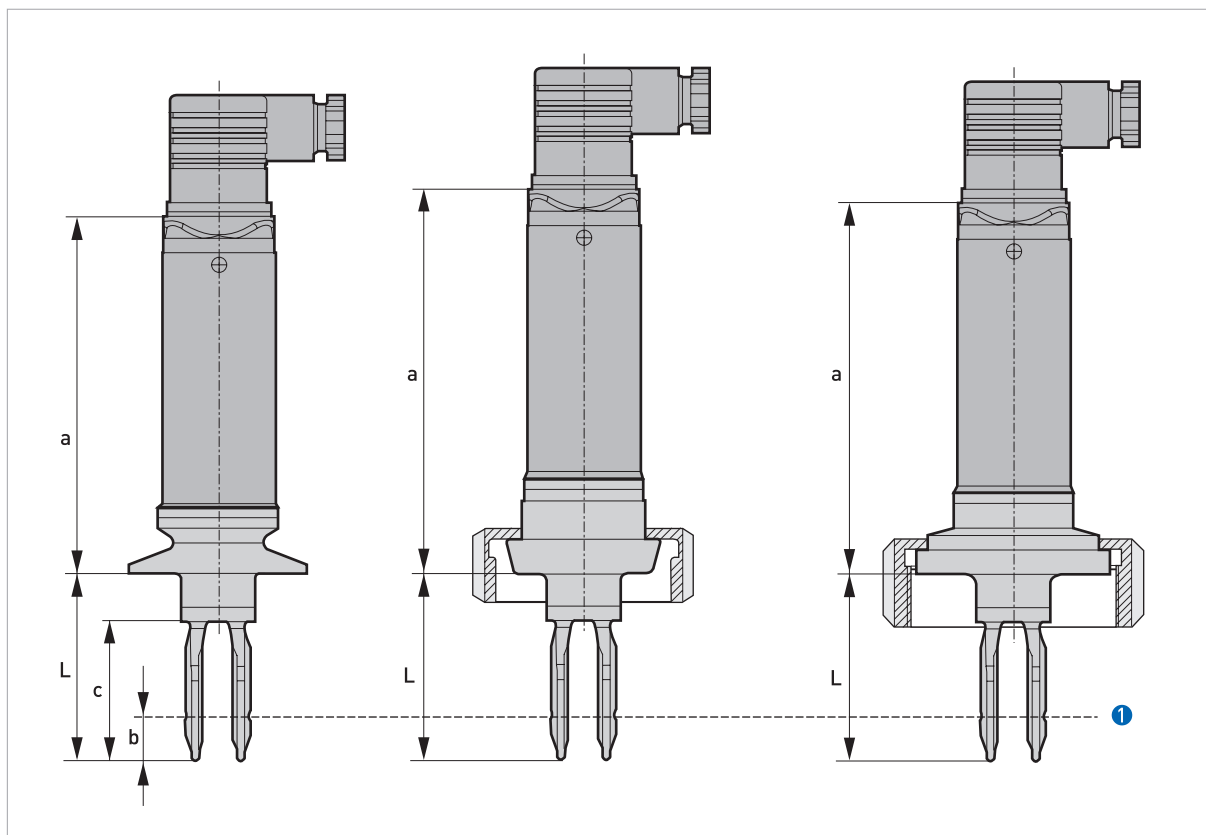
### Dimensions in inches

|                                                                                                                  | a        | b    | c     | d    | e    | f    | g    | h    | L   |
|------------------------------------------------------------------------------------------------------------------|----------|------|-------|------|------|------|------|------|-----|
|                                                                                                                  | [inches] |      |       |      |      |      |      |      |     |
| Thread G $\frac{3}{4}$ A, G1 A, $\frac{3}{4}$ NPT or 1 NPT (M12x1)                                               | 5.22     | 0.39 | WS 32 | -    | -    | 0.84 | 0.51 | 1.57 | L ① |
| Thread G $\frac{3}{4}$ A, G1 A, $\frac{3}{4}$ NPT or 1 NPT (valve plug DIN 43650)                                | 6.22     | 1.38 | -     | 1.06 | 1.42 | -    | -    | -    | -   |
| Thread G $\frac{3}{4}$ A, G1 A, $\frac{3}{4}$ NPT or 1 NPT (valve plug DIN 43650 with IDC method of termination) | 6.50     | 1.65 | -     | 1.10 | 1.65 | -    | -    | -    | -   |

