

# BDT18 HP– Industrial high pressure gauge

## Product description

Badotherm pressure gauge model BDT18-HP for high pressures above 1600 bar. Badotherm pressure gauge model BDT18-HP is manufactured in full stainless steel and suitable bourdon tube materials. The gauge is not fully in accordance with DIN16001 because of the missing baffle wall and blow out back, however the gauge is following the standard on all other specifications. This pressure gauge is typically used for applications in the hydraulic, water jetting and high pressure environments and machine building and general process industries. The pressure elements are made of special materials to withstand the high pressures. These gauges are designed to withstand the severest of operating conditions of the ambient environment and the process medium.

## Design standard

Following DIN 16001 / EN837-1 (where DIN 16001 refers to EN837)

## Dial sizes, ranges & accuracy

Possibilities in ranges and accuracies are led by the dial size. Accuracy class is based on dry gauges. Liquid filling can affect the accuracy.

| Dial size | Ranges                | Accuracy                          |
|-----------|-----------------------|-----------------------------------|
| 100mm     | >1600 to 0...7000 bar | 1.0% <6000 bar                    |
| 160mm     |                       | 1.6% 6000, 7000 bar (1% optional) |

## Mounting variation

Not all gauges are suitable for some mounting variations. For the BDT18 series the mounting variations are below.

- **type A** (10) bottom connection, direct mounting
- **type B** (33) Lower-back connection U-bracket
- **type C** (11) bottom connection, surface mounting (back)
- **type D** (30) lower back connection, direct mounting
- **type E** (32) lower back connection, panel mounting (front)
- **type F** (12) bottom connection, panel mounting (front)

More specifically per gauge size:

| Dial size | A | B               | C | D               | E               | F |
|-----------|---|-----------------|---|-----------------|-----------------|---|
| 100mm     | • | •               | • | •               | •               | • |
| 160mm     | • | • <sup>*1</sup> | • | • <sup>*1</sup> | • <sup>*1</sup> | • |

\*1) Type B, D and E 160mm only for ≤3000 bar



## Process connection

| size  | Standard thread                                 | optionally  |
|-------|---|---|
| 100mm | 9/16" UNF Female<br>(According Autoclave F250C) | 9/16" 18 UNF LH Male<br>(According Autoclave M562C) |
| 160mm |   |   |

Other threads possible on accordance between manufacturer and user.

-> See datasheet "thread information" for specific thread details

## Materials of construction

|                               | BDT18 HP                                     |
|-------------------------------|--|
| Case                          | AISI 304 (optionally 316)                    |
| Bezel                         | AISI 304 (optionally 316)                    |
| Connection <sup>*1</sup>      | AISI 316                                     |
| Sensing element <sup>*1</sup> | AISI316 /NiSpan-C 902/ 25CrMo4 <sup>*2</sup> |
| Movement                      | Stainless steel                              |
| Pointer                       | Aluminium                                    |
| Dial                          | Aluminium                                    |
| Window gasket                 | NBR  |
| Blow out                      | NBR  |
| Fill plug                     | NBR (HNBR for filled gauges)                 |
| Mounting flanges              | AISI 304                                     |
| Window                        | Laminated safety glass                       |

\*1) wetted materials

\*2) 25CrMo4 is not suitable for water (only for non-corrosive media)

## Pressure limitations

The gauges are built to withstand harsh environments however the DIN 16001 limits the use of a pressure gauge according below table.

| Dial size | Steady     | Fluctuating | Short time |
|-----------|------------|-------------|------------|
| 100mm     | 0.75 x FSV | 0.67 x FSV  | FSV        |
| 160mm     |            |             |            |

FSV: full scale value

## Temperature limitations

The gauges can withstand ambient and process temperature up to a certain limit. The limitations on temperature are:

|             | Ambient        | Medium         |
|-------------|----------------|----------------|
| Dry case    | -40°C ...+60°C | -40°C...+200°C |
| Filled case | -20°C ...+60°C | -20°C...+90°C  |

The variation of indication caused by the effect of temperature shall not exceed:  $\pm 0.4\% / 10K$  FSV

## Window

Standard BDT18 HP gauges have a laminated safety glass.

