BERTHOLD TECHNOLOGIES

Evaluation unit
Auswerteeinheit

DUO XPERT

Detectors
Detektoren

DUO SERIES

2 WIRE TECHNOLOGY
2-LEITER TECHNOLOGIE

Level and density
Füllstand und Dichte

Technical Information
Technische Information

56925TI
Rev. No.: 00, 06.2016

2 wire technology

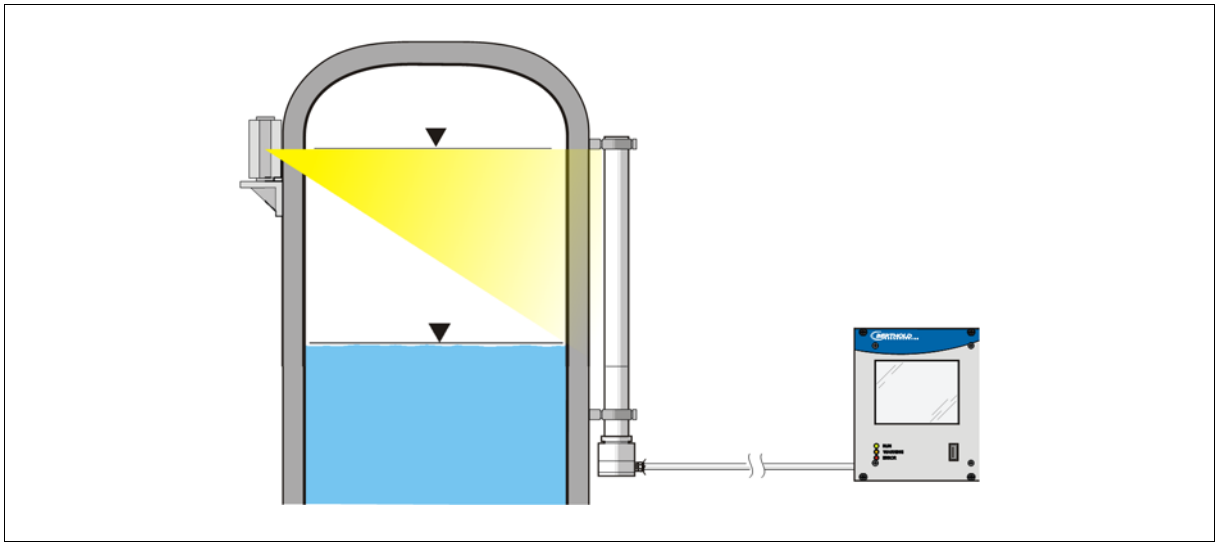
The DuoSeries/DuoXPERT measuring system consists of a scintillation detector – CrystalSENS point detector or UniSENS rod detector – and a sophisticated evaluation unit (DuoXPERT) for display and operation.

The evaluation unit is a state-of-the-art control unit with robust 3.5" TFT touch panel, powerful Dual Core CPU and diverse operator interfaces. Advanced self diagnostics and monitoring features ensure a safe function of the system. Furthermore the data logging functionality allows operators to analyze their processes in depth, e.g. develop trends, track process changes etc.

2-Leiter Technologie

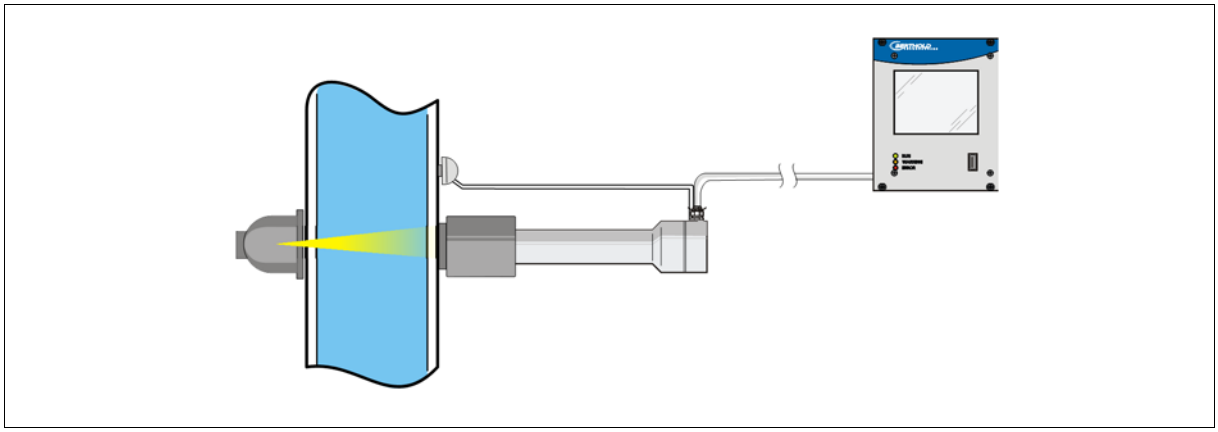
Das DuoSeries/DuoXpert Messsystem besteht aus einem Detektor mit Szintillator-Technologie – CrystalSENS Punktdetektor oder UniSENS Stabdetektor – sowie einer separaten Auswerteeinheit zur Anzeige und Bedienung.

Die moderne Auswerteeinheit verfügt über ein 3,5" Touch Panel, eine starke Dual Core CPU und verschiedenen Bedien-Optionen. Erweiterte Funktionen zur Selbstdiagnose und Überwachung sorgen zudem für höchste funktionale Sicherheit der Messung im Betrieb. Darüber hinaus können die Betreiber die Daten-Log Funktionen für eine detaillierte Prozessanalyse nutzen und so zum Beispiel Trends entwickeln oder Prozessänderungen nachvollziehen.



Example measurement arrangement for level

Beispiel einer Messanordnung für Füllstand



Example measuremet arrangement for density

Beispiel einer Messanordnung für Dichte

Sophisticated measuring system in 2 wire technology

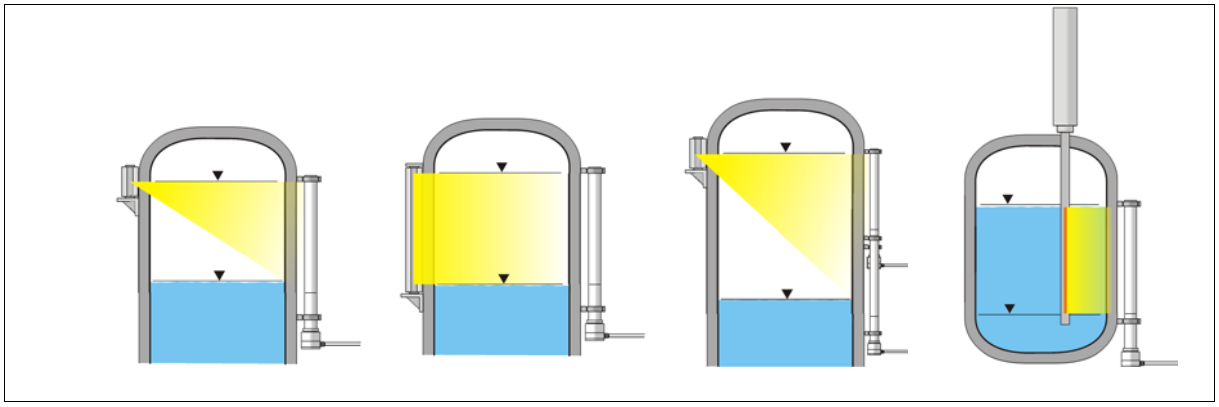
- Unique: Radiometric system with intrinsically safe power supply (Full Ex-i)
- Real 2-wire technology, only 2 wires in the field
- Advanced self diagnostics and monitoring features
- Easy to use touch screen panel for local display and operation
- Integrated gas density compensation feature
- Direct replacement of predecessor model LB 440
- Interfaces with all 2-wire detectors LB 44xx, LB 54xx and LB 47xx

Hochentwickeltes Messsystem in 2-Leiter Technologie

- Einzigartig: Radiometrische Messung mit eigensicherer Spannungsversorgung (Voll Ex-i)
- Echte 2-Leiter Technik, nur 2 Adern im Feld
- Verbesserte Diagnosefunktionenund Sellbstüberwachung
- Einfache, intuitive Bedienung über Touch-Screen
- Integriertes Feature zur Kompensation von Gas-Phasen Schwankungen
- Volle Kompatibilität zum Vorgängermodell LB 440
- Kompatibel zu alle 2-Leiter Detektoren LB 44xx, LB54xx und LB 47xx

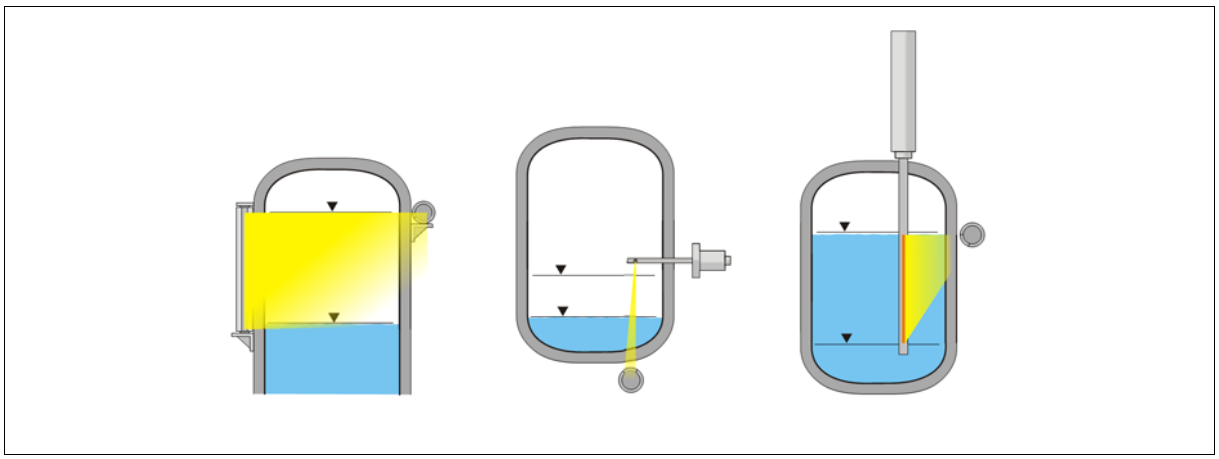
Measurement arragements level

Messanordnungen Füllstand



Measurement arrangements with rod detector

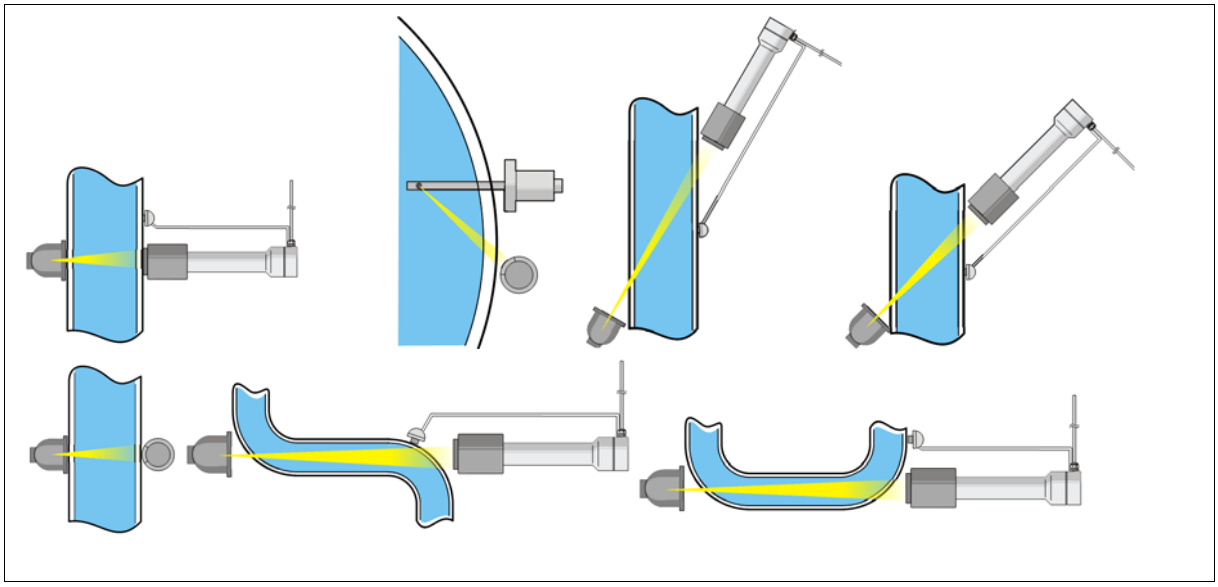
Messanordnungen mit Stabdetektor



Measurement arrangements with point detector

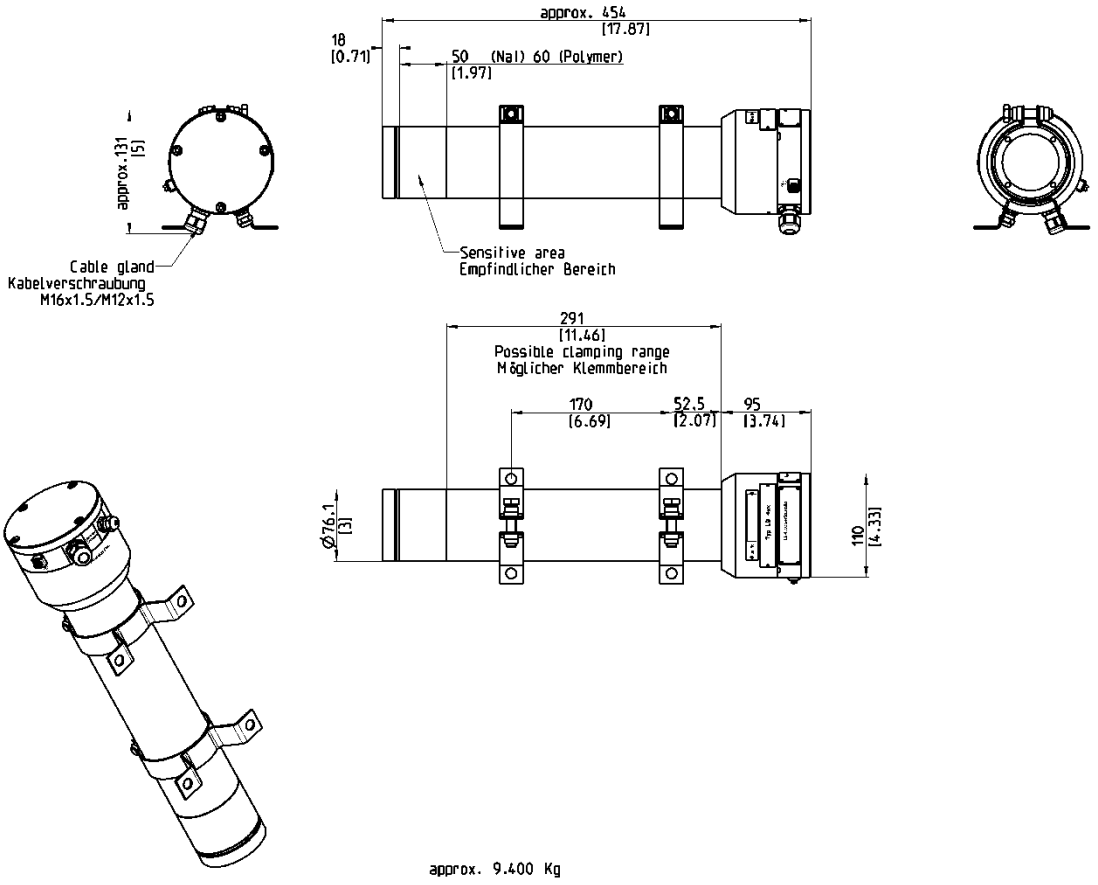
Messanordnungen mit Punktdetektor

Measurement arragements density Messanordnungen Dichte



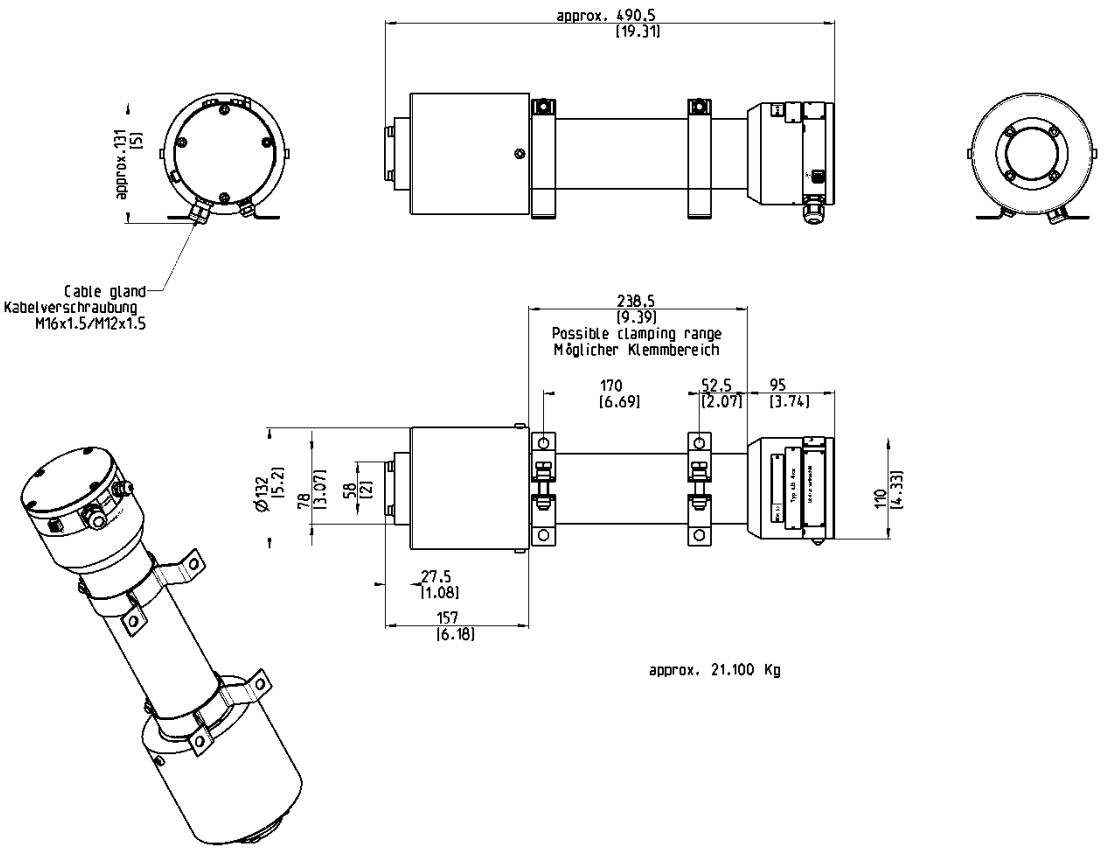
Measurement arrangements density Messanordnungen für Dichtemessung

CrystalSENS without water-cooling
CrystalSENS ohne Wasserkühlung



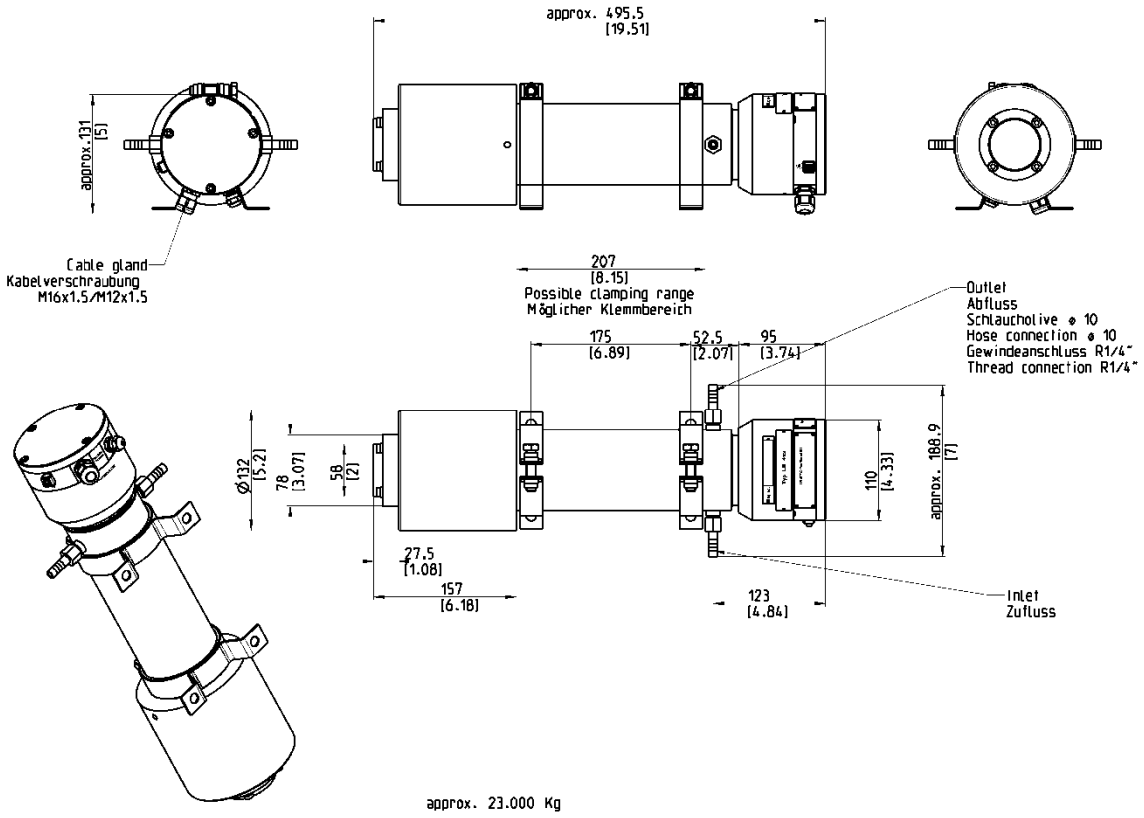
Dimensions in mm
Abmessungen in mm

CrystalSENS with collimator (frontal irridation)
CrystalSENS mit Kollimator (frontal)



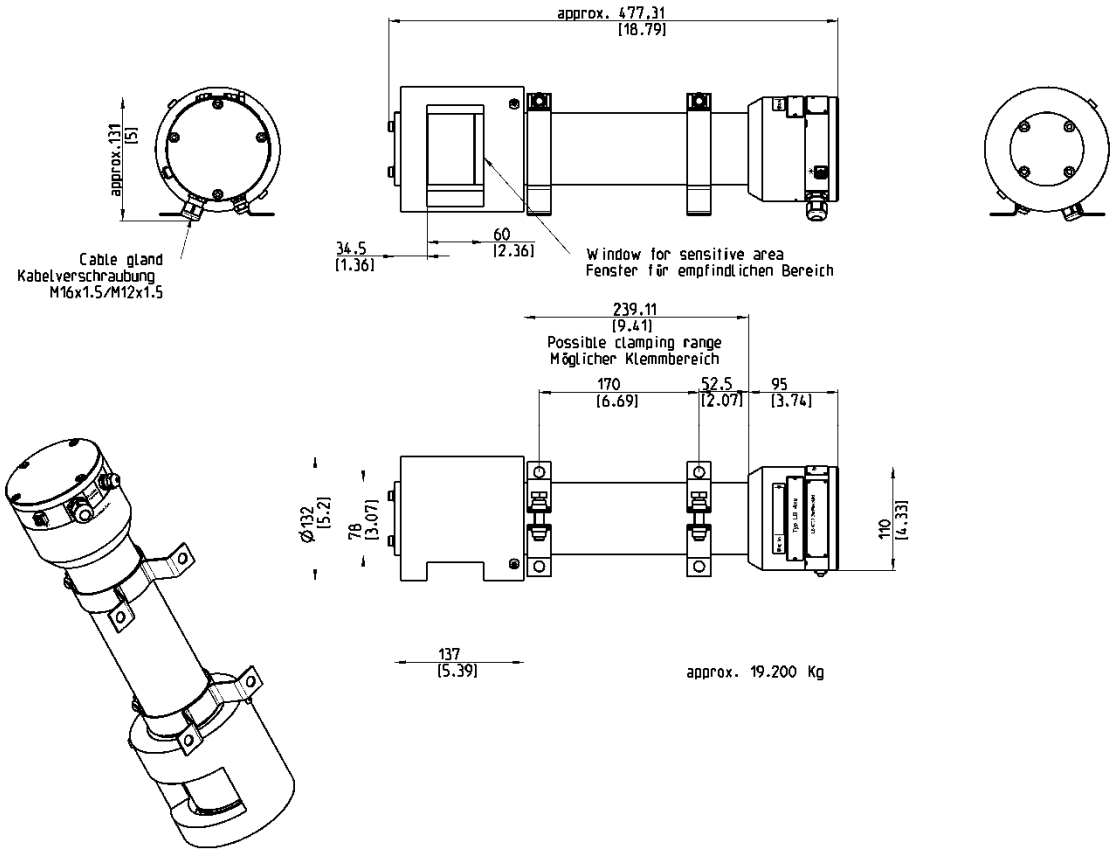
Dimensions in mm
Abmessungen in mm

CrystalSENS with collimator (frontal irridation) and water-cooling
CrystalSENS mit Kollimator (frontal) und Wasserkühlung



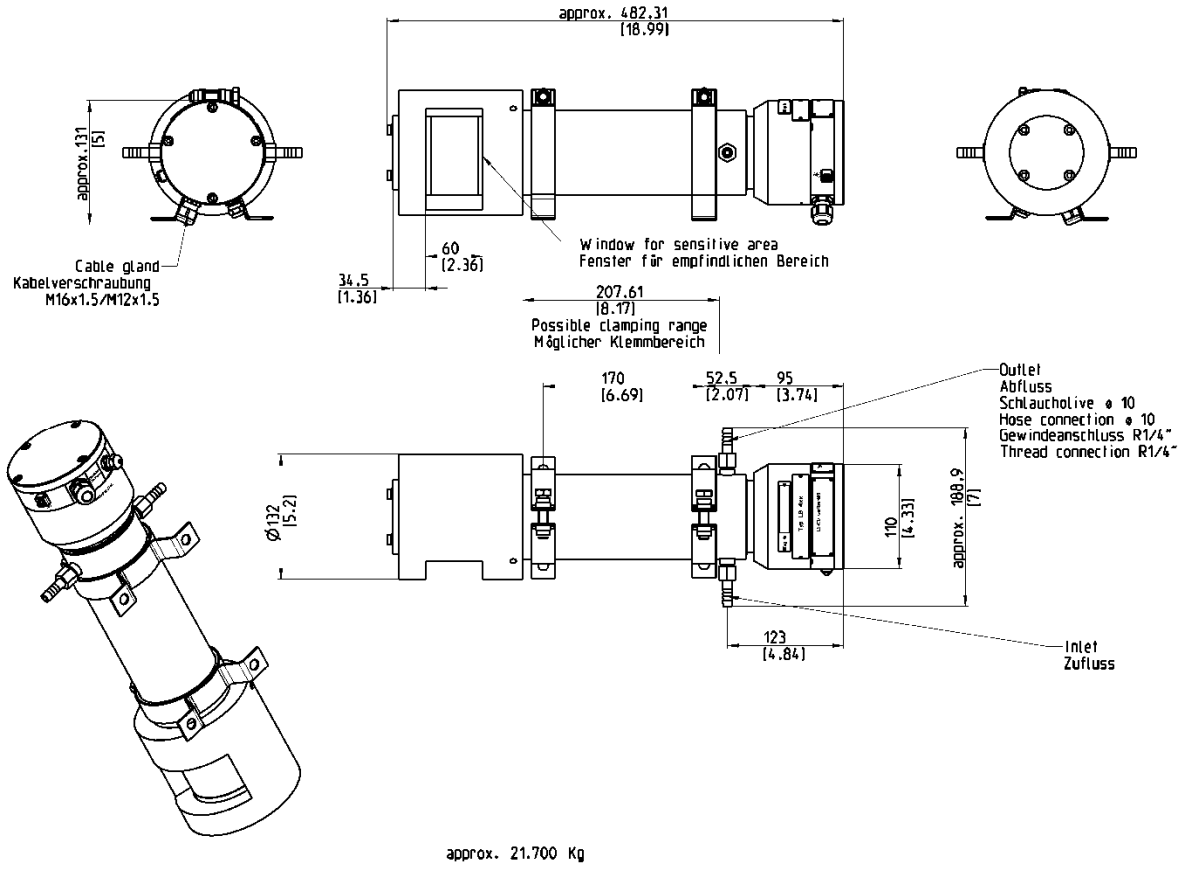
Dimensions in mm
Abmessungen in mm

CrystalSENS with collimator (side irridation)
CrystalSENS mit Kollimator (seitlich)



