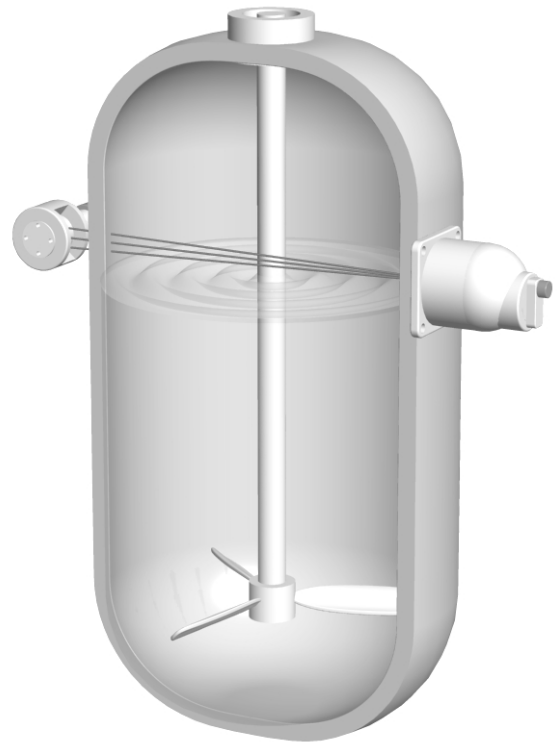
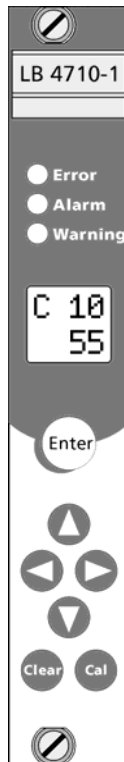


Process Control

detect and identify

Level Switch Mini-Switch LB 471 *Super-Sens*

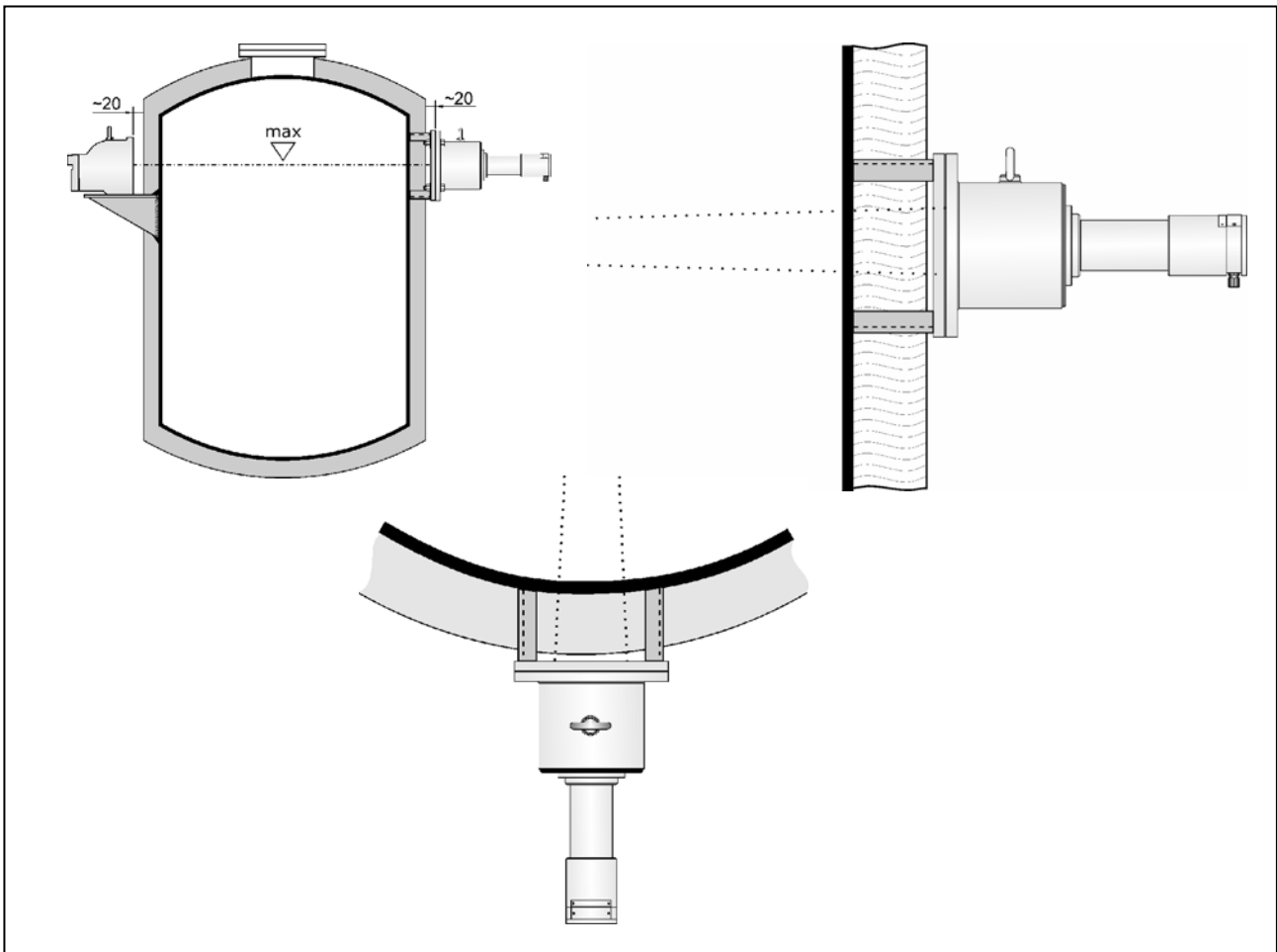
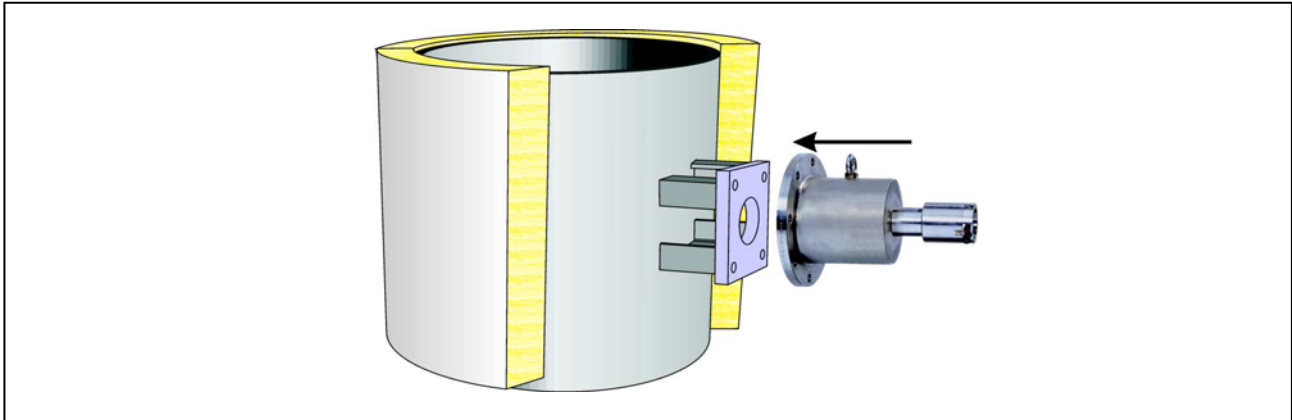