## Pointer

Standard pointer is a fixed black painted aluminum pointer.

As options a slotted and micro adjustable pointer are available

## Dial facing

The dial plate is made from aluminum and coated with UV resistant white coating. The black dial markings, scale, numbering, and interval is according the EN 837-1. Options like colored dial, customer logo, or colored segments are possible as well. However, the gauge is following the DIN 16001 it will not be printed on the dial like the BDT-20 HP. ASME dial facing (divisions) available on request (see table 3)

## Limit stop

The BDT18 HP has a limit stop on the movement to prevent, in case of overpressure, the pointer reentering the scale (graduations) thus preventing the operator reading a low pressure when in fact the pressure is dangerously high. This internal limit stop normally engages at approx. 130% of full scale value. The gauges have a free zero.

## Degree of protection

The BDT18 has a standard degree of protection of IP65. The values are determined according the IEC/EN 60529. Class IP66 and IP67 are available as option.

## Case filling

The gauges can be filled with different kind of fill fluids. The fill fluids available are:

- BPF01 – Glycerine 86%
- BPF02 – Silicon
- BPF06 – Glycerine 99.5%

## Restrictor Screw

All gauges can be executed with a restrictor of 0.8 or 0.3 orifice in AISI316. Optional the restrictor can be secured in the connection so the restrictor cannot come out with vibration and damage your installation.

## Certification & Declaration

### Calibration

Gauges are full range calibrated as a factory standard. Optionally you can select a 5 points calibration certificate, and a 10 points calibration certificate.

### [Pressure Equipment Directive - 2014\\_68\\_EU](#)

PED approval is given according article 3.3 and is valid for ranges >200 bar. All gauges will be marked accordingly. A declaration of conformity can be supplied.

### [ATEX 114 - 2014/68/EU](#)

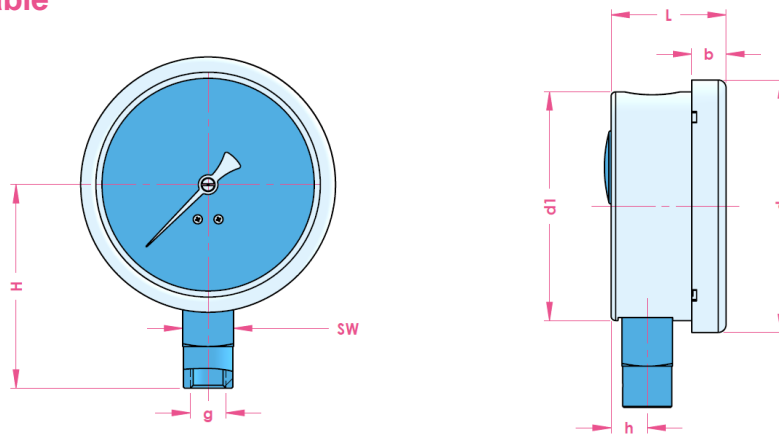
ATEX restrictions are explained in the IOM and in the ATEX background datasheet.

### [EN 10204 material certificate](#)

A material 3.1 certificate on the wetted parts can be supplied.