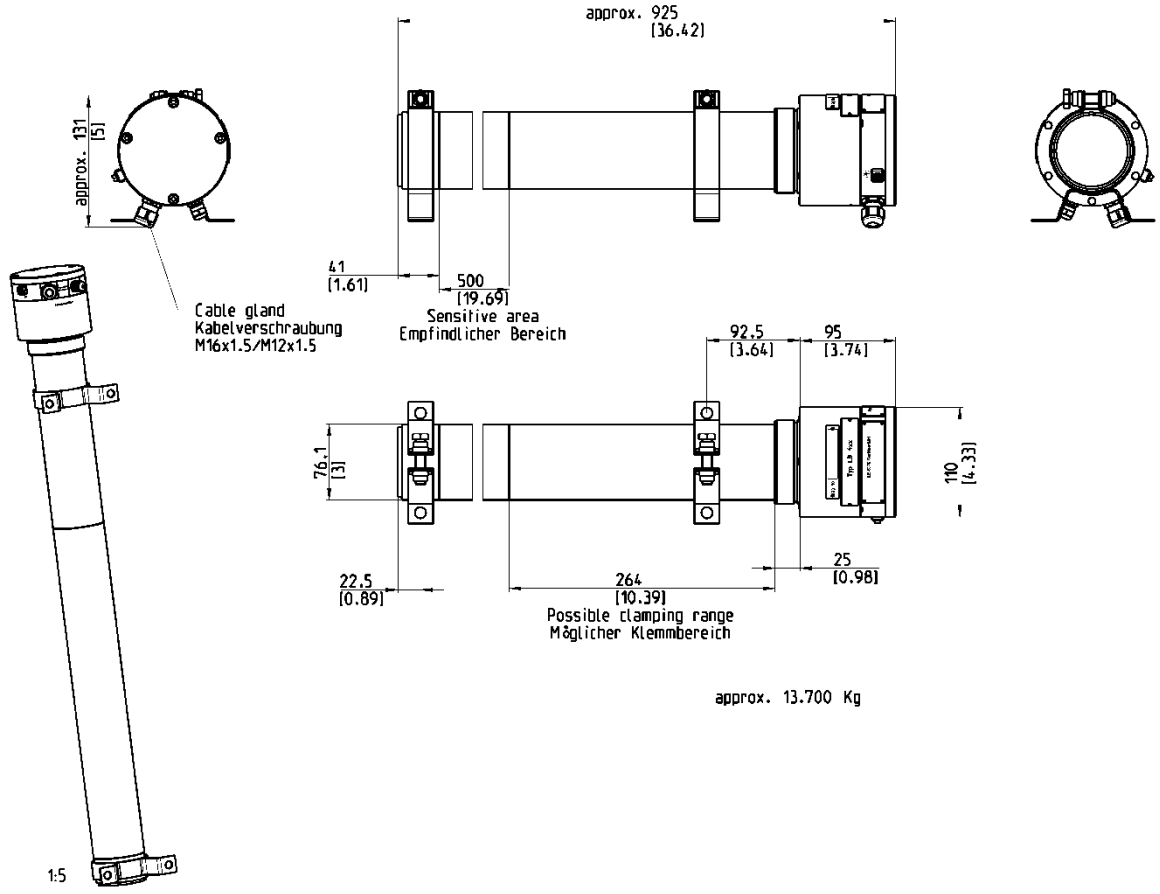
Dimensions in mm
Abmessungen in mm

CrystalSENS with collimator (side irridation) and water-cooling
CrystalSENS mit Kollimator (seitlich) und Wasserkühlung



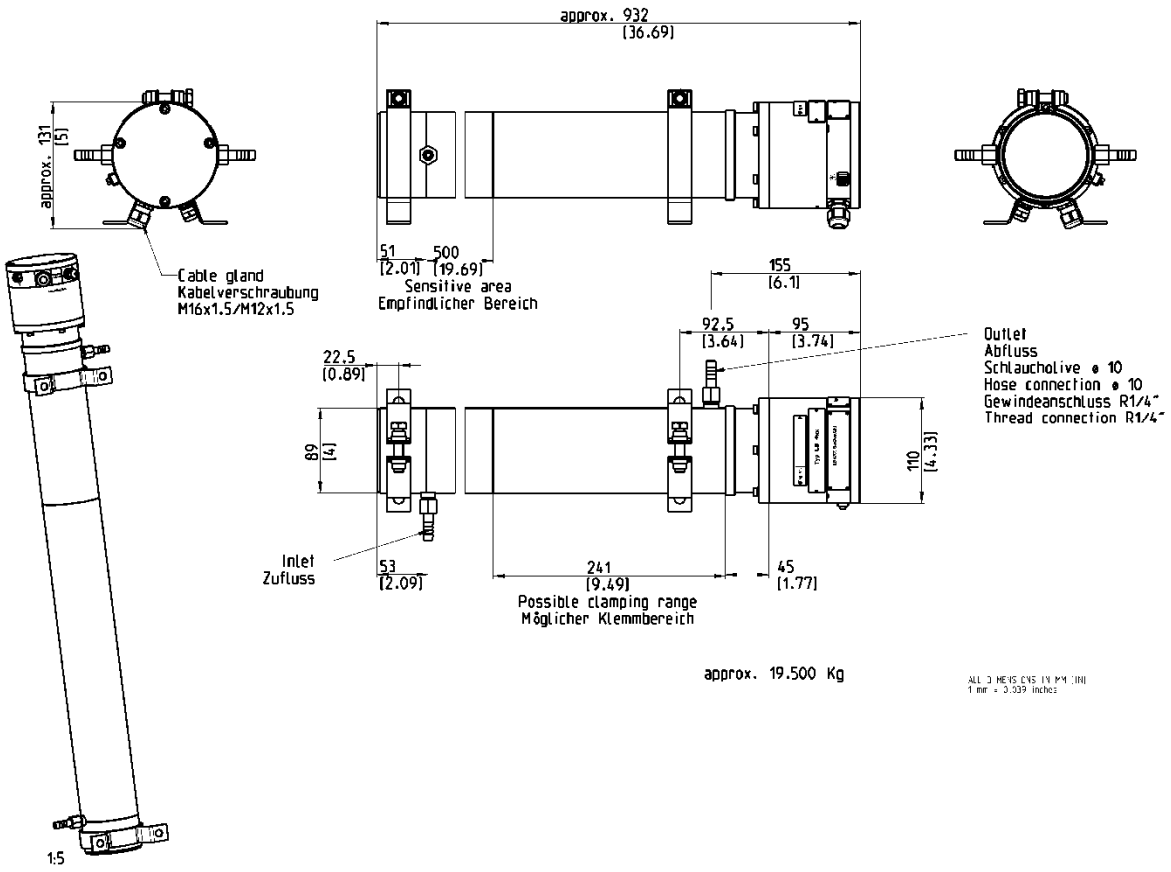
Dimensions in mm
Abmessungen in mm

UniSENS 500mm without water-cooling
UniSENS 500mm ohne Wasserkühlung



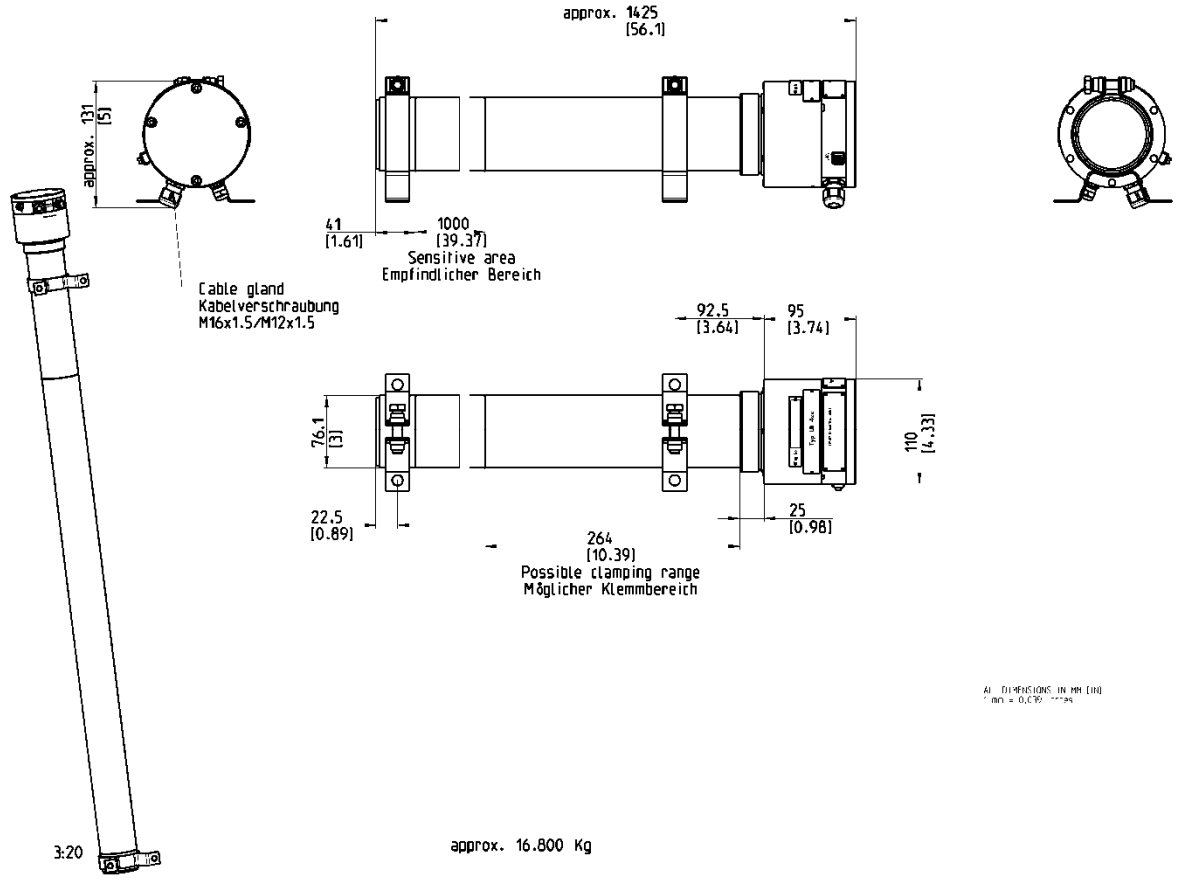
Dimensions in mm
Abmessungen in mm

UniSENS 500mm with water-cooling
UniSENS 500mm mit Wasserkühlung



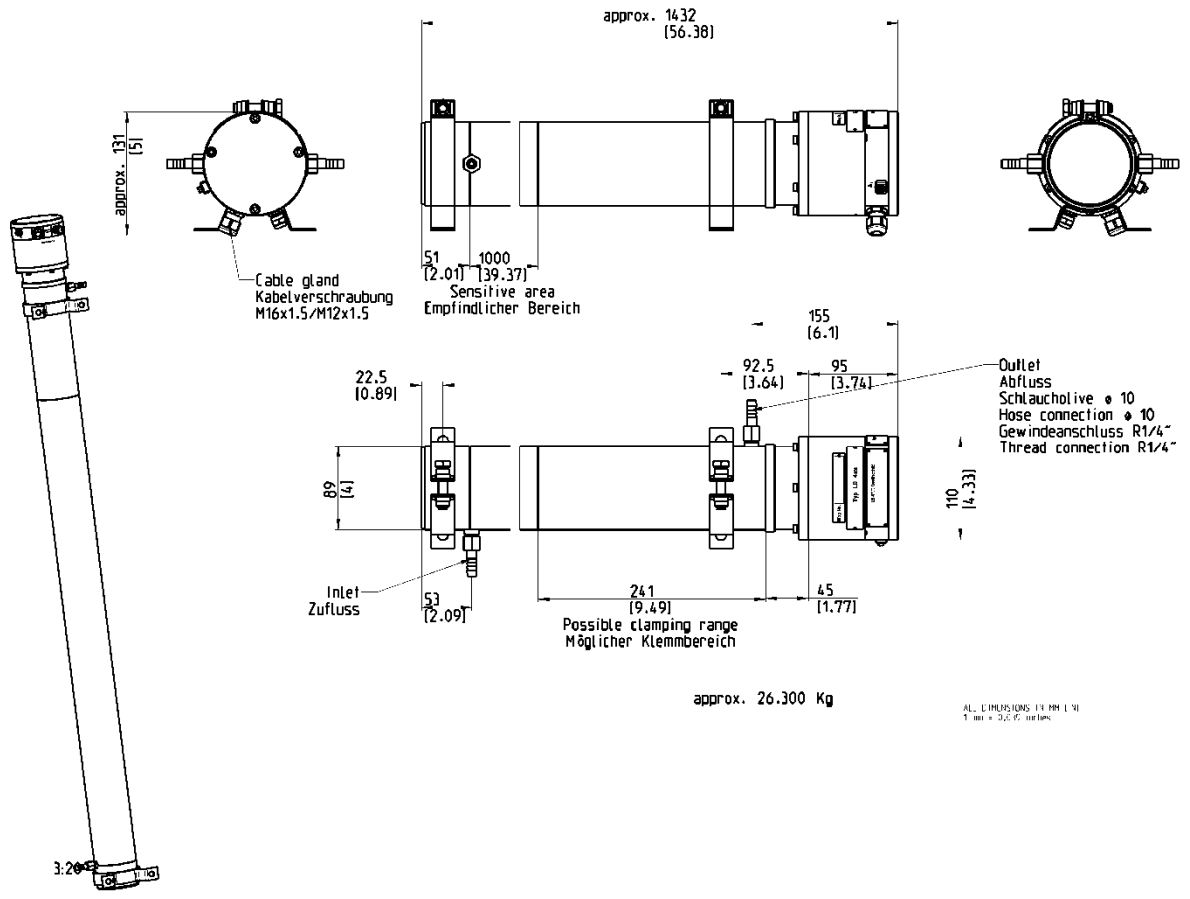
Dimensions in mm
Abmessungen in mm

UniSENS 1000mm without water-cooling
UniSENS 1000mm ohne Wasserkühlung



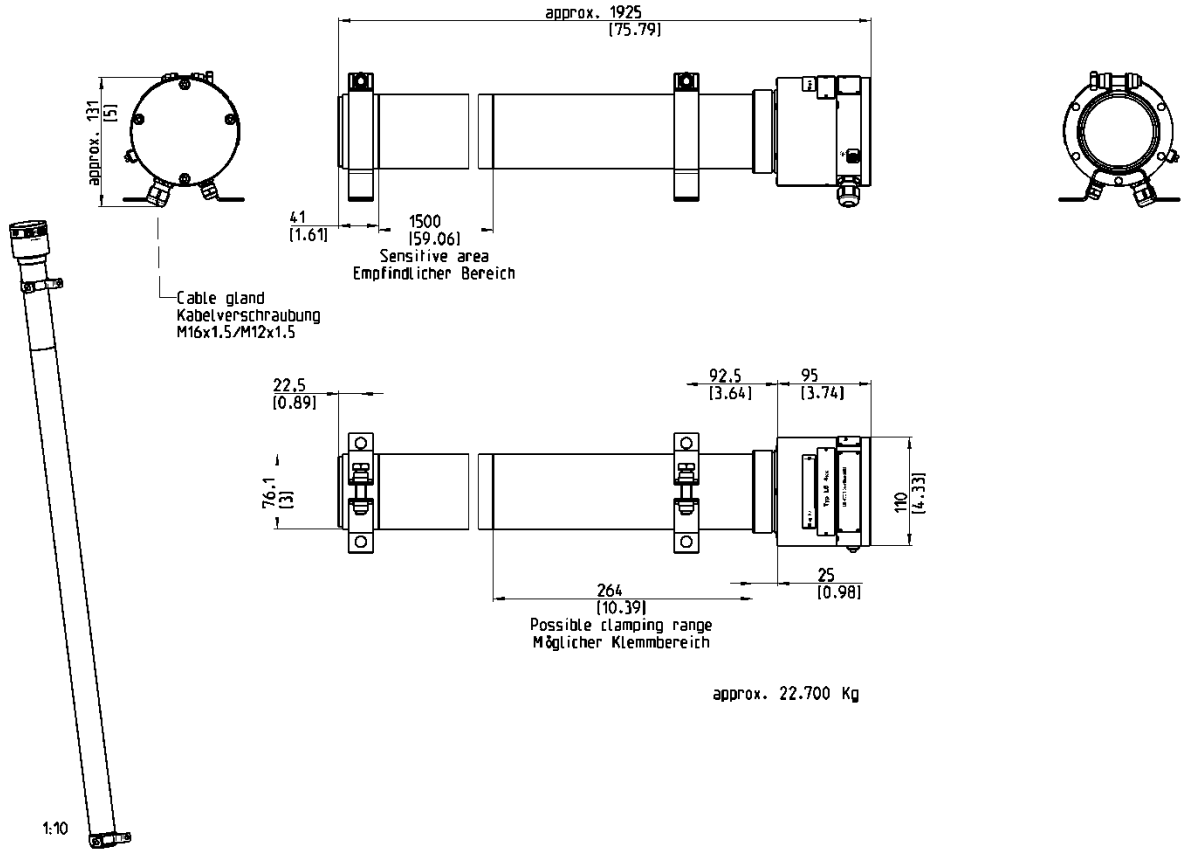
Dimensions in mm
Abmessungen in mm

UniSENS 1000mm with water-cooling
UniSENS 1000mm mit Wasserkühlung



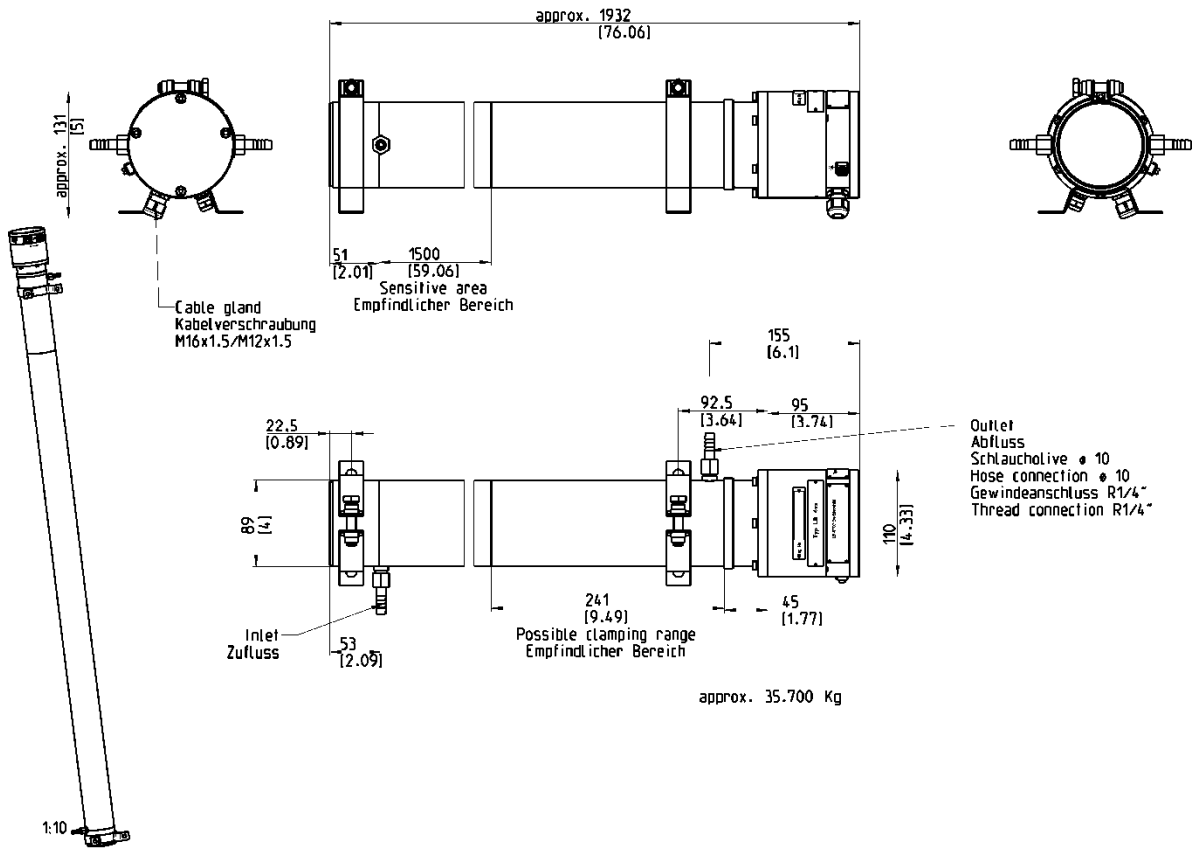
Dimensions in mm
Abmessungen in mm

UniSENS 1500mm without water-cooling
UniSENS 1500mm ohne Wasserkühlung



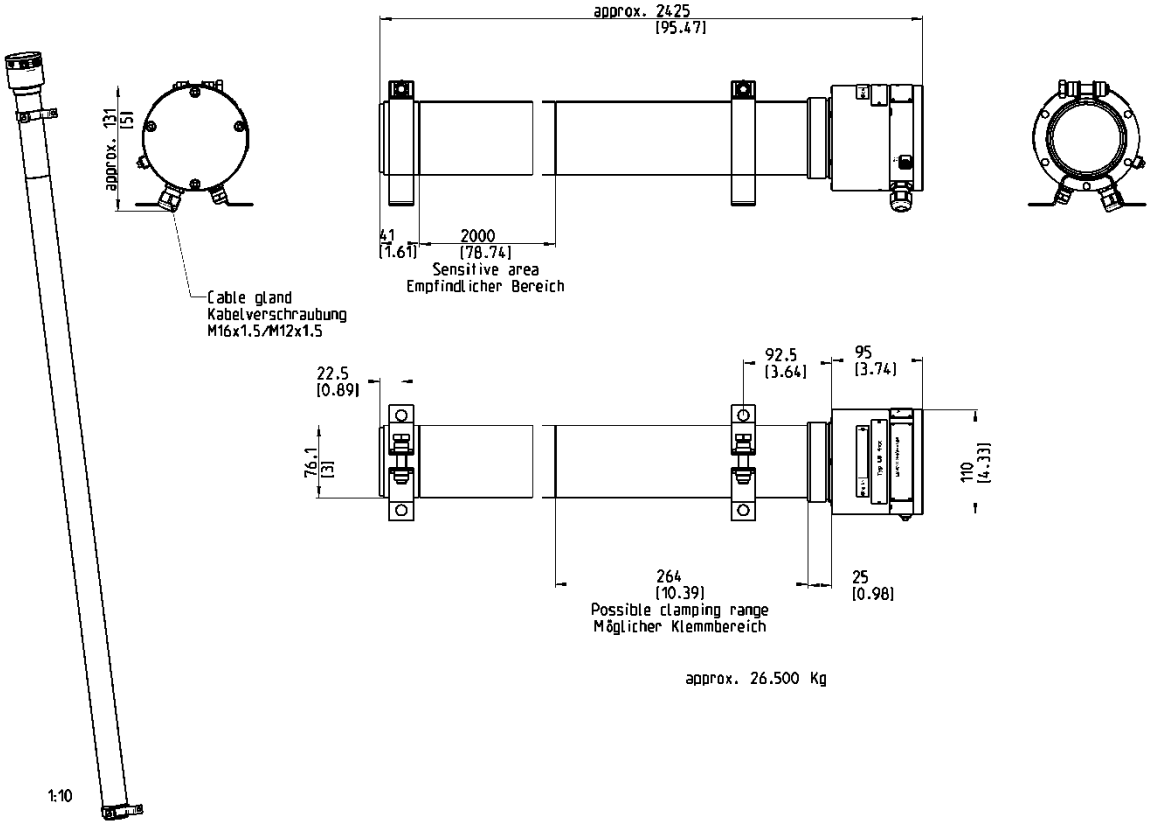
Dimensions in mm
Abmessungen in mm

UniSENS 1500mm with water-cooling
UniSENS 1500mm mit Wasserkühlung



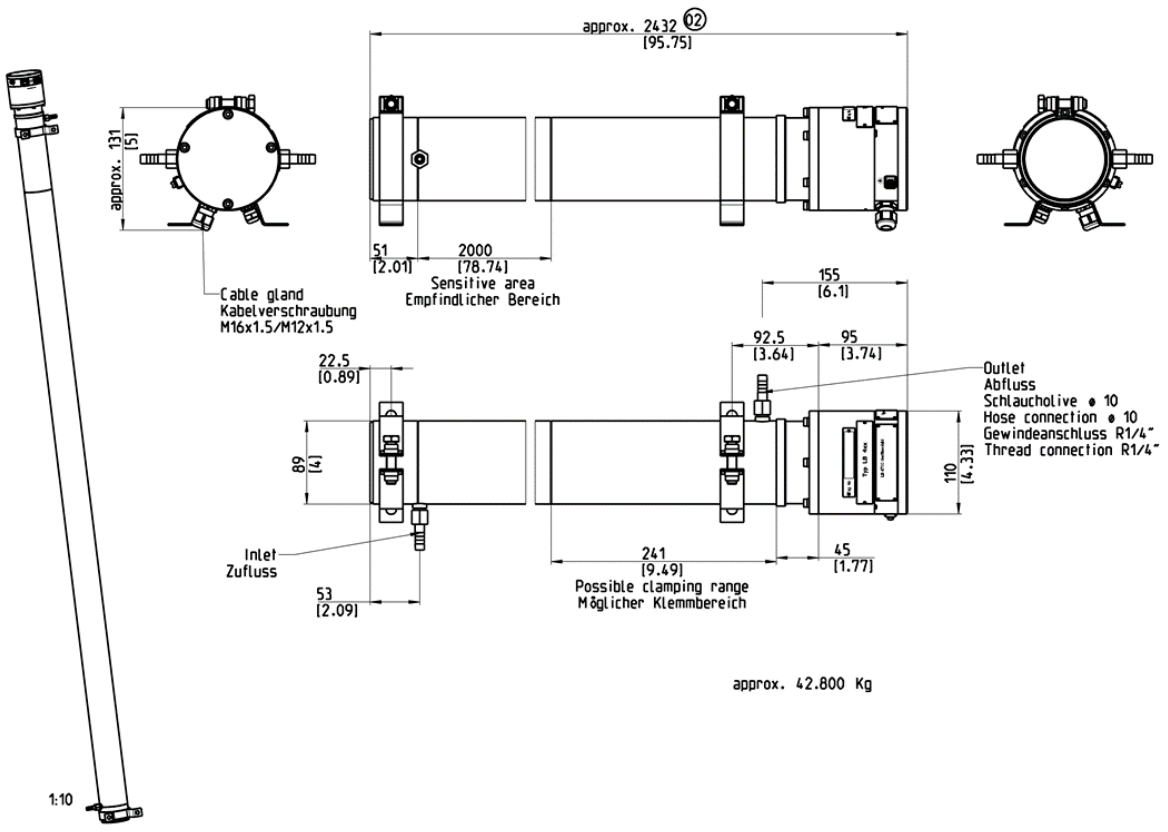
Dimensions in mm
Abmessungen in mm

UniSENS 2000mm without water-cooling
UniSENS 2000mm ohne Wasserkühlung



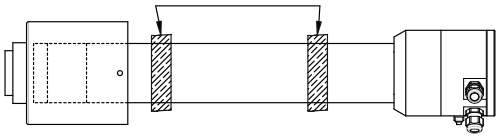
Dimensions in mm
Abmessungen in mm

UniSENS 2000mm with water-cooling
UniSENS 2000mm mit Wasserkühlung

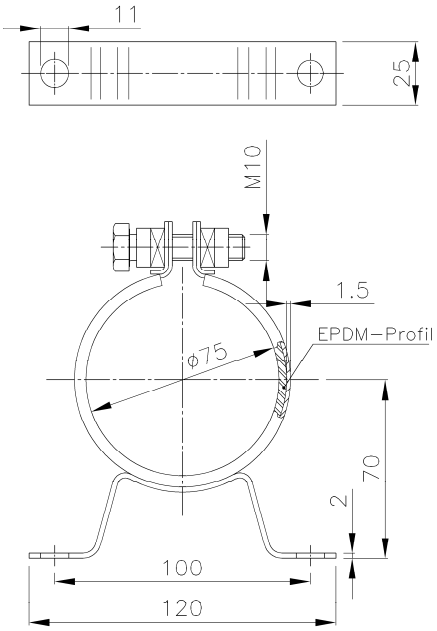


Dimensions in mm
Abmessungen in mm

Mounting Clamps for Detector
Befestigungsschellen für Detektor



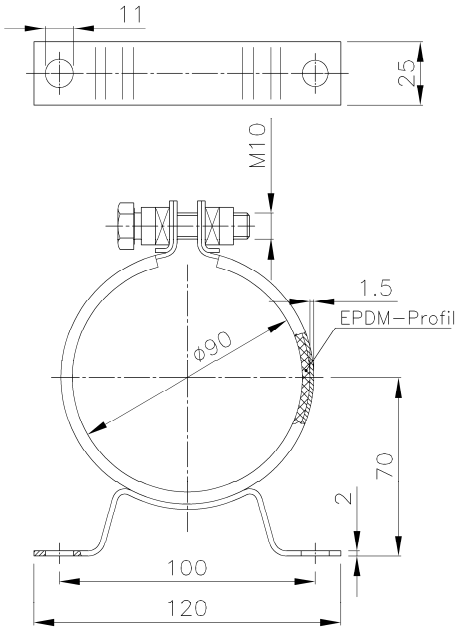
for Detectors without water cooling
für Detektoren ohne Wasserkühlung



Part No. 31346 (1 set = 2 clamps)
Id. Nr. 31346 (1 Set = 2 Schellen)

Part No. 31345 (single clamp)
Id. Nr. 31345 (einzelne Schelle)

for Detectors with water cooling
für Detektoren mit Wasserkühlung



Part No. 31347 (1 set = 2 clamps)
Id. Nr. 31347 (1 Set = 2 Schellen)

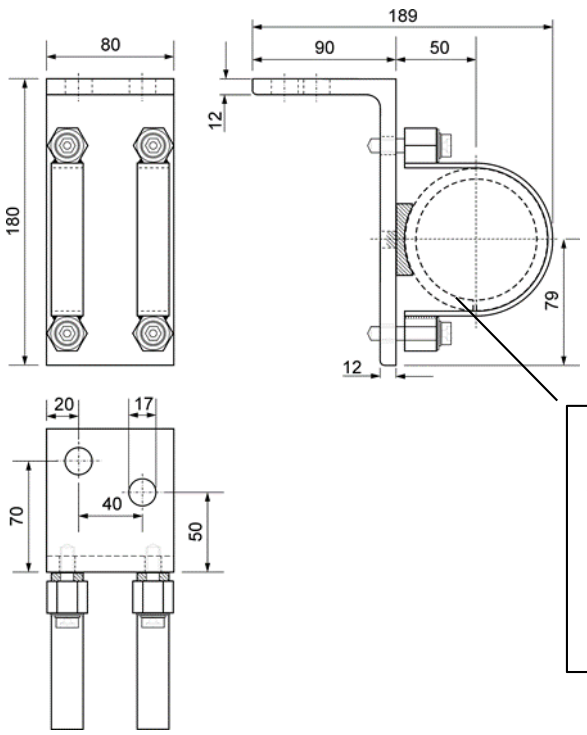
Part No. 31344 (single clamp)
Id. Nr. 31344 (einzelne Schelle)

Material
316Ti
1.4571

position for the clamps, see detector drawing
Position für die Schellen-Befestigung siehe Detektor-Zeichnung

Dimensions in mm
Abmessungen in mm

Heavy Duty Detector Holder (stainless steel)
Robuste Detektor Halterung (Edelstahl)



Remove the plastic ring for detectors with water cooling.

