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## Density, concentration and solids content

### SmartSeries LB 414

**Technical Information**  
**56927TI**

Rev. No.: 02, 04/2016



# 1 Technical Information

## 1.1 Technical Data

| Mechanical Design                               |                                                                                                                                                                                                               |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Ambient temperatures</b>                     | <p>-20...+60°C (-4...+140°F)</p> <p>extended temperature range with metal cover and metal cable glands:<br/>-40... +60°C (-40...+140°F)</p> <p>with Water Cooling System:<br/>-40... 100°C (-40...+212°F)</p> |
| <b>Housing material</b>                         | Stainless steel ISO 1.4301 / AISI 304 (other materials on request)                                                                                                                                            |
| <b>Plastic components</b>                       | PBT or PC                                                                                                                                                                                                     |
| <b>Weight</b>                                   | approx. 10 kg                                                                                                                                                                                                 |
| <b>Length</b>                                   | approx. 483 mm                                                                                                                                                                                                |
| <b>Degree of protection (with closed cover)</b> | IP 66 / IP 67 (according to IEC 60529)                                                                                                                                                                        |
| <b>Degree of protection (with open cover)</b>   | IP 40 (according to IEC 60529)                                                                                                                                                                                |
| <b>Vibration mech. shock</b>                    | Vibration (according to DIN EN 60086-2-6 and 60068-2-27)<br>mech. shock: 30 g                                                                                                                                 |
| <b>General ambient conditions</b>               | <p>Degree of pollution 2</p> <p>Installation category 3</p> <p>Height above sea level up to 3,000 m</p>                                                                                                       |
| <b>Water Cooling System</b>                     | <p>Optional, stainless steel ISO 1.4301 / AISI 304;</p> <p>Water pressure up to 6 bar</p> <p>Tube connection R1/4", d=10mm</p> <p>Weight approx. 3.5 kg</p>                                                   |
| <b>Collimator</b>                               | <p>Optional, lead, painted</p> <p>To reduce background radiation</p> <p>ID no. 4506 and 11814</p> <p>Weight approx. 9.5 kg</p>                                                                                |
| <b>IR Remote Control</b>                        | <p>Optional, can be used alternatively to the operating knob.</p> <p>This enables operation of the field device without removing the screw cover.</p> <p>Id. No. 61167</p>                                    |

| Electrical Design                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Supply voltage</b>                          | <p>Variant 1: 100...240 VAC +/- 10%, 50...60 Hz max. 10 VA<br/>Variant 2: 24 VDC, 18...32 VDC max. 8 W</p> <p>1x fuse 1A/T</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>EMC</b>                                     | <p>Emitted interference according to EN 61326-1,<br/>operating equipment class A interference immunity according to EN 61326-1, NAMUR NE21<br/>Low-voltage Directive EN 61010-1</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Approvals</b>                               | CE, cCSA <sub>US</sub> general area                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Line glands</b>                             | <p>2x M20 x 1.5 mm<br/>2x M16 x 1.5 mm</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Wire cross section for spring terminals</b> | 1 mm <sup>2</sup> to 2.5 mm <sup>2</sup> ; 8 mm insulation stripping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Relay output</b>                            | <p>Relay contact (SPDT) with max. 24 V switching voltage at 5 A max. current carrying capacity and 5AT safety fuse.</p> <p>Can be configured by means of software for:</p> <ul style="list-style-type: none"> <li>• System status messages</li> <li>• Detector temperature violations</li> <li>• exceeding / short falling process value limits.</li> </ul>                                                                                                                                                                                                                                                                                  |
| <b>Current output</b>                          | <p>HART current output 4...20 mA, potential-free, passive or active<br/>Resolution above 6 µA.</p> <p>Active impedance range: 120 Ohm to 500 Ohm<br/>Passive impedance range: max. 250 Ohm at 12 V, max. 500 Ohm at 24 V.</p> <p>For safe HART® communication, at least 250 Ohm are required.</p> <p>The maximum cable length of the HART® loop depends on the connected resistance as well as on the capacity and inductance of the cable.</p> <p>Max. cable length with BERTHOLD cable (ID no. 32024):</p> <ul style="list-style-type: none"> <li>• 3300 m at 120 Ohm</li> <li>• 1600 m at 250 Ohm</li> <li>• 800 m at 500 Ohm.</li> </ul> |
| <b>RS485</b>                                   | <p>For software updates and PC software interface<br/>Max. cable length 30 m</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>External connection plug</b>                | M20 plug and cable for Detector Service Modem or 475 HART Communicator connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>System integration</b>                      | Via 4...20 mA current interface with optional HART® protocol according to BEL-202 FSK standard.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Temperature monitoring</b>                  | Measuring sensor inside the detector, deviation of max. 3 K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Temperature stability</b>                   | <p>≤ 0.01 %/°C (-20...+50°C, -4...+122°F) for polymer scintillator<br/>≤ 0.002 %/°C (-20...+50°C, -4...+122°F) for NaI(Tl) crystal</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Digital electronics</b>          | 32 bit microprocessor<br>with Watchdog timer and self-monitoring<br>2x16 digits display with backlight,<br>one-button operation and integrated status LED                                                                                                                                                                                                                                                           |
| <b>Scintillator</b>                 |                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Scintillator</b>                 | Nal point detector 40x35 mm<br>Polymer point scintillator 50x60 mm<br><br>Sensitivity: Dose rate approx. 1 µSv/h for 300 cps                                                                                                                                                                                                                                                                                        |
| <b>Software</b>                     |                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Measuring application</b>        | Density (e.g. of fluids, suspensions or bulk material) <ul style="list-style-type: none"> <li>• Measuring units: g/cm<sup>3</sup>, kg/m<sup>3</sup>, g/l, SGU, % (wt/wt), lb/gal, lb/ft<sup>3</sup></li> <li>• Conformity according to NE-21, NE-43 and NE-107</li> <li>• Safety write protection for software available. Prevents unauthorised operation.</li> <li>• Data backup in non-volatile memory</li> </ul> |
| <b>Automatic decay compensation</b> | Cs-137, Co-60                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>User interfaces</b>              | All interfaces enable full parameterisation and calibration: <ul style="list-style-type: none"> <li>• Local User Interface</li> <li>• HART® (device description is provided)</li> <li>• PC Interface (with Detector Service Modem and special software)</li> <li>• IR Remote Control.</li> </ul>                                                                                                                    |