① with G $\frac{3}{4}$  A,  $\frac{3}{4}$  NPT: 2.6"; with G1 A, 1 NPT: 2.7"

## OPTISWITCH 4000 - Hygienic version:

From left to right: Tri-Clamp (valve plug DIN 43650); Bolting (valve plug DIN 43650); SMS 1145 (valve plug DIN 43650)



① Switching point

### Dimensions in mm

|                                  | a     | b    | c    | L   |
|----------------------------------|-------|------|------|-----|
|                                  | [mm]  |      |      |     |
| Tri-Clamp (valve plug DIN 43650) | 101.0 | 13.0 | 40.0 | L ① |
| Bolting (valve plug DIN 43650)   | 115.0 | -    | -    | L ① |
| SMS 1145 (valve plug DIN 43650)  | 105.0 | -    | -    | L ① |

① 53 mm

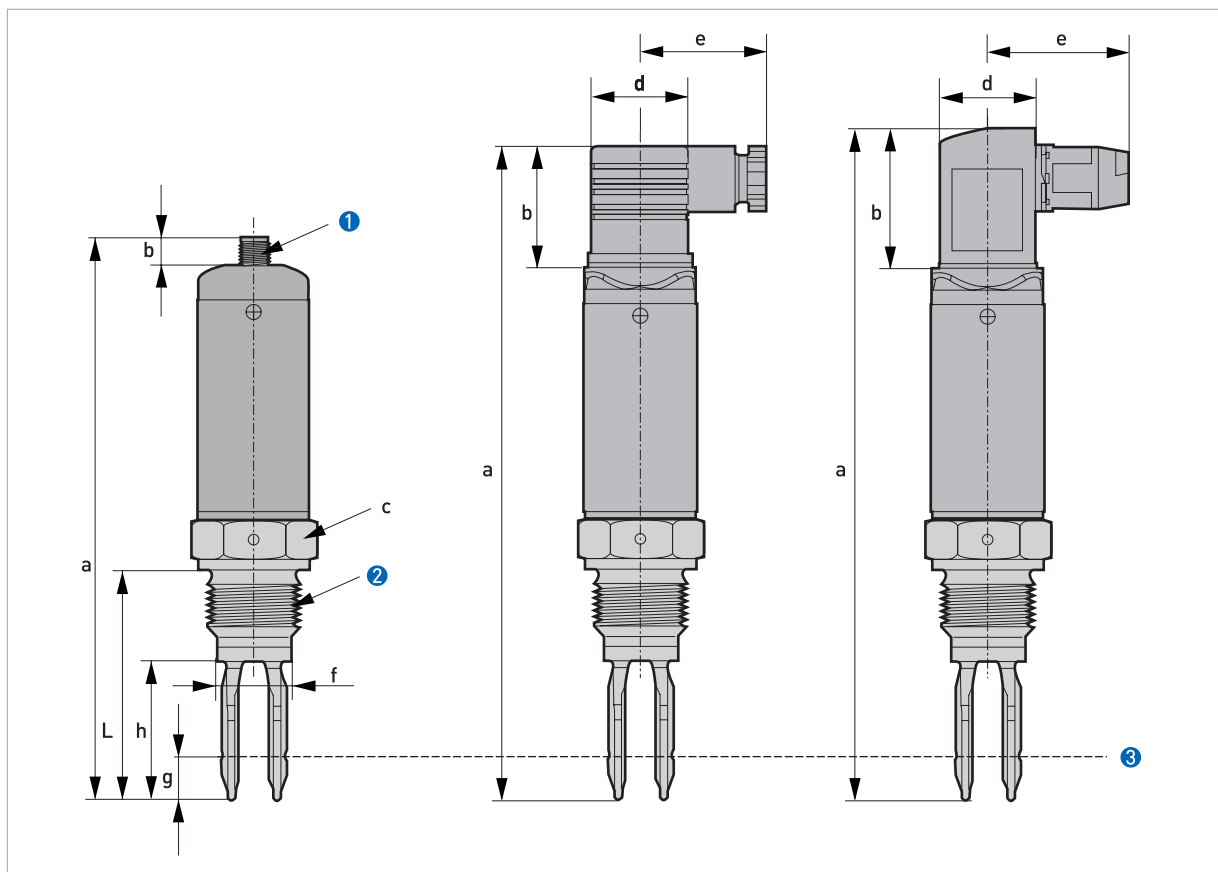
### Dimensions in inches

|                                  | a        | b    | c    | L   |
|----------------------------------|----------|------|------|-----|
|                                  | [inches] |      |      |     |
| Tri-Clamp (valve plug DIN 43650) | 3.98     | 0.51 | 1.57 | L ① |
| Bolting (valve plug DIN 43650)   | 3.53     | -    | -    | L ① |
| SMS 1145 (valve plug DIN 43650)  | 4.13     | -    | -    | L ① |

① 2.1"

## OPTISWITCH 4000 - High temperature version:

From left to right: thread (M12x1, valve plug DIN 43650 and valve plug DIN 43650 with IDC method of termination)



- ① M12x1
- ② Thread G $\frac{3}{4}$  A, G1 A,  $\frac{3}{4}$  NPT, 1 NPT
- ③ Switching point

### Dimensions in mm

|                                                                                                                  | a     | b    | c     | d    | e    | f    | g    | h    | L   |
|------------------------------------------------------------------------------------------------------------------|-------|------|-------|------|------|------|------|------|-----|
|                                                                                                                  | [mm]  |      |       |      |      |      |      |      |     |
| Thread G $\frac{3}{4}$ A, G1 A, $\frac{1}{4}$ NPT or 1 NPT (M12x1)                                               | 162.5 | 10.0 | WS 32 | -    | -    | 21.3 | 13.0 | 40.0 | L ① |
| Thread G $\frac{3}{4}$ A, G1 A, $\frac{1}{4}$ NPT or 1 NPT (valve plug DIN 43650)                                | 188.0 | 35.0 | -     | 27.0 | 36.0 | -    | -    | -    | -   |
| Thread G $\frac{3}{4}$ A, G1 A, $\frac{1}{4}$ NPT or 1 NPT (valve plug DIN 43650 with IDC method of termination) | 182.0 | 42.0 | -     | 28.0 | 42.0 | -    | -    | -    | -   |