Kunststoffring bei Detektoren mit Wasserkühlung entfernen.

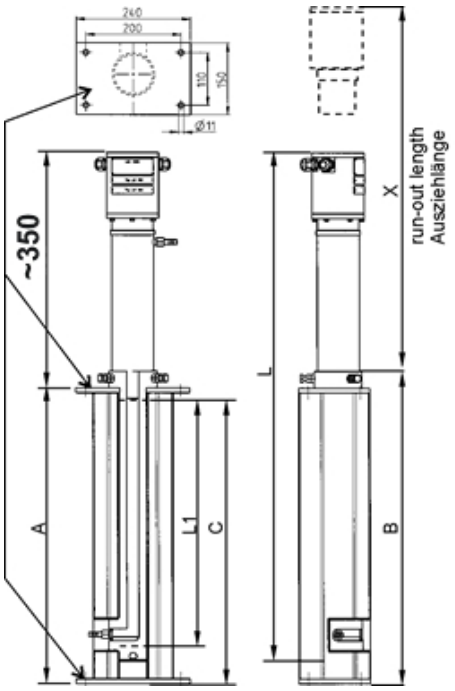
Part No. 39246 = without water cooling
Id. Nr. 39246 = ohne Wasserkühlung

Part No. 39247 = with water cooling
Id. Nr. 39247 = mit Wasserkühlung

Dimensions in mm
Abmessungen in mm

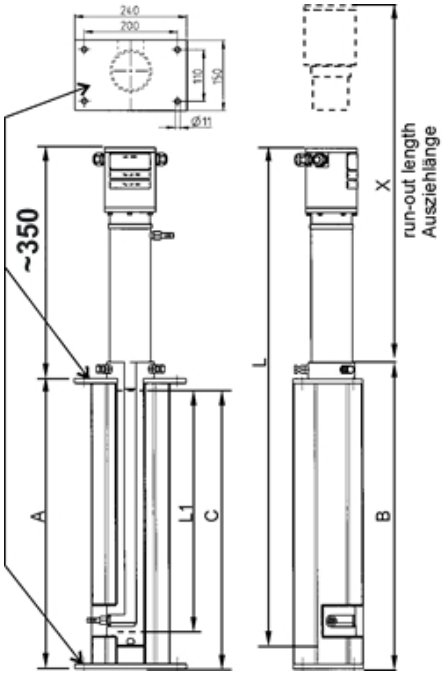
Collimator for Rod Detector
Kollimator für Stabdetektor

for Detectors without water cooling
für Detektoren ohne Wasserkühlung

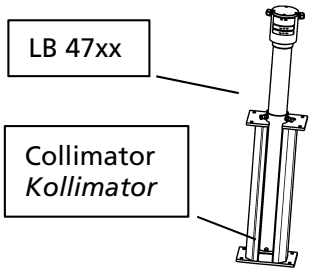


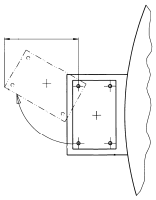
Lead thickness: 36 mm
Bleidicke: 36 mm

for Detectors with water cooling (WC)
für Detektoren mit Wasserkühlung (WK)



Lead thickness: 30 mm
Bleidicke: 30 mm





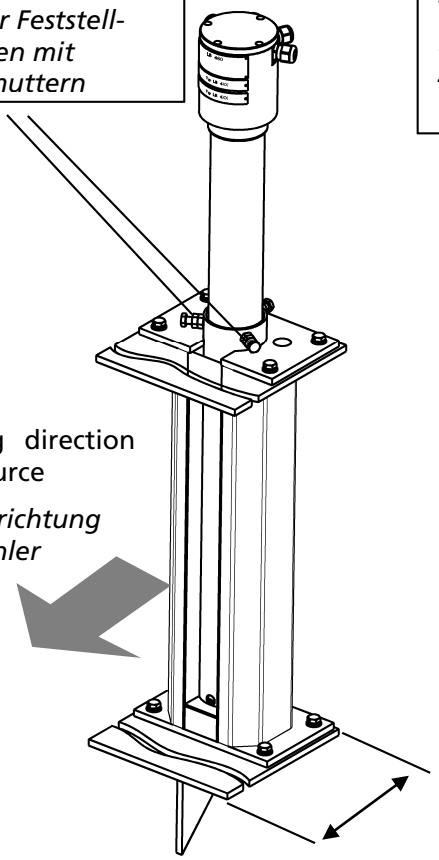
For installation/deinstallation, space for swiveling the collimator is recommended.

Empfohlener Installations-/Deinstallationsraum zum Ausschwenken des Kollimators.

Part No. Id. Nr.	for WC mit WK	A	B	L (detector length) *(Detektorlänge)*	C	X	Weight *Gewicht* (kg)
59957-050	500	620	655	925	590	1000	110
59957-100	100	1120	1155	1425	1090	1500	195
59957-150	1500	1620	1655	1925	1590	2000	280
59957-200	2000	2120	2155	2425	2090	2500	365
60085-050	500	620	655	929	590	1000	100
60085-100	1000	1120	1155	1429	1090	1500	180
60085-150	1500	1620	1655	1929	1590	2000	255
60085-200	2000	2120	2155	2429	2090	2500	330

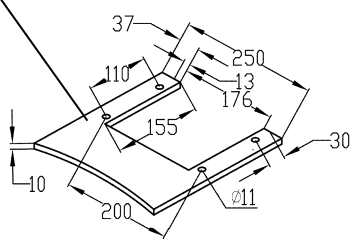
Examples for Mounting Devices and the Installation at the Collimator
Beispiele für die Halterung und Montage des Kollimators

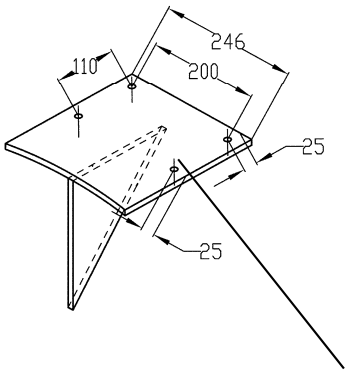
Detector locking screws with counter nuts.
Detektor Feststell-schrauben mit Kontermuttern



Stabilizer against tilting, installed by customer. Bracket e.g. welded to the vessel or a special support.

Kippsicherung installiert vom Errichter. Lasche z.B. angeschweißt am Behälter oder einer Tragekonstruktion.



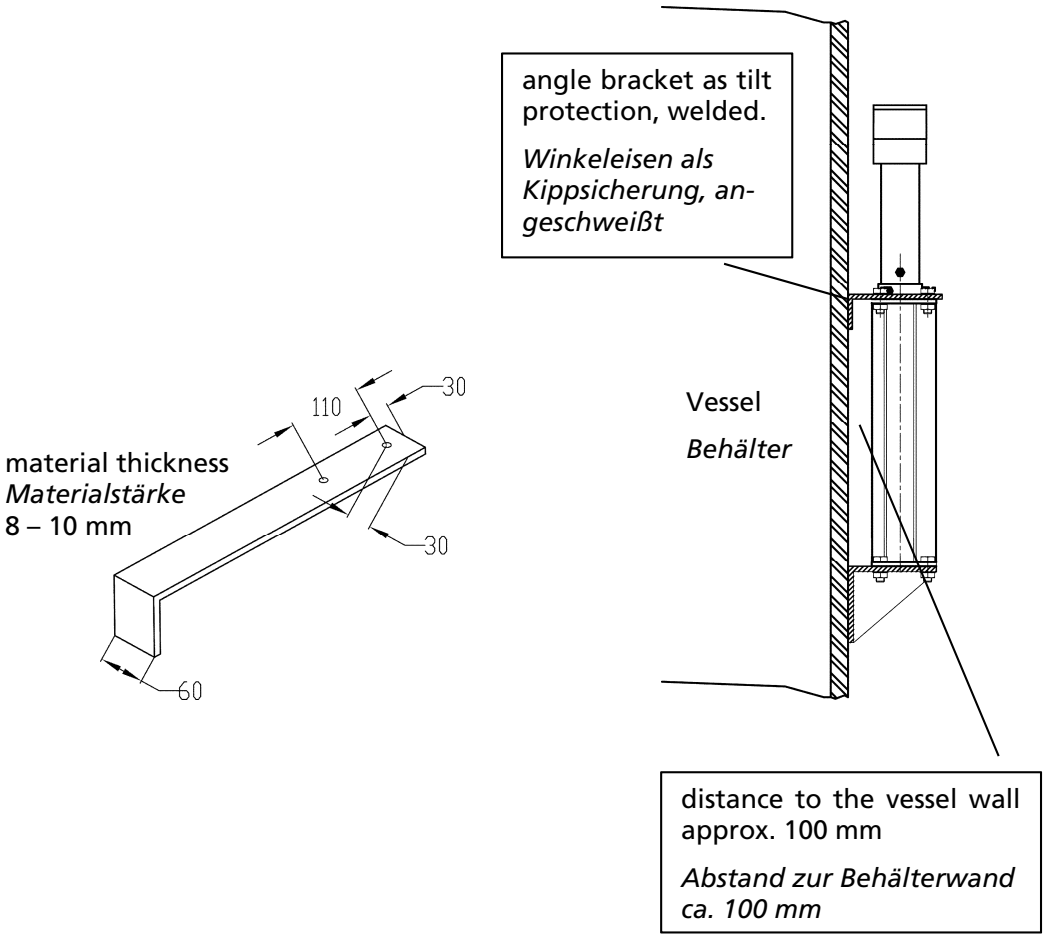


Assembly platform installed by customer; must carry the total load of the collimator and the detector. It is e.g. welded to the vessel or on a special support.

Montage-Plattform installiert vom Errichter; sie trägt das komplette Gewicht des Kollimators und des Detektors. Sie ist z.B. angeschweißt am Behälter oder einer Tragekonstruktion.

Examples for Mounting Devices and the Installation at the Collimator

Alternative to the stabilizer against tilting in the previous drawing, you can use a one-sided mounted angle bracket as a stabilizer too.



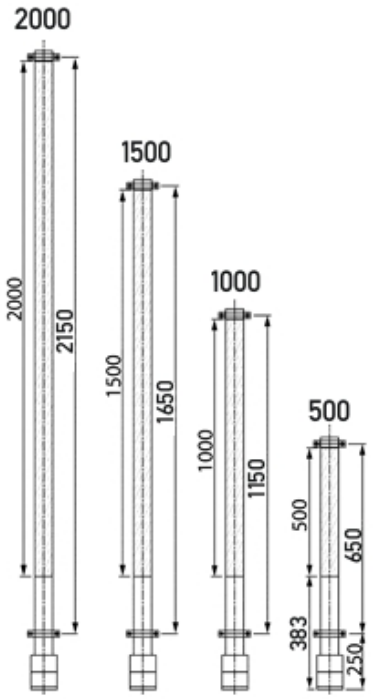
Dimensions in mm
Abmessungen in mm

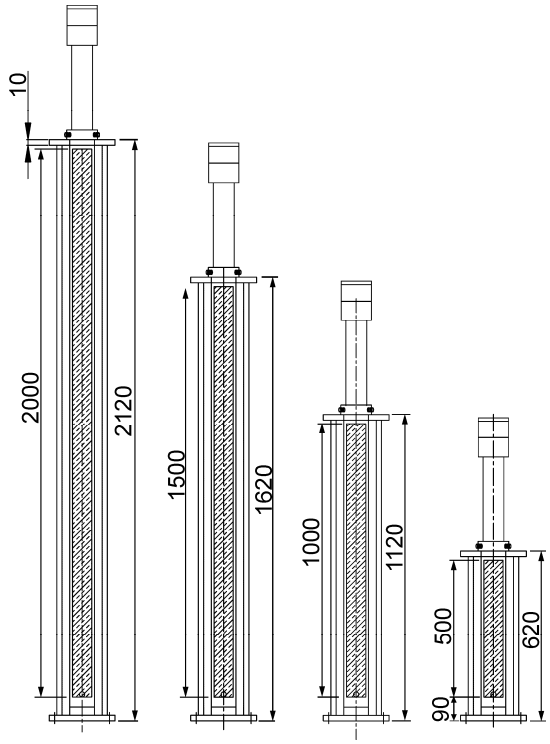
Clamping and Mounting Positions for Rod Detectors
Klemmenposition und Montageposition für Stabdetektoren

Clamping Position for Rod Detectors
Klemmenposition für Stabdetektoren

Mounting Position for Rod Detector Shieldings
Klemmenposition für Stabdetektor-abschirmungen

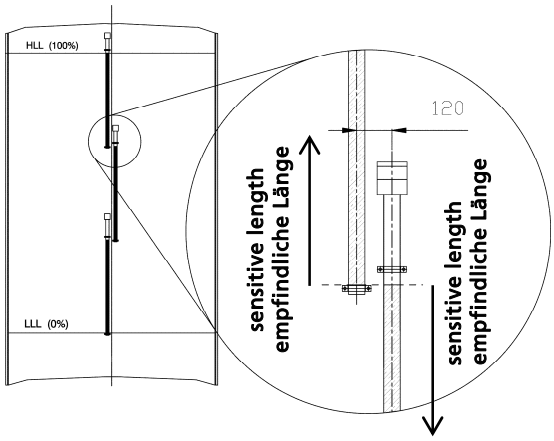
The drawings on this valid for Detectors with and without water cooling jacket.
Die Zeichnungen auf dieser Seite sind gültig für Detektoren mit und ohne Wasserkühlung.





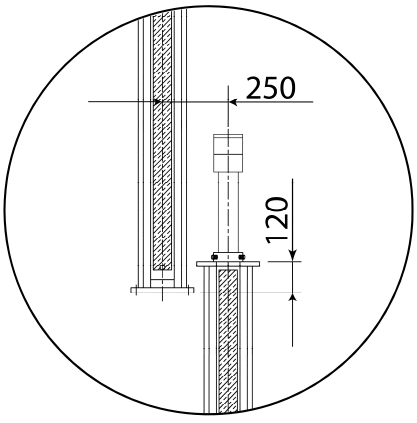
Clamping Position for Multi Detector Arrangement

Klemmenposition für Multidetektor-Anordnung



Mounting Position for Rod Detector Shieldings

Klemmenposition für Stab-detektorabschirmungen



Dimensions in mm
Abmessungen in mm

Technical Data
Technische Daten

Mechanical Design *Mechanischer Aufbau*	
Operating Temperature	-20 ... +60 °C (-4 ... +140 °F) extended temperature range metallic cable glands: -40 ... +60 °C (-40 ... +140 °F) with water cooling system: -40 ... 100 °C (-40 … +212 °F) Observe the max. permissible ambient and surface temperatures for explosion protection (see explosion protection and environmental conditions).
Betriebstemperatur	*-20 ... +60 °C (-4 ... +140 °F)* *erweiterter Temperaturbereich:* *metallische Kabelverschraubungen:* *-40 ... +60 °C (-40 ... +140 °F)* *zusätzlich mit Wasserkühlung:* *-40 ... 100 °C (-40 … +212 °F)* *Beachten Sie die max. zulässigen Umgebungs-und Oberflächentemperaturen für den Explosionsschutz (siehe Explosionsschutz und Umgebungsbedingungen).*
Housing material *Gehäusematerial*	Stainless steel ISO 1.4301/AISI 304 (other materials on request) *Edelstahl ISO 1.4301 / AISI 304(andere Materialien auf Anfrage)*
Weights	Point detectors: CrystalSENSDuo, 50 x 50 (NaI/Tl): approx. 9 kg CrystalSENSDuo, 50 x 50 (polymer): approx. 9 kg with collimator (optional): additional approx. 10 kg with point detector water cooling (optional): additional approx. 3 kg
Gewichte	*Punktdetektoren:* *CrystalSENS Duo, 50 x 50 (NaI/Tl): ca. 9 kg* *CrystalSENSDuo, 50 x 50 (Polymer): ca. 9 kg* *mit Kollimator (Option): zusätzlich ca. 10 kg* *mit Punktdetektor Wasserkühlung (Option): zusätzlich ca. 3 kg*

Mechanical Design *Mechanischer Aufbau*	
Weights	Rod detectors: UniSENSDuo, 50 x 500 (polymer): approx. 13 kg with rod detector water cooling 500 mm (optional): additional approx. 6 kg UniSENSDuo, 50 x 1000 (polymer): approx. 17 kg with rod detector water cooling 1000 mm (optional): additional approx. 10 kg UniSENSDuo, 50 x 1500 (polymer): approx. 21 kg with rod detector water cooling 1500 mm (optional): additional approx. 13 kg UniSENSDuo, 50 x 2000 (polymer): approx. 27 kg with rod detector water cooling 2000 mm (optional): additional approx. 16 kg
Gewichte	*Stabdetektoren:* *UniSENSDuo, 50 x 500 (Polymer): ca. 13 kg* *mit Stabdetektor Wasserkühlung 500 mm (Option):* *zusätzlich ca. 6 kg* *UniSENSDuo, 50 x 1000 (Polymer): ca. 17 kg* *mit Stabdetektor Wasserkühlung 1000 mm (Option):* *zusätzlich ca. 10 kg* *UniSENSDuo, 50 x 1500 (Polymer): ca. 21 kg* *mit Stabdetektor Wasserkühlung 1500 mm (Option):* *zusätzlich ca. 13 kg* *UniSENSDuo, 50 x 2000 (Polymer): ca. 27 kg* *mit Stabdetektor Wasserkühlung 2000 mm (Option):* *zusätzlich ca. 16 kg*
Installation Lengths	Point detectors: CrystalSENSDuo, 50 x 50 (NaI/Tl): approx. 460 mm CrystalSENSDuo, 50 x 50 (polymer): approx. 460 mm with collimator (optional): additional approx. 40 mm with point detector water cooling (optional): additional approx. 15 mm Rod detectors: UniSENSDuo, 50 x 500 (polymer): approx. 930 mm UniSENSDuo, 50 x 1000 (polymer): approx. 1430 mm UniSENSDuo, 50 x 1500 (polymer): approx. 1930 mm UniSENSDuo, 50 x 2000 (polymer): approx. 2430 mm with rod detector water cooling (optional): additional approx. 10 mm
Einbaulängen	*Punktdetektoren:* *CrystalSENS Duo, 50 x 50 (NaI/Tl): ca. 460 mm* *CrystalSENSDuo, 50 x 50 (Polymer): ca. 460 mm* *mit Kollimator (Option): zusätzlich ca. 40 mm* *mit Punktdetektor Wasserkühlung (Option): zusätzlich ca. 15 mm* *Stabdetektoren:* *UniSENSDuo, 50 x 500 (Polymer): ca. 930 mm* *UniSENSDuo, 50 x 1000 (Polymer): ca. 1430 mm* *UniSENSDuo, 50 x 1500 (Polymer): ca. 1930 mm* *UniSENSDuo, 50 x 2000 (Polymer): ca. 2430 mm* *mit Stabdetektor Wasserkühlung (Option): zusätzlich ca. 10 mm*

Mechanical Design *Mechanischer Aufbau*	
Environmental Testing *Umweltprüfungen*	IEC 60068-2-27: mechanical shock (30 g) IEC 60068-2-6: Vibration (1.9 g at resonance, sinusoidal) IEC 60068-2-38: Climate testing (-10 ... +65 °C; relative humidity >90%) IEC 60068-2-14 NA: Temperature shock (-45 °C ... 65 °C in 10 s) *IEC 60068-2-27: mechanischer Schock (30 g)* *IEC 60068-2-6: Vibration (1,9 g bei Resonanz, sinusförmig)* *IEC 60068-2-38: Klimalagerung* *(-10 … +65 °C; rel. Luftdeuchte >90%)* *IEC 60068-2-14 NA: Temperatur-Schock (-45 °C ... 65 °C in 10 s)*
Water cooling system *Wasserkühlung*	Optional, stainless steel ISO 1.4301/AISI 304 Water pressure up to 6 bar Tube connection R1/4”, d=10 mm Weight approx. 3 kg *Optional, Edelstahl ISO 1.4301 / AISI 304* *Wasserdruck bis 6 bar* *Schlauchanschluss R1/4" bzw. d = 10 mm* *Gewicht ca. 3 kg*
Collimator *Kollimator*	Optional, lead, painted Frontal or lateral radiation To reduce background radiation Weight approx. 10 kg *Optional, Blei, lackiert* *Frontale oder seitliche Einstrahlung* *Zur Reduzierung der Hintergrundstrahlung* *Gewicht ca. 10 kg*

Scintillator *Szintillator*	
Scintillator *Szintillator*	Point detectors: NaI(Tl) crystal 50x50 mm Polymer scintillator 50x60 mm Rod detectors: Polymer scintillator 50x500 mm Polymer scintillator 50x1000 mm Polymer scintillator 50x1500 mm Polymer scintillator 50x2000 mm *Punktdetektoren:* *NaI(Tl) Kristall 50x50 mm* *Polymer-Szintillator50x60 mm* *Stabdetektoren:* *Polymer-Szintillator50x500 mm* *Polymer-Szintillator50x1000 mm* *Polymer-Szintillator50x1500 mm* *Polymer-Szintillator50x2000 mm*

Sensitivity *Empfindlichkeit*	Point detectors: CrystalSENSDuo, 50 x 50 (NaI/Tl): ≥600 cps / µ Sv/h CrystalSENSDuo, 50 x 60 (polymer): ≥300 cps / µ Sv/h Rod detectors: UniSENSDuo, 50 x 500 (polymer): ≥5,000 cps / µ Sv/h UniSENSDuo, 50 x 1000 (polymer): ≥10,000 cps / µ Sv/h UniSENS Duo, 50 x 1500 (polymer): ≥15,000 cps / µ Sv/h UniSENS Duo, 50 x 2000 (polymer): ≥20,000 cps / µ Sv/h *Punktdetektoren:* *CrystalSENS Duo, 50 x 50 (NaI/Tl): ≥600 cps/ µ Sv/h* *CrystalSENSDuo, 50 x 60 (Polymer): ≥300 cps / µ Sv/h* *Stabdetektoren:* *UniSENSDuo, 50 x 500 (Polymer): ≥5.000 cps/ µ Sv/h* *UniSENSDuo, 50 x 1000 (Polymer): ≥10.000 cps/ µ Sv/h* *UniSENSDuo, 50 x 1500 (Polymer) : ≥15.000 cps/ µ Sv/h* *UniSENSDuo, 50 x 2000 (Polymer): ≥20.000 cps/ µ Sv/h*

Electrical Design ***Elektrischer Aufbau***	
Supply voltage *Versorgungsspannung*	by the connected evaluation unit: LB 44x or LB 47x *durch die angeschlossene Auswerteeinheit:* *LB 44x oder LB 47x*
EMC *EMV*	Emissions: according to EN 61326-1, Electrical Equipment Class B Immunity: according to EN 61326-1, according to EN 61326-3 (SIL2) according to NAMUR NE21 *Störaussendung:* *nach EN 61326-1, Betriebsmittel der Klasse B* *Störfestigkeit:* *nach EN 61326-1,* *nach EN 61326-3 (SIL2)* *nach NAMUR NE21*
Core cross-section for the screw terminals *Aderquerschnitt für die Schraubklemmen*	0.75 mm^2 to 2.5 mm^2 *0,75 mm^2 bis 2,5 mm^2*
Max. cable length between detector and evaluation unit *Max. Kabellänge zwischen Detektor und Auswerteeinheit*	1000 m with BERTHOLD cables: ID no. 32024: Signal cable, 2x1.0 mm^2, black ID no. 46413: Signal cable Ex i, 2x1.0 mm^2, blue Line resistance less than 20 ohms/km *1000 m mit BERTHOLD Kabeln:* *ID-Nr. 32024: Signalkabel, 2x1,0 mm2, schwarz* *ID-Nr. 46413: SignalkabelEx i, 2x1,0 mm2, blau* *Leitungsbelagkleiner 20 Ohm/km*