## 1.2 System Components

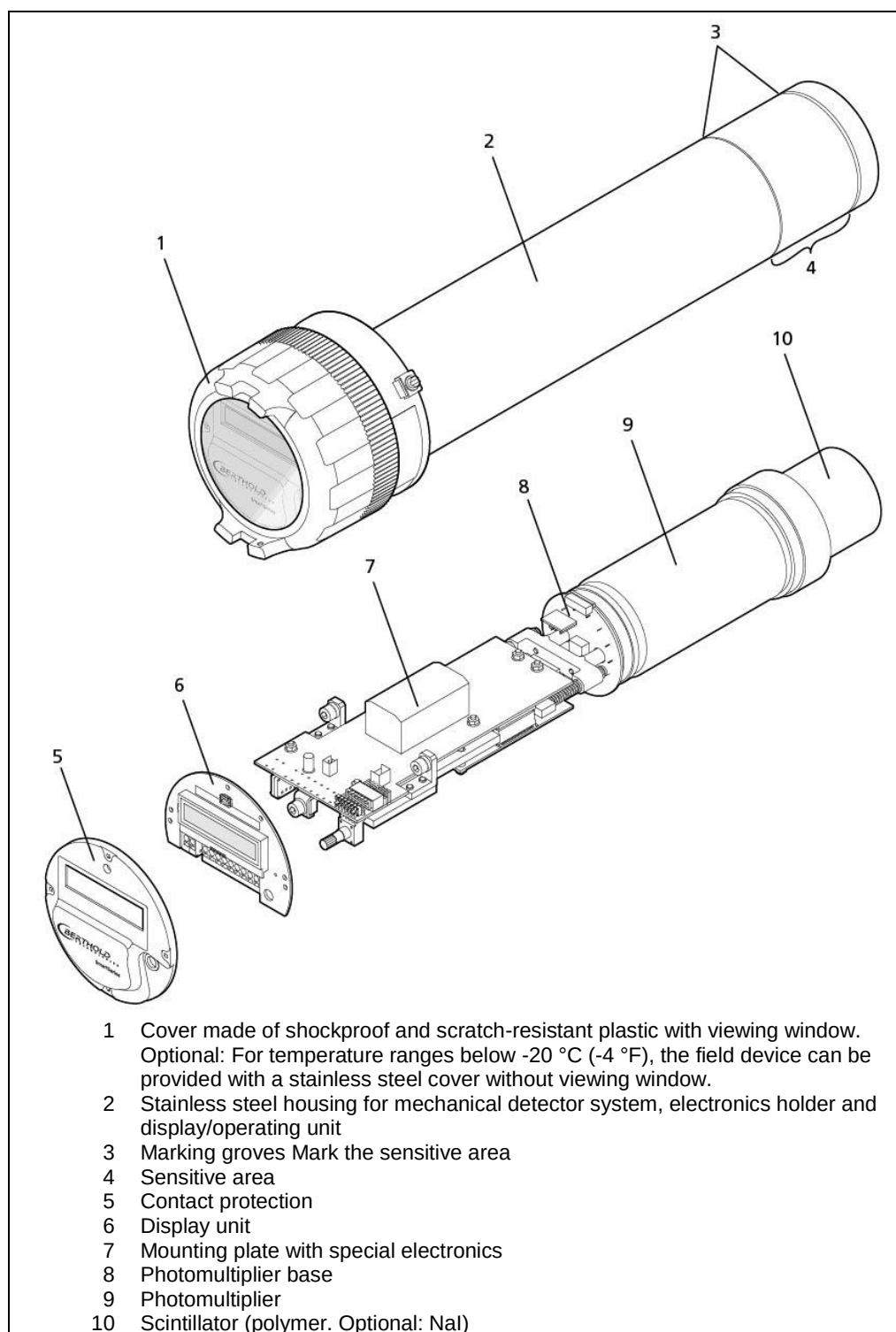


Fig. 1 System Components

### 1.3 Spare Parts (selection)

|         |                                                                      |
|---------|----------------------------------------------------------------------|
|         |                                                                      |
| 4506    | Collimator for NaI Detector, side irradiation                        |
| 11814   | Collimator for NaI Detector, frontal irradiation Ø 50mm              |
| 47189   | Adaptor for water cooling, Rp1/4" to 1/2" NPT                        |
| 48254   | Collimator for NaI Detector, frontal irradiation Ø 50 mm, reinforced |
| 48925   | Collimator for NaI Detector, side irradiation, reinforced            |
| 4498-S  | Multiplier crystal combination NaI(Tl) 40x35                         |
| 5295-S  | 2" Photomultiplier for point detectors                               |
| 5450-S  | Ersatzteilsatz NaI (TI ) Kristall 40x35 mm                           |
| 58094-S | Spare part detector housing                                          |
| 58110-S | Spare part stainless steel cover                                     |
| 59024-S | Spare part display panel                                             |
| 59229-S | Electronic assembly (24 VDC)                                         |
| 59231-S | Electronic assembly (100...240 VAC)                                  |
| 59237-S | Cover for electrical contacts                                        |
| 59239-S | Polymer cover                                                        |
| 59244-S | Felt cap for NaI crystal 40x35 mm                                    |
| 60594-S | Multplier-scintillator combination (polymer 50x60 mm)                |
| 60801-S | Spare part kit cable glands, polymer                                 |
| 60802-S | Spare part kit cable glands, brass                                   |
| 62545-S | Mounting material                                                    |

## 1.4 Connection plan

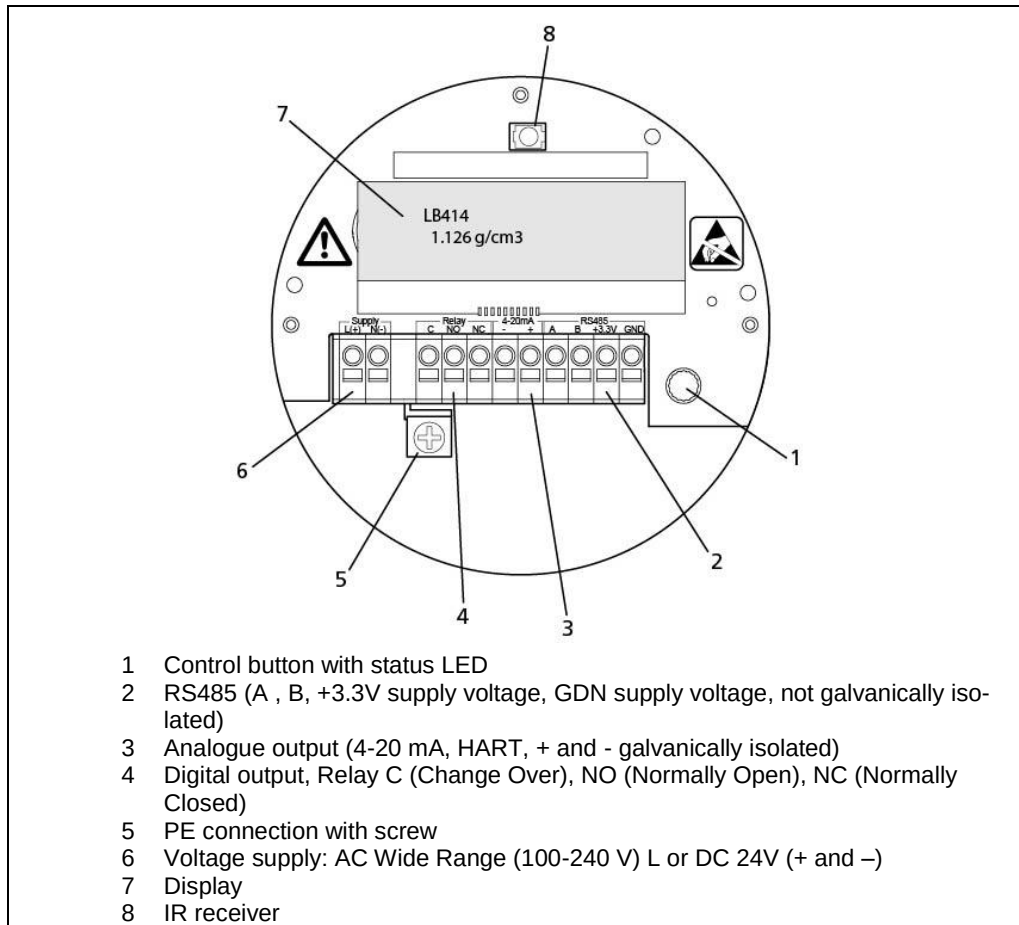


Fig. 2 Connection chamber Master

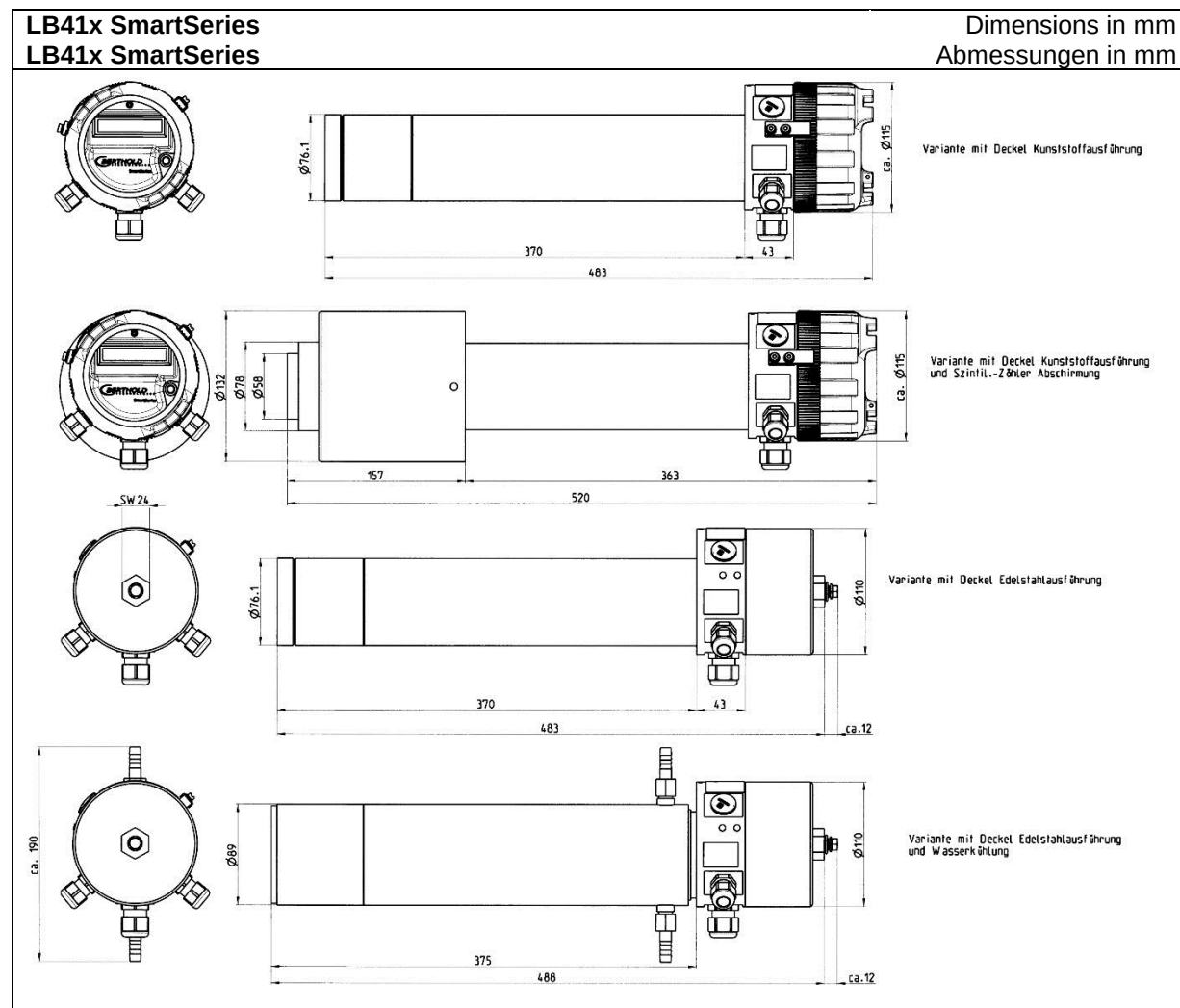
### Pin assignment

|    |                                          |
|----|------------------------------------------|
| 1  | AC Wide Range (100-240 V) L or DC 24 V + |
| 2  | AC Wide Range (100-240 V) N or DC 24 V - |
| 3  | Relay C (change over)                    |
| 4  | Relay NO (normally open)                 |
| 5  | Relay NC (normally closed)               |
| 6  | Current output – (galvanically isolated) |
| 7  | Current output + (galvanically isolated) |
| 8  | RS485 A *                                |
| 9  | RS485 B *                                |
| 10 | RS485 +3.3 V supply voltage *            |
| 11 | RS485 GND supply voltage *               |
| PE | Protective earth                         |

\* no galvanic isolation



## 1.5 Dimensional drawings



## 1.6 Accessories / Options

### 1.6.1 Water cooling system (ID no. 59262)

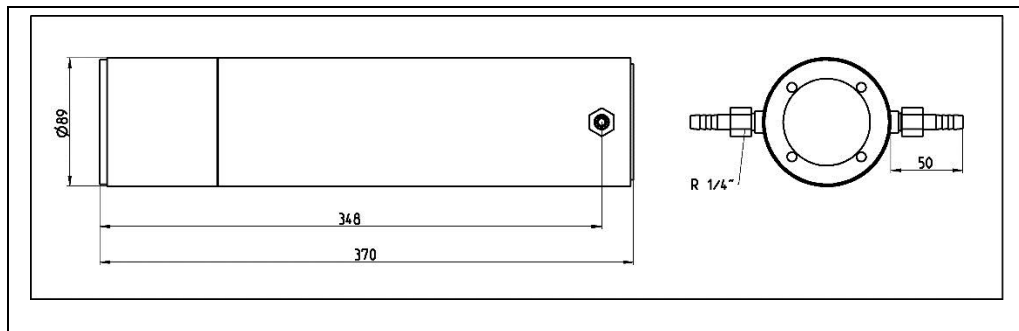


Fig. 3 Field device water cooling system

Installation and connection of the water cooling system: See chap. **Fehler! Verweisquelle konnte nicht gefunden werden..**

For the minimum cooling water requirement, please refer to the following chart.