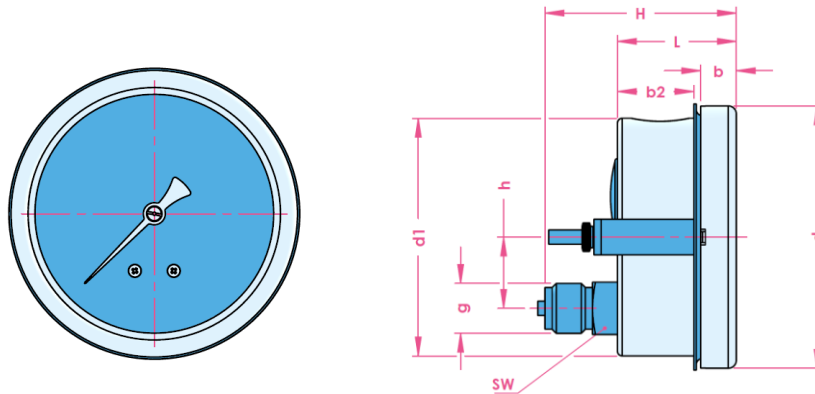
## Dimensions table

### Type A (10)



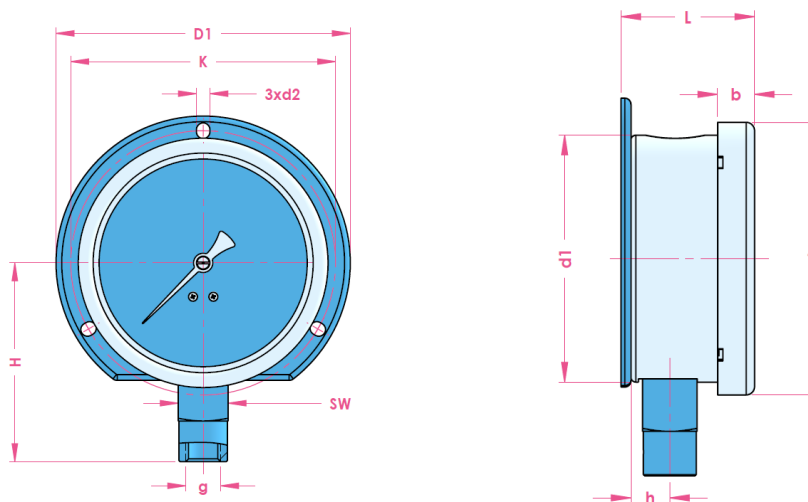
| Dial size | d     | d1    | b    | L    | h    | g         | SW | H     | weight |
|-----------|-------|-------|------|------|------|-----------|----|-------|--------|
| 100/100R  | 110.0 | 100.0 | 15.0 | 49.0 | 15.8 | 9/16" UNF | 22 | 85.0  | 0.5 kg |
| 160/160R  | 160.0 | 149.0 | 16.0 | 50.0 | 16.0 |           |    | 117.0 | 0.8 kg |

### Type B (33)



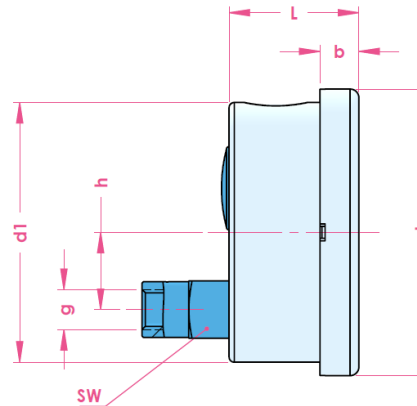
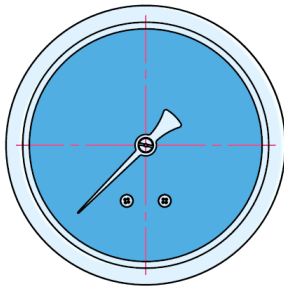
| Size | d     | d1    | b    | b2   | L    | h    | g       | SW | H    | weight |
|------|-------|-------|------|------|------|------|---------|----|------|--------|
| 100  | 110.0 | 100.0 | 15.0 | 30.0 | 50.0 | 30.0 | G 1/2 A | 22 | 80.5 | 0.6 kg |
| 160  | 160.0 | 150.0 | 16.0 | 29.5 | 52.0 | 48.5 |         |    | 82.0 | 0.8 kg |