① with G $\frac{3}{4}$  A,  $\frac{1}{4}$  NPT: 66 mm; with G1 A, 1 NPT: 69 mm

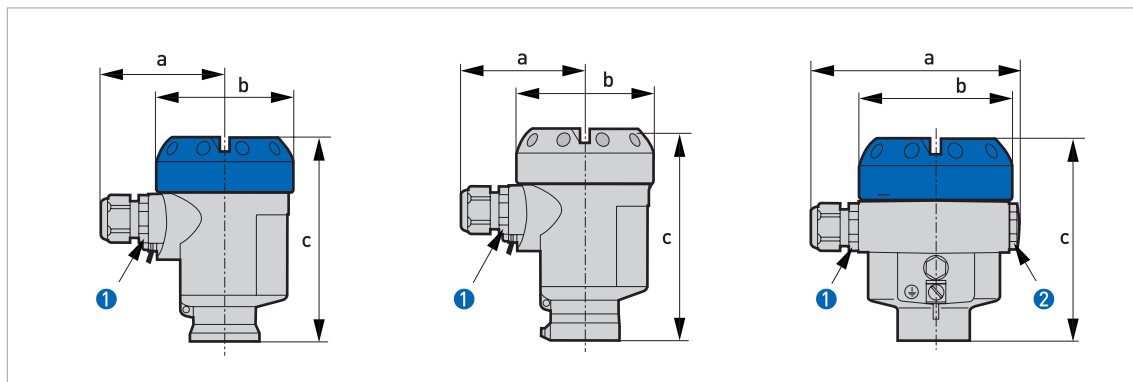
### Dimensions in inches

|                                                                                                                  | a        | b    | c     | d    | e    | f    | g    | h    | L   |
|------------------------------------------------------------------------------------------------------------------|----------|------|-------|------|------|------|------|------|-----|
|                                                                                                                  | [inches] |      |       |      |      |      |      |      |     |
| Thread G $\frac{3}{4}$ A, G1 A, $\frac{1}{4}$ NPT or 1 NPT (M12x1)                                               | 6.40     | 0.39 | WS 32 | -    | -    | 0.84 | 0.51 | 1.57 | L ① |
| Thread G $\frac{3}{4}$ A, G1 A, $\frac{1}{4}$ NPT or 1 NPT (valve plug DIN 43650)                                | 7.40     | 1.38 | -     | 1.06 | 1.42 | -    | -    | -    | -   |
| Thread G $\frac{3}{4}$ A, G1 A, $\frac{1}{4}$ NPT or 1 NPT (valve plug DIN 43650 with IDC method of termination) | 7.15     | 1.65 | -     | 1.10 | 1.65 | -    | -    | -    | -   |

① with G $\frac{3}{4}$  A,  $\frac{1}{4}$  NPT: 2.6"; with G1 A, 1 NPT: 2.7"

## OPTISWITCH 5000 series - Housing

From left to right: Plastic, Stainless steel and Aluminium housing



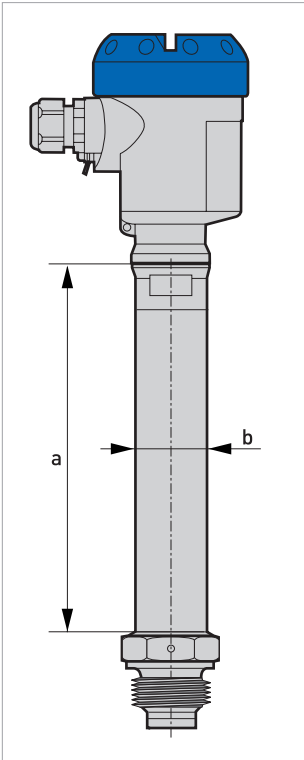
① M20x1,5 / ½ NPT

② M20x1,5

## Dimensions and Weights

|                         | Dimensions |     |     | Weight | Dimensions |      |      | Weight |
|-------------------------|------------|-----|-----|--------|------------|------|------|--------|
|                         | [mm]       |     |     | [kg]   | [inches]   |      |      | [lbs]  |
|                         | a          | b   | c   |        | a          | b    | c    |        |
| Plastic Housing         | 69         | Ø77 | 112 | 0.76   | 2.72       | Ø3.0 | 4.41 | 1.68   |
| Stainless steel housing | 69         | Ø77 | 117 | 1.53   | 2.72       | Ø3.0 | 4.61 | 3.37   |
| Aluminium housing       | 116        | 84  | 114 | 1.17   | 4.57       | 3.31 | 4.49 | 2.58   |