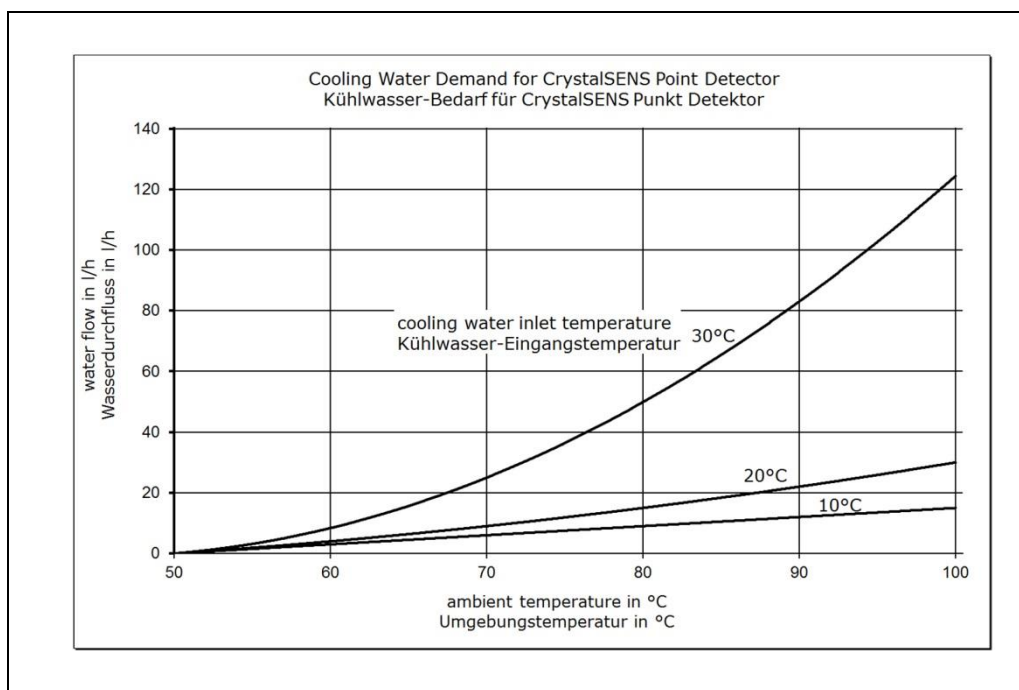


Fig. 4 Cooling water requirement

### 1.6.2 IR Remote Control (ID no. 61167)

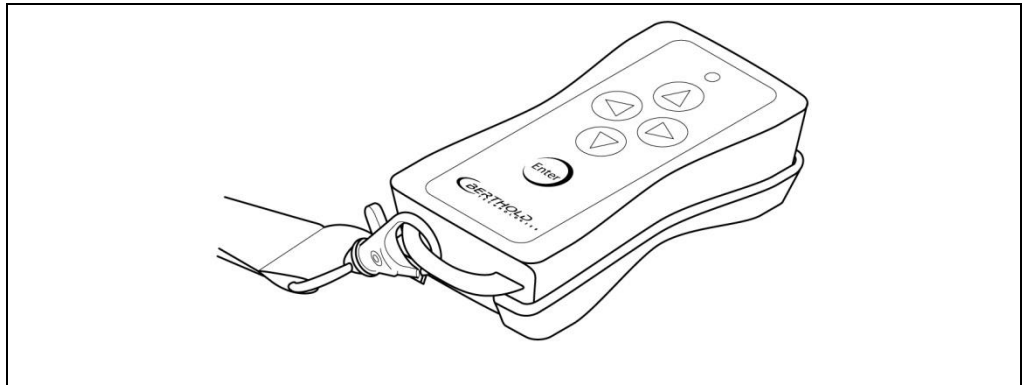


Fig. 5 IR Remote Control

The “IR Remote Control” infrared control unit can be used alternatively to the operating knob. If the field device is controlled by IR Remote Control, the screw cover does not need to be removed. The infrared control unit has to be activated by means of a software.

### 1.6.3 Detector Service Modem (ID no. 60606)

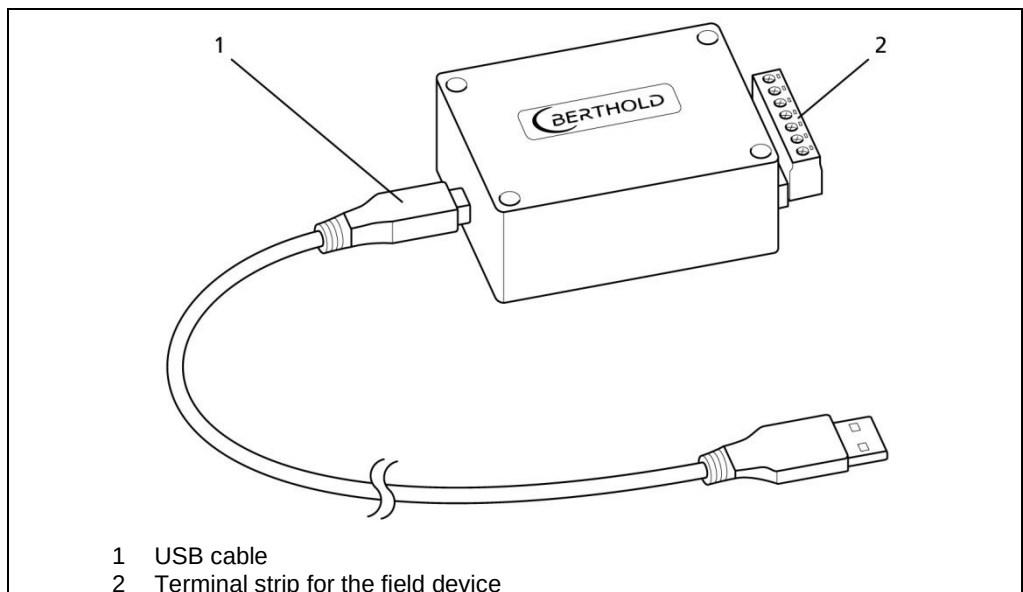


Fig. 6 Detector Service Modem

With the help of the Detector Service Modem, the field device can be connected to a PC to check it in a workshop, for software updates and for parametrization.

For information on system requirements, PC connection and driver software, refer to chapter **Fehler! Verweisquelle konnte nicht gefunden werden..**

### 1.6.4 HART / RS485 Plug (ID no. 60644)

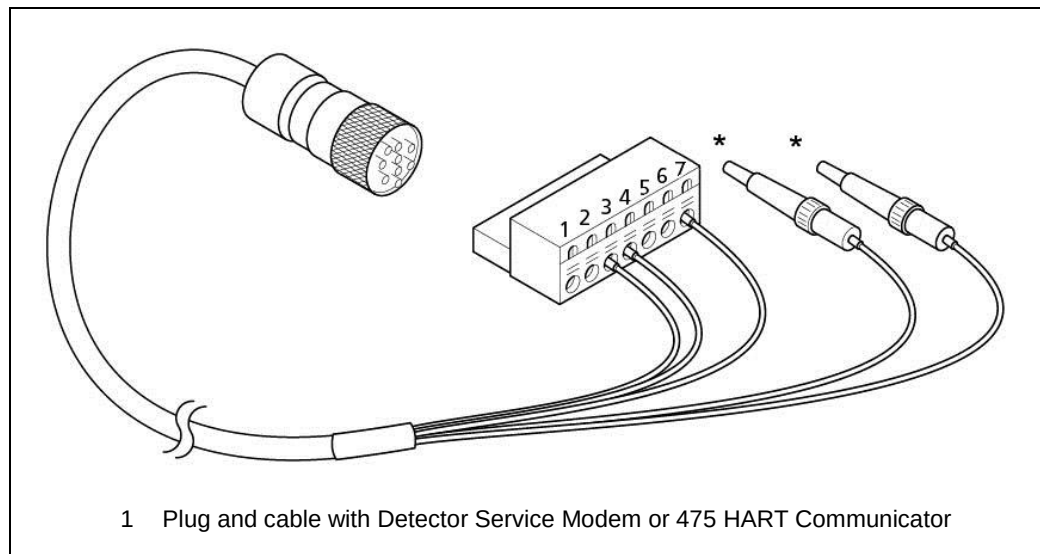


Fig. 7 Control cable 3 m

#### Terminal assignment Detector Service Modem

|   |                         |        |
|---|-------------------------|--------|
| 1 | N/A                     |        |
| 2 | N/A                     |        |
| 3 | RS 485 A                | Orange |
| 4 | RS 485 B                | White  |
| 5 | N/A                     |        |
| 6 | N/A                     |        |
| 7 | Ground                  | Blue   |
| * | 475 Hart Kommunikator + | Red    |
| * | 475 Hart Kommunikator – | Black  |