Electrical Design *Elektrischer Aufbau*	
Count rate *Zählrate*	max. 1,000,000 CPS *max. 1.000.000 cps*
Temperature stability *Temperatur Stabilität*	≤ 0.01%/°C (-40 ...+60 °C) for rod detectors ≤ 0.002%/°C (-40 ...+60 °C) for point detectors *≤ 0,01 %/°C (-40 ...+60 °C) für Stabdetektoren* *≤ 0,002 %/°C (-40 ...+60 °C) für Punktdetektoren*
Pt100 input *Pt100 Eingang*	-40°C to 200°C, 0.24°C accuracy *-40°C bis 200°C, Genauigkeit 0,24°C*

Explosion Protection and Environmental Conditions *Explosionsschutz und Umgebungsbedingungen*	
Inspection documents *Prüfbescheinigungen*	EPS 13 ATEX 1 547 X IECEx EPS 13.0008X *EPS 13 ATEX 1 547 X* *IECExEPS 13.0008X*
Degree of protection *Schutzart*	IP66/IP67 according to IEC 60529 *IP66 / IP67 nach IEC 60529*
Air pressure *Luftdruck*	80 kPa (0.8 bar) to 110 kPa (1.1 bar) Oxygen content of the air, usually: 21% (Vi/V) *80 kPa(0,8 bar) bis110 kPa(1,1 bar)* *Sauerstoffgehalt der Luft,üblicherweise: 21 % (Vi/V)*

Overview of explosion protection concepts

Design ***Bauform***	**LB 4700-1x-xx (CrystalSENS)** **LB 4700-2x-xx (UniSENS)**	
Protection concept ***Schutzkonzept***	**LB 4700-xx-1x**	**LB 4700-xx-Ix**
Signal circuit **Signalstromkreis**	**not intrinsically safe** ***nicht eigensicher***	**intrinsically safe** ***eigensicher***
Explosion concept of the space ***Ex-Konzeptd. Räume***		
all spaces *Alle Räume*	Ex-t (dust protection) *Ex-t (Staubschutz)*	
Housing (electronics compartment) *Gehäuse (Elektronikraum)*	Ex-d (pressure resistant enclosure) *Ex-d (druckfeste Kapselung)*	
Connection compartment *Anschlussraum*	Ex-e (increased safety) *Ex-e (erhöhte Sicherheit)*	Ex-i (intrinsically safe) *Ex-i (Eigensicherheit)*
Ambient temperature ***Umgebungstemperatur***		
min.	-40 °C (-20 °C[1])	
max.	+80 °C (+60 °C[1])	
II 2 G	**Gas**	
Identification *Kennzeichnung*	Ex db eb IIB / IIC	Ex db [ib] IIB / IIC
Temperature class Temperaturklasse	T1-T5 ($T_a \leq$ +80 °C) T6 ($T_a \leq$ +75 °C)	
II 2 D	**Dust** ***Staub***	
Identification *Kennzeichnung*	Ex tb IIIC T85 °C	Ex tb [ib] IIIC T85 °C
Temperature class *Temperaturklasse*	T85 °C	
Protection principle ***Schutzprinzip***	**Ex-d/-e/-t**	**Ex-d/-i/-t**

1) when using a non-metallic cable connection
bei Verwendung nichtmetallischer Kabelverschraubungen

Electric parameters for the supply
Elektrische Kenngrößen für die Versorgung

Terminal 1+, 2– ***Klemme 1+, 2–***	**Supply and signal circuit (FSK)** ***Versorgungs-und Signalstromkreis (FSK)***
max. input voltage U_{max} max. Eingangs-spannung U_{max}	16.8 V
max. input power P_{max} max. Eingangs-leistung P_{max}	5 W

Electrical safety parameters for the associated equipment

Terminal 1+, 2– ***Klemme 1+, 2–***	**Supply and signal circuit (FSK) Rectangular characteristic curve** ***Versorgungs-und Signalstromkreis (FSK)RechteckKennlinie***	
Gas group ***Gasgruppe***	**IIB**	**IIC**
max. input voltage U_i *max. Eingangsspannung U_i*	17.64 V	
max. input current I_i *max. Eingangsstrom I_i*	81 mA	118 mA
max. input power P_i *max. Eingangsleistung P_i*	1.4 W	2 W
max. internal inductance L_i *max. innereInduktivität L_i*	2.7 µH	
max. internal capacitance C_i *max. innere Kapazität C_i*	2.42 nF	

Signal output (terminal 3, 4) ***Signalausgang (Klemme 3, 4)***	**Thermometer circuit (Pt100) linear characteristic curve** ***Thermometerstromkreis (Pt100) lineare Kennlinie***	
max. output voltage U_{io} *max. Ausgangsspannung U_{io}*	16.8 V	
max. output current I_o *max. Ausgangsstrom I_o*	33.3 mA	
max. output power P_o *max. Ausgangsleistung P_o*	140 mW	
max. internal inductance L_i *max. innere Induktivität L_i*	2.7 µH	
max. internal capacitance C_i *max. innere Kapzität C_i*	2.42 nF	
Maximum permissible external values jointly acting reactances (C_i, L_i are not taken into account) ***Höchstzulässige äußere Werte gemeinsam wirkender Reaktanzen (Ci, Li sind nicht berücksichtigt)***	**IIB**	**IIC**
L_o	5 mH	5 mH
C_o	1.6 µF	0.29 µF

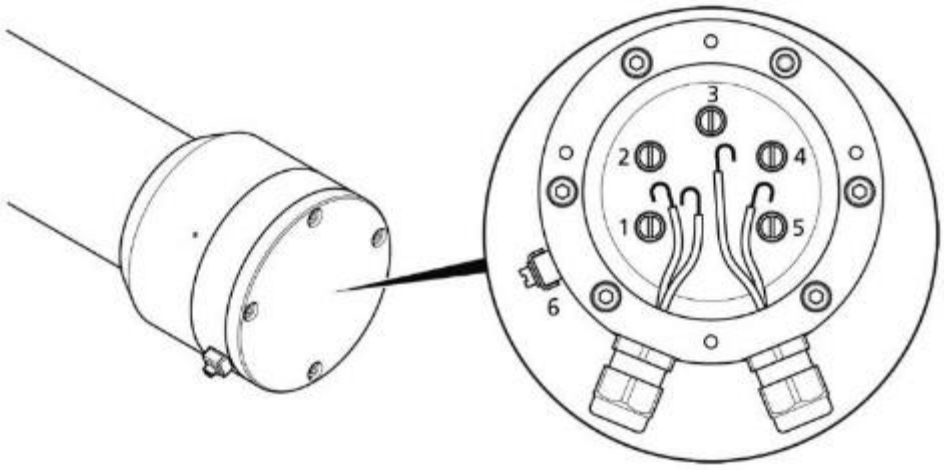
Cable Glands

Material	Size *Größe*	ID No. *Id.-Nr.*	Ex-designation/Type of Protection *Ex-Kennzeich-nung/Schutzart*	Cable cross-section for sealing rings *Kabelquer-schnittfür Dichtringe*	Wrench Size *Schlüssel-weite*	Torque/Sealing Material *Drehmoment / Dich-tungsmaterial*	
						Pressure screw *Druck-schraube*	Fitting Body *Verschr.-körper*
Plastic	M12 x 1.5	63555 (black) 63557 (blue)	IMQ 13 ATEX 010 X / IECEx IMQ 13.0003X IP66 / IP68	4.0 - 6.5 mm	15 mm	2.0 Nm chloro-prene *Chloro-pren*	1.5 Nm chloro-prene *Chloro-pren*
	M16 x 1.5	63556 (black) 63558 (blue)		5.0 - 8.0 mm	19 mm	4.0 Nm chloro-prene *Chloro-pren*	1.5 Nm chloro-prene *Chloro-pren*
Nickel-plated brass *Messing vernickelt*	M12 x 1.5	61621	PTB 11 ATEX 1007 IP66/IP67	4 - 8 mm	17 mm	5 Nm silicone *Silikon*	5 Nm silicone *Silikon*
	M16 x 1.5	61622		5 - 11 mm	20 mm	8 Nm silicone *Silikon*	8 Nm silicone *Silikon*

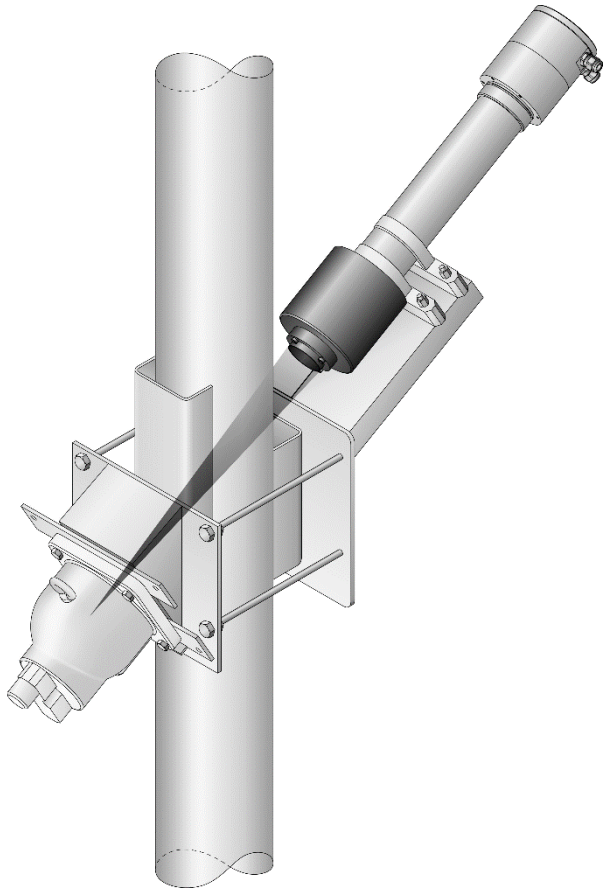
Blind Plugs
Verschlussstücke

Material	Size *Größe*	ID No. *Id.-Nr.*	Ex Code/Type of Protection *Ex-Kennzeich-nung/Schutzart*	Wrench Size *Schlüsselweite*	Torque *Drehmoment*
Nickel-plated brass *Messing vernickelt*	M12 x 1.5	61300	PTB 09 ATEX 1002 IP68	14 mm (outer hexagon) *(Aussensechskant)*	6 Nm silicone *Silikon*
	M16 x 1.5	61299		18 mm (outer hexagon) *(Aussensechskant)*	8 Nm silicone *Silikon*

Connection Plan
Elektrischer Anschlussplan



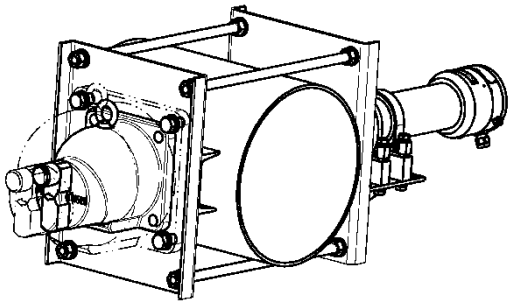
1 Signal and power supply circuit +
Signal-und Versorgungsstromkreis +
2 Signal and power supply circuit -
Signal-und Versorgungsstromkreis -
3 Pt100
4 Pt100
5 Equipotential bonding
Potentialausgleich
6 Equipotential bonding
Potentialausgleich

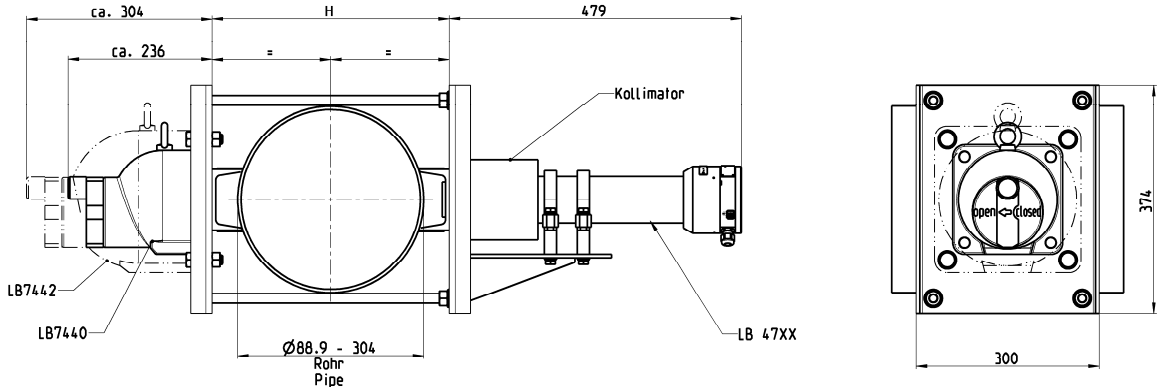


Clamping devices for density measurement
Montagevorrichtungen für Dichtemessungen

Clamping Device 90° for Pipe Diameter 88.9 ... 304 mm
Montagevorrichtung 90°für Rohrdurchmesser 88.9 ... 304 mm

Material: Carbon Steel St37
Material: Stahl St37
Painting: Polyurethane, gray
Lackierung: Polyurethan, grau



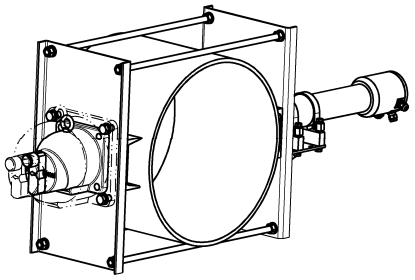


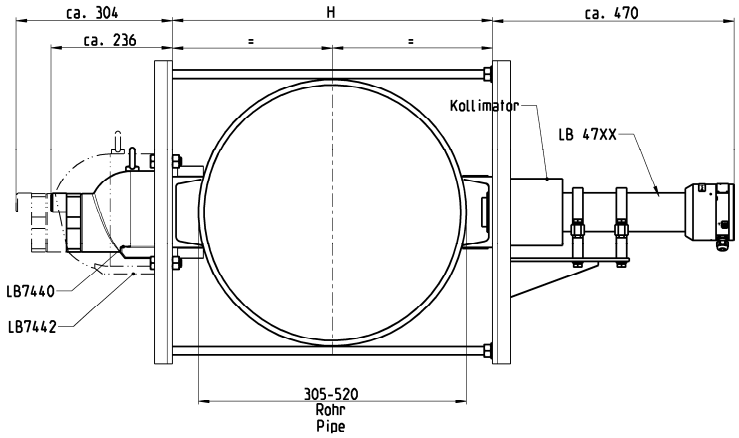
Dimensions in mm
Abmessungen in mm

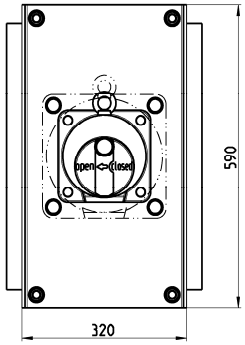
Part No. *Id. Nr.*	Pipe Diameter *Rohrdurchmesser*	H	Weight of Clamp. Device *Gewicht Montagevorrichtung*
80795	88.9	120	23 kg
	101.6	156	
	114.3	180	
	141.3	218	
	168.3	250	
	219.1	310	
	237.0	368	
	304.0	402	

Clamping Device 90° for Pipe Diameter 305 ... 521 mm
Montagevorrichtung 90°für Rohrdurchmesser 305 ... 521 mm

Material: Carbon Steel St37
Material: Stahl St37
Painting: Polyurethane, gray
Lackierung: Polyurethan, grau





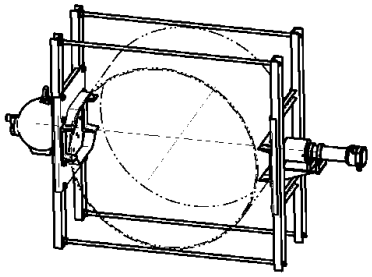


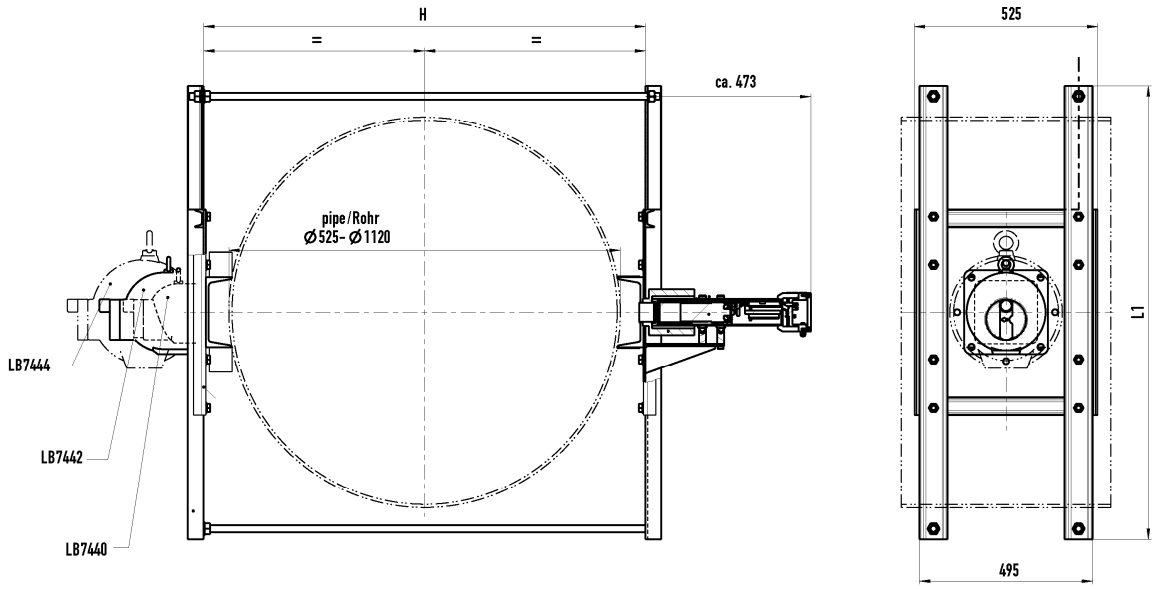
Dimensions in mm
Abmessungen in mm

Part No. *Id. Nr.*	Pipe Diameter *Rohrdurchmesser*	H	Weight of Clamp. Device *Gewicht Montagevorrichtung*
80796	305.5	400	34 kg
	318.0	413	
	323.8	419	
	355.6	451	
	406.4	501	
	457.2	552	
	508.0	603	
	521.0	616	

Clamping Device 90° for Large Pipe Diameters
Montagevorrichtung 90°für große Rohrleitungsquerschnitte

Material: Carbon Steel St37
Material: Stahl St37
Painting: Polyurethane, gray
Lackierung: Polyurethan, grau



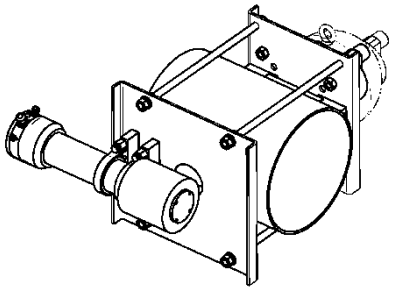


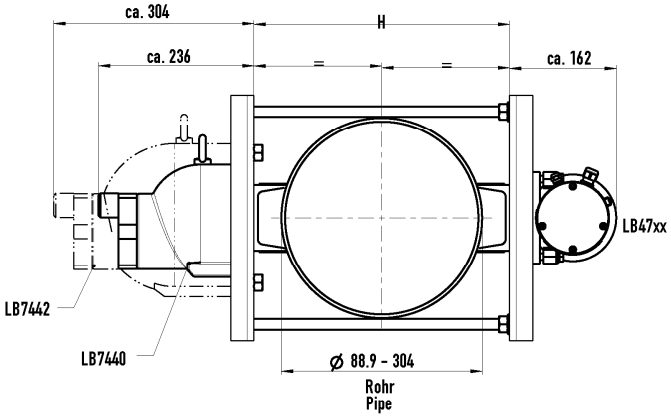
Dimensions in mm
Abmessungen in mm

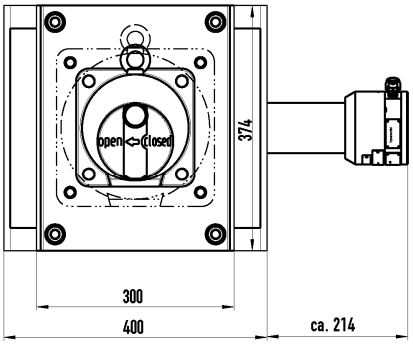
Part No. *Id. Nr.*	Pipe Diameter *Rohrdurchmesser*	H	L	L1	Weight of Clamp. Device *Gewicht Montagevorrichtung*
51872-01	400 … 519	643	735	680	76 kg
51872-02	520 … 559	686	790	680	77 kg
51872-03	560 … 659	792	890	740	79 kg
51872-04	660 … 759	896	990	840	84 kg
51872-05	760 … 869	1009	1100	950	89 kg
51872-06	870 … 1020	1163	1250	1200	98 kg
51872-07	1020 …1120	1265	1350	1300	103 kg

Parallel Clamping Device 90° for Pipe Diameter 88.9 ... 304 mm
Parallele Montagevorrichtung 90°für Rohrdurchmesser 88.9 ... 304 mm

Material: Carbon Steel St37
Material: Stahl St37
Painting: Polyurethane, gray
Lackierung: Polyurethan, grau





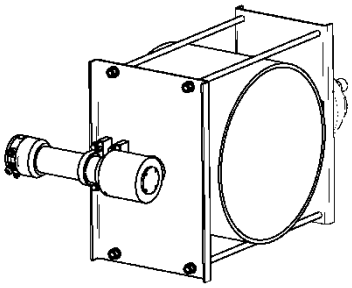


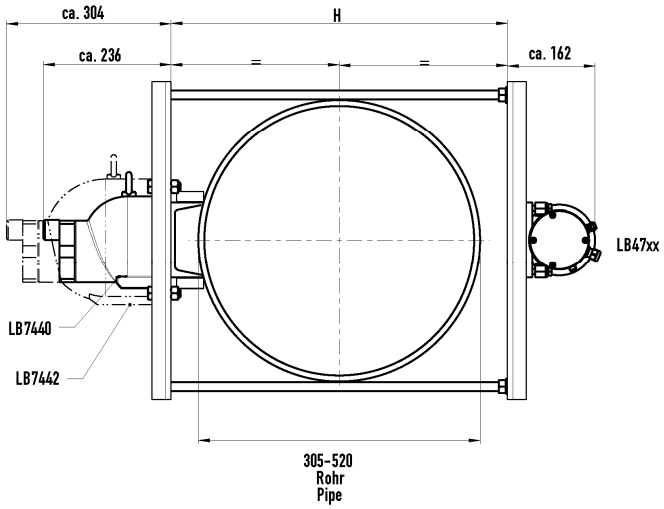
Dimensions in mm
Abmessungen in mm

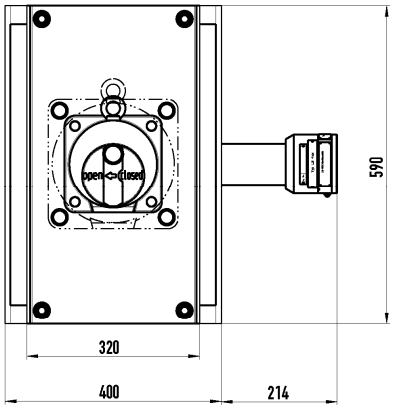
Part No. *Id. Nr.*	Pipe Diameter *Rohrdurchmesser*	H	Weight of Clamp. Device *Gewicht Montagevorrichtung*
59296	88.9	120	22 kg
	101.6	156	
	114.3	180	
	141.3	218	
	168.3	250	
	219.1	310	
	273.0	368	
	304.0	402	

Parallel Clamping Device 90° for Pipe Diameter 305 ... 521 mm
Parallele Montagevorrichtung 90°für Rohrdurchmesser 305 ... 521 mm

Material: Carbon Steel St37
Material: Stahl St37
Painting: Polyurethane, gray
Lackierung: Polyurethan, grau





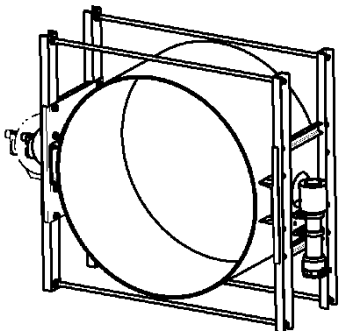


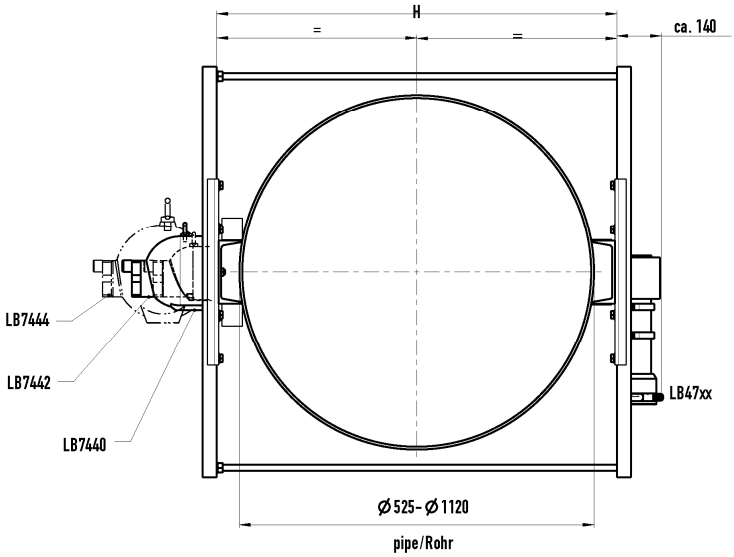
Dimensions in mm
Abmessungen in mm

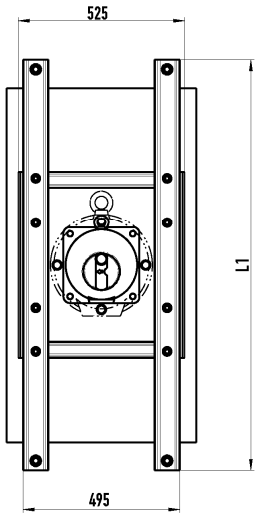
Part No. *Id. Nr.*	Pipe Diameter *Rohrdurchmesser*	H	Weight of Clamp. Device *Gewicht Montagevorrichtung*
59293	305.0	400	34 kg
	318.0	413	
	323.8	419	
	355.6	451	
	406.4	501	
	457.2	552	
	508.0	603	
	521.0	616	

Clamping Device 90° for for Large Pipe Diameters
Montagevorrichtung 90° für große Rohrleitungsquerschnitte

Material: Carbon Steel St37
Material: Stahl St37
Painting: Polyurethane, gray
Lackierung: Polyurethan, grau





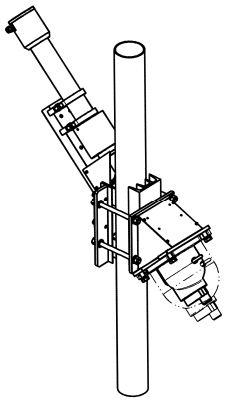


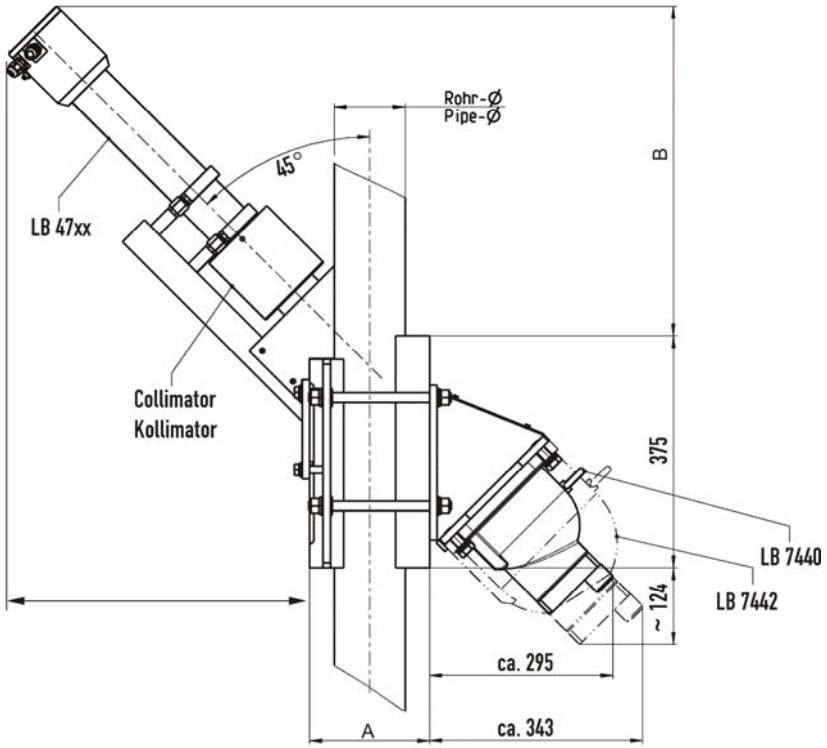
Dimensions in mm
Abmessungen in mm

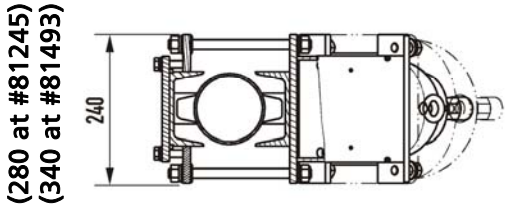
Part No. *Id. Nr.*	Pipe Diameter *Rohrdurchmesser*	H	L	L1	Weight of Clamp. Device *Gewicht Montagevorrichtung*
81491-01	400 … 519	643	735	680	73kg
81491-02	520 … 559	686	790	680	74 kg
81491-03	560 … 659	792	890	740	76 kg
81491-04	660 … 759	896	990	840	79 kg
81491-05	760 … 869	1009	1100	950	86 kg
81491-06	870 … 1020	1163	1250	1200	95 kg
81491-07	1020 …1120	1265	1350	1300	100 kg