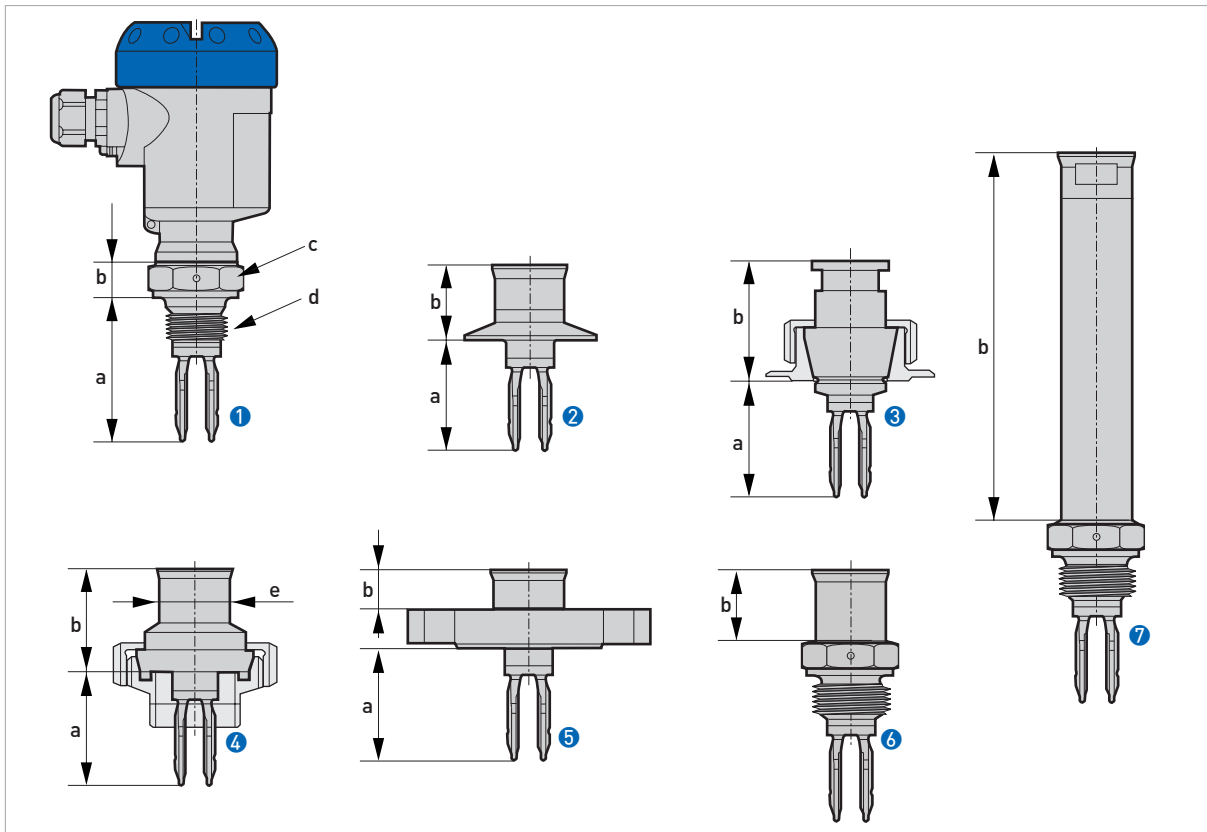
### OPTISWITCH 5100 C, 5150 C, 5200 C, 5250 C - Temperature adapter



### Dimensions in mm and inches

|                     | a    | b   | a        | b     |
|---------------------|------|-----|----------|-------|
|                     | [mm] |     | [inches] |       |
| Temperature adapter | 178  | Ø34 | 7        | Ø1.34 |

## OPTISWITCH 5100 C, 5150 C



- ① Thread
- ② Tri-Clamp (OPTISWITCH 5150)
- ③ Cone DN 25 (OPTISWITCH 5150)
- ④ Bolting DN 40 (OPTISWITCH 5150)
- ⑤ Flange
- ⑥ Gas-tight leadthrough
- ⑦ Temperature adapter