### 1.6.5 Locking (ID no. 60529)

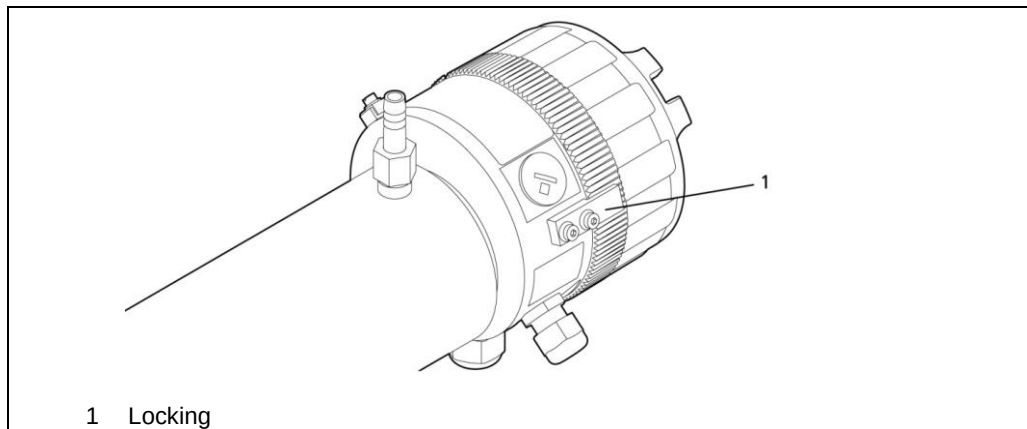


Fig. 8 Locking

Locking prevents accidental unscrewing of the cover.

### 1.6.6 Sun cover against strong insolation

If a detector temperature of more than 50 °C (122°F) is reached due to insolation, an appropriate sun cover must be installed.

A thin heatsink can also prevent the detector from being heated up excessively by the heat emissions of the container.

In addition, an appropriate water cooling system (option) is available for each detector.

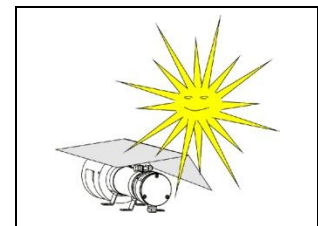


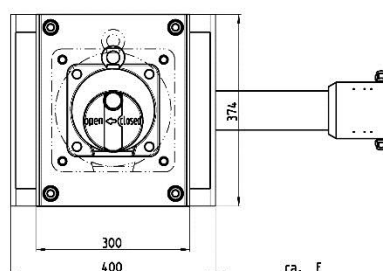
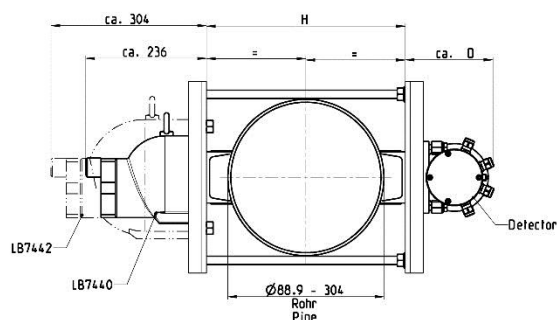
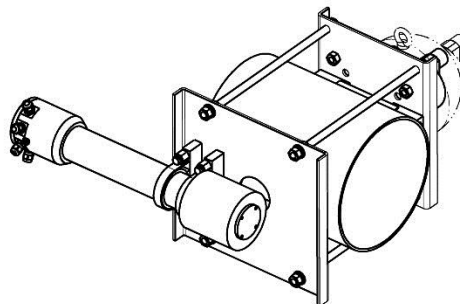
Fig. 9 Sun cover

## 1.7 Mounting Fixtures

**Clamping Device 90° for Pipe Diameter  
88,9 ... 304 mm, Radial Irradiation  
Montagevorrichtung 90° für Rohrdurchmesser  
88,9 ... 304 mm Radiale Einstrahlung**

Dimensions in mm  
Abmessungen in mm

|                        |                                         |
|------------------------|-----------------------------------------|
| Material               | Carbon steel<br>Stahl St37              |
| Painting<br>Lackierung | Polyurethane, grey<br>Polyurethan, grau |

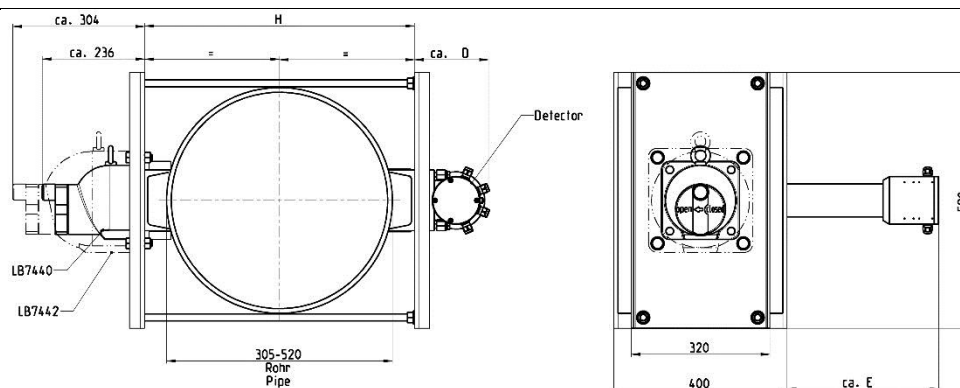
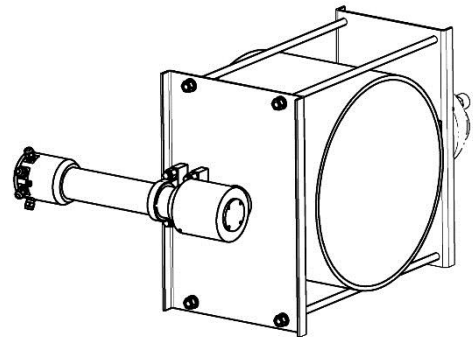


| Part No.<br>Id. Nr. | Pipe Diameter<br>Rohrdurchmesser | D<br>Approx./ca. | E<br>Approx./ca. | H   | Weigth of Clamping Device approx. kg<br>Gewicht der Montagevorr. ca. kg |
|---------------------|----------------------------------|------------------|------------------|-----|-------------------------------------------------------------------------|
| 59296<br>M1         | 88,9                             | 169              | 236.5            | 120 | 22                                                                      |
|                     | 101,6                            |                  |                  | 156 |                                                                         |
|                     | 114,3                            |                  |                  | 180 |                                                                         |
|                     | 141,3                            |                  |                  | 218 |                                                                         |
|                     | 168,3                            |                  |                  | 250 |                                                                         |
|                     | 219,1                            |                  |                  | 310 |                                                                         |
|                     | 273                              |                  |                  | 368 |                                                                         |
|                     | 304                              |                  |                  | 402 |                                                                         |

**Clamping Device 90° for pipe diameter  
305 ... 520 mm, radial irradiation  
Montagevorrichtung 90° für Rohrdurchmesser  
305 ... 520 mm, Radiale Einstrahlung**

Dimensions in mm  
Abmessungen in mm

|                        |                                         |
|------------------------|-----------------------------------------|
| Material               | Carbon steel<br>Stahl St37              |
| Painting<br>Lackierung | Polyurethane, grey<br>Polyurethan, grau |