Technical Information

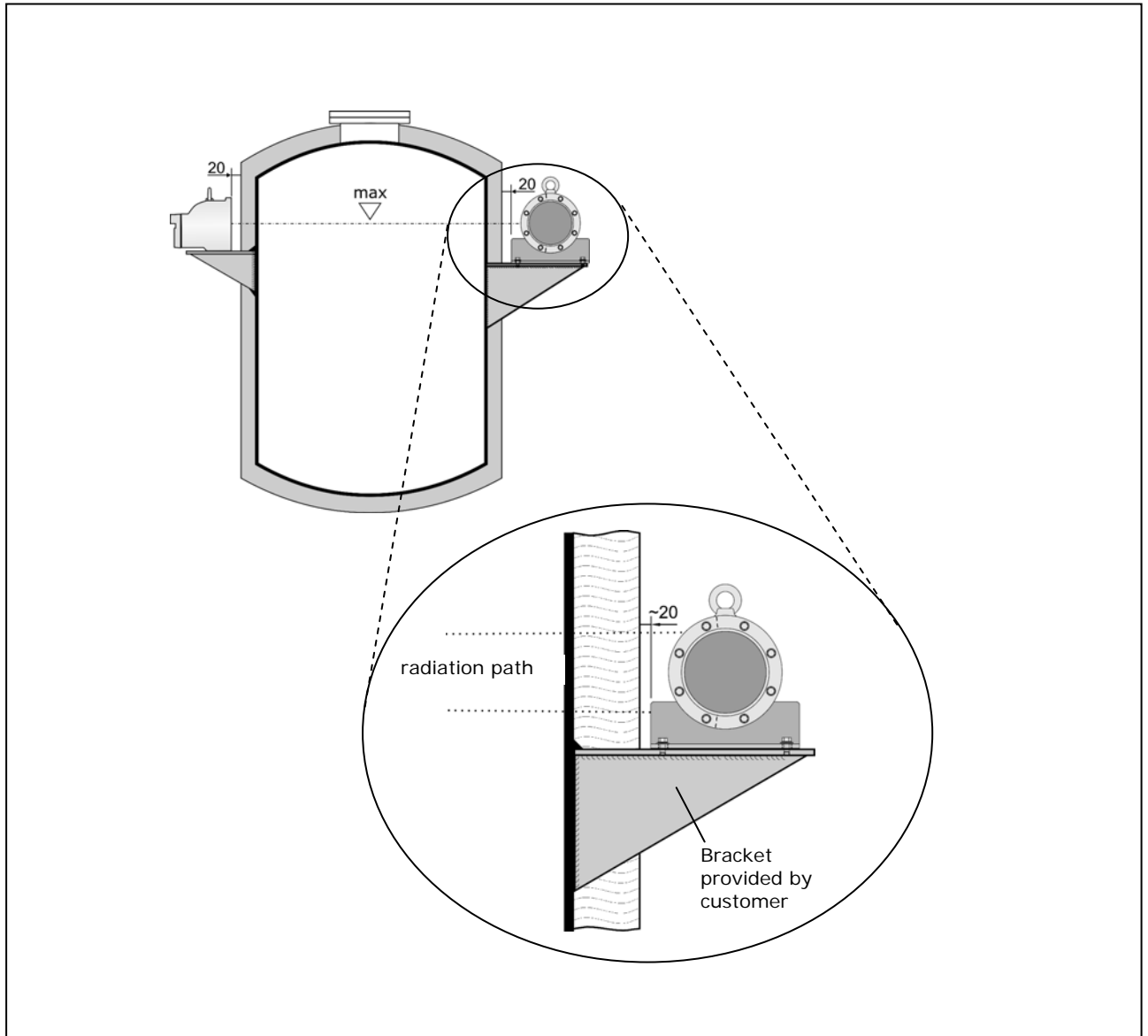
Id. Nr. 39505TI21
Rev. No.: 00 22/04/04

1. Mechanical Installation

1.1 Super-Sens with Frontal Irradiation

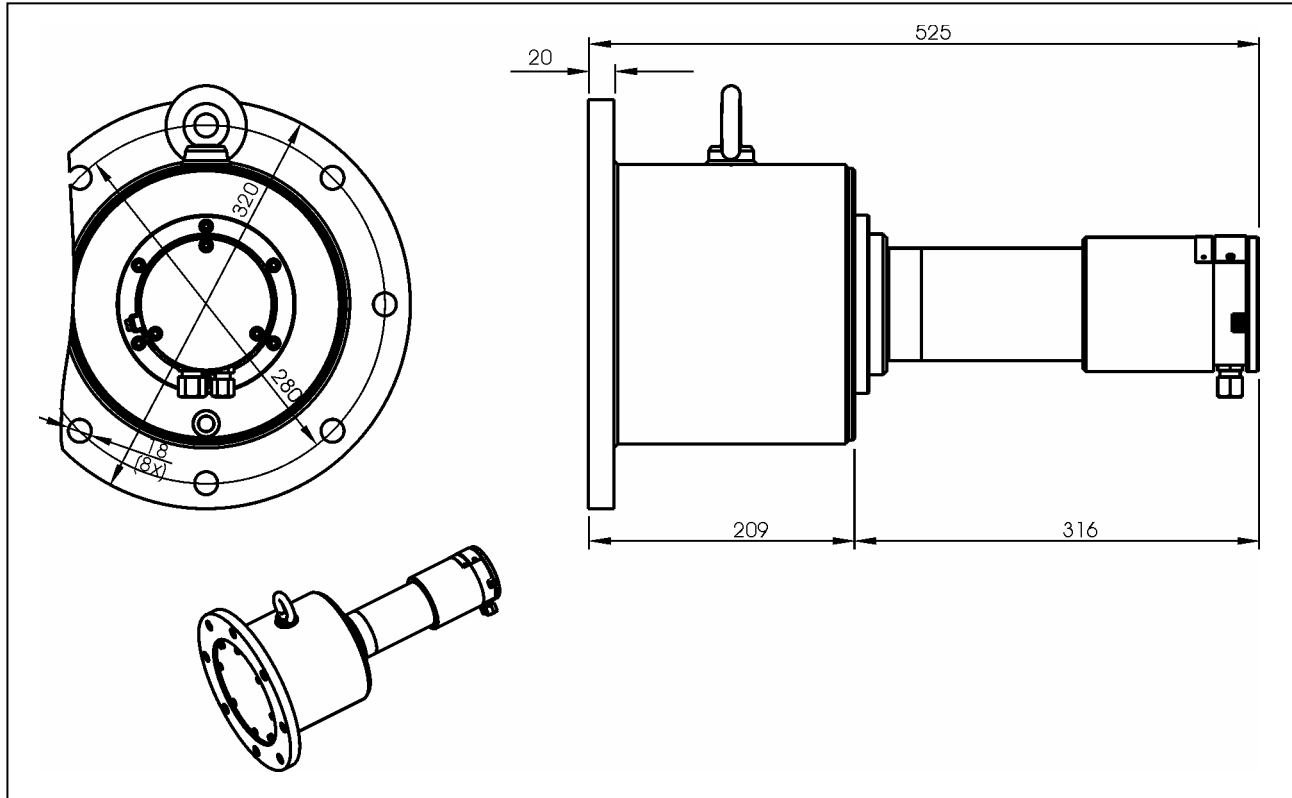