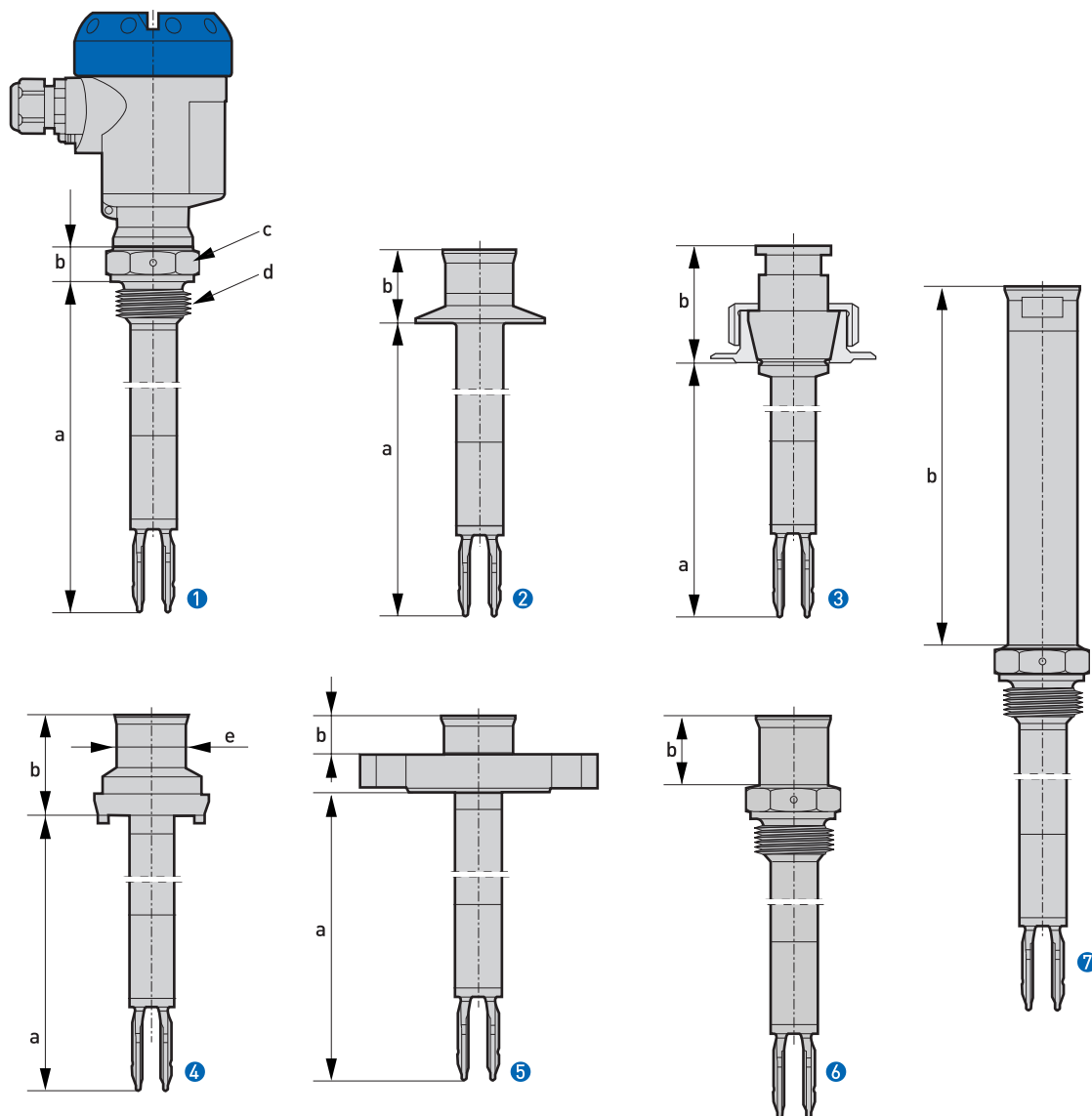
### Dimensions in mm

|                                 | a    | b    | c                                                                      | d                                                   |
|---------------------------------|------|------|------------------------------------------------------------------------|-----------------------------------------------------|
|                                 | [mm] |      |                                                                        |                                                     |
| Thread                          | 66   | 18.5 | WS 32 (G $\frac{3}{4}$ A;<br>$\frac{3}{4}$ NPT); WS 41<br>(G1A; 1 NPT) | G $\frac{3}{4}$ A, $\frac{3}{4}$ NPT;<br>G1A, 1 NPT |
| Tri-Clamp (OPTISWITCH 5150)     | 53   | 36   | -                                                                      | -                                                   |
| Cone DN 25 (OPTISWITCH 5150)    | 55   | 57   | -                                                                      | -                                                   |
| Bolting DN 40 (OPTISWITCH 5150) | 53   | 50   | Ø33.7                                                                  | -                                                   |
| Flange                          | 53   | 19   | -                                                                      | -                                                   |
| Gas-tight leadthrough           | -    | 34   | -                                                                      | -                                                   |
| Temperature adapter             | -    | 178  | -                                                                      | -                                                   |