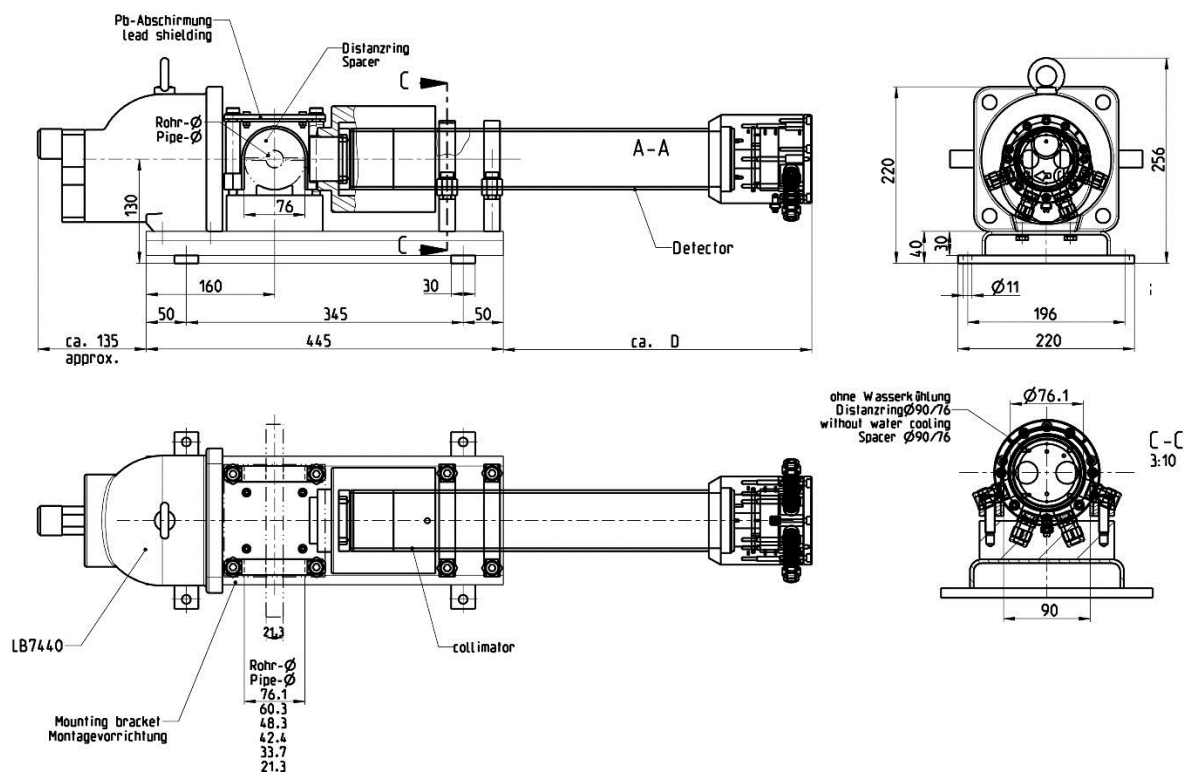


| Part No.<br>Id. Nr. | Pipe Diameter<br>Rohrdurchmesser                             | D<br>Approx./ca. | E<br>Approx./ca. | H                                                    | Weight of Clamping Device approx. kg<br>Gewicht der Montagevorrichtung ca. kg |
|---------------------|--------------------------------------------------------------|------------------|------------------|------------------------------------------------------|-------------------------------------------------------------------------------|
| 59293<br>M1         | 305<br>318<br>323,8<br>255,6<br>406,4<br>457,2<br>508<br>520 | 171              | 349.5            | 400<br>413<br>419<br>451<br>501<br>552<br>603<br>615 | 34                                                                            |

**Clamping Device 90° for Pipe Diameter  
21,3 ... 76,1 mm, Axial Irradiation  
Montagevorrichtung 90° für Rohrdurchmesser  
21,3 ... 76,1 mm, Axiale Einstrahlung**

Dimensions in mm  
Abmessungen in mm

|                        |                                         |
|------------------------|-----------------------------------------|
| Material               | Carbon steel<br>Stahl St37              |
| Painting<br>Lackierung | Polyurethane, grey<br>Polyurethan, grau |



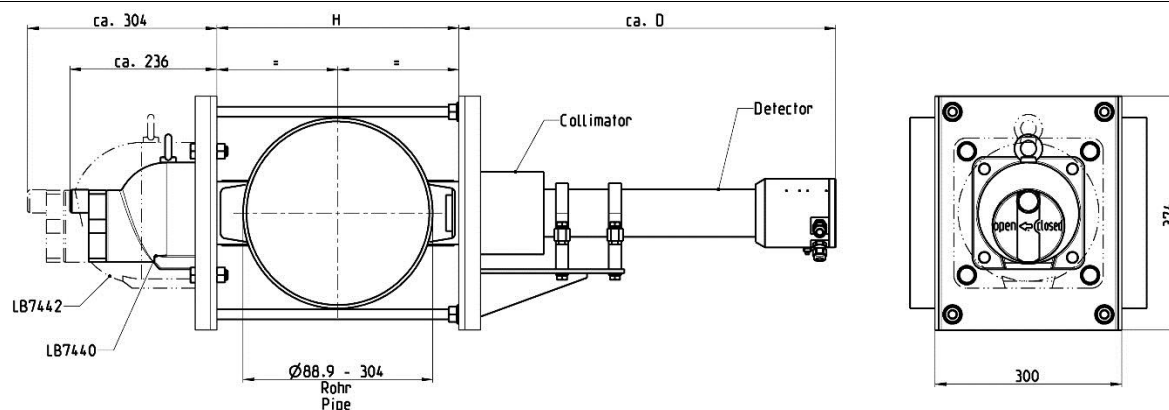
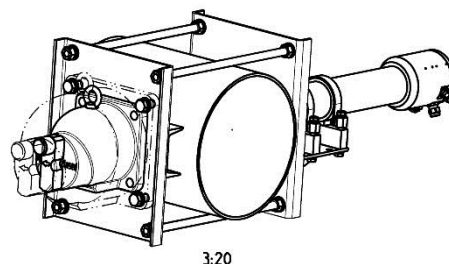
| Part No.<br>Id. Nr. | Pipe Diameter<br>Rohrdurchmesser             | D<br>Approx./ca. | Weight of Clamping Device approx. kg<br>Gewicht der Montagevorrichtung ca. kg |
|---------------------|----------------------------------------------|------------------|-------------------------------------------------------------------------------|
| 47292<br>M3         | 21,3<br>33,7<br>42,4<br>48,3<br>60,3<br>76,1 | 278              | 70                                                                            |



**Clamping Device 90° for pipe diameter  
88.9 ... 304 mm, Axial Irradiation  
Montagevorrichtung 90° für Rohrdurchmesser  
88,9 ... 304 mm, Axiale Einstrahlung**

Dimensions in mm  
Abmessungen in mm

|                        |                                         |
|------------------------|-----------------------------------------|
| Material               | Carbon steel<br>Stahl St37              |
| Painting<br>Lackierung | Polyurethane, grey<br>Polyurethan, grau |

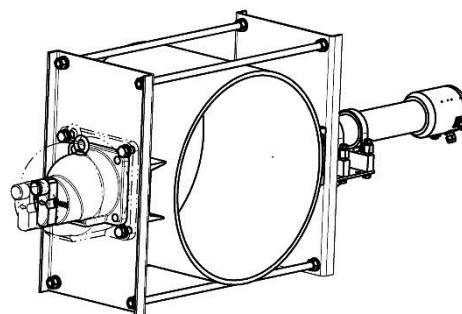


| Part No.<br>Id. Nr. | Pipe Diameter<br>Rohrdurchmesser | D<br>Approx./ca | H<br>Approx./ca | Weight of Clamping Device approx. kg<br>Gewicht der Montagevorrichtung ca. kg |
|---------------------|----------------------------------|-----------------|-----------------|-------------------------------------------------------------------------------|
| 80795 M3            | 88,9                             | 499             | 120             | 23                                                                            |
|                     | 101,6                            |                 | 156             |                                                                               |
|                     | 114,3                            |                 | 180             |                                                                               |
|                     | 141,3                            |                 | 218             |                                                                               |
|                     | 168,3                            |                 | 250             |                                                                               |
|                     | 219,1                            |                 | 310             |                                                                               |
|                     | 273                              |                 | 368             |                                                                               |
|                     | 304                              |                 | 402             |                                                                               |

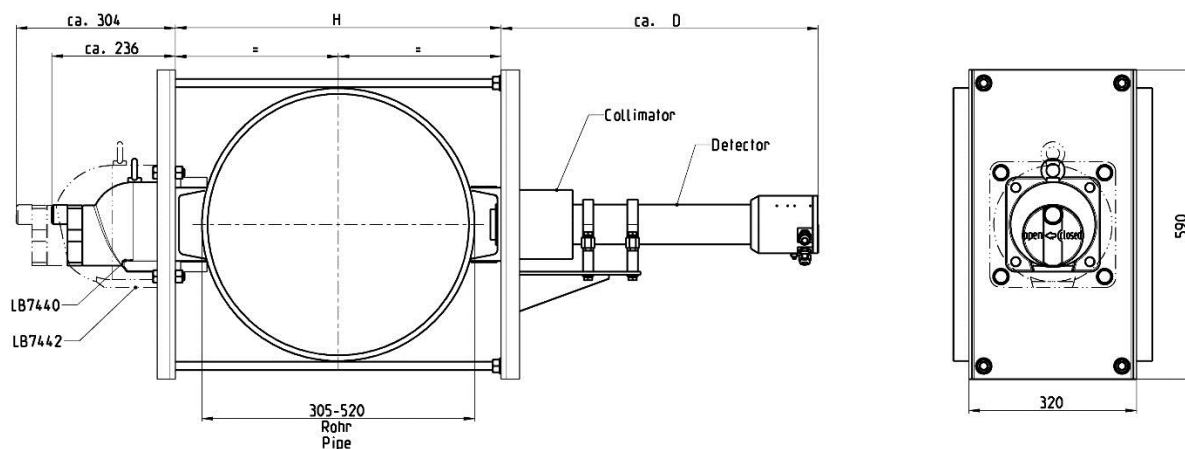
**Clamping Device 90° for pipe diameter  
305 ... 520 mm, Axial Irradiation  
Montagevorrichtung 90° für Rohrdurchmesser  
305 ... 520 mm, Axiale Einstrahlung**

Dimensions in mm  
Abmessungen in mm

|                        |                                         |
|------------------------|-----------------------------------------|
| Material               | Carbon steel<br>Stahl St37              |
| Painting<br>Lackierung | Polyurethane, grey<br>Polyurethan, grau |