Clamping Device 45°
Montagevorrichtung 45°

Material: Carbon Steel St37
Material: Stahl St37
Painting: Polyurethane, gray
Lackierung: Polyurethan, grau







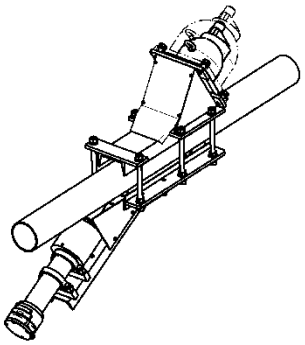
Dimensions in mm
Abmessungen in mm

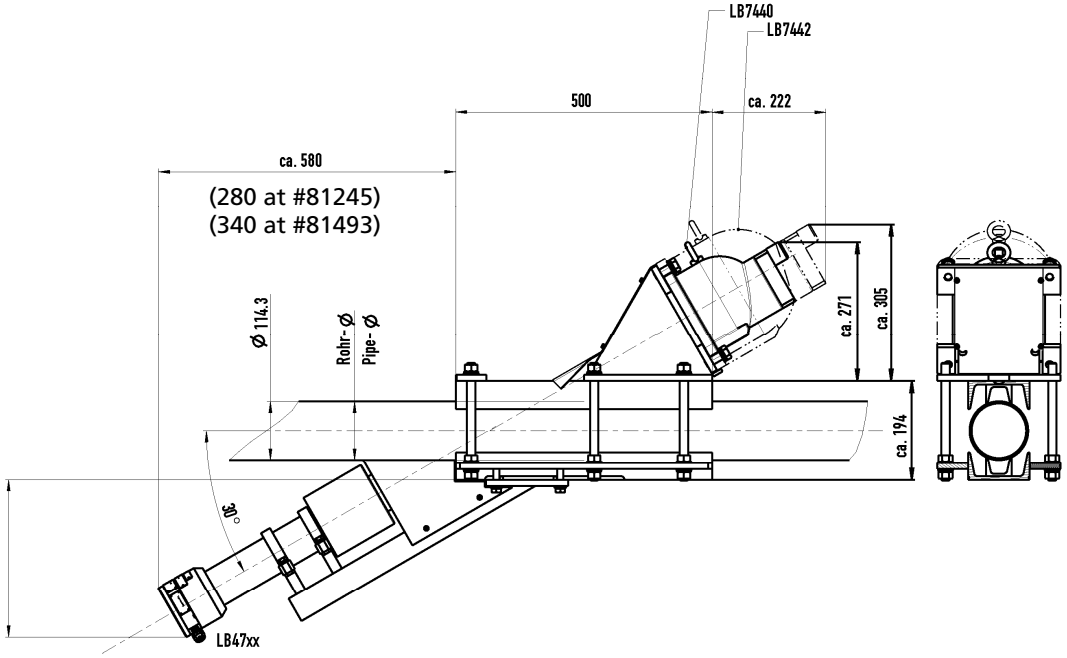
Clamping Device 45° (continued)
Montagevorrichtung 45° (Fortsetzung)

Part No. *Id. Nr.*	Pipe Diameter *Rohrdurchmesser*	A	B	Weight of Clamp. Device *Gewicht Montagevorrichtung*
27249	48.3	128	470	31 kg
27248	60.3	128	470	
27250	63.5	133	475	
27251	70.0	142	484	
27252	76.1	149	490	
27253	82.5	157	498	
27254	88.9	165	506	
27255	95.0	172	512	
27256	101.6	179	519	
27257	108.0	187	526	
27258	114.3	194	533	
80794	121.0	201	540	
80793	127.0	165	513	30 kg
26997	133.0	177	524	
26998	139.7	189	535	
26999	146.0	199	545	
27000	152.4	209	553	
27001	159.0	219	563	
27002	165.1	227	571	
27003	168.3	232	575	
27004	171.0	235	579	
27005	177.8	244	588	
27006	191.0	261	604	
81245	220.0	296	636	
81493	273.0	356	696	

Clamping Device 30°
Montagevorrichtung 30°

Material: Carbon Steel St37
Material: Stahl St37
Painting: Polyurethane, gray
Lackierung: Polyurethan, grau





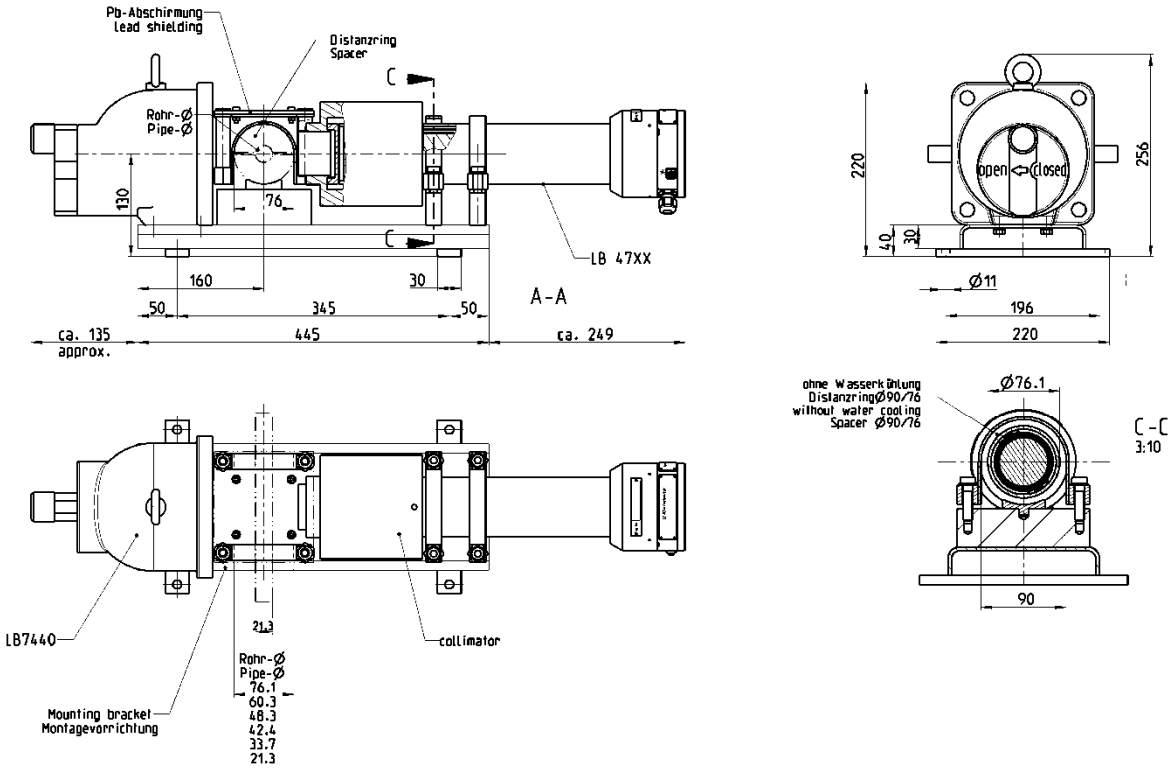
Dimensions in mm
Abmessungen in mm

Clamping Device 45° (continued)
Montagevorrichtung 45° (Fortsetzung)

Part No. *Id. Nr.*	Pipe Diameter *Rohrdurchmesser*	A	B	Weight of Clamp. Device *Gewicht Montagevorrichtung*
25964	48.4	128	589	39 kg
80792	60.3	128	589	
25971	63.5	133	597	
25972	70.0	142	612	
25973	76.1	149	623	
25974	82.5	157	637	
25975	88.9	165	650	
25976	95.0	172	661	
25977	101.6	179	673	
25978	108.0	187	685	
25979	114.3	194	697	
25980	121.0	201	710	
80791	127.0	165	661	39 kg
26655	133.0	177	679	
26656	139.7	189	699	
26657	146.0	199	715	
26658	152.4	209	728	
26659	159.0	219	746	
26660	165.1	227	760	
26661	168.3	232	767	
26662	171.0	235	774	
26663	177.8	244	790	
26664	191.0	261	817	
81246	220.0	296	871	
81485	273.0	356	975	40 kg

Clamping Device 90° for small Pipe Diameters
Montagevorrichtung 90° für kleine Rohrleitungsquerschnitte

Material: Carbon Steel St37
Material: Stahl St37
Painting: Polyurethane, gray
Lackierung: Polyurethan, grau

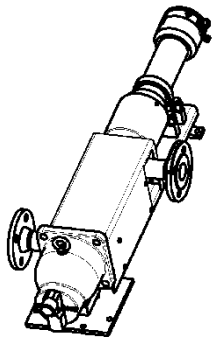


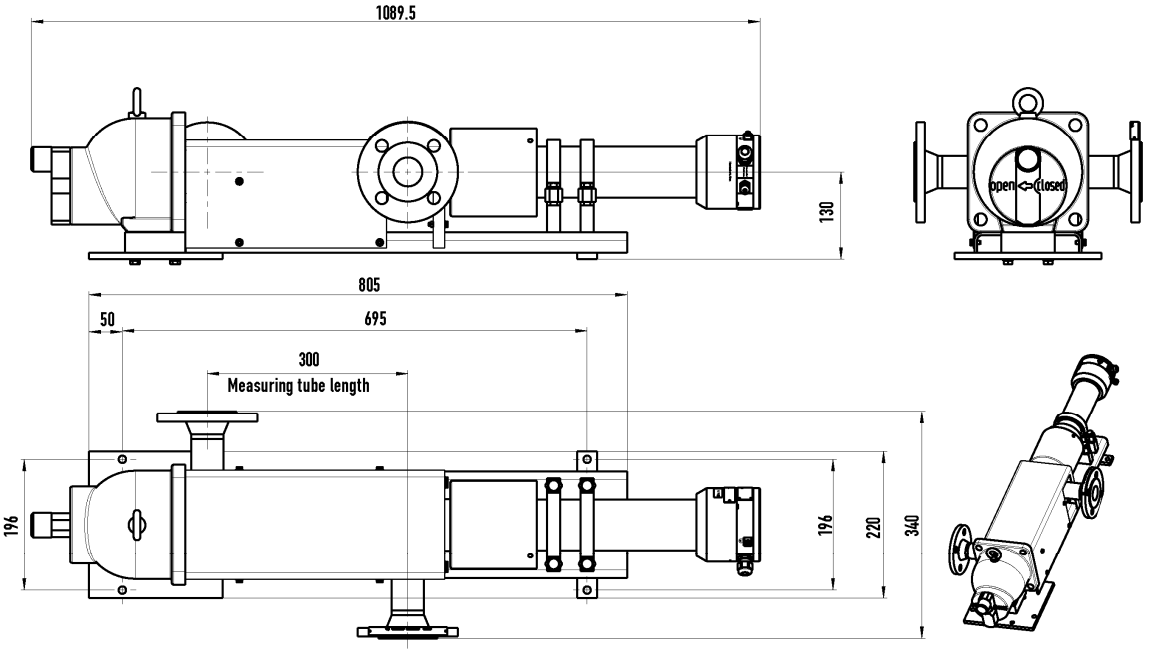
Dimensions in mm
Abmessungen in mm

Part No. *Id. Nr.*	Pipe Diameter *Rohrdurchmesser*	Weight of Clamp. Device *Gewicht Montagevorrichtung*
47292-01	21.3	70 kg
47292-02	33.7	
47292-03	42.4	
47292-04	48.3	
47292-05	60.3	
47292-06	76.1	

S + U Pipe Clamping Device
S + U förmige Montagevorrichtung

Material: Carbon Steel St37
Material: Stahl St37
Painting: Polyurethane, gray
Lackierung: Polyurethan, grau





Dimensions in mm
Abmessungen in mm

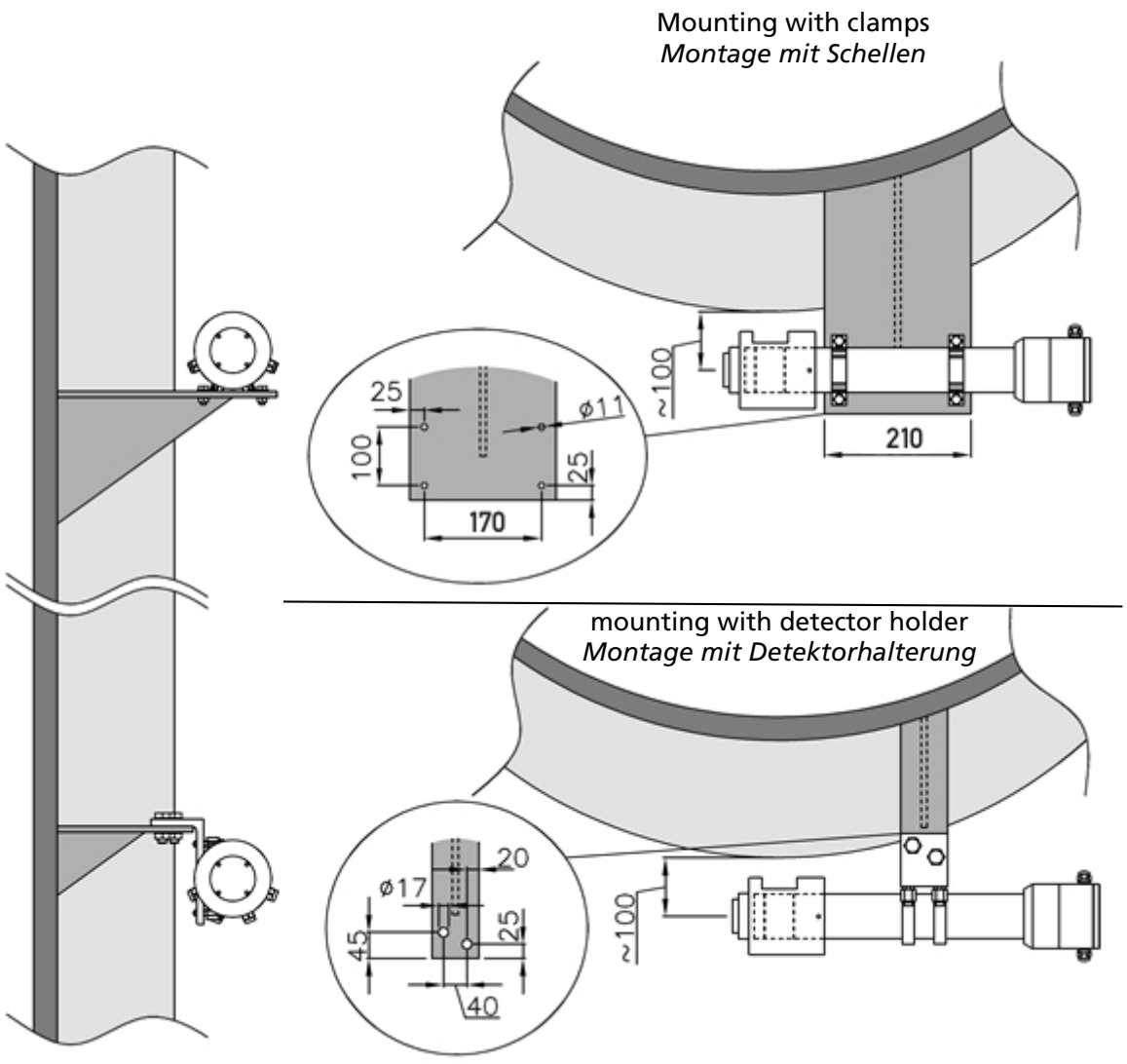
Various versions available.
The drawing above shows exemplarily a clamping device with:

- S-shaped
- DN40
- pipelength300
- PN16
- without temp.-sensor

Verschiedene Versionen erhältlich.
Obige beispielhafte Abbildung zeigt die Messstrecke in:

- S-Form
- DN40
- Messrohrlänge300
- PN16
- ohne Temp.-Fühler

Mounting point detector
Befestigung Punktdetektor



Dimensions in mm
Abmessungen in mm

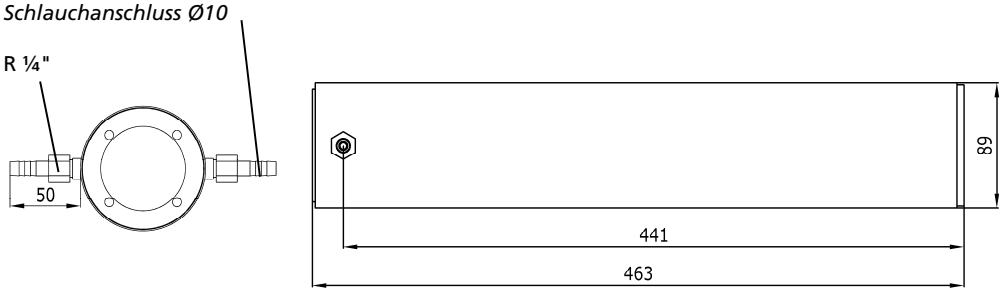
NOTICE

Direct sun radiation can overheat the detector. If the detector temperature can reach more than 50°C, a suitable sun roof must be installed. The heating of the detector by thermal radiation from the vessel can also be moderated by a thermal sheet, e.g. by a thin metal plate. For each detector a water cooling (option) is available.

Wird durch Sonneneinstrahlung eine Detektortemperatur von über 50°C erreicht, so ist ein geeigneter Sonnenschutz zu montieren. Auch die Aufheizung des Detektors durch Wärmeabstrahlung vom Behälter kann durch ein dünnes Wärmeableitblech gemildert werden. Für jeden Detektor steht auch eine geeignete Wasserkühlung (Option) zur Verfügung.

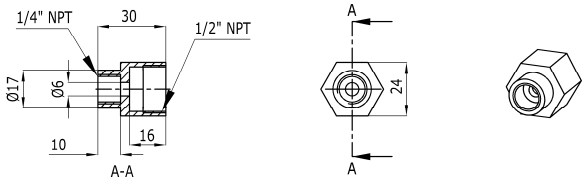
Water Cooling Jacket and Adaptor Fittings
Wasserkühlung und Adapter Anschlussstücke

Pipe connection diameter 10
Schlauchanschluss Ø10



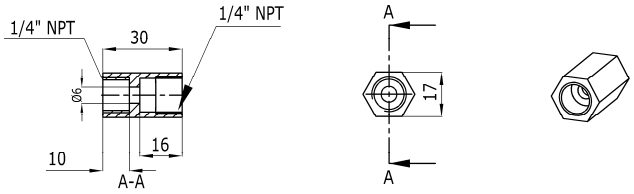
Fitting adaptor for standard water cooling Rp ¼" → ½" NPT
stainless steel 304, part no: 47189

Adapter für Standard Wasserkühlung Rp¼" →½" NPT
Edelstahl 1.4301, Id. Nr.: 47189



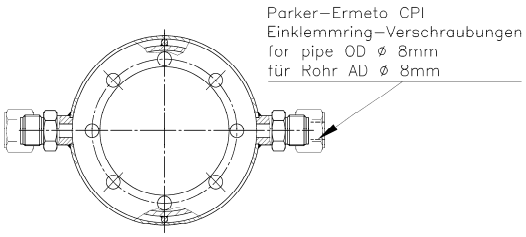
Fitting adaptor for standard water cooling Rp ¼ → ¼" NPT
stainless steel 304, part no: 46743

Adapter für Standard Wasserkühlung Rp¼ → ¼" NPT
Edelstahl 1.4301, Id. Nr.: 46743



Water cooling jacket with Parker Ermeto Fittings
stainless steel 304, part no: 37816

Wasserkühlung mit Parker Ermeto Anschlüssen
Edelstahl 1.4301, Id. Nr.: 37816



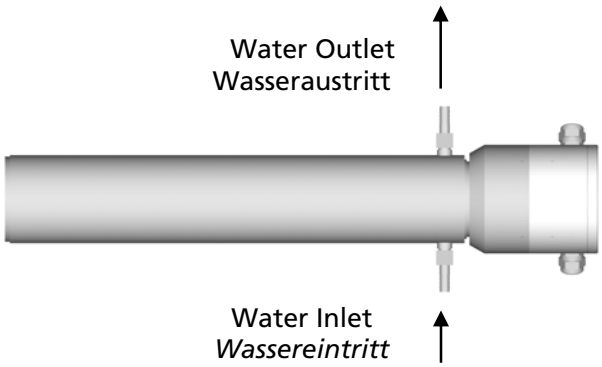
Further fitting adaptors for standard water cooling jacket:
Rp ¼"→ ½" NPT male, stainless steel 304, part no: 06352
Rp ¼"→ ¼" NPT male, stainless steel 304, part no: 06349

Weitere Adapter für die Standard-Wasserkühlung:
Rp¼"→ ½" NPT Außengewinde, 1.4301, Id. Nr.: 06352
Rp¼"→ ¼" NPT Außengewinde, 1.4301, Id. Nr.: 06349

Fitting Connection *Anschluss-Stutzen*	Part No. (material) *Id.Nr. (Werkstoff)*
R ¼" pipe connection, male European standard Whitworth pipe thread *R ¼" Außengewinde für Rohrverschraubung europäisches Standard Whitworth-Rohrgewinde*	21326 (304/1.4301) 38055 (Carbon Steel St37)
10 mm hose connection for water hose connection ID 10 mm *Schlauchstutzen für Schlauch-Innendurchmesser 10 mm*	21326 (304/1.4301) 38055 (Carbon Steel St37)
fitting adaptor ½" NPT female *Adapter mit ½" NPT Innengewinde*	47189 (304/1.4301)
fitting adaptor ¼" NPT female *Adapter mit ¼" NPT Innengewinde*	46743 (304/1.4301)
fitting adaptor ½" NPT male *Adapter mit ½" NPT Außengewinde*	06352 (304/1.4301)
fitting adaptor ¼" NPT male *Adapter mit ¼" NPT Außengewinde*	06349 (304/1.4301)

Water Cooling Installation Instruction
Anweisung zur Installation der Wasserkühlung

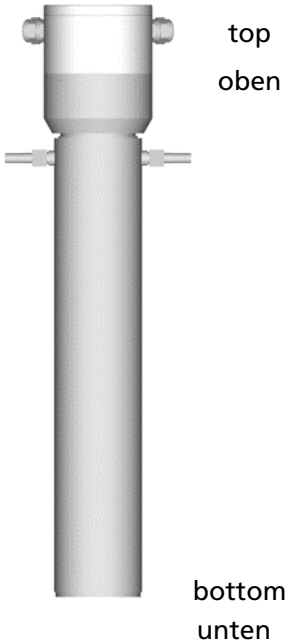
Horizontal Detector Installation
Horizontale Detektor Installation



In order to fill the entire water cooling jacket, incoming water must enter from the bottom.

Damit sich die Wasserkuhlung vollständig mit Wasser füllt, muss der Wasserzufluss von unten erfolgen.

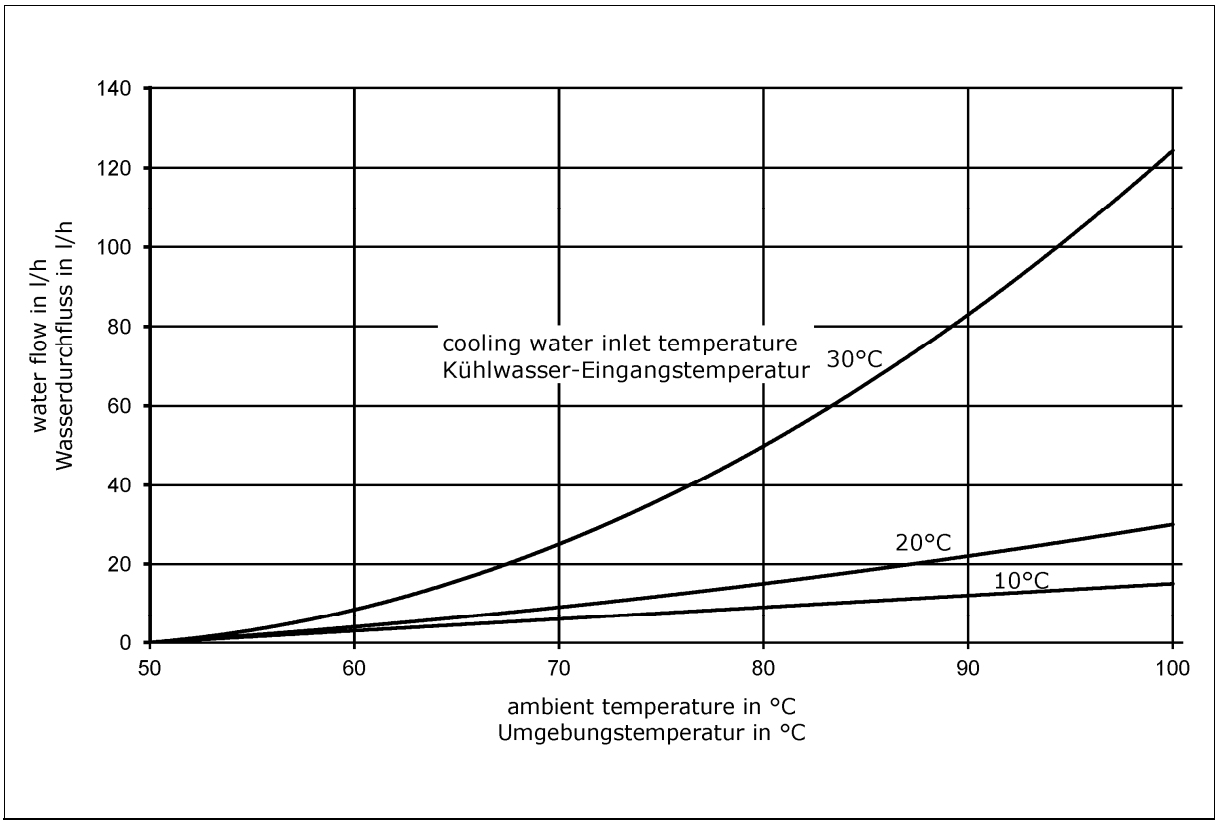
Vertical Detector Installation
Vertikale Detektor Installation



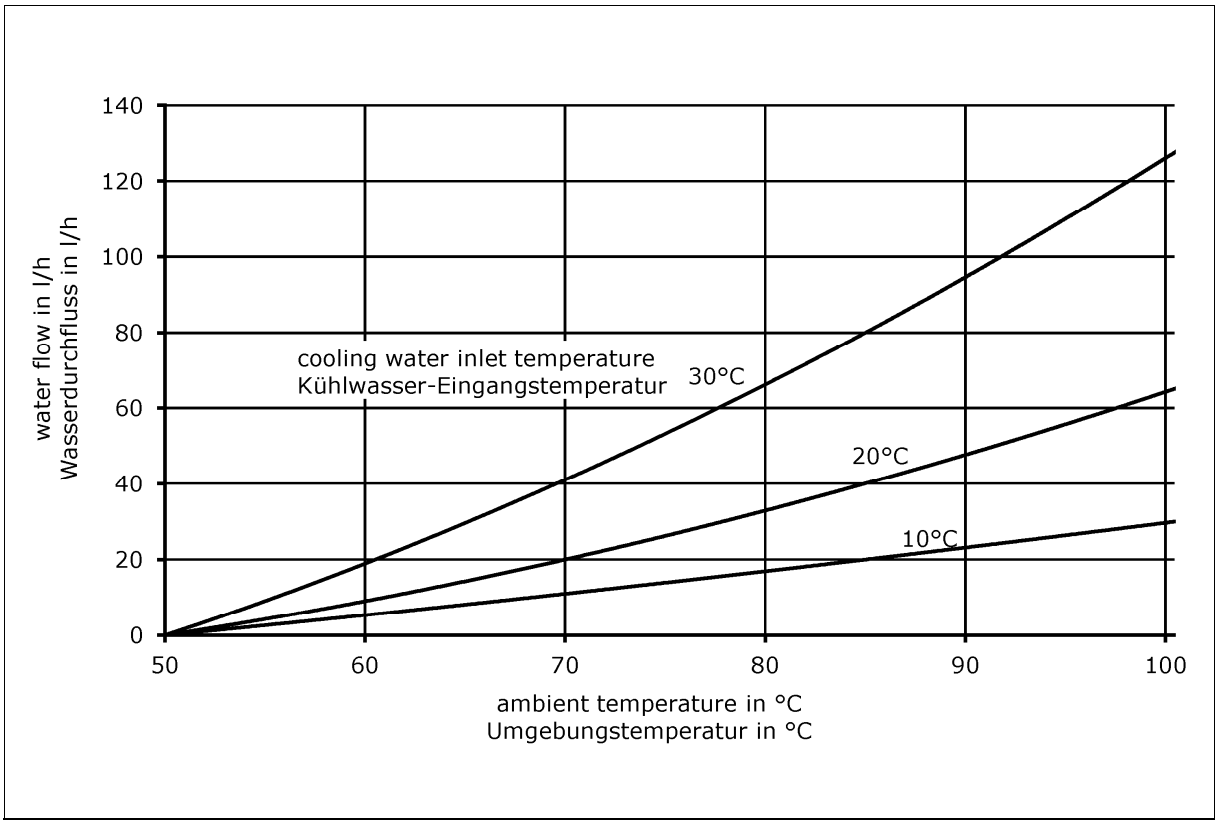
Install the Detector with the connection at the top.