### Type C (11)



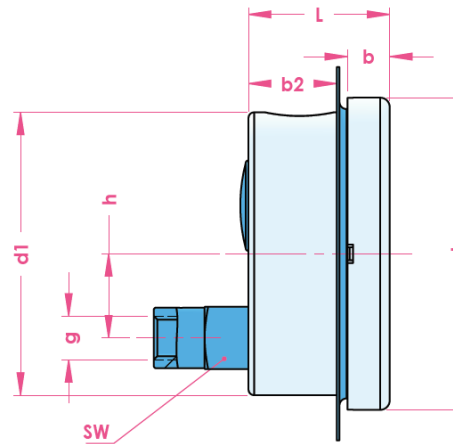
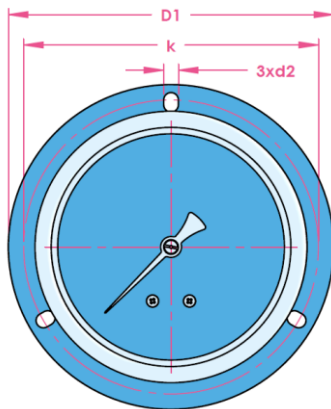
| size | d     | d1    | b    | L    | h    | K     | D1    | d2  | g         | SW | H     | weight |
|------|-------|-------|------|------|------|-------|-------|-----|-----------|----|-------|--------|
| 100  | 110.0 | 100.0 | 15.0 | 49.0 | 15.8 | 118.0 | 130.0 | 6.0 | 9/16" UNF | 22 | 88.0  | 0.5 kg |
| 160  | 160.0 | 150.0 | 16.0 | 50.0 | 16.0 | 178.0 | 196.0 |     |           |    | 120.0 | 0.8 kg |

## Type D (30)



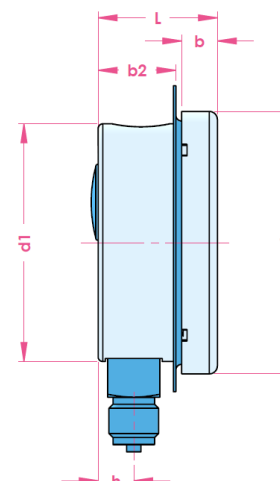
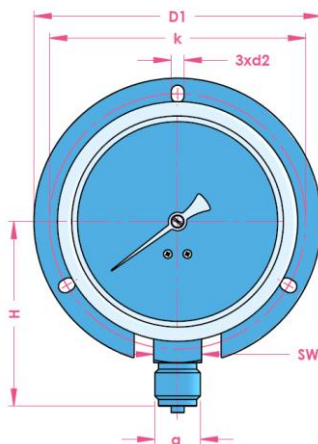
| Dial size | d     | d1    | b    | L    | h    | g         | SW | H     | weight |
|-----------|-------|-------|------|------|------|-----------|----|-------|--------|
| 100       | 110.0 | 100.0 | 15.0 | 49.0 | 30.0 | 9/16" UNF | 22 | 83.0  | 0.5 kg |
| 160       | 160.0 | 149.0 | 16.0 | 50.0 | 48.5 |           |    | 125.5 | 0.8    |

## Type E (32)



| Dial size | d     | d1    | b    | b2   | L    | h    | K     | D1    | g   | SW        | H  | weight |        |
|-----------|-------|-------|------|------|------|------|-------|-------|-----|-----------|----|--------|--------|
| 100       | 110.0 | 100.0 | 15.0 | 30.0 | 49.0 | 30.0 | 117.6 | 132.0 | 6.0 | 9/16" UNF | 22 | 80.5   | 0.5 kg |
| 160       | 160.0 | 149.0 | 16.0 | 29.5 | 50.0 | 48.5 | 178.0 | 190.0 |     |           |    | 82.0   | 0.8 kg |