13:100

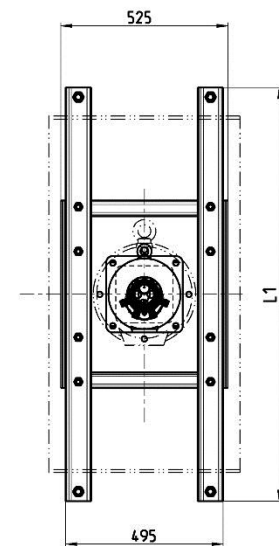
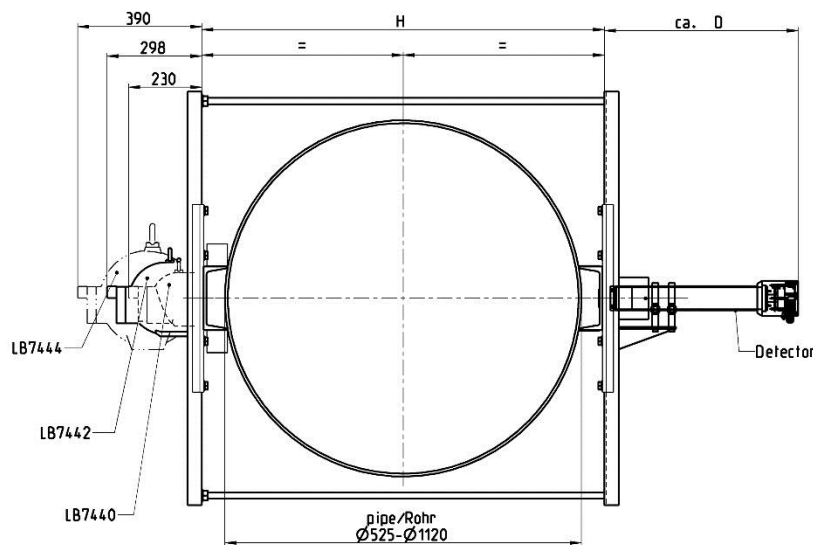
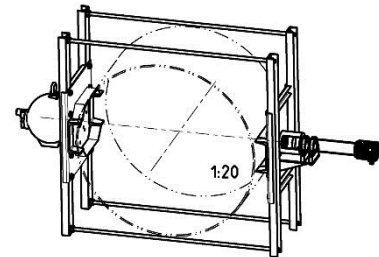


| Part No.<br>Id. Nr. | Pipe Diameter<br>Rohrdurchmesser | D<br>Approx./<br>ca. | H<br>Approx./<br>ca. | Weight of Clamping Device approx. kg<br>Gewicht der Montagevorrichtung ca. kg |
|---------------------|----------------------------------|----------------------|----------------------|-------------------------------------------------------------------------------|
| 80796 M2            | 305                              | 499                  | 400                  | 34                                                                            |
|                     | 318                              |                      | 413                  |                                                                               |
|                     | 323,8                            |                      | 419                  |                                                                               |
|                     | 255,6                            |                      | 451                  |                                                                               |
|                     | 406,4                            |                      | 501                  |                                                                               |
|                     | 457,2                            |                      | 552                  |                                                                               |
|                     | 508                              |                      | 603                  |                                                                               |
|                     | 520                              |                      | 616                  |                                                                               |

**Clamping Device 90° for pipe diameter  
520 ... 1120 mm, Axiale Einstrahlung  
Montagevorrichtung 90° für Rohrdurchmesser  
520 ... 1120 mm, Axial Irradiation**

Dimensions in mm  
Abmessungen in mm

|                        |                                         |
|------------------------|-----------------------------------------|
| Material               | Carbon steel<br>Stahl St37              |
| Painting<br>Lackierung | Polyurethane, grey<br>Polyurethan, grau |

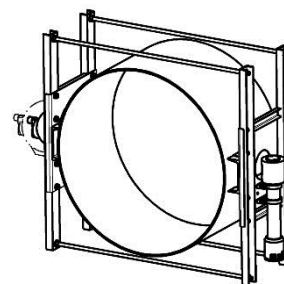


| Part No.<br>Id. Nr. | Pipe Diameter<br>Rohrdurchmesser | Thread bar<br>Gewinde-<br>stange H | D<br>Approx./<br>ca. | L1<br>Approx./<br>ca. | Weigth of Clamp. Device approx. kg<br>Gewicht der Montagevorr. ca. kg |
|---------------------|----------------------------------|------------------------------------|----------------------|-----------------------|-----------------------------------------------------------------------|
| 51875<br>M2         | 525                              | 643                                | 735                  | 680                   | 13x2 = 26                                                             |
|                     | 560                              | 686                                | 790                  | 680                   | 14x2 = 28                                                             |
|                     | 660                              | 792                                | 890                  | 740                   | 15x2 = 30                                                             |
|                     | 760                              | 896                                | 990                  | 840                   | 16x2 = 32                                                             |
|                     | 870                              | 1009                               | 1100                 | 950                   | 18x2 = 36                                                             |
|                     | 1020                             | 1163                               | 1250                 | 1200                  | 22x2 = 44                                                             |
|                     | 1120                             | 1265                               | 1350                 | 1300                  | 24x2 = 48                                                             |

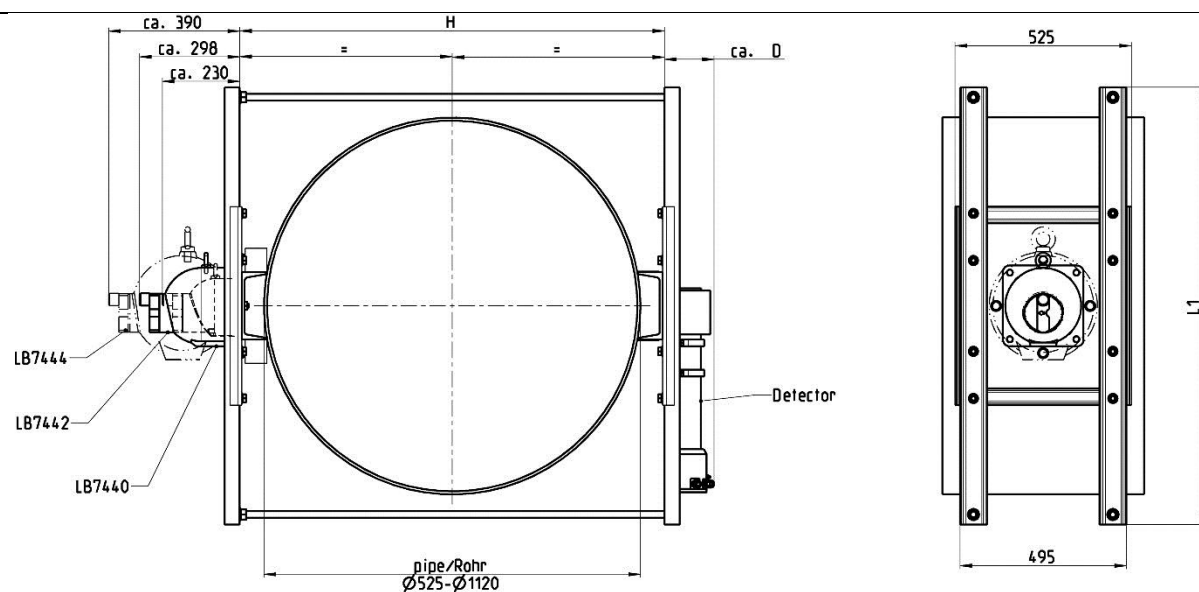
**Clamping Device 90° for Pipe Diameter  
525 ... 1120 mm, Lateral Irradiation  
Montagevorrichtung 90° für Rohrdurchmesser  
525 ... 1120 mm, seitliche Einstrahlung**

Dimensions in mm  
Abmessungen in mm

|                        |                                         |
|------------------------|-----------------------------------------|
| Material               | Carbon steel<br>Stahl St37              |
| Painting<br>Lackierung | Polyurethane, grey<br>Polyurethan, grau |