Installieren Sie den Detektor mit dem Anschlussgehäuse oben.

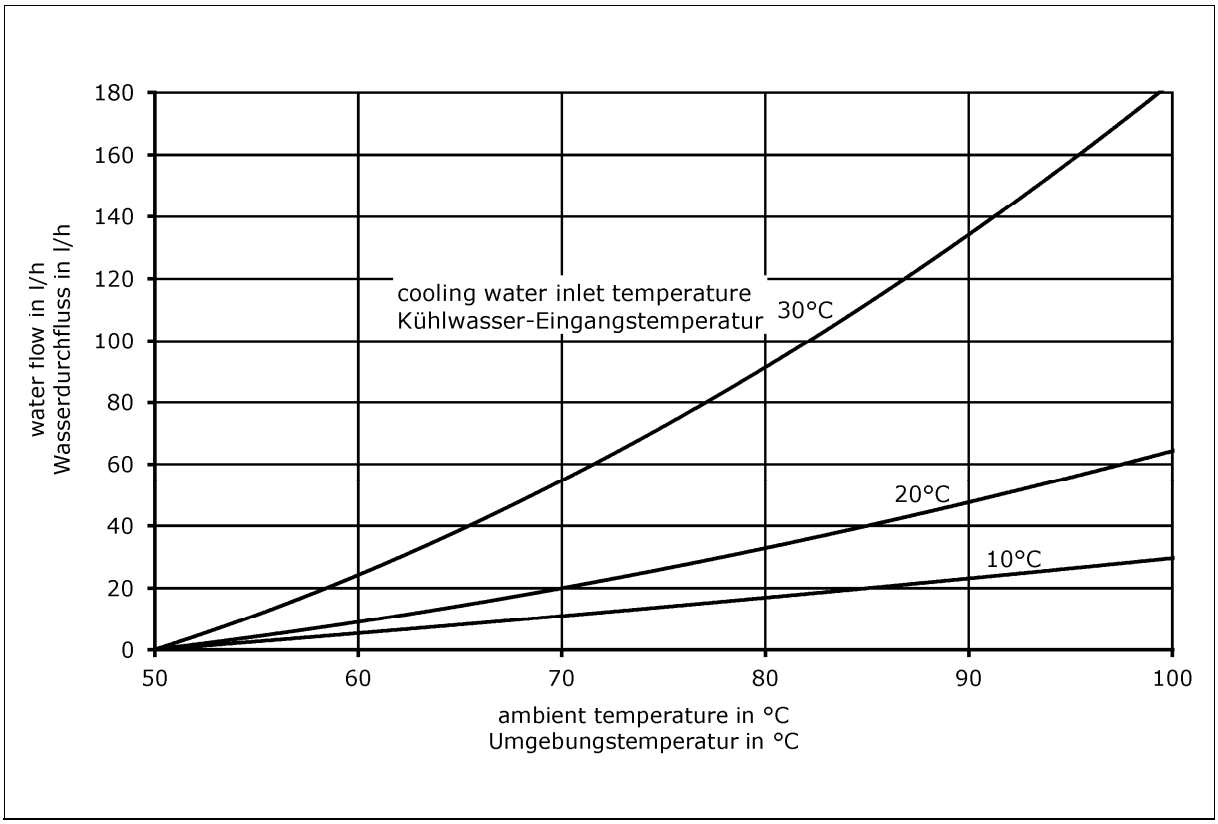
Cooling Water Demand point detector
Kühlwasserbedarf Punktdetektor



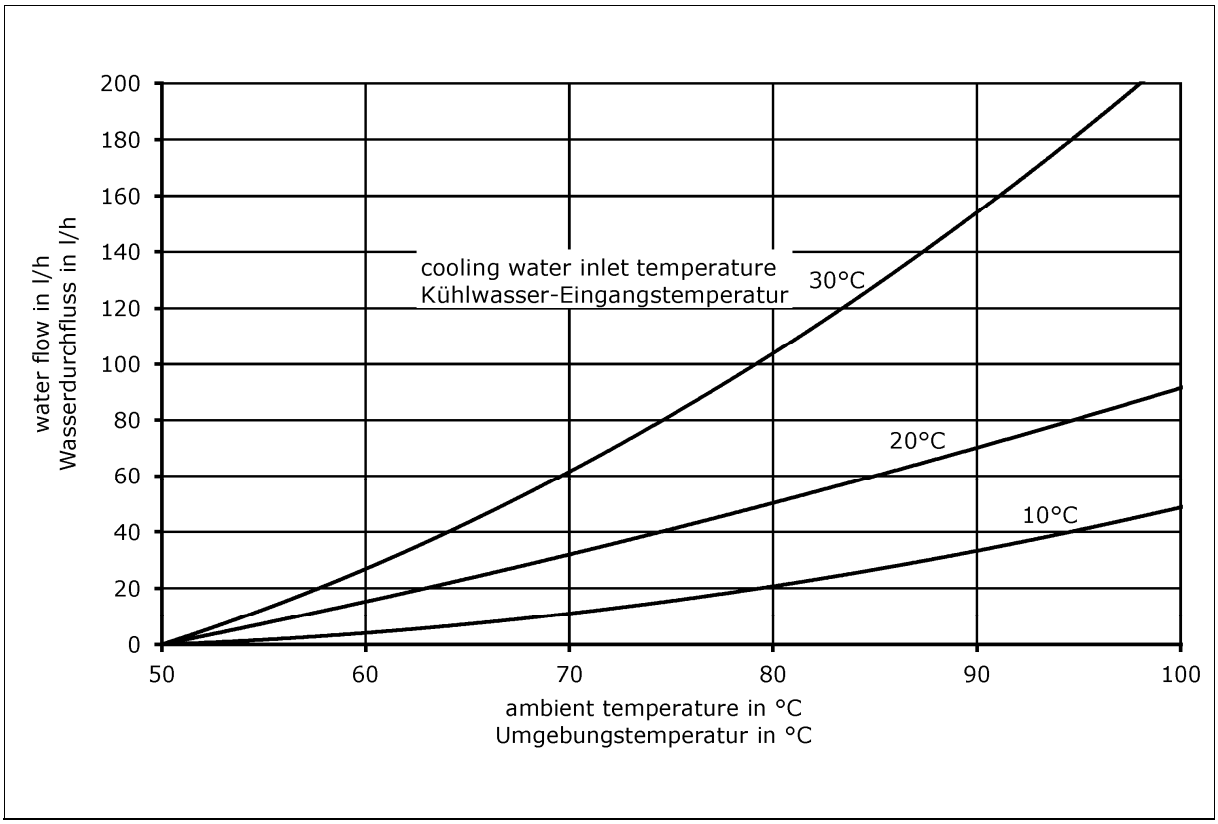
Cooling Water Demand rod detector 500mm
Kühlwasserbedarf Stabdetektor 500mm



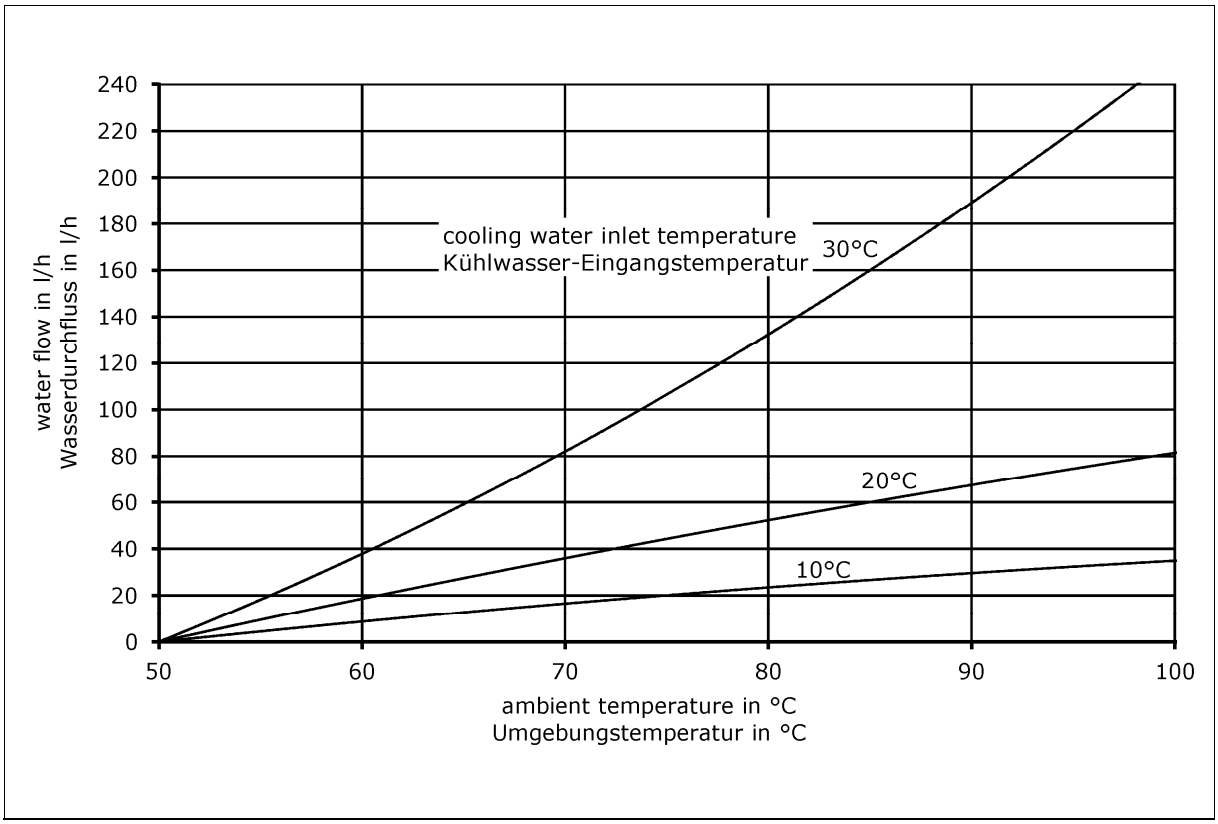
Cooling Water Demand rod detector 1000mm
Kühlwasserbedarf Stabdetektor 1000mm



Cooling Water Demand rod detector 1500mm
Kühlwasserbedarf Stabdetektor 1500mm



Cooling Water Demand rod detector 2000mm
Kühlwasserbedarf Stabdetektor 2000mm



Certificates LB47xx
Zertifikate LB47xx

ATEX Certificate
ATEX Zertifikat

BUREAU VERITAS

(1) EC-Type Examination Certificate

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres – **Directive 94/9/EC**

(3) EC Type Examination Certificate Number

EPS 13 ATEX 1 547 X **Revision 3**

(4) Equipment: Scintillation measuring unit Type LB 4700

(5) Manufacturer: Berthold Technologies GmbH & Co. KG

(6) Address: Calmbacher Str. 22, 75323 Bad Wildbad, Germany

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) Bureau Veritas Consumer Products Services Germany GmbH, Notified Body No. 2004 in accordance with Article 9 of the Council Directive 94/9/EC of March 23rd 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II of the Directive. The examination and test results are recorded in the confidential report 12TH0493.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0:2012 **EN 60079-1:2007** **EN 60079-31:2009**

EN 60079-7:2007 **EN 60079-11:2012**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-Type Examination Certificate relates only to the design and the construction of the specified equipment in accordance with Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and supply of this equipment.

(12) The marking of the equipment shall include the following:

II 2G Ex db eb IIC T1-T6
II 2D Ex tb IIIC T80°C / T85°C
II 2G Ex db [ib] IIB / IIC T1-T6
II 2D Ex tb [ib] IIIC T85°C

Certification department of explosion protection

D. Zitzmann

Nuremberg, 2015-10-09

Page 1 of 3

Certificates without signature are void. This certificate is allowed to be distributed only if not modified. Extracts or modifications must be authorized by Bureau Veritas Consumer Products Services Germany GmbH. EPS 13 ATEX 1 547 X, Revision 3.

BUREAU VERITAS
Consumer Products Services Germany GmbH
Thurn-und-Taxis-Straße 18, 90411 Nürnberg, Germany
Phone: + 49 40 74041-0
cps-nuernberg@de.bureauveritas.com
www.bureauveritas.de/cps

ATEX Certificate (continued)
ATEX Zertifikat (Fortsetzung)

BUREAU VERITAS

(1) EC-Type Examination Certificate

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres – **Directive 94/9/EC**

(3) EC Type Examination Certificate Number

EPS 13 ATEX 1 547 X **Revision 3**

(4) Equipment: Scintillation measuring unit Type LB 4700

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(12) The marking of the equipment shall include the following:

II 2G Ex db eb IIC T1-T6
II 2D Ex tb IIIC T80°C / T85°C
II 2G Ex db [ib] IIB / IIC T1-T6
II 2D Ex tb [ib] IIIC T85°C

Certification department of explosion protection

D. Zitzmann

Nuremberg, 2015-10-09

Page 1 of 3

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BUREAU VERITAS
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cps-nuernberg@de.bureauveritas.com
www.bureauveritas.de/cps

ATEX Certificate (continued)
ATEX Zertifikat (Fortsetzung)

(16) Test report: 12TH0493

(17) Special conditions for safe use:

Only certified components defined by manufacturer can be used.

Repair of flameproof joints is not allowed according to values of table 1 and 2 of IEC 60079-1.

The ambient temperature range is given by the following table:

Ambient temperature range	Temperature class
-40 °C ≤ Ta ≤ +75 °C	T6 / T80 °C
-40 °C ≤ Ta ≤ +80 °C	T1-T5 / T85 °C
-20 °C ≤ Ta ≤ +60 °C	T1-T6 / T80 °C when using non-metallic gable glands

(18) Essential health and safety requirements:

Met by standards.

Certification department of explosion protection

Nuremberg, 2015-10-09

D. Zitzmann

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www.bureauveritas.de/cps

IECEx Certificate
IECEx Zertifikat

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx EPS 13.0008X	Issue No: 3	Certificate history:
Status:	Current	Page 1 of 4	Issue No. 3 (2015-10-09)
Date of Issue:	2015-10-09		Issue No. 2 (2015-03-16)
			Issue No. 1 (2014-04-03)
			Issue No. 0 (2013-06-04)

Applicant: Berthold Technologies GmbH & Co. KG
Calmbacher Str. 22
75323 Bad Wildbad
Germany

Electrical Apparatus: Scintillation measuring unit
Optional accessory:

Type of Protection: LB 4700

Marking:
Ex db eb IIC T1-T6
Ex tb IIIC T80 °C / T85 °C
or
Ex db [ib] IIB / IIC T1-T6
Ex tb [ib] IIIC T85 °C

Approved for issue on behalf of the IECEx Certification Body: Dieter Zitzmann

Position: Head of Certification

Signature:
(for printed version)

Date: 2015-10-09

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:
Bureau Veritas Consumer Products Services Germany GmbH
Businesspark A96
86842 Türkheim
Germany

IECEx Certificate (continued)
IECEx Zertifikat (Fortsetzung)

IECEx Certificate of Conformity

Certificate No:	IECEx EPS 13.0008X	Issue No: 3
Date of Issue:	2015-10-09	Page 2 of 4
Manufacturer:	Berthold Technologies GmbH & Co. KG Calmbacher Str. 22 75323 Bad Wildbad Germany	
Additional Manufacturing location(s):		

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:

The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2011 Edition:6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-1 : 2007-04 Edition:6	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
IEC 60079-11 : 2011 Edition:6.0	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
IEC 60079-31 : 2008 Edition:1	Explosive atmospheres – Part 31: Equipment dust ignition protection by enclosure 't'
IEC 60079-7 : 2006-07 Edition:4	Explosive atmospheres - Part 7: Equipment protection by increased safety "e"

This Certificate does not indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.

TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:

DE/EPS/ExTR13.0009/03

Quality Assessment Report:

DE/PTB/QAR06.0011/03

IECEx Certificate (continued)
IECEx Zertifikat (Fortsetzung)

IECEx Certificate of Conformity

Certificate No: IECEx EPS 13.0008X Issue No: 3

Date of Issue: 2015-10-09 Page 3 of 4

Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

The LB 4700 Series is a Scintillation measuring unit for measuring of filling level, charging and density of different materials. The enclosure is constructed with an Ex-e connection space and electronics are fitted in Ex-d room. Water cooling can be provided for cooling of electronics.

Intrinsic safe type (ib), electrical ratings:
Power supply (FSK)
IIB : Ui = 17.64 V, Ii = 118 mA, Pi = 2.0 W, Li = 2.7 µH, Ci = 2.42 nF
IIC : Ui = 17.64 V, Ii = 81 mA, Pi = 1.4 W, Li = 2.7 µH, Ci = 2.42 nF
Pt100 circuit
IIB and IIC: Uo = 16.8 V, Io = 33 mA, Po = 139 mW, Li = 2.7 µH, Ci = 2.42 nF

CONDITIONS OF CERTIFICATION: YES as shown below:

Only certified components defined by manufacturer can be used.

Repair of flameproof joints is not allowed according to values of table 1 and 2 of IEC 60079-1.

Ambient temperature range:

-40 °C ≤ *Ta* ≤+75 °C (T6 / T80 °C)

-40 °C ≤ *Ta* ≤+80 °C (T1-T5 / T85 °C)

-20 °C ≤ *Ta* ≤+60 °C (T1-T6 resp. T80 °C when using the non-metallic cable glands)

IECEx Certificate (continued)
IECEx Zertifikat (Fortsetzung)

IECEx Certificate of Conformity

Certificate No: IECEx EPS 13.0008X Issue No: 3

Date of Issue: 2015-10-09 Page 4 of 4

DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

Changed values

Evaluation unit
Auswerteeinheit

Evaluation unit

The modules can be installed either in wall housings or 19" subracks. It can be equipped differently, depending on requirements. The rear clamp blocks or terminal panels are used for the electrical connection. The connection between the master EVU and slave modules (level measurement only) is made with a 4-pin master/slave plug.

Auswerteinheit

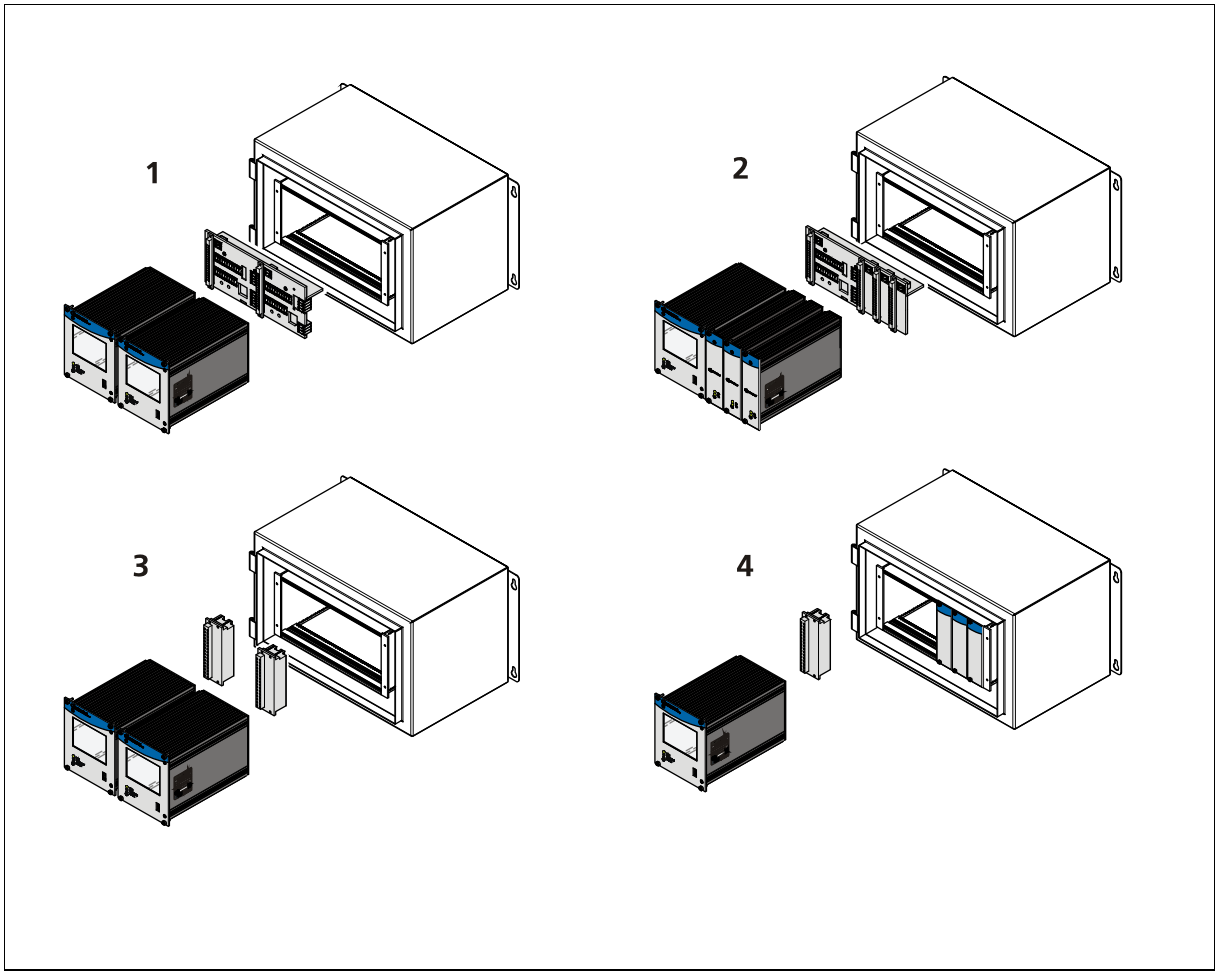
Die Module können entweder in Wandgehäusen oder 19"-Baugruppenträgern eingebaut und kann je nach Bedarf unterschiedlich bestückt werden. Zum elektrischen Anschluss werden die rückwärtigen Klemmenblöcke oder Anschlussplatinen verwendet. Die Verbindung zwischen Master-AWE und Slave-Modulen erfolgt mit einem 4-poligen Master/Slave-Stecker

NOTICE

Detector of the type LB44xx and LB54xx can capture measurement data only with master EVU.

Messdaten der Detektoren vom Typ LB44xx und LB54xx können nur mit einem Master-Modul erfasst werden.