## Type F (12)



| Dial size | d     | d1    | b    | L    | h    | K     | D1    | g       | SW | H    | weight |
|-----------|-------|-------|------|------|------|-------|-------|---------|----|------|--------|
| 100/100R  | 110.0 | 100.0 | 15.0 | 50.0 | 30.0 | 117.6 | 132.0 | G 1/2 A | 22 | 85.0 | 0.5 kg |
| 150/150R  | 160.0 | 150.0 | 16.0 | 52.0 | 48.5 | 168.0 | 190.0 |         |    |      |        |
| 160/160R  |       |       |      |      |      | 178.0 |       |         |    |      |        |

## Product code 100mm

| Code   |                          |
|--|--------------------------|
| <b>BDT18 HP</b>                                | 100 A 7 S 4 F 0 G B50 10 |
| <b>TYPE</b>                                    |                          |
| 100 mm ◀                                       | 100                      |
| <b>MOUNTING</b>                                |                          |
| Bottom connection - direct mounting (10) ◀     | A                        |
| Lower-back connection U-bracket (33)           | B                        |
| Bottom connection - surface mounting (11)      | C                        |
| Lower back connection. - direct mounting (30)  | D                        |
| Lower back connection.- panel mount (32)       | E                        |
| Bottom connection, panel mounting (front) (12) | F                        |
| <b>CONNECTION</b>                              |                          |
| 9/16" UNF female (F250C) ◀                     | U20M                     |
| 9/16" - 18 UNF LH male (M562C)                 | U50M                     |
| M16 x 1.5 female HP connection                 | M16F                     |
| <b>TUBE &amp; SOCKET MATERIAL</b>              |                          |
| AISI316 / AISI316L (<3000 bar) ◀               | S363                     |
| NiSpan C 902 / AISI316L ◀                      | C902                     |
| 25CrMo4 / AISI316L*1                           | C52M                     |
| <b>CASE/BEZEL MATERIAL</b>                     |                          |
| AISI 304 ◀                                     | S304                     |
| AISI 316                                       | S300                     |
| <b>POINTER</b>                                 |                          |
| Fixed pointer ◀                                | F                        |
| Adjustable slotted pointer                     | A                        |
| Micro adjustable pointer                       | M                        |
| <b>LIQUID FILLING</b>                          |                          |
| Dry ◀  | 0                        |
| BPF 01 - Glycerine filled 1,23 (86%)           | 1                        |
| BPF 06 - Glycerine filled 1,26 (99,5%)         | 6                        |
| BPF 02 - Silicone filled                       | 2                        |
| <b>WINDOW</b>                                  |                          |
| Laminated safety glass (S1) ◀                  | L                        |
| <b>RANGE</b>                                   |                          |
| See page table 1 and table 2                   | ....                     |
| <b>ACCURACY</b>                                |                          |
| 1.0  | 10                       |
| 1.6 ◀  | 16                       |

◀: is the sign for the standard pressure gauge

\*1: option only for 3000 bar gauge / 25CrMo4 is not suitable for water (only for non-corrosive media)