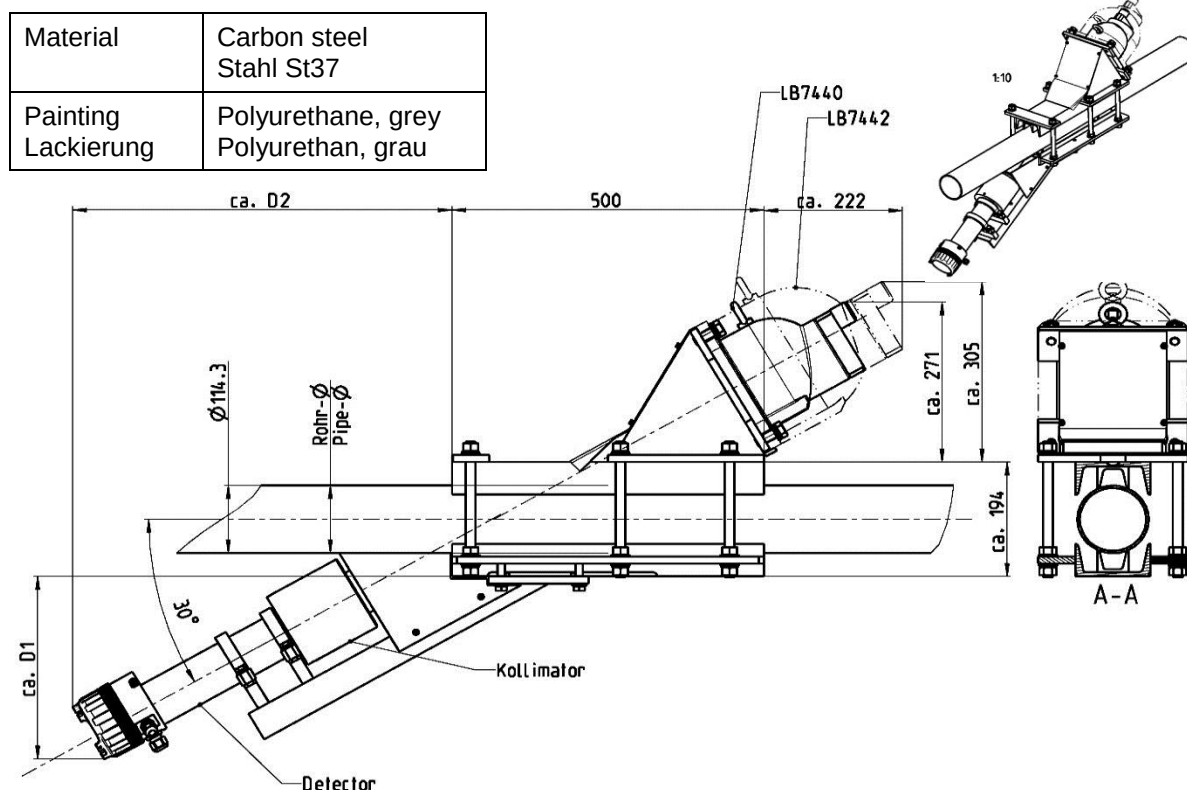


1:20



| Part No.<br>Id. Nr. | Pipe Diameter<br>Rohrdurchmesser | Thread bar<br>Gewin-<br>destange<br>H | D<br>Approx.<br>ca. | L1<br>Approx.<br>ca. | Weight of Clamp. Device<br>approx. kg<br>Gewicht der Montagevorrichtung ca.<br>kg |
|---------------------|----------------------------------|---------------------------------------|---------------------|----------------------|-----------------------------------------------------------------------------------|
| 81491<br>M2         | 525                              | 643                                   | 143                 | 680                  | 13x2 = 26                                                                         |
|                     | 560                              | 686                                   |                     | 680                  | 14x2 = 28                                                                         |
|                     | 660                              | 792                                   |                     | 740                  | 15x2 = 30                                                                         |
|                     | 760                              | 896                                   |                     | 840                  | 16x2 = 32                                                                         |
|                     | 870                              | 1009                                  |                     | 950                  | 18x2 = 36                                                                         |
|                     | 1020                             | 1163                                  |                     | 1200                 | 22x2 = 44                                                                         |
|                     | 1120                             | 1265                                  |                     | 1300                 | 24x2 = 48                                                                         |

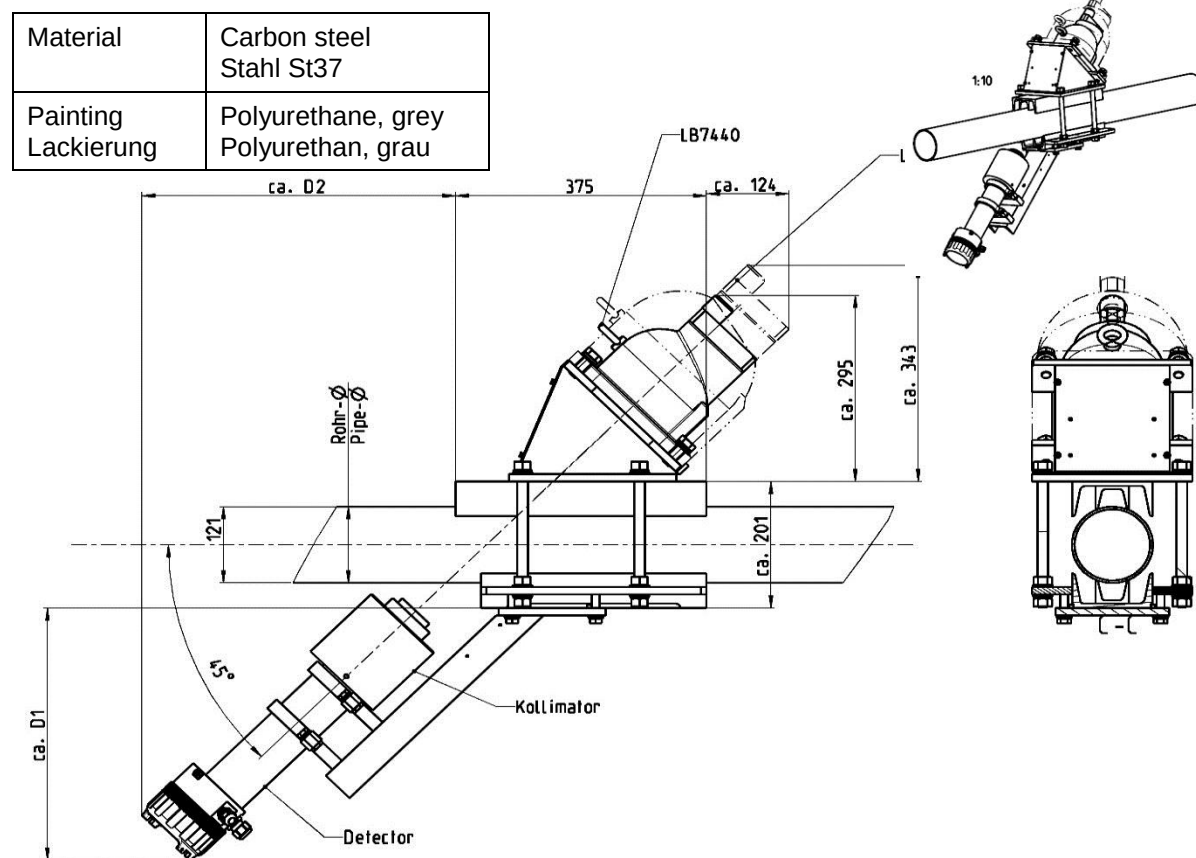
**Clamping Device 30° for pipe diameter  
114,3 / St 37 mm**
**Montagevorrichtung 30° für Rohrdurchmesser  
114,3 / St 37 mm**

 Dimensions in mm  
 Abmessungen in mm


| Part#, Id. Nr. | Pipe Ø, Rohr Ø | D1~ | D2~ | Weight of Clamping Device,<br>Gewicht Montagevorrichtung |
|----------------|----------------|-----|-----|----------------------------------------------------------|
| 25964          | Ø 48,3         | 310 | 395 | approx., ca. 45 kg                                       |
| 80792          | Ø 60,3         |     | 438 |                                                          |
| 25971          | Ø 63,5         |     | 445 |                                                          |
| 25972          | Ø 70           |     | 460 |                                                          |
| 25973          | Ø 76,1         |     | 470 |                                                          |
| 25974          | Ø 82,5         |     | 485 |                                                          |
| 25975          | Ø 88,9         |     | 500 |                                                          |
| 25976          | Ø 95           |     | 510 |                                                          |
| 25977          | Ø 101,6        |     | 522 |                                                          |
| 25978          | Ø 108          |     | 534 |                                                          |
| 25979          | Ø 114,3        |     | 546 |                                                          |
| 25980          | Ø 121          |     | 558 |                                                          |
| 80791          | Ø 127          |     | 452 |                                                          |
| 26655          | Ø 133          |     | 470 |                                                          |
| 26656          | Ø 139,7        |     | 490 |                                                          |
| 26657          | Ø 146          |     | 506 |                                                          |
| 26658          | Ø 152,4        |     | 519 |                                                          |
| 26659          | Ø 159          |     | 537 |                                                          |
| 26660          | Ø 165,1        |     | 551 |                                                          |
| 26661          | Ø 168,3        |     | 558 |                                                          |
| 26662          | Ø 171          |     | 564 |                                                          |
| 26663          | Ø 177,8        |     | 580 |                                                          |
| 26664          | Ø 191          |     | 608 |                                                          |
| 81246          | Ø 220          |     | 625 |                                                          |
| 81485          | Ø 273          |     | 630 |                                                          |

**Clamping Device 45° for pipe diameter  
60.3 ...121 mm**  
**Montagevorrichtung 45° für Rohrdurchmesser  
60,3 ...121 mm**