1.2 Super-Sens with Radial Irradiation



2. Mechanical Dimensions of Super-Sens Detector

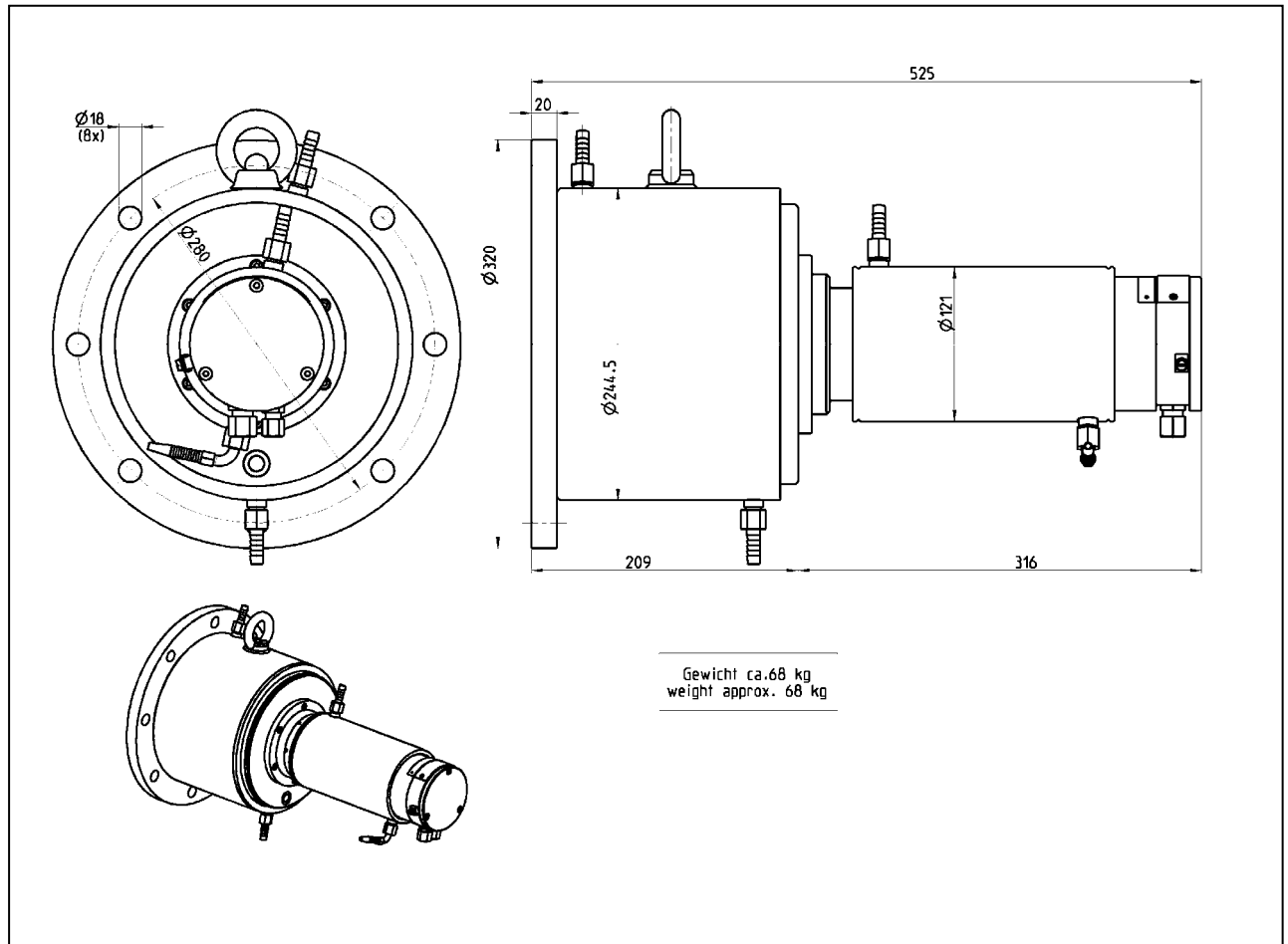
Super-Sens with frontal irradiation without water cooling