### Dimensions in inches

|                                 | a        | b    | c                                                                      | d                                                   |
|---------------------------------|----------|------|------------------------------------------------------------------------|-----------------------------------------------------|
|                                 | [inches] |      |                                                                        |                                                     |
| Thread                          | 2.6      | 0.72 | WS 32 (G $\frac{3}{4}$ A;<br>$\frac{3}{4}$ NPT); WS 41<br>(G1A; 1 NPT) | G $\frac{3}{4}$ A, $\frac{3}{4}$ NPT;<br>G1A, 1 NPT |
| Tri-Clamp (OPTISWITCH 5150)     | 2.09     | 1.41 | -                                                                      | -                                                   |
| Cone DN 25 (OPTISWITCH 5150)    | 2.17     | 2.24 | -                                                                      | -                                                   |
| Bolting DN 40 (OPTISWITCH 5150) | 2.09     | 1.97 | Ø1.33                                                                  | -                                                   |
| Flange                          | 2.09     | 0.75 | -                                                                      | -                                                   |
| Gas-tight leadthrough           | -        | 1.34 | -                                                                      | -                                                   |
| Temperature adapter             | -        | 7.0  | -                                                                      | -                                                   |

## OPTISWITCH 5200 C, 5250 C



- ① Thread
- ② Tri-Clamp (OPTISWITCH 5250)
- ③ Cone DN 25 (OPTISWITCH 5250)
- ④ Bolting DN 40 (OPTISWITCH 5250)
- ⑤ Flange
- ⑥ Gas-tight leadthrough
- ⑦ Temperature adapter

### Dimensions in mm

|                                 | a    | b    | c                                                                      | d                                       |
|---------------------------------|------|------|------------------------------------------------------------------------|-----------------------------------------|
|                                 | [mm] |      |                                                                        |                                         |
| Thread                          | L ①  | 18.5 | WS 32 (G $\frac{3}{4}$ A;<br>$\frac{3}{4}$ NPT); WS 41<br>(G1A; 1 NPT) | G3/4A, $\frac{3}{4}$ NPT;<br>G1A, 1 NPT |
| Tri-Clamp (OPTISWITCH 5250)     | L ①  | 36   | -                                                                      | -                                       |
| Cone DN 25 (OPTISWITCH 5250)    | L ①  | 57   | -                                                                      | -                                       |
| Bolting DN 40 (OPTISWITCH 5250) | L ①  | 50   | Ø33.7                                                                  | -                                       |
| Flange                          | L ①  | 19   | -                                                                      | -                                       |
| Gas-tight leadthrough           | -    | 34   | -                                                                      | -                                       |
| Temperature adapter             | -    | 178  | -                                                                      | -                                       |

① Ordered sensor length

### Dimensions in inches

|                                 | a        | b    | c                                                                      | d                                                   |
|---------------------------------|----------|------|------------------------------------------------------------------------|-----------------------------------------------------|
|                                 | [inches] |      |                                                                        |                                                     |
| Thread                          | L ①      | 0.72 | WS 32 (G $\frac{3}{4}$ A;<br>$\frac{3}{4}$ NPT); WS 41<br>(G1A; 1 NPT) | G $\frac{3}{4}$ A, $\frac{3}{4}$ NPT;<br>G1A, 1 NPT |
| Tri-Clamp (OPTISWITCH 5250)     | L ①      | 1.41 | -                                                                      | -                                                   |
| Cone DN 25 (OPTISWITCH 5250)    | L ①      | 2.24 | -                                                                      | -                                                   |
| Bolting DN 40 (OPTISWITCH 5250) | L ①      | 1.97 | Ø1.33                                                                  | -                                                   |
| Flange                          | L ①      | 0.75 | -                                                                      | -                                                   |
| Gas-tight leadthrough           | -        | 1.34 | -                                                                      | -                                                   |
| Temperature adapter             | -        | 7.0  | -                                                                      | -                                                   |

① Ordered sensor length