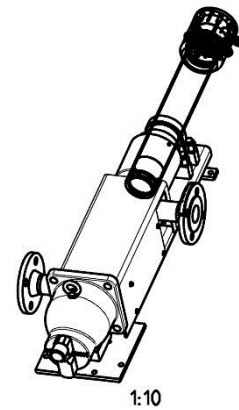
Dimensions in mm  
Abmessungen in mm



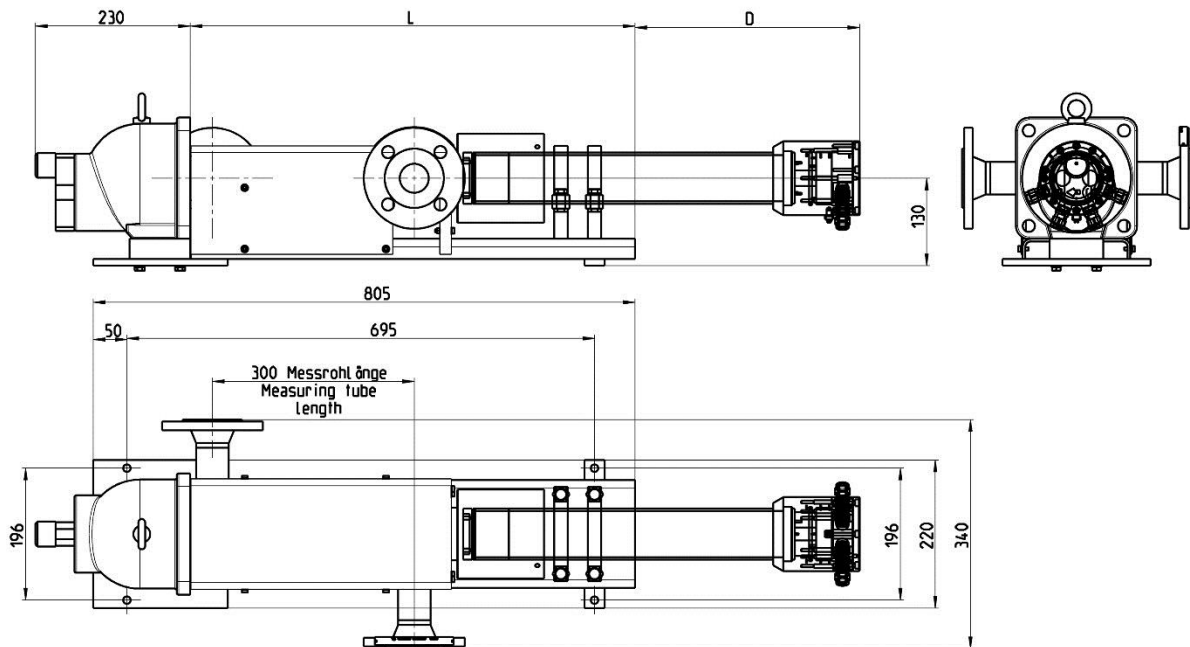
| Part#, Id. Nr. | Pipe Ø , Rohr Ø | D1~ | D2~ | Weight of clamping device, Gewicht Montagegestell |
|----------------|-----------------|-----|-----|---------------------------------------------------|
| 27249          | Ø 48,3          | 380 | 376 | approx., ca. 45 kg                                |
| 27248          | Ø 60,3          |     | 376 |                                                   |
| 27250          | Ø 63,5          |     | 382 |                                                   |
| 27251          | Ø 70            |     | 390 |                                                   |
| 27252          | Ø 76,1          |     | 396 |                                                   |
| 27253          | Ø 82,5          |     | 404 |                                                   |
| 27254          | Ø 88,9          |     | 412 |                                                   |
| 27255          | Ø 95            |     | 418 |                                                   |
| 27256          | Ø 101,6         |     | 424 |                                                   |
| 27257          | Ø 108           |     | 430 |                                                   |
| 27258          | Ø 114,3         |     | 438 |                                                   |
| 80794          | Ø 121           |     | 445 |                                                   |
| 80793          | Ø 127           |     | 384 |                                                   |
| 26997          | Ø 133           |     | 395 |                                                   |
| 26998          | Ø 139,7         |     | 406 |                                                   |
| 26999          | Ø 146           |     | 416 |                                                   |
| 27000          | Ø 152,4         |     | 424 |                                                   |
| 27001          | Ø 159           |     | 434 |                                                   |
| 27002          | Ø 165,1         |     | 442 |                                                   |
| 27003          | Ø 168,3         |     | 446 |                                                   |
| 27004          | Ø 171           |     | 450 |                                                   |
| 27005          | Ø 177,8         |     | 460 |                                                   |
| 27006          | Ø 191           |     | 475 |                                                   |
| 81245          | Ø 220           |     | 496 |                                                   |
| 81493          | Ø 273           |     | 495 |                                                   |

**S shaped measuring path**Dimensions in mm  
Abmessungen in mm

|                        |                                         |
|------------------------|-----------------------------------------|
| Material               | Carbon steel<br>Stahl St37              |
| Painting<br>Lackierung | Polyurethane, grey<br>Polyurethan, grau |



Part No. / Id. No. 21087M34

**Measuring path as illustrated above**

- S shaped
- DN 40
- Measuring length 300
- PN 16
- Without temperature sensor

**Obige Abbildung zeigt die Messstrecke in**

- S-Form
- DN 40
- Messweg 300
- PN 16
- Ohne Temperatur-Fühler



## 1.8 Certificates



# Certificate of Compliance

**Certificate:** 70002079

**Master Contract:** 215040

**Project:** 70002079

**Date Issued:** January 6, 2014

**Issued to:** Berthold Technologies GMBH & CO KG

Calmbacher Str 22  
Bad Wildbad, 75323  
Germany  
Attention: Karl Hoffman

*The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.*



*J-P Laplante*

Issued by: J-P Laplante, Eng.

### PRODUCTS

**CLASS 8721 86** - ELECTRICAL EQUIPMENT FOR LABORATORY USE - Certified to US Standards

**CLASS 8721 06** - LABORATORY EQUIPMENT - Electrical

Radiation detector for radiometric measurements, Models LB41x, input rated: 100 - 240 VAC, 50/60 Hz, 8 VA or 24 Vdc, 4 W.

'X' in the model name and any following characters or figures, indicate difference in supply voltage (100 - 240 Vac or 24 Vdc) and other minor differences between the types.

### Notes:

1. The above models are permanently connected, Equipment Class I, Pollution Degree 2, Installation Category II
2. Mode of operation: Continuous
3. Environmental Conditions: Extended: -40 °C to +60 °C (type with metal screw cap; -20 °C to +60 °C (type with plastic screw cap); altitude ≤ 3000 m; humidity ≤ 90 %





Certificate: 70002079

Master Contract: 215040

Project: 70002079

Date Issued: January 6, 2014

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#### **APPLICABLE REQUIREMENTS**

**CAN/CSA-C22.2 No. 61010-1-12:** Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements

**ANSI/UL Std. No. 61010-1 (3rd Edition):** Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements

#### **CONDITIONS OF ACCEPTABILITY**

1. The Models are certified for use with other equipment, where the suitability of the combination is to be determined by CSA.
2. Equipment can optionally be water cooled, however the equipment has only been tested without water cooling. Once water cooled, the ambient (outside) temperature of the equipment may exceed 60 °C under the condition that the ambient temperature inside the equipment does not exceed 60 °C
3. Equipment sub-types for use in ATEX environment are not evaluated as part of this approval.
4. Incorrect reading of the measured quantity shall not lead to a hazard. If incorrect reading is hazardous in end application, guidance to check correct operation of the equipment is required from the manufacturer
5. The equipment I/O RS-485, 4-20mA and relay contact are considered to be (indirectly) accessible in end use application. These I/O shall therefore be only connected to equipment which is safe to touch (voltage/current levels in accordance with CSA/UL 61010-1 cl 6.3 and two means of protection against hazardous live parts in accordance with cl 6.4 and 6.5)
6. The 24 Vdc type shall be supplied by a 24 Vdc voltage which is safe to touch (voltage/current levels in accordance with CSA/UL 61010-1 cl 6.3 and two means of protection against hazardous live parts in accordance with cl 6.4 and 6.5)
7. Equipment is for use in normal (PD2) environments and not for use in wet locations
8. A disconnect device, complying with 6.11.3.1 shall be provided by the installation of the end use application of the equipment
9. IP testing was not part of the approval
10. The equipment shall be connected to a mains supply with an overcurrent protective device of max 20 A



BERTHOLD TECHNOLOGIES GmbH & Co. KG  
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 Fax: +49 (0)7081 / 177 - 100  
 Email: [berthold@Berthold.com](mailto:berthold@Berthold.com)  
[www.Berthold.com](http://www.Berthold.com)

## EC-Declaration of Conformity

We, hereby declare under our sole responsibility that the design of the following products / systems / units brought into circulation by us comply with the relevant EC regulations listed below.

This declaration loses its validity should modifications or unsuitable and improper use take place without our authorisation.

Description: **Continuous Level and Density Measurement System SmartSeries**

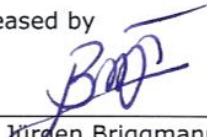
Type: **LB 41x**

|      | EC-Regulation | And Reviews | Standards and Norms |      |
|------|---------------|-------------|---------------------|------|
| EMC  | 2004/108/EG   |             | EN 61326-1          | 2006 |
|      |               |             | +A1                 | 2008 |
|      |               |             | +A2                 | 2011 |
|      |               |             | EN 55011            | 2009 |
|      |               |             | +A1                 | 2010 |
|      |               |             | Namur NE021         | 2011 |
| LVD  | 2006/95/EG    |             | IEC 61010-1         | 2010 |
| RoHS | 2011/65/EU    |             |                     |      |

This declaration is issued by the manufacturer

BERTHOLD TECHNOLOGIES GmbH & Co. KG  
 Calmbacher Str. 22, D-75323 Bad Wildbad, Germany

released by

  
 Dr. Jürgen Briggmann  
 Head of R&D

Bad Wildbad, 27<sup>th</sup> of September, 2013

Registergericht / Court of Registration  
 Persönlich haftende Gesellschafter / Fully liable Associates  
 Registergericht / Court of Registration  
 Geschäftsführer / Chief Executive Officer  
 USt.-Id-Nr. / VAT Reg.No.  
 Deutsche Steuernummer / German Tax No.  
 WEE-Reg.No.

Stuttgart HRA 330991  
 BERTHOLD TECHNOLOGIES Verwaltungs-GmbH  
 Stuttgart HRB 331520  
 Horst G. Knauff  
 DE813050511  
 49038/08038  
 DE99468690

Sparkasse PF-CW 75323 Bad Wildbad Konto/Account No. 8 045 003 (BLZ 666 500 85)

DE37 6665 0085 0008 0450 03

Volksbank 75119 Pforzheim Konto/Account No. 957 004

DE85 6669 0000 0000 9570 04

Commerzbank 75105 Pforzheim Konto/Account No. 6 511 120 (BLZ 666 800 13)

IBAN: DE05 6668 0013 0651 1120 00

SWIFT-BIC PZHSDE66 IBAN:

SWIFT-BIC VBPFDE66 IBAN:

SWIFT-BIC DRES DEFF 666



## Certificate of Registration HCF Verified

|                                                                |                                           |
|----------------------------------------------------------------|-------------------------------------------|
| <u>Berthold Technologies GmbH &amp; co. KG</u><br>Manufacturer | <u>LB414 SmartSeries</u><br>Product Name  |
| <u>00A1</u><br>Manufacturer ID (Hex)                           | <u>A175</u><br>Expanded Device Type (Hex) |
| <u>7</u><br>HART Protocol Revision                             | <u>01</u><br>Device Revision (Hex)        |
| <u>01</u><br>Hardware Revision (Hex)                           | <u>01</u><br>Software Revision (Hex)      |
| <u>10/19/2013</u><br>Test Date                                 | <u>HCF</u><br>Verification Method         |

The above product has successfully completed the validation process and meets the requirements to be "HART REGISTERED"

Registration  
Number: L2-06-1000-287

Registration  
Issue Date: Oct. 19, 2013

HCF QA  
Approval:

T. F. Mastus



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