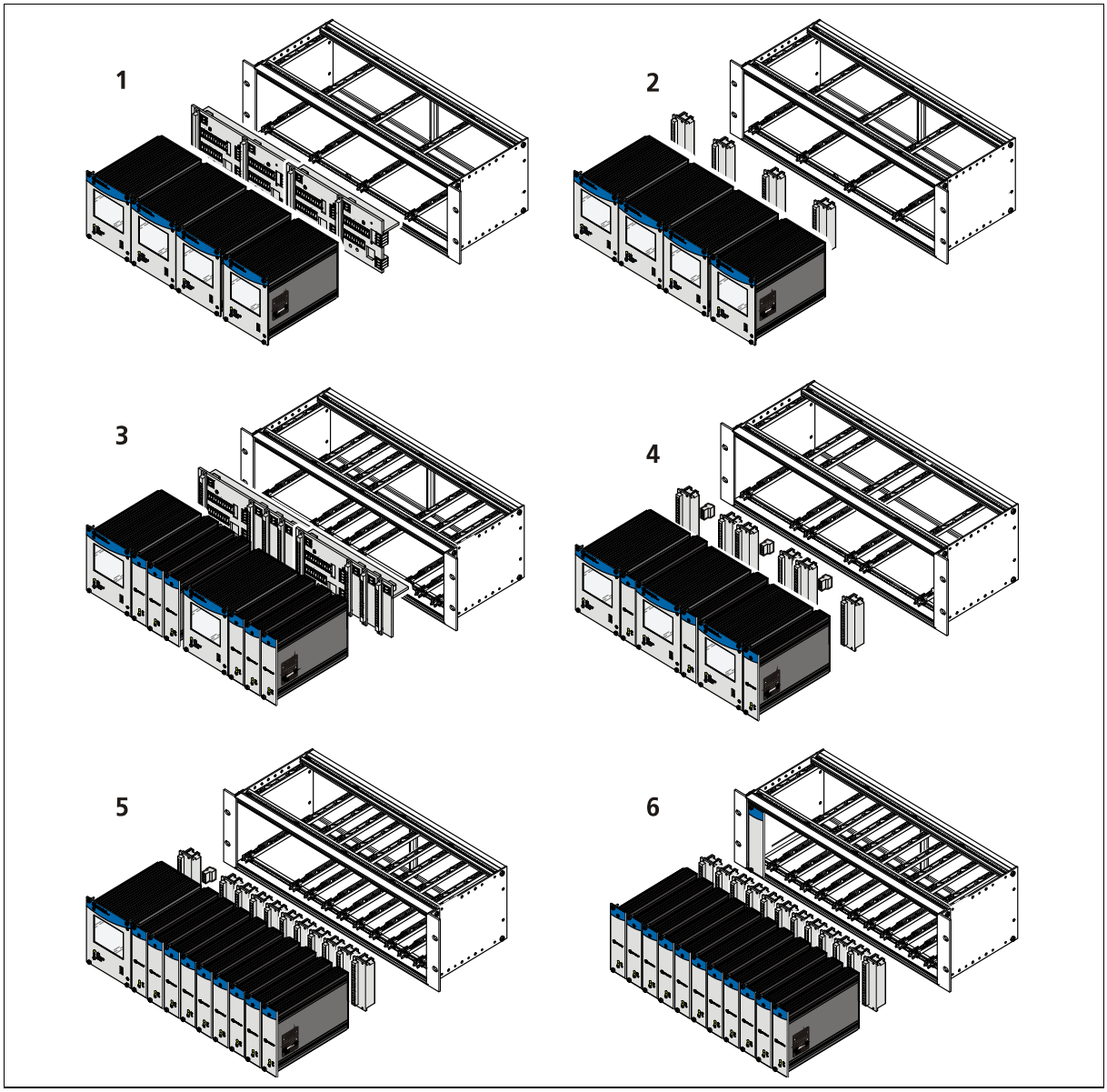
Installation variants wall housing (level measurement)
Einbauvarianten Wandgehäuse (Füllstandsmessung)



Item Pos.	Compontens *Komponenten*	Connection *Anschluss*
1	2 Master	1 Terminal panel master/master [1] *1 Anschlussplatine Master/Master [1]*
2	1 Master, 3 Slaves	1 Terminal panel master/slave [1] *1 Anschlussplatine Master/Slave [1]*
3	2 Master	2 Terminal blocks *2 Klemmenblöcke*
4	1 Master, 0 – 3 Slaves	1 Terminal block for master, 0 – 3 Terminal block for slave module *1 Klemmenblock für Master, 0-3 Klemmenblöcke für Slave Modul*

[1] NRTL certification US/CAN
NTRL Zertifikat US/CAN

Installation variants 19" subrack (level measurement)
Einbauvarianten 19" Baugruppenträger (Füllstandsmessung)

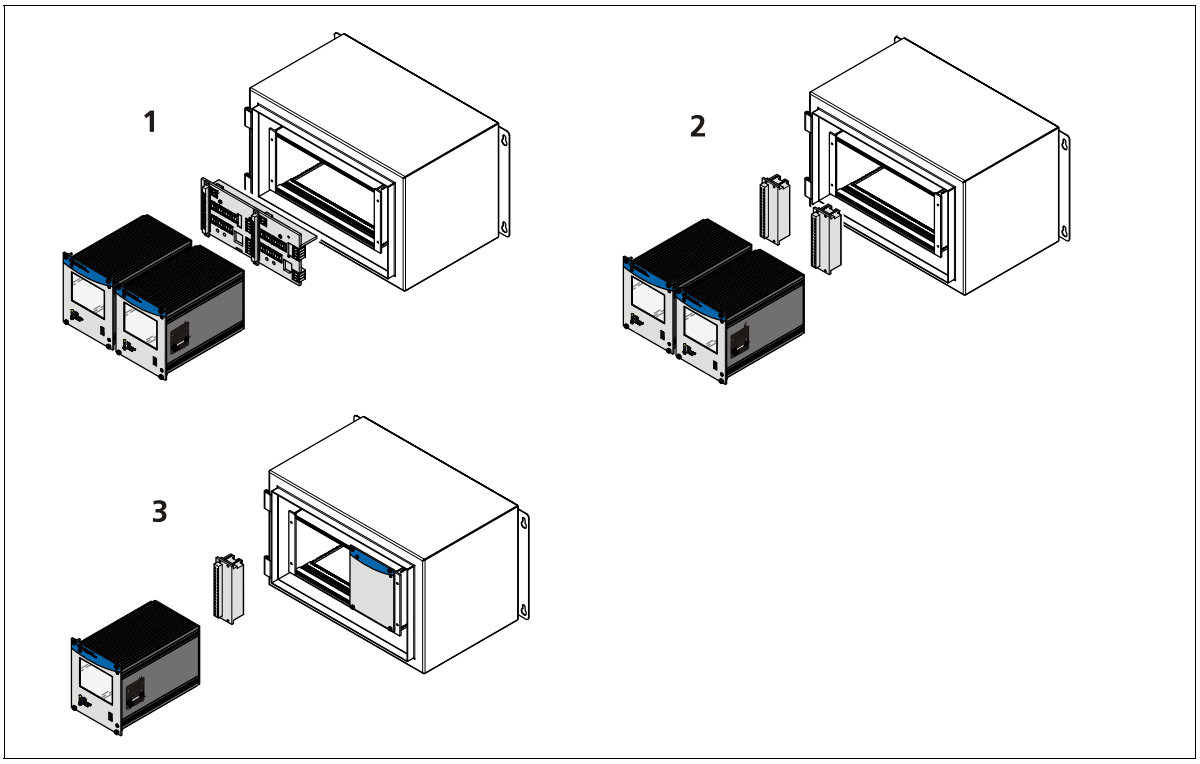


Item Pos.	Compontens *Komponenten*	Connection *Anschluss*
1	4 Master	2 Terminal panel master *2 Anschlussplatine Master*
2	4 Master [2]	4 Terminal blocks *4 Klemmenblöcke*
3	2x (1 Master, 3 Slaves)	2 Terminal panel master/slave *2 Anschlussplatinen Master/Slave*
4	4x (1 Master, 1 Slave) [2]	6 Terminal blocks; master/slave plugs *6 Klemmenblöcke; Master/Slave Stecker*

[2] Application example. The modules can be arranged arbitrarily with terminal blocks.
Anwendungsbeispiele. Mit Klemmenblöcken können Module frei zusammengestellt werden.

5	1 Master, 9 Slaves [2]	10 Terminal blocks; master/slave plug *10 Klemmenblöcke; Master/Slave Stecker*
6	11 Slaves [2]	11 Terminal blocks *11 Klemmenblöcke*

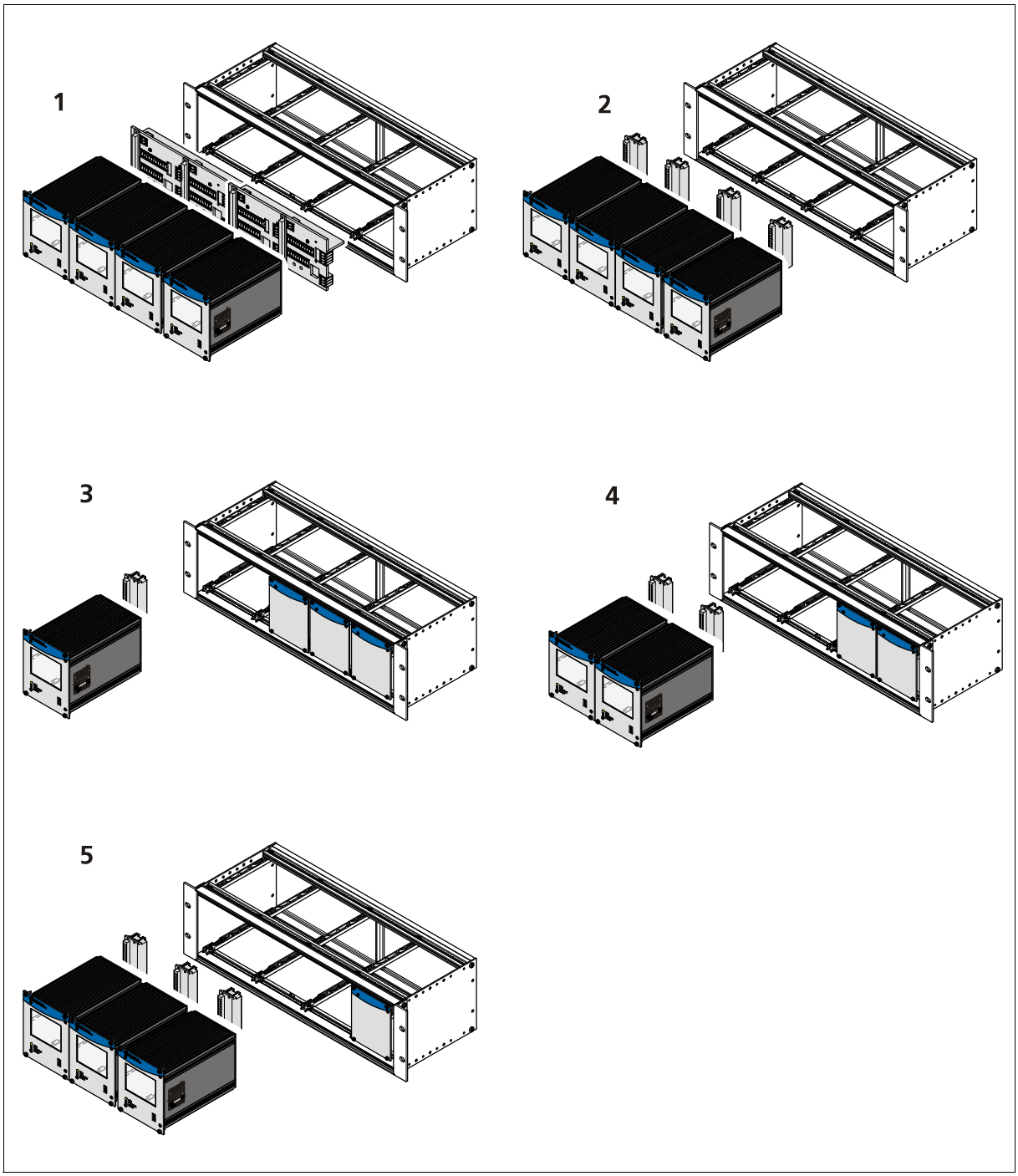
Installation variants wall housing (density measurement)
Einbauvarianten Wandgehäuse (Dichtemessung)



Item Pos.	Compontens *Komponenten*	Connection *Anschluss*
1	2 Master	1 Terminal panel master/master [3] *1 Anschlussplatine Master/Master*
2	2 Master	2 Terminal blocks *2 Klemmenblöcke*
3	1 Master, 1 blanking panel	1 Terminal block *1 Klemmenblock*

[3] NRTL certification US/CAN
NRTL Zertifikat US/CAN

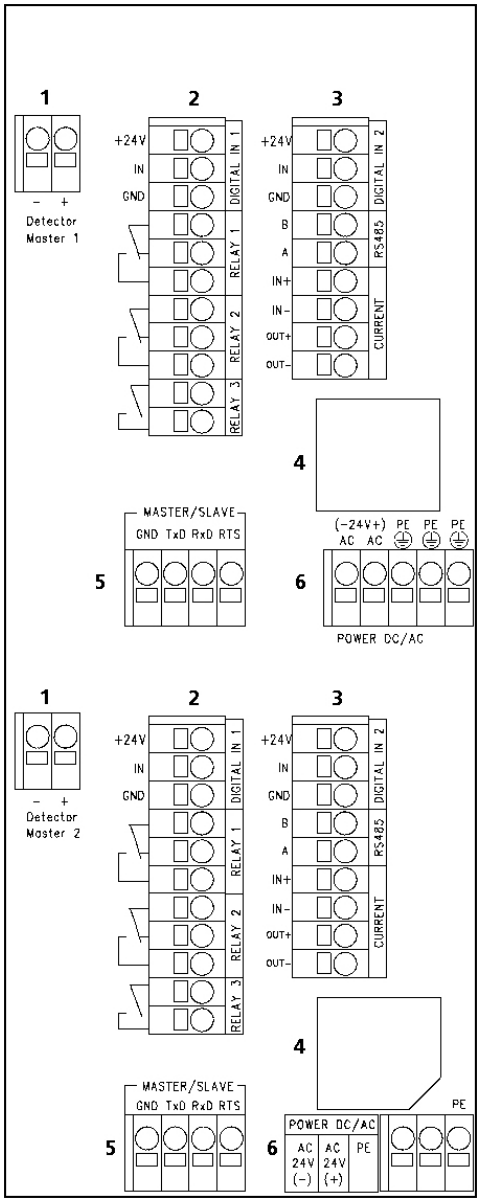
Installation variants 19" subrack (density measurement)
Einbauvarianten 19" Baugruppenträger (Dichtemessung)



Item Pos.	Compontens *Komponenten*	Connection *Anschluss*
1	4 Master	2 Terminal panel master/master *2 Anschlussplatinen Master/Master*
2	4 Master	4 Terminal blocks *4 Klemmenblöcke*
3	1 Master, 3 blanking panels *1 Master, 3 Blindplatten*	1 Terminal block *1 Klemmenblock*

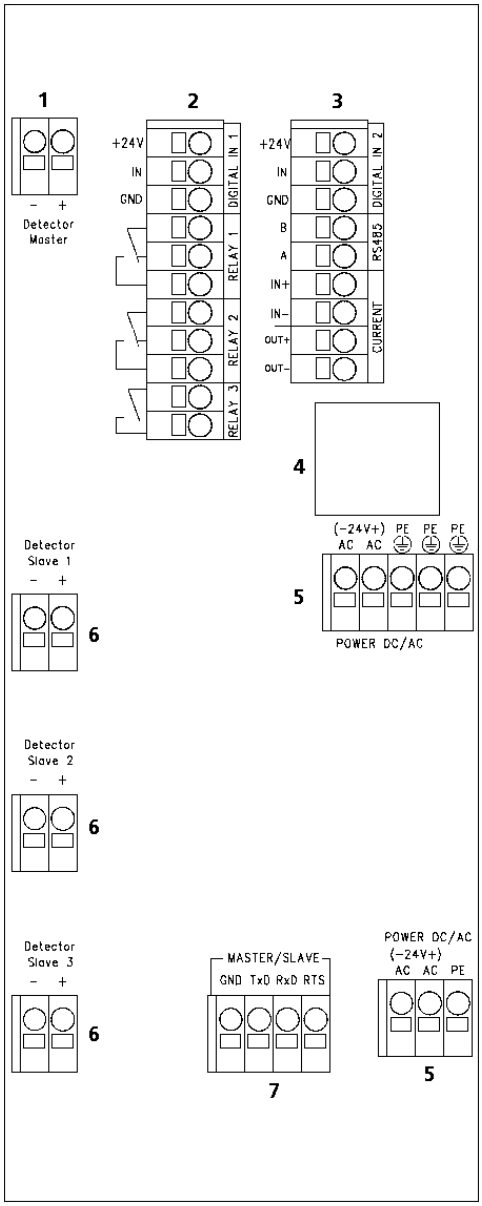
4	2 Master, 2 blanking panels *2 Master, 2 Blindplatten*	2 Terminal blocks *2 Klemmenblöcke*
5	3 Master, 1 blanking panel *3 Master, 1 Blindplatten*	3 Terminal blocks *3 Klemmenblöcke*

Connection diagram terminal board master/master
Anschlussplan Anschlussplatine Master/Master



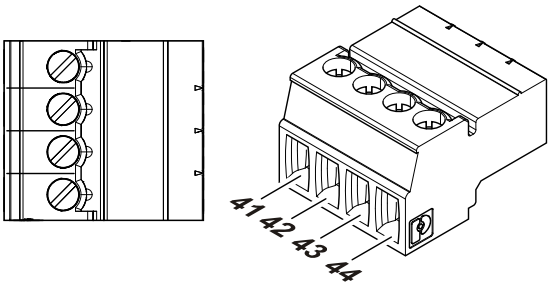
Item	Plug connectors	Function
1	DETECTOR MASTER 1 & 2 +	Connection LB 4700 or LB 44xx detector
	DETECTOR MASTER 1 & 2 –	
2	DIGITAL IN 1 + 24 V	24 V out (max. 200 mA)
	DIGITAL IN 1 IN	Logic Input
	DIGITAL IN 1 GND	GND
	RELAIS 1 NC	Error DO
	RELAIS 1 COM	
	RELAIS 1 NO	
	RELAIS 2 NC	Alarm DO 1
	RELAIS 2 COM	
	RELAIS 2 NO	
	RELAIS 3 NC	Alarm DO 2
	RELAIS 3 COM	
3	DIGITAL IN 2 + 24 V	24 V out (max. 200 mA)
	DIGITAL IN 2 IN	Logic Input
	DIGITAL IN 2 GND	GND
	RS 485 B	Communication and service interface (master-master)
	RS 485 A	
	CURRENT IN +	Is not used for LB 470
	CURRENT IN –	
	CURRENT OUT +	4 mA … 20 mA
	CURRENT OUT –	
4		Recess for LAN cable
5	MASTER/SLAVE GND	Connection of additional slave units
	MASTER/SLAVE TxD	
	MASTER/SLAVE RxD	
	MASTER/SLAVE RTS	
6	POWER DC 24 V (–) / AC	24 V DC / Wide Range
	POWER DC 24 V (+) / AC	
	POWER DC/AC PE	

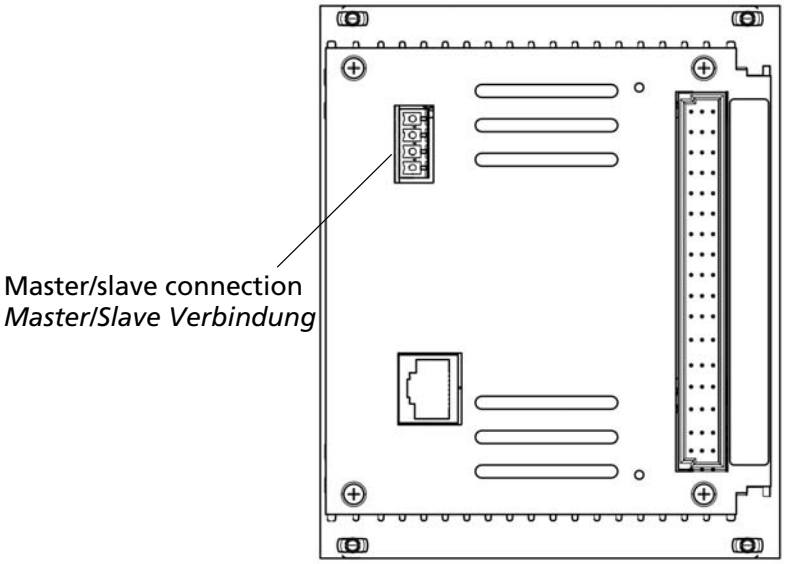
Connection diagram terminal board master/slave
Anschlussplan Anschlussplatine Master/Slave



Item	Plug connectors	Function
1	DETECTOR MASTER 1 +	Connection LB 4700 or LB 44xx detector
	DETECTOR MASTER 1 –	
2	DIGITAL IN 1 + 24 V	24 V out (max. 200 mA)
	DIGITAL IN 1 IN	Logic Input
	DIGITAL IN 1 GND	GND
	RELAIS 1 NC	Error DO
	RELAIS 1 COM	
	RELAIS 1 NO	
	RELAIS 2 NC	Alarm DO 1
	RELAIS 2 COM	
	RELAIS 2 NO	
	RELAIS 3 NC	Alarm DO 2
	RELAIS 3 COM	
3	DIGITAL IN 2 + 24 V	24 V out (max. 200 mA)
	DIGITAL IN 2 IN	Logic Input
	DIGITAL IN 2 GND	GND
	RS 485 B	Communication and service interface (Master-Master)
	RS 485 A	
	CURRENT IN +	Is not used for LB 470
	CURRENT IN –	
	CURRENT OUT +	4 mA … 20 mA
	CURRENT OUT –	
4		Recess for LAN cable
5	POWER AC / DC 24 V (–)	24 V DC / Wide Range
	POWER AC / DC 24 V (+)	
	POWER DC/AC PE	
6	DETECTOR SLAVE +	Connection LB 4700 and LB 44xx detector (for slave 1 - 3)
	DETECTOR SLAVE –	
7	MASTER/SLAVE GND	Connection of additional Slave units
	MASTER/SLAVE TxD	
	MASTER/SLAVE RxD	
	MASTER/SLAVE RTS	

Assignment terminals master/slave plug
Klemmenbelegung Master/Slave Stecker





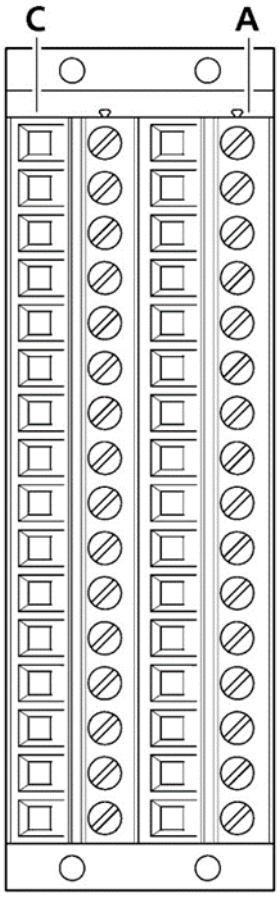
Signal	Pin
TxD	41
RxD	42
RTS	43
GND	44

The master/slave plug is not used by applications with terminal panels. The master/slave plug is contained in the purchase order terminal block (Part No. 59477). In the case of existing 19" subrack and retrofitting to LB470, the master-slave plug (Part No. 64608) must ordered separately.

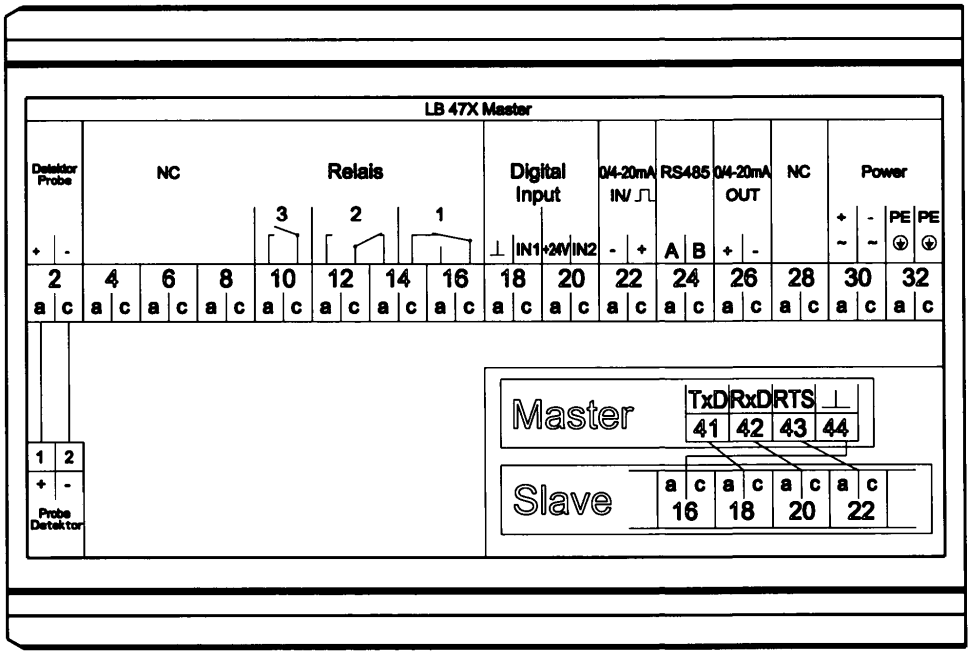
Der Master/Slave Stecker wird bei Einbauvarianten mit Anschlussplatinen nicht benötigt. Der Master/Slave Stecker ist im Lieferumfang des Klemmenblocks (Id. Nr. 59477) enthalten. Bei der Nachrüstung eines 19"Baugruppenträgers mit LB470 Modulen muss der Master-Slave Stecker (Id. Nr. 64608) gesondert bestellt werden

Assignment terminal block master EVU
Belegung Klemmenblock Master AWE

Signal	Pin
DETECTOR GND	C - 2
not assigned	C - 4
not assigned	C - 6
not assigned	C - 8
RELAY 3 COM	C - 10
RELAY 2 COM	C - 12
RELAY 1 NC	C - 14
RELAY 1 COM	C - 16
DIGITAL IN 1	C - 18
DIGITAL IN 2	C - 20
CURRENT IN +	C - 22
RS 485 B	C - 24
CURRENT OUT –	C - 26
not assigned	C - 28
Power AC, DC 24 V (–)	C - 30
Protective conductor PE	C - 32

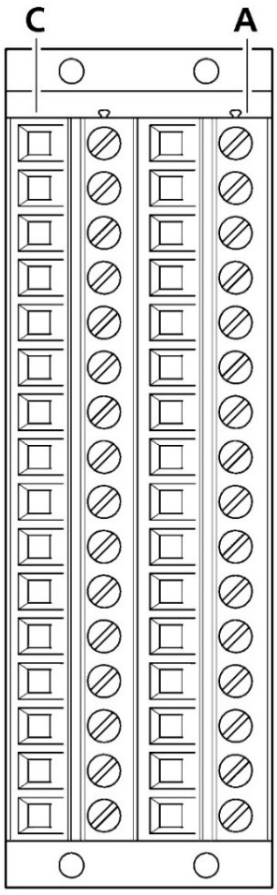


Pin	Signal
A - 2	DETECTOR +
A - 4	not assigned
A - 6	not assigned
A - 8	not assigned
A - 10	RELAY 3 NO
A - 12	RELAY 2 NO
A - 14	RELAY 2 NC
A - 16	RELAY 1 NO
A - 18	DIGITAL IN 1 GND
A - 20	+ 24 V
A - 22	CURRENT IN –
A - 24	RS 485 A
A - 26	CURRENT OUT +
A - 28	not assigned
A - 30	Power AC, DC 24 V (+)
A - 32	Protective conductor PE

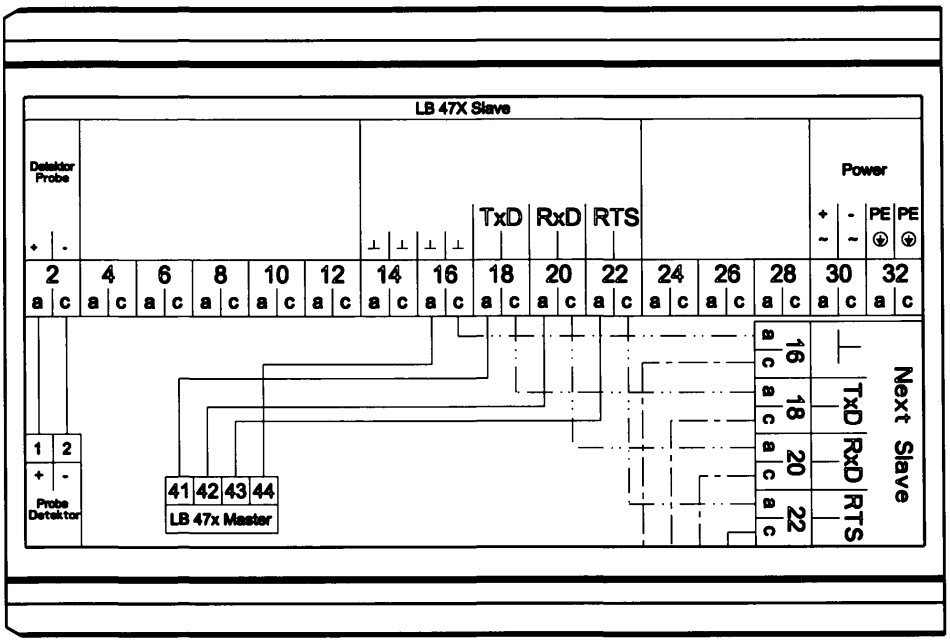


Assignment terminal block slave module
Belegung Klemmenblock Slave Modul

Signal	Pin
DETECTOR SLAVE GND	C - 2
not assigned	C - 4
not assigned	C - 6
not assigned	C - 8
not assigned	C - 10
not assigned	C - 12
GND	C - 14
GND	C - 16
RTS to the SLAVE	C - 18
RxD to the SLAVE	C - 20
TxD to the SLAVE	C - 22
not assigned	C - 24
not assigned	C - 26
not assigned	C - 28
Network AC, DC 24 V (–)	C - 30
Protective conductor PE	C - 32