## Product code 160mm

| Code   |                          |
|--|--------------------------|
| <b>BDT18 HP</b>                                  | 160 A 6 S 4 F 0 G B50 10 |
| <b>TYPE</b>                                      |                          |
| 160 mm ◀   | 160                      |
| <b>MOUNTING</b>                                  |                          |
| Bottom connection - direct mounting (10) ◀       | A                        |
| Lower-back connection U-bracket (33)             | B                        |
| Bottom connection - surface mounting (11)        | C                        |
| Lower back connection. - direct mounting (30) *2 | D                        |
| Lower back connection.- panel mount (32) *2      | E                        |
| Bottom connection, panel mounting (front) (12)   | F                        |
| <b>CONNECTION</b>                                |                          |
| 9/16" UNF female (F250C) ◀                       | U20M                     |
| 9/16" - 18 UNF LH male (M562C)                   | U50M                     |
| M16 x 1.5 female HP connection                   | M16F                     |
| <b>TUBE &amp; SOCKET MATERIAL</b>                |                          |
| AISI316 / AISI316L(<3000 bar) ◀                  | S363                     |
| NiSpan C 902 / AISI316L ◀                        | C902                     |
| 25CrMo4 / AISI316L*1                             | C52M                     |
| <b>CASE/BEZEL MATERIAL</b>                       |                          |
| AISI 304 ◀                                       | S304                     |
| AISI 316   | S300                     |
| <b>POINTER</b>                                   |                          |
| Fixed pointer ◀                                  | F                        |
| Adjustable slotted pointer                       | A                        |
| Micro adjustable pointer                         | M                        |
| <b>LIQUID FILLING</b>                            |                          |
| Dry ◀  | 0                        |
| BPF 01 - Glycerine filled 1,23 (86%)             | 1                        |
| BPF 06 - Glycerine filled 1,26 (99,5%)           | 6                        |
| BPF 02 - Silicone filled                         | 2                        |
| <b>WINDOW</b>                                    |                          |
| Laminated safety glass (S1) ◀                    | L                        |
| <b>RANGE</b>                                     |                          |
| See page table 1 and table 2                     | ....                     |
| <b>ACCURACY</b>                                  |                          |
| 1.0  | 10                       |
| 1.6 ◀  | 16                       |

◀: is the sign for the standard pressure gauge

\*1: option only for 3000 bar gauge / 25CrMo4 is not suitable for water (only for non-corrosive media)

\*2: Type D and E 160mm only for ≤3000 bar

**Table 1: Pressure Range code**

| bar  |          | psi  |             | MPa  |         | kgf/cm2 |          |
|------|----------|------|-------------|------|---------|---------|----------|
| Code | Range    | Code | Range       | Code | Range   | Code    | Range    |
| B77  | 0...1800 | P78  | 0...30.000  | N77  | 0...180 | K77     | 0...1800 |
| B78  | 0...2000 | P80  | 0...40.000  | N78  | 0...200 | K78     | 0...2000 |
| B79  | 0...2500 | P83  | 0...60.000  | N79  | 0...250 | K79     | 0...2500 |
| B80  | 0...2800 | P85  | 0...80.000  | N80  | 0...280 | K80     | 0...2800 |
| B81  | 0...3000 | P87  | 0...100.000 | N81  | 0...300 | K81     | 0...3000 |
| B82  | 0...3500 |      |             | N82  | 0...350 | K82     | 0...3500 |
| B83  | 0...4000 |      |             | N83  | 0...400 | K83     | 0...4000 |
| B87  | 0...7000 |      |             | N87  | 0...700 | K87     | 0...7000 |

**Table 2: Secondary scale**

| Dual scale option | code  |
|-------------------|-------|
| PSI red           | #PR   |
| PSI black         | #PB   |
| PSI blue          | #PBL  |
| bar red           | #BR   |
| bar black         | #BB   |
| bar blue          | #BBL  |
| kPa blue (x100)   | #LBLX |

Add the code behind the pressure code  
(eg B45#PR for 0...10 bar//psi with red scale)

**Table 3: General option code**

| Option (start options with X_)    | code  |
|-----------------------------------|-------|
| IP 66 class                       | _IP66 |
| IP 67 Class                       | _IP67 |
| Index pointer                     | _IP   |
| Restrictor screw 0.8mm            | _RS8  |
| Restrictor screw 0.3mm            | _RS3  |
| Calibrated at 0°                  | C0    |
| Calibrated at 180°                | _C180 |
| ATEX II2GDc-IM2c                  | _ATEX |
| 3.1 material certificate          | _IC31 |
| Calibration certificate 5 points  | _CC5  |
| Calibration certificate 10 points | _CC10 |
| ASME division on scale range      | _ASC  |

**Change log**

| Date     | Change  |
|----------|---|
| 6-5-2020 | Added ASME scale division as option in table 3  |
|          | Added kPa blue (x100) option as secondary scale |
|          | Added type B and F as mounting option.          |

Holland – Romania – India – Thailand – Dubai – USA

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