Dimensions in mm

Type	ATEX		Weight in kg approx.
LB 4430-04-0a-Gd-E	Gas Ex	II 2 G EEx de IIC T6	54
LB 4430-04-0a-Gi-E	Gas Ex intrinsically safe	II 2 G EEx ib d IIC T6	54
LB 4430-04-1a-Md-E	Firedamp		54
LB 4430-04-1a-Mi-E	Firedamp intrinsically safe		54
LB 5430	-		49

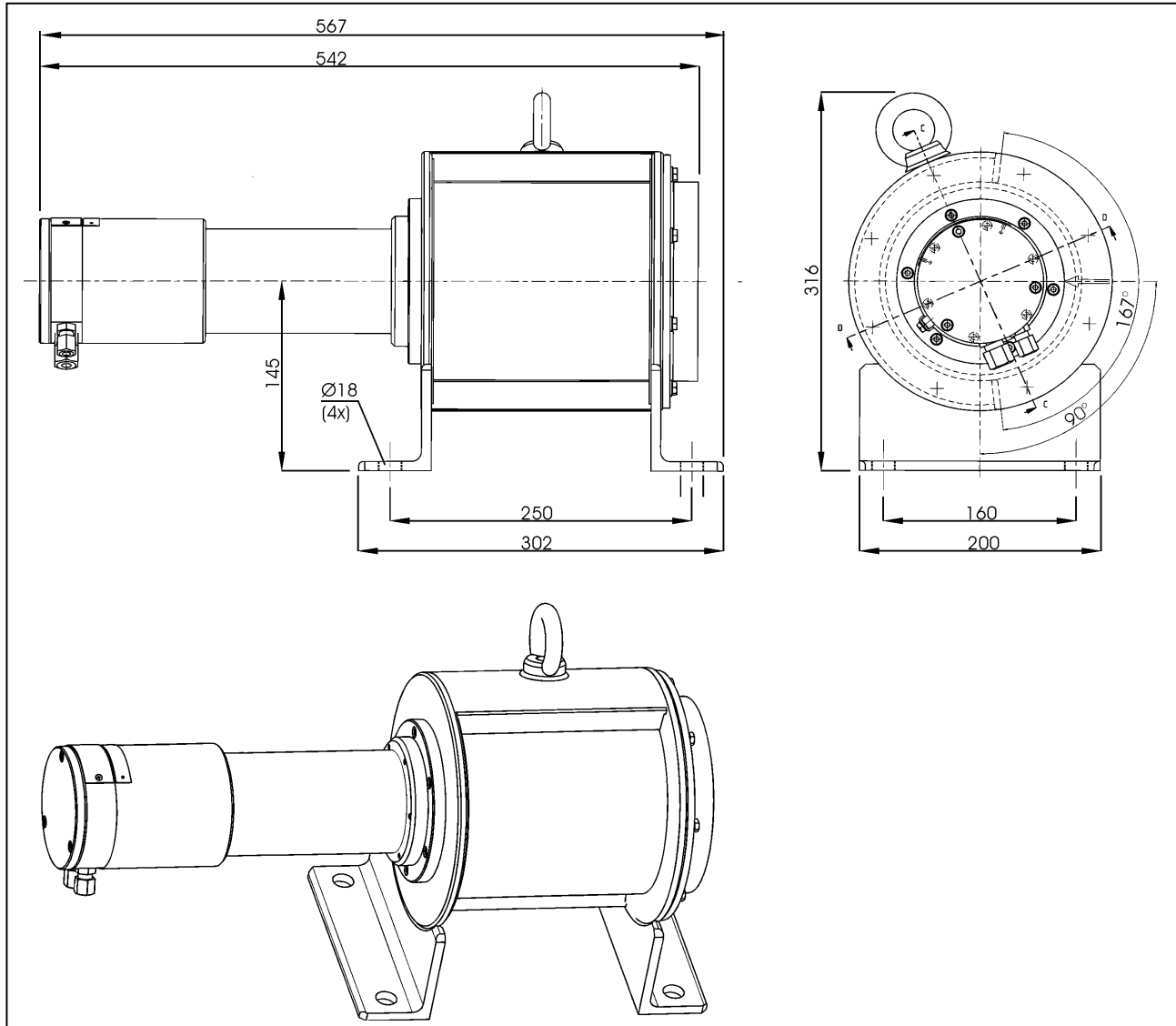
Super-Sens with frontal irradiation and water cooling



Dimensions in mm

Type	ATEX		Weight in kg approx.
LB 4430-14-0a-Gd-E	Gas Ex	II 2 G EEx de IIC T6	68
LB 4430-14-0a-Gi-E	Gas Ex intrinsically safe	II 2 G EEx ib d IIC T6	68

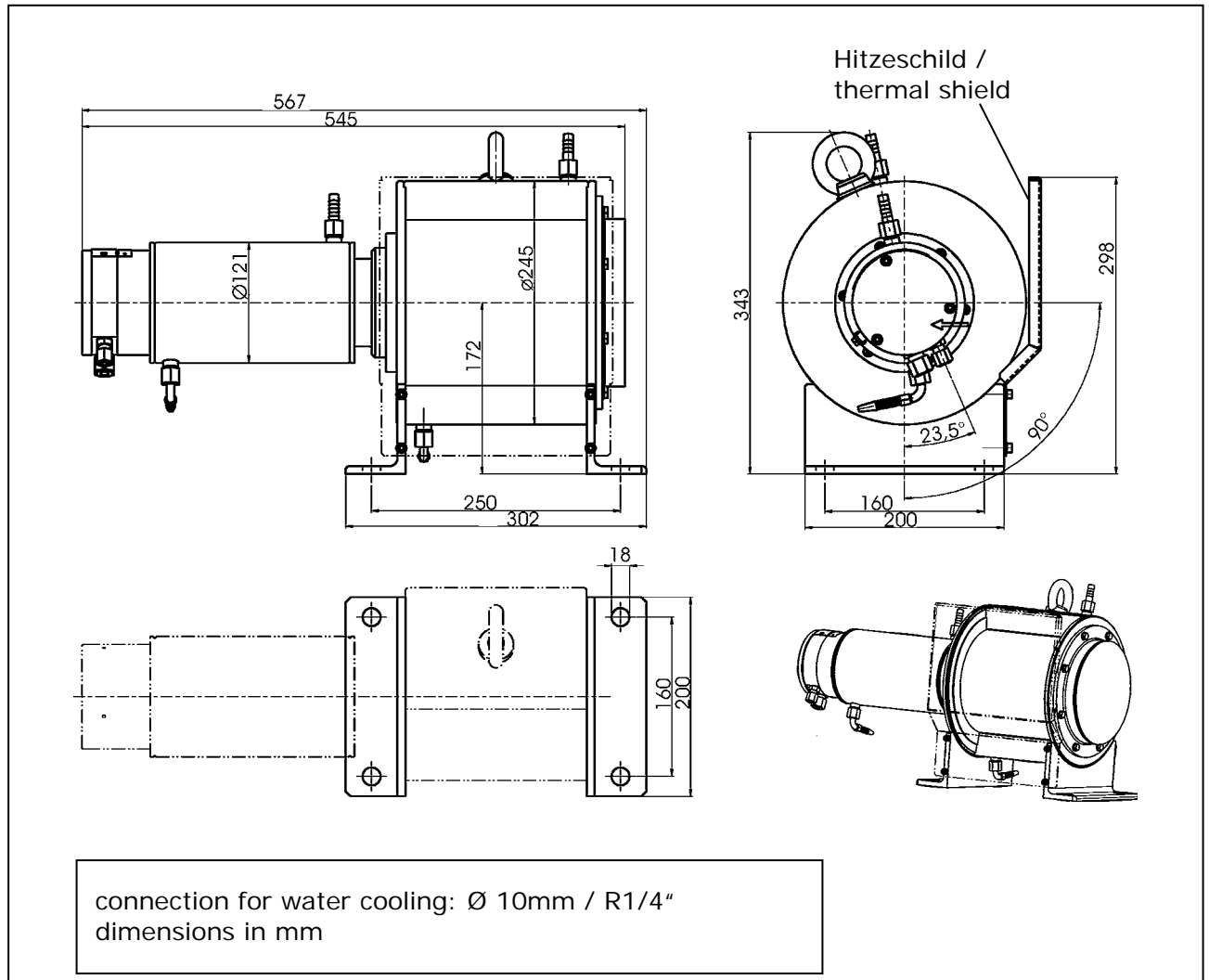
Super-Sens with radial irradiation 90° without water cooling



Dimensions in mm

Type	ATEX		Irradiation	Weight in kg approx.
LB 4431-04-0s-Gd-E	Gas Ex	II 2 G EEx de IIC T6	90°	60
LB 4431-04-0s-Gi-E	Gas Ex intrinsically safe	II 2 G EEx ib d IIC T6	90°	60
LB 4431-04-1s-Md-E	Firedamp		90°	60
LB 4431-04-1s-Mi-E	Firedamp intrinsically safe		90°	60

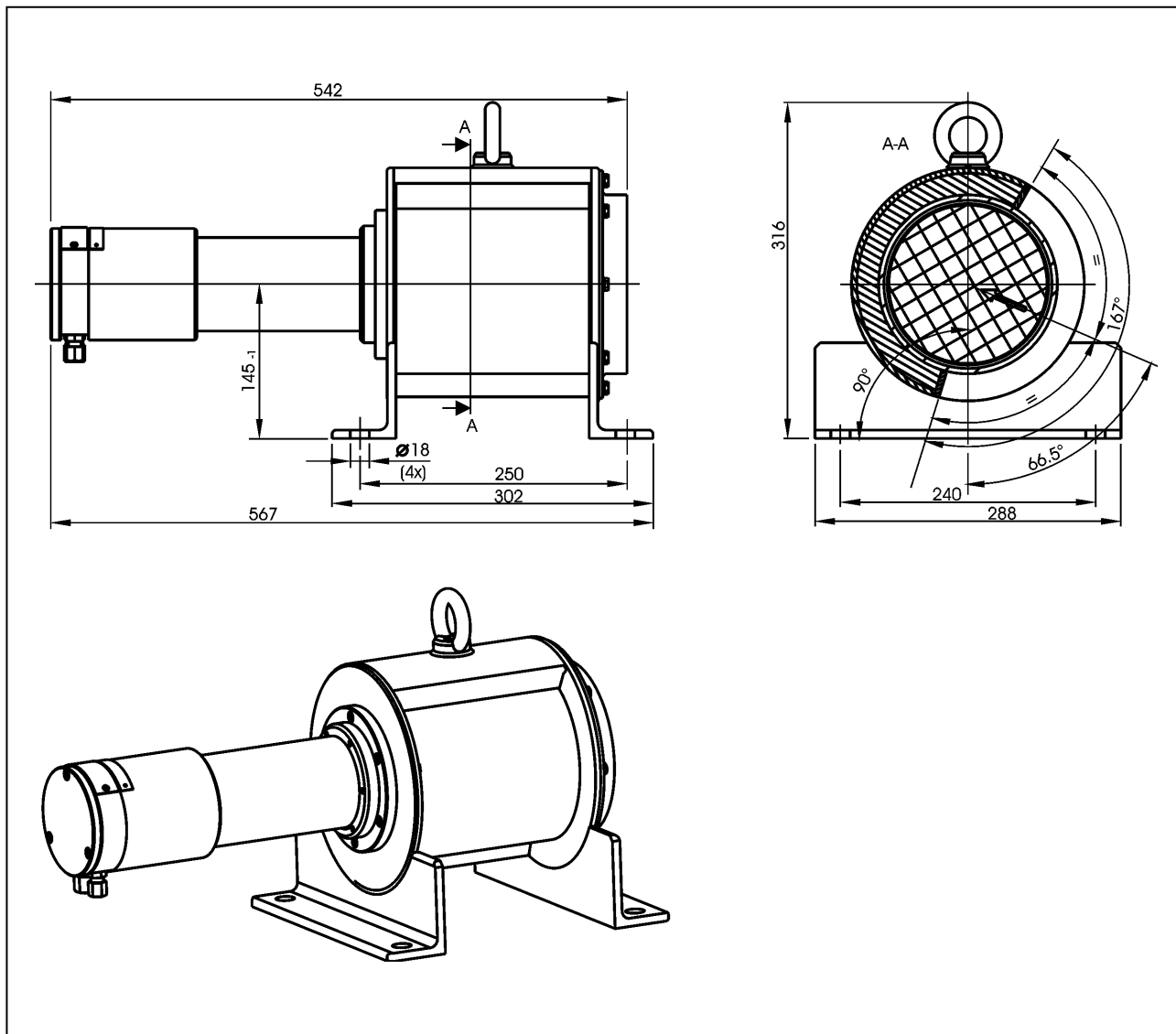
Super-Sens with radial irradiation 90° with water cooling



Dimensions in mm

Type	ATEX		Irradiation	Weight in kg approx.
LB 4431-14-0s-Gd-E	Gas Ex	II 2 G EEx de IIC T6	90°	74
LB 4431-14-0s-Gi-E	Gas Ex intrinsically safe	II 2 G EEx ib d IIC T6	90°	74

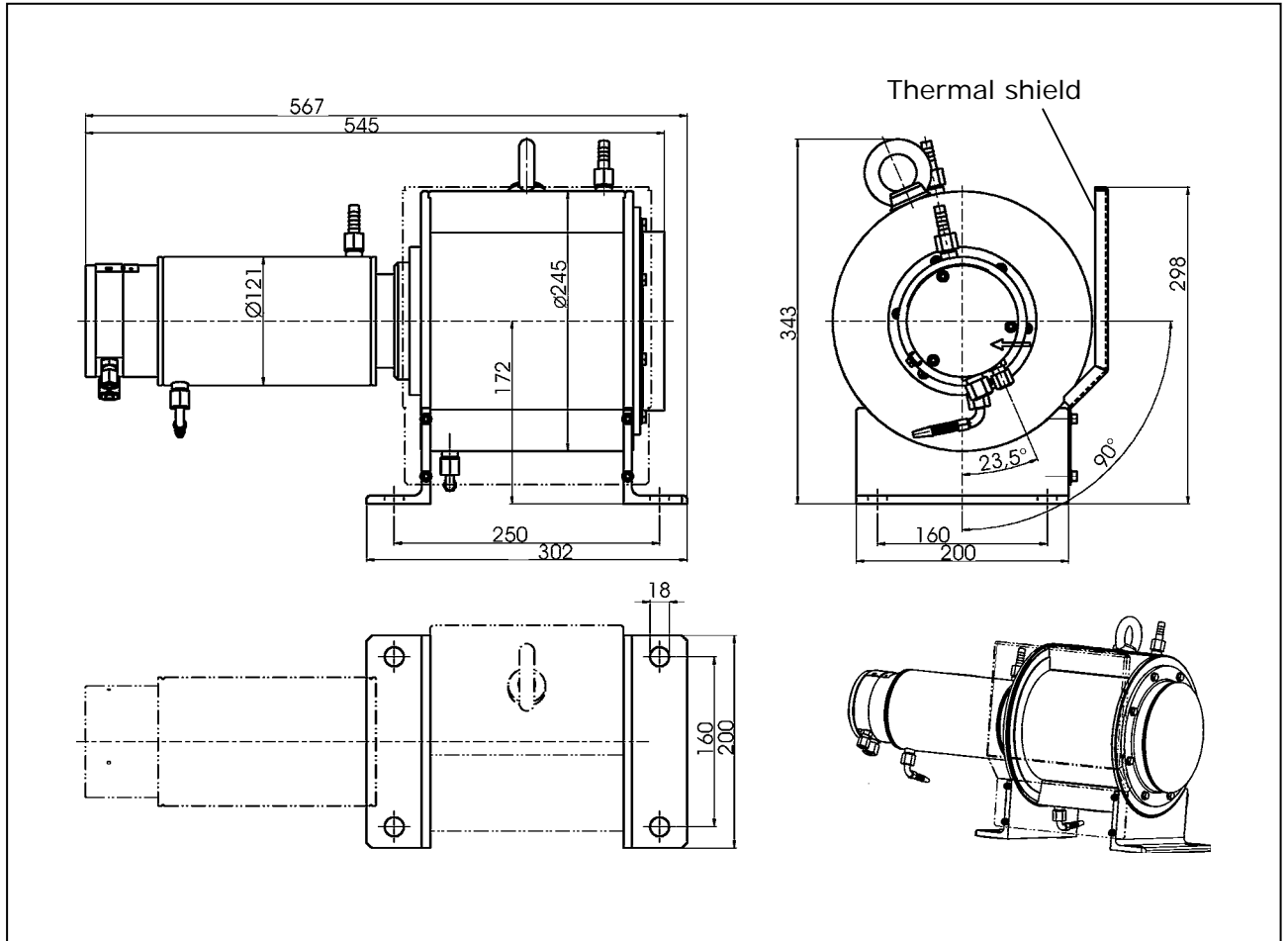
Super-Sens with radial irradiation 66° without water cooling



Dimensions in mm

Type	ATEX		Irradiation	Weight in kg approx.
LB 4431-04-0r-Gd- E	Gas Ex	II 2 G EEx de IIC T6	66°	60
LB 4431-04-0r-Gi- E	Gas Ex intrinsically safe	II 2 G EEx ib d IIC T6	66°	60
LB 5431	-		66°	58

Super-Sens with radial irradiation and water cooling



Dimensions in mm

Type	ATEX			Irradiation	Weight in kg approx.
LB 4431-14-0s-Gd-E	Gas Ex	II 2 G EEx	de IIC T6	90°	74
LB 4431-14-0r-Gd-E	Gas Ex		de IIC T6	66°	74
LB 4431-14-0s-Gi-E	Gas Ex intrinsically safe		ib d IIC T6	90°	74
LB 4431-14-0r-Gi-E	Gas Ex intrinsically safe		ib d IIC T6	66°	74

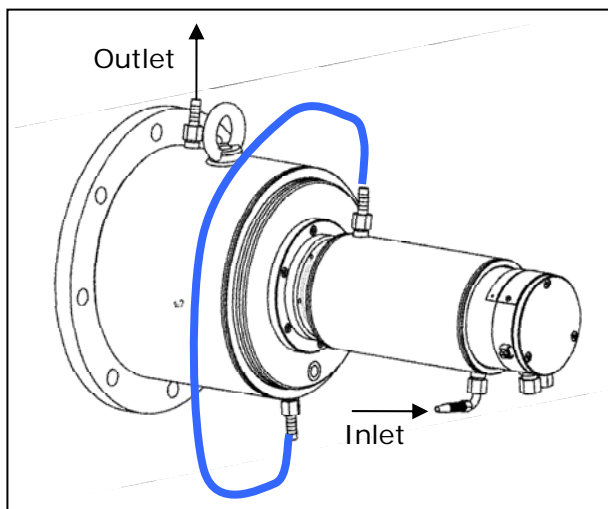
2.1 Water Cooling

In a Super-Sens with water cooling, the water cooling device is integrated in the housing. The water cooling comprises two cooling jackets which have to be connected with each other during installation.

If a water cooling device is installed on the detector, connection has to be aligned such that the water feed pipes can be connected easily. Make sure that the water pipes do not lead past the radiation window.

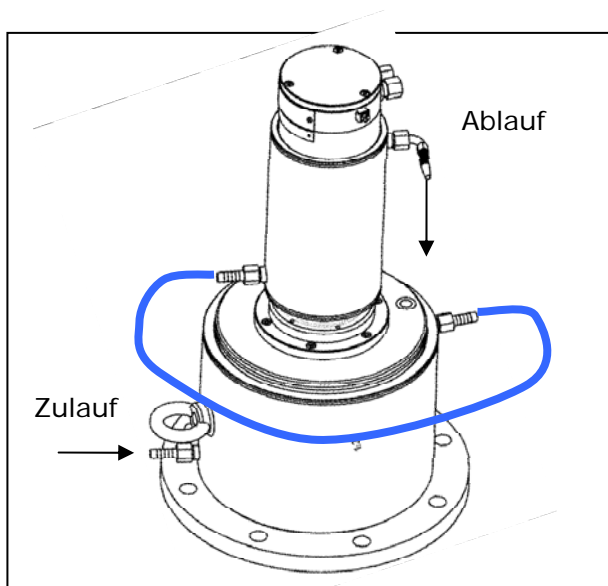
Keep the following in mind to prevent that an air cushion builds up in the water cooling device:

Horizontal installation:



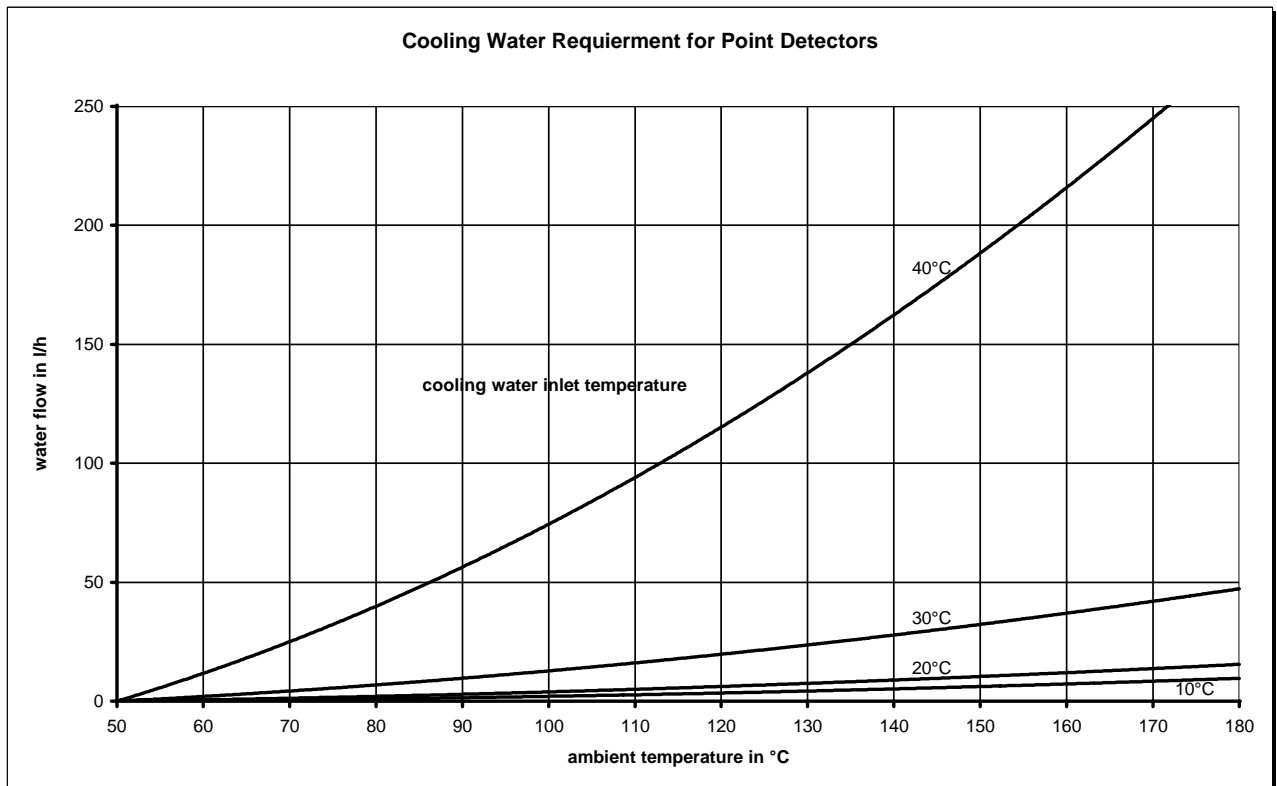
If the detector is installed horizontally, then the bottom connection piece is to be used as water inlet.

Vertical installation:



Ist der Detektor senkrecht montiert, dann muss der Stutzen der am tiefsten liegt als Zulauf verwendet werden.

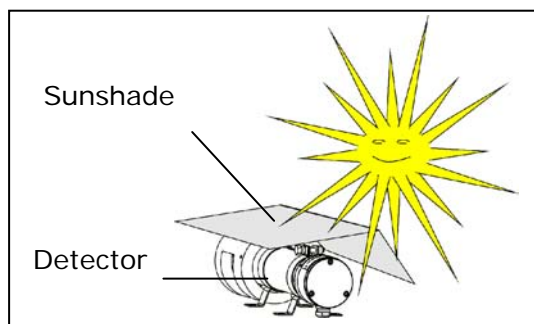
2.2 Cooling Water Characteristic Curve



2.3 Requirements on Cooling Water

The water must be free from particles like drinking water in order to avoid build ups and chocking in the water cooling jacket.

2.4 Sunshade



Direct insolation is not permitted. Otherwise, you have to install a sunshade in order to avoid a head up of the detector

3. Shielding for Sources

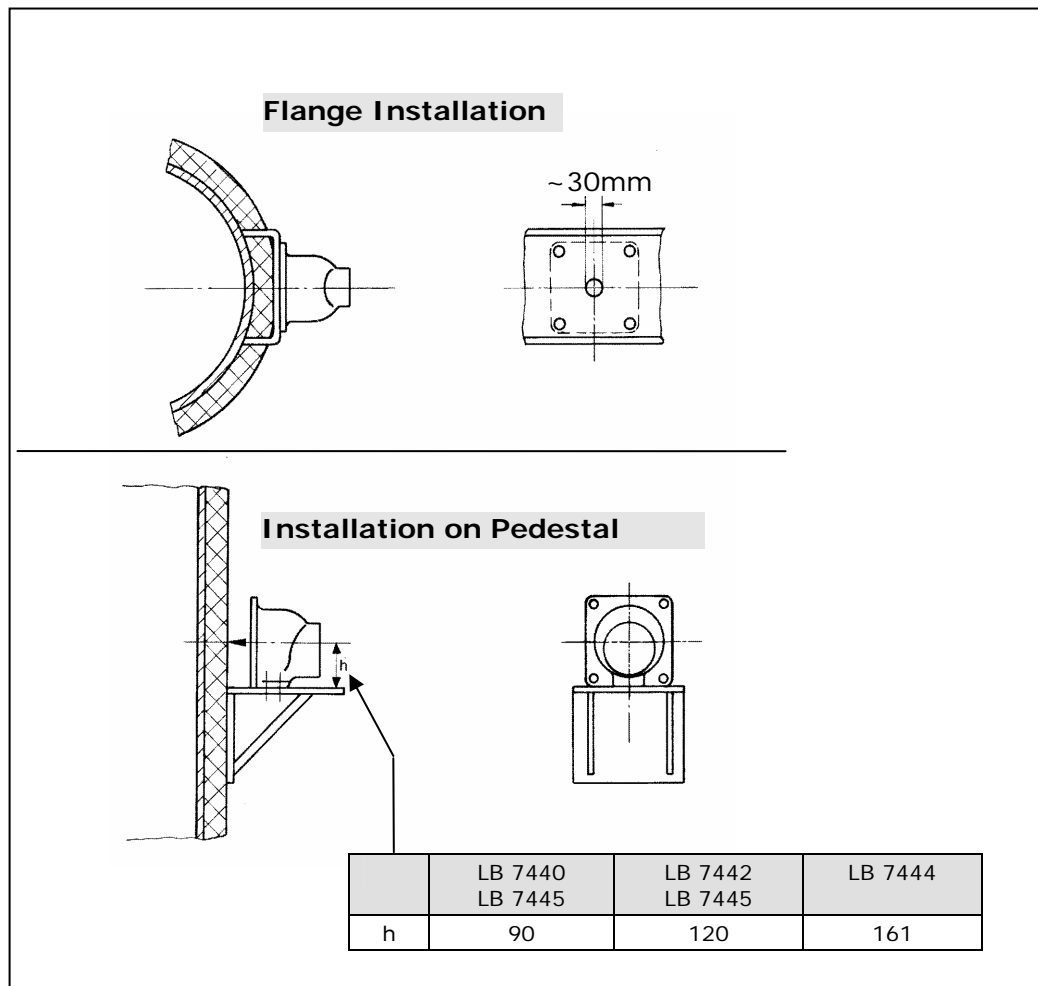
3.1 Installation Proposal for Shielding

The shielding container comprises a lead-filled sturdy cast iron housing. A revolving shutter is installed to close the radiation exit channel. This shutter is operated from the rear side via a handle, which can be locked by means of a padlock in its open or closed position.