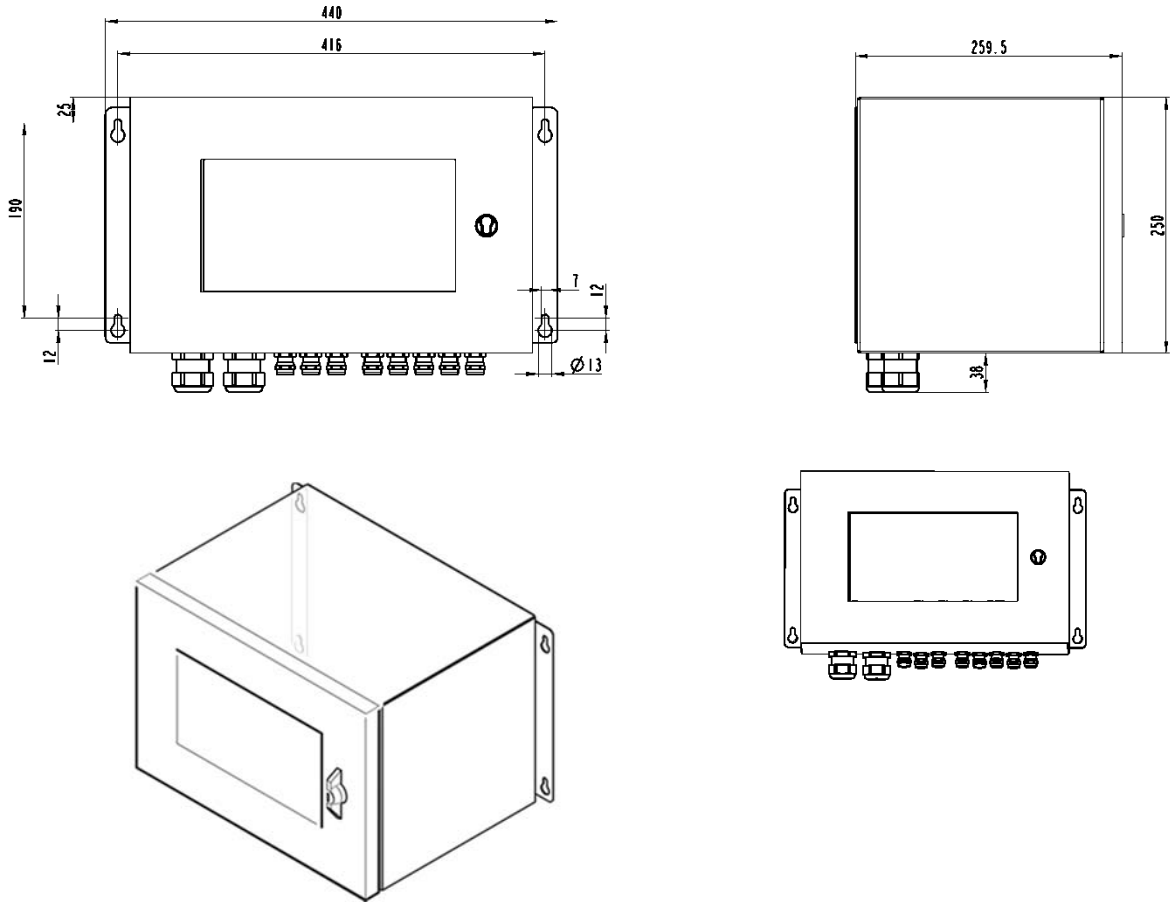


Pin	Signal
A - 2	DETECT. SLAVE +15 V
A - 4	not assigned
A - 6	not assigned
A - 8	not assigned
A - 10	not assigned
A - 12	not assigned
A - 14	GND
A - 16	GND
A - 18	RTS to MASTER/SLAVE[4]
A - 20	RxD to the MASTER/SLAVE
A - 22	TxD to the MASTER/SLAVE
A - 24	not assigned
A - 26	not assigned
A - 28	not assigned
A - 30	Network AC, DC 24 V (+)
A - 32	Protective conductor PE



[4] Optional

Wall housing
Wandgehäuse



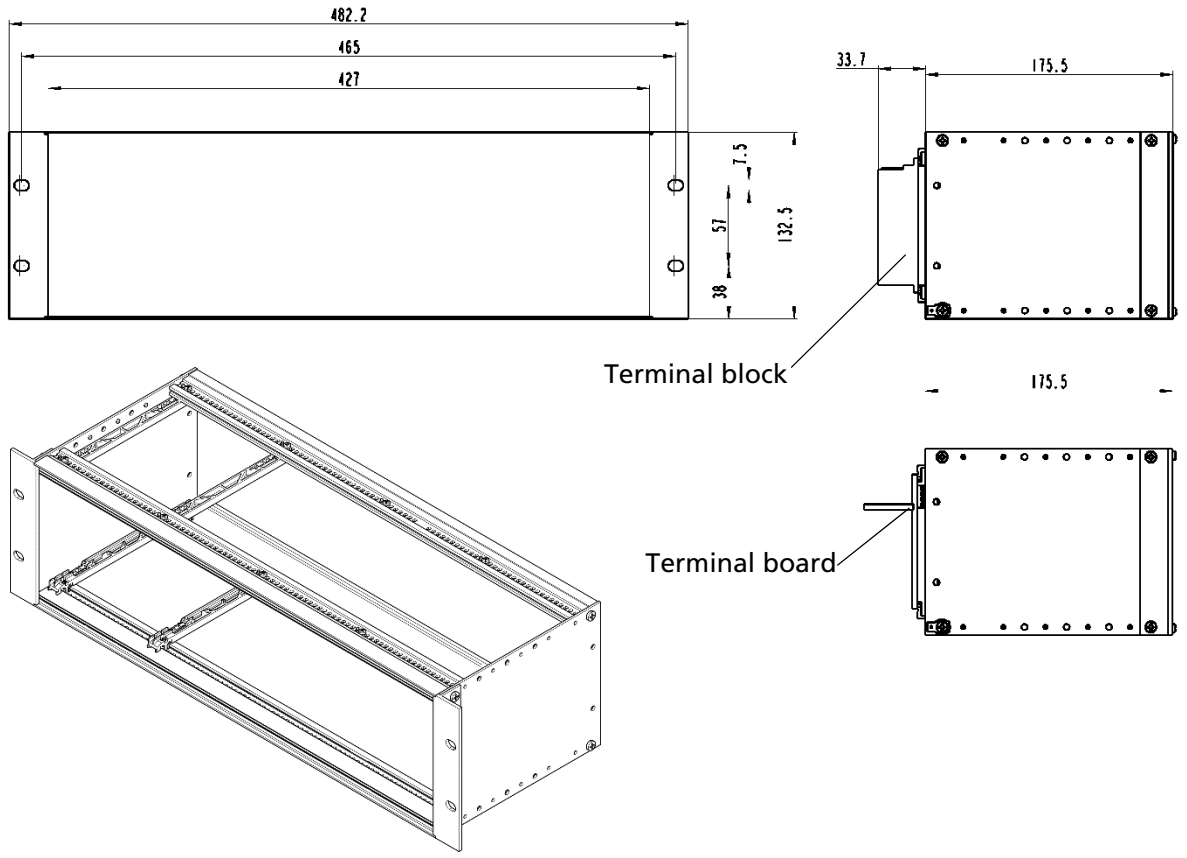
Dimensions in mm
Abmessungen in mm

Technical Data *Technische Daten*	
Dimensions *Abmessungen*	440x250x257mm (WxHxD)
Max. Assembly *Max. Bestückung*	- 2 Master with terminal board (master/master) [5] *- 2 Master mit Anschlussplatine (Master/Master)* - 1 Master, 3 Slave with terminal board (master/slave)[5] *- 1 Master , 3 Slave mit Anschlussplatine (Master/Slave)* - 2 Master with calmp blocks [6] *- 2 Master mit Klemmenblöcken*

[5] NRTL certification US/CAN
[6] No certification

Weight (with circuit board, without modules) *Gewicht (mit Anschluss-platine, ohne Module)*	8.8 kg
Operational temperature *Betriebstemperatur*	-20°C … +40°C
User interface, colours *Obefläche, Farbe*	powder coated, grey *pulverbeschichtet, grau*

19" subrack
19" Baugruppenträger

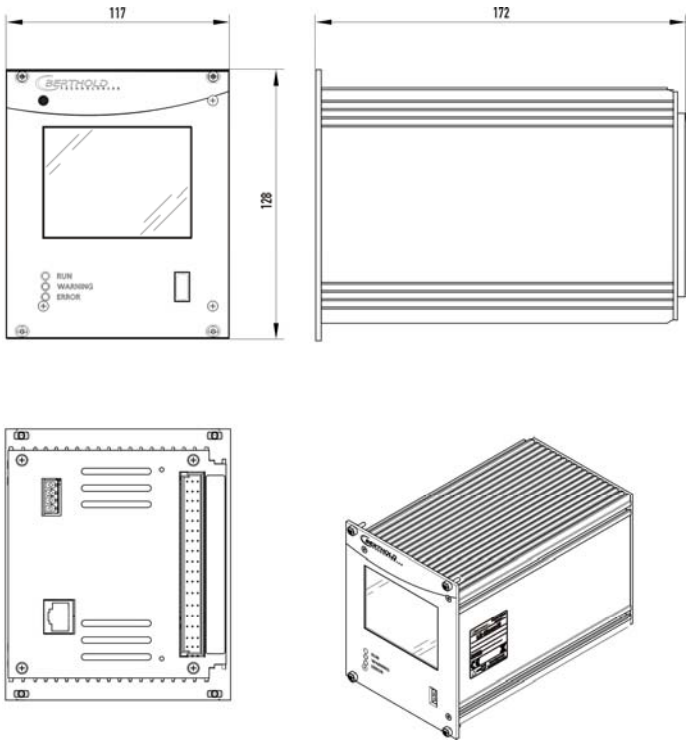


Dimensions in mm
Abmessungen in mm

Technical Data *Technische Daten*	
Dimensions Abmessungen	3HE/84TE/5T, 482x132x172mm (WxHxD)
Max. Assembly *Max. Bestückung*	- 3 Master, 3 Slave - 2 Master, 6 Slave - 4 Master - 1 Master, 9 Slave - 12 Slave
Weight (with circuit board, without modules) *Gewicht (mit Anschluss-platine, ohne Module)*	1.4 kg
Weight terminal block *Gewicht Klemmenblock*	220 g

Operational temperature *Betriebstemperatur*	-20°C … +50°C, not condensing *nicht kondensierend*
Storage temperature *Lagerungstemperatur*	-30°C … +60°C
Degree of protection *Schutzklasse*	IP20

Master EVU
Master AWE



Dimensions in mm
Abmessungen in mm

Technical Data *Technische Daten*	
Dimensions *Abmessungen*	117/128/172mm (WxHxD)
Weight *Gewicht*	1200 g
Operational temperature *Betriebstemperatur*	-20°C … +50°C, not condensing. Avoid direct sunlight. Unobstructed air circulation must be provided to the subrack. *-20°C … +50°C nicht kondensierend. Direkte Sonneneinstrahlung ist zu vermeiden. Für eine ungehinderte Luftzirkulation um den Baugruppenträger ist zu sorgen.*
Storage temperature *Lagerungstemperatur*	-30°C … +60°C
Degree of protection *Schutzgrad*	IP20

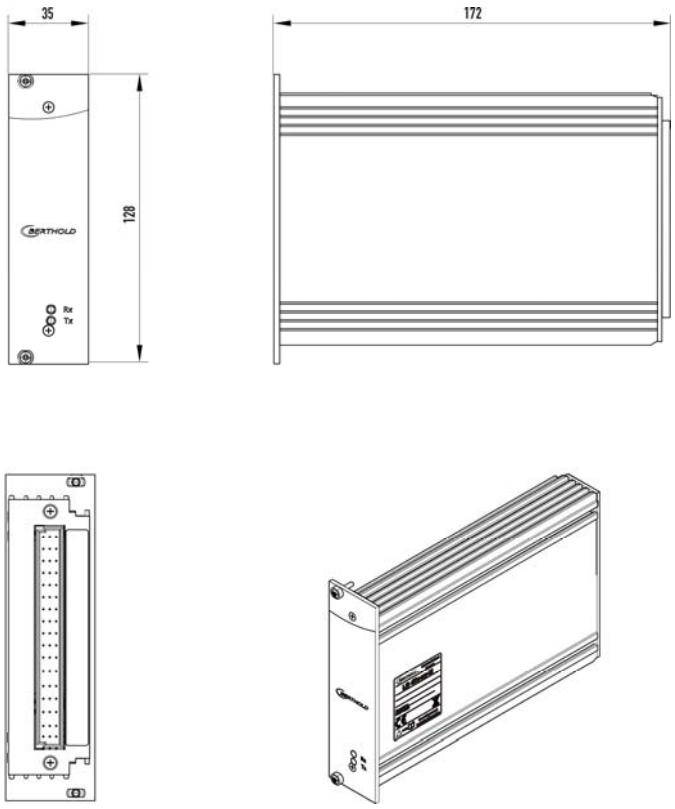
Connections *Anschlüsse*	- USB port for the connection to the USB storage medium - Master/slave connection (4-pin) and plug - RJ45 connection for Ethernet (on back wall) - 32-pin plug connector according to DIN 19465 Series C *- USB-Port zum Anschluss von USB-Speichermedium* *- Master/Slave Buchse (4-polig) und Stecker* *- RJ45-Buchse für Ethernet (an Rückwand)* *- 32 polige Stiftleiste nach DIN 19465 Baureihe C*
Display	- graphical LCD display - 320 x 240 points, 262,000 colours - Dimmable LED background lighting - Touch screen *- graphisches LCD-Display* *- 320 x 240 Punkte, 262.000 Farben* *- Dimmbare LED Hintergrundbeleuchtung* *- Touchscreen*
Computer core *Rechnerkern*	- Processor: Dual Core DSP/ARM Controller - clock frequency: 300 MHz internal (20MHz external quartz) - ROM: 512 KByte - RAM: 64 MByte ext. SDRAM, 128 KByte int. shared RAM - FLASH: 8 MByte external serial *- Prozessor: Dual Core DSP/ARM Controller* *- Taktfrequenz: 300 MHz intern (20MHz externer Quarz)* *- ROM: 512 KByte* *- RAM: 64 MByte ext. SDRAM, 128 KByte int. shared RAM* *- FLASH: 8 MByte extern seriell*

Power Supply ***Stromversorgung***	
Voltage *Spannung*	100-240 V AC 50/60 Hz (wide range input) +/- 10% 18-32 V DC (24V DC power input)
Power consumption *Leistungsauf-nahme*	22VA, 15W
Fuses *Sicherungen*	Internal, 2 x 250 V, 1A delayed, 5x20mm, 1500 A breaking capacity IEC 60127-2, 1x 250V TR5 T80mA (Ø 8,5 mm)

Interfaces *Schnittstellen*	
Current output	4-20mA internally switched from power source to sink current (according to NAMUR recommendation NE 006 and NE 043). Continuous short circuit proof and isolated (500V). Internal resistance about 105 ohms max. Burden when operating as a power source: 850 ohm. Internal monitoring of the loop current and additional error signalling by hardware on detection of a fault condition.
Stromausgang	*4-20mA (nach Namur-Empfehlung NE 006 und NE 043) intern von Stromquelle auf Stromsenke umschaltbar.* *Dauerhaft kurzschlussfest und potentialgetrennt (500V).* *Innenwiderstand ca. 105 Ohm max.* *Bürde bei Betrieb als Stromquelle: 850 Ohm.* *Interne Überwachung des Schleifenstroms und zusätzliche Fehlersignalisierung durch Hardware bei Erkennung eines Fehlerzustands.*
Current input	4-20mA (according to NAMUR recommendation NE 006 and NE 043) switchable via software on frequency input electrically isolated (500V). Internal resistance approx. 300 ohm max. input voltage: 24V DC
Stromeingang	*4-20mA (nach Namur-Empfehlung NE 006 und NE 043) per Software umschaltbar auf Frequenzeingang potentialgetrennt (500V). Innenwiderstand ca. 300 Ohm max. Eingangsspannung: 24V DC*
Impulse input	Frequency 0-100kHz, U_{max} = 28V, right angle signal form, low <1,5V; high 4 – 28V. Switchable to current input
Impuls-eingang	*Frequenz 0-100kHz, U_{max} = 28V,* *Rechteck-Signalform, Low <1,5V; High 4 – 28V.* *Umschaltbar auf Stromeingang*
Digital outputs	3 relays, U_{max} = 30V AC_{eff}, 46V DC; I_{max} = 5A functions: Relay 1: SPDT for error signalling Relay 2: SPDT assignable by software Relay 3: SPST assignable by software
Digitale Ausgänge	*3 Relais, U_{max} = 30V AC_{eff}, 46V DC; I_{max} = 5A* *Funktionen: Relais 1: SPDT zur Fehlersignalisierung* *Relais 2: SPDT über Software zuweisbar* *Relais 3: SPST über Software zuweisbar*
Digital inputs	2 x together electrically isolated (500V) Switch between DigIn and GND, U_{out}^{max} approx. 24V Function configurable via software
Digitale Eingänge	*2 x gemeinsam potentialgetrennt (500V),* *Schalter zwischen DigIn und GND, U_{out}^{max} ca. 24V* *Funktion über Software konfigurierbar*
External supply	Output voltage: 24V DC Output current: max. 150mA
Externe Versorgung	*Ausgangsspannung: 24V DC* *Ausgangsstrom: max. 150mA*

RS485	for master/master communication, and testing and evaluation purposes. not isolated from main electronics and USB port electrically isolated from remaining I/Os (500V) für Master/Master Kommunikation und Prüf-und Testzwecke. Nicht potential-getrennt von Hauptelektronik und USB-Anschluss potentialgetrennt von restlichen I/Os (500V)
USB port	1 x USB 2.0 Type A (Host) via front plate to the connection of an ext. mouse, keyboard or storage medium U_{out} = 5V, I_{out}^{max} = 0.5A *1 x USB 2.0 Typ A (Host) über Frontplatte zum Anschluss einer ext. Maus, Tastatur oder Speichermedium* *Uout = 5V, Ioutmax = 0,5A*
Ethernet	RJ45 connection via back wall, 10Mbit, DHCP supported, max. 3m *RJ45-Buchse über Rückwand, 10Mbit,* *DHCP unterstützt, max. 3m*

Slave Module
Slave Modul



Dimensions in mm
Abmessungen in mm

Technical Data *Technische Daten*	
Dimensions *Abmessungen*	35/128/172mm (WxHxD)
Weight *Gewicht*	600 g
Operational temperature *Betriebstemperatur*	-20°C … +50°C, not condensing. Avoid direct sunlight. Unobstructed air circulation must be provided to the subrack. *-20°C … +50°C nicht kondensierend. Direkte Sonneneinstrahlung ist zu vermeiden. Für eine un-gehinderte Luftzirkulation um den Baugruppenträger ist zu sorgen.*
Storage temperature *Lagertemperatur*	-30°C … +60°C
Degree of protection *Schutzgrad*	IP20

Electrical data	
Power consumption *Leistungsaufnahme*	6VA, 5W
Fuses Sicherungen	Internal, 2 x 250 V, 1A delayed, 5x20mm, 1500 A breaking capacity IEC 60127-2 *Intern, 2 x 250 V, 1A träge, 5x20mm, 1500 A Abschaltvermögen IEC 60127-2*
Connections *Anschlüsse*	- 32-pin plug connector *- 32 polige Stiftleiste*

Certificates
Zertifikate

NRTL certification US/CAN wall-mounted housing
NTRL Zertifikat US/CAN Wandgehäuse

Nemko

Nemko-CCL, Inc.

Certificate of Compliance

Certificate: NA201610530 **Date Issued:** January 20, 2016

Project: 257087-7.1

Issued to: Berthold Technologies GmbH & Co. KG
Calmbacher Straße 22
75323 Bad Wildbad
Germany

The products listed below have been certified as being compliant with all applicable requirements of the specifications listed and are eligible to bear the following certification mark

c Nemko US

Issued by: Robert Keller, Senior Engineer/Safety Supervisor

Authorized by: Thomas Jackson, Certification Manager

PRODUCTS

MEASUREMENT, CONTROL, OR LABORATORY EQUIPMENT – Certified to US and Canada Standards

Product: Process measurement unit
Model: Wall-mounted LB 47x, 1M/3S; Wall-mounted LB 47x, 2M (x can be 0 to 8 and describes different software versions for the master and slave modules not affecting safety).
Ratings: Wall-mounted LB 47x, 1M/3S: 40VA 100-240V, 50/60Hz, Class I; Wall-mounted LB 47x, 2M: 44VA 100-240V, 50/60Hz, Class I

The certification system, as described in ISO/IEC Guide 67 (Conformity Assessment – Fundamentals of Product Certification), most closely resembles System 3

Nemko-CCL, Inc. 1940 West Alexander Street Salt Lake City, Utah 84119-2039 Tel (801) 972-6146 Fax (801) 972-8432

NFCC-002 Issue 2 May 2014 Page 1 of 3

NRTL certification US/CAN wall-mounted housing (continued)
NTRL Zertifikat US/CAN Wandgehäuse (Fortsetzung)

APPLICABLE REQUIREMENTS

UL Std. No. 61010-1 2nd Edition - Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use – Part 1: General Requirements

CAN/CSA-C22.2 No. 61010-1-04 Second Edition - Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use – Part 1: General Requirements

This certificate is issued on condition that the holder complies and will continue to comply with the requirements of the above mentioned specifications and pursuant to the terms and conditions specified in the Certification Agreement.

The certification system, as described in ISO/IEC Guide 67 (Conformity Assessment – Fundamentals of Product Certification), most closely resembles System 3

Nemko-CCL, Inc. 1940 West Alexander Street Salt Lake City, Utah 84119-2039 Tel (801) 972-6146 Fax (801) 972-8432

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NRTL certification US/CAN wall-mounted housing (continued)
NTRL Zertifikat US/CAN Wandgehäuse (Fortsetzung)

Supplement to Certificate of Compliance

Certificate: NA201610530 **Project:** 257087-7.1

Nemko-CCL grants a license to the applicant to apply the Certification Mark to the certified products and that the mark shall only be affixed at the following factory locations

Factory Information

Factory Name	Location
Berthold Technologies GmbH & Co. KG	Calmbacher Straße 22 75323 Bad Wildbad Germany

The products listed, including the latest revision described below, are eligible to be marked in accordance with the referenced Certificate.

Product Certification History

Project	Date	Description
257087-7.1	January 20, 2016	**Original Certification: Model:** Wall-mounted LB 47x, 1M/3S; Wall-mounted LB 47x, 2M (x can be 0 to 8 and describes different software versions for the master and slave modules not affecting safety). **Ratings:** Wall-mounted LB 47x, 1M/3S: 40VA 100-240V, 50/60Hz, Class I; Wall-mounted LB 47x, 2M: 44VA 100-240V, 50/60Hz, Class I

This Supplement forms an integral part of the Certificate of Compliance

The certification system, as described in ISO/IEC Guide 67 (Conformity Assessment – Fundamentals of Product Certification), most closely resembles System 3

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NRTL certification US/CAN DuoXpert LB 47x
NTRL Zertifikat US/CAN DuoXpert LB 47x

Nemko

Certificate of Compliance

Nemko-CCL, Inc.

Certificate: NA201510498 **Date Issued:** September 17, 2015

Project: 235982-14.1

Issued to: Berthold Technologies GmbH & Co. KG
Calmbacher Straße 22
75323 Bad Wildbad
Germany

The products listed below have been certified as being compliant with all applicable requirements of the specifications listed and are eligible to bear the following certification mark

c Nemko US

Issued by: Robert Keller, Senior Engineer/Safety Supervisor

Authorized by: Thomas Jackson, Certification Manager

PRODUCTS

MEASUREMENT, CONTROL, OR LABORATORY EQUIPMENT – Certified to US and Canada Standards

Product: Process measurement unit for building-in
Model: DuoXpert LB47x-02-M; DuoXpert LB47x-02-S (x can be 0 to 8 and describes different software versions for the master and slave modules not affecting safety)
Ratings: LB47x-02-M: 100-240V AC 22VA 50/60Hz; LB47x-02-S: 100-240V AC 6VA 50/60Hz

APPLICABLE REQUIREMENTS

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

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

This certificate is issued on condition that the holder complies and will continue to comply with the requirements of the above mentioned specifications and pursuant to the terms and conditions specified in the Certification Agreement.

The certification system, as described in ISO/IEC Guide 67 (Conformity Assessment – Fundamentals of Product Certification), most closely resembles System 3

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NRTL certification US/CAN DuoXpert LB 47x (continued)
NTRL Zertifikat US/CAN DuoXpert LB 47x (Fortsetzung)

Supplement to Certificate of Compliance

Certificate: NA201510498 **Project:** 235982-14.1

Nemko-CCL grants a license to the applicant to apply the Certification Mark to the certified products and that the mark shall only be affixed at the following factory locations

Factory Information

Factory Name	Location
Berthold Technologies GmbH & Co. KG	Calmbacher Straße 22 75323 Bad Wildbad Germany

The products listed, including the latest revision described below, are eligible to be marked in accordance with the referenced Certificate.

Product Certification History

Project	Date	Description
235982-14.1	September 17, 2015	**Original Certification: Model:** DuoXpert LB47x-02-M; DuoXpert LB47x-02-S (x can be 0 to 8 and describes different software versions for the master and slave modules not affecting safety) **Ratings:** LB47x-02-M: 100-240V AC 22VA 50/60Hz; LB47x-02-S: 100-240V AC 6VA 50/60Hz

This Supplement forms an integral part of the Certificate of Compliance

The certification system, as described in ISO/IEC Guide 67 (Conformity Assessment – Fundamentals of Product Certification), most closely resembles System 3

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Parts overview
Übersicht Zubehör

ID. No. *Id. Nr.*	Description *Beschreibung*
63284	LB 470-01-M Level Transmitter (Master, 24 VDC) *LB 470-01-M Füllstandmessgerät (Master, 24 VDC)*
63283	LB 470-02-M Level Transmitter (Master, 100...240 VAC) *LB 470-02-M Füllstandmessgerät (Master, 100...240 VAC)*
63286	LB 470 Slave (24 VDC) *LB 470 Slave (24 VDC)*
63285	LB 470 Slave (100...240 VAC) *LB 470 Slave (100...240 VAC)*
64576	LB 474-01-M Density Transmitter (24 VDC) *LB 474-01-M Dichtemessgerät (24 VDC)*
64575	LB 474-02-M Density Transmitter (100...240 VAC) *LB 474-02-M Dichtemessgerät (100...240 VAC)*
56925BA1	Operating manual DuoSeries LB 470 Level, German *Betriebsanleitung Füllstand (deutsch)*
56925BA2	Operating manual DuoSeries LB 470 Level, English *Betriebsanleitung Füllstand (englisch)*
56925-4BA1	Operating manual DuoSeries LB 474 Density, German *Betriebsanleitung Dichte (deutsch)*
56925-4BA2	Operating manual DuoSeries LB 474 Density, English *Betriebsanleitung Dichte (englisch)*
63781	Wall-mounted Housing for LB 47x 1x Master / 3x Slave (24 VDC) *Wandgehäuse für LB 47x, 1x Master / 3x Slave (24 VDC)*
63782	Wall-mounted Housing for LB 47x 1x Master / 3x Slave (110...240 VAC) *Wandgehäuse für LB 47x, 1x Master / 3x Slave (110...240 VAC)*
63783	Wall-mounted Housing for 2x LB 47x Master (24 VDC) *Wandgehäuse für LB 47x, 2x Master (24 VDC)*
63784	Wall-mounted Housing for 2x LB 47x Master (110...240 VAC) *Wandgehäuse für LB 47x, 2x Master (110...240 VAC)*
64402	Wall-mounted Housing for 2x LB 47x Master (terminal blocks) *Wandgehäuse für LB 47x, 2x Master (Klemmblöcke)*
59484	19" rack for LB 47x, 4 x Master *19"-Baugruppenträger für LB 47x, 4 x Master*
59481	19" rack for LB 47x, 3x (1x Master & 1x Slave) *19"-Baugruppenträger für LB 47x, 3x (je 1x Master & 1x Slave)*
64607	19" rack, 84 HP / 3 RU for use with terminal blocks *19"-Baugruppenträger für den Einsatz mit Klemmblöcken*
59477	Terminal block for LB 47x, Master *Klemmenblock für LB 47x, Master*
59478	Terminal block for LB 47x, Slave *Klemmenblock für LB 47x, Slave (mit Führungsschienen)*

37526	Front Cover Plate 21 HP / 3 RU (Master) *Blindplatte 21TE / 3 HE (Master)*
59501	Front Cover Plate 7 HP / 3 RU (Slave) *Blindplatte 7TE / 3 HE (Slave)*
64608	Connector for LB 47x slaves when changing from LB 44x to LB 47x slaves *Stecker für LB 47x Slaves bei Umrüstung von LB44x auf LB47x Slaves*

Modifications due to technical advancement reserved.
Änderungen im Zuge technischer Weiterentwicklung vorbehalten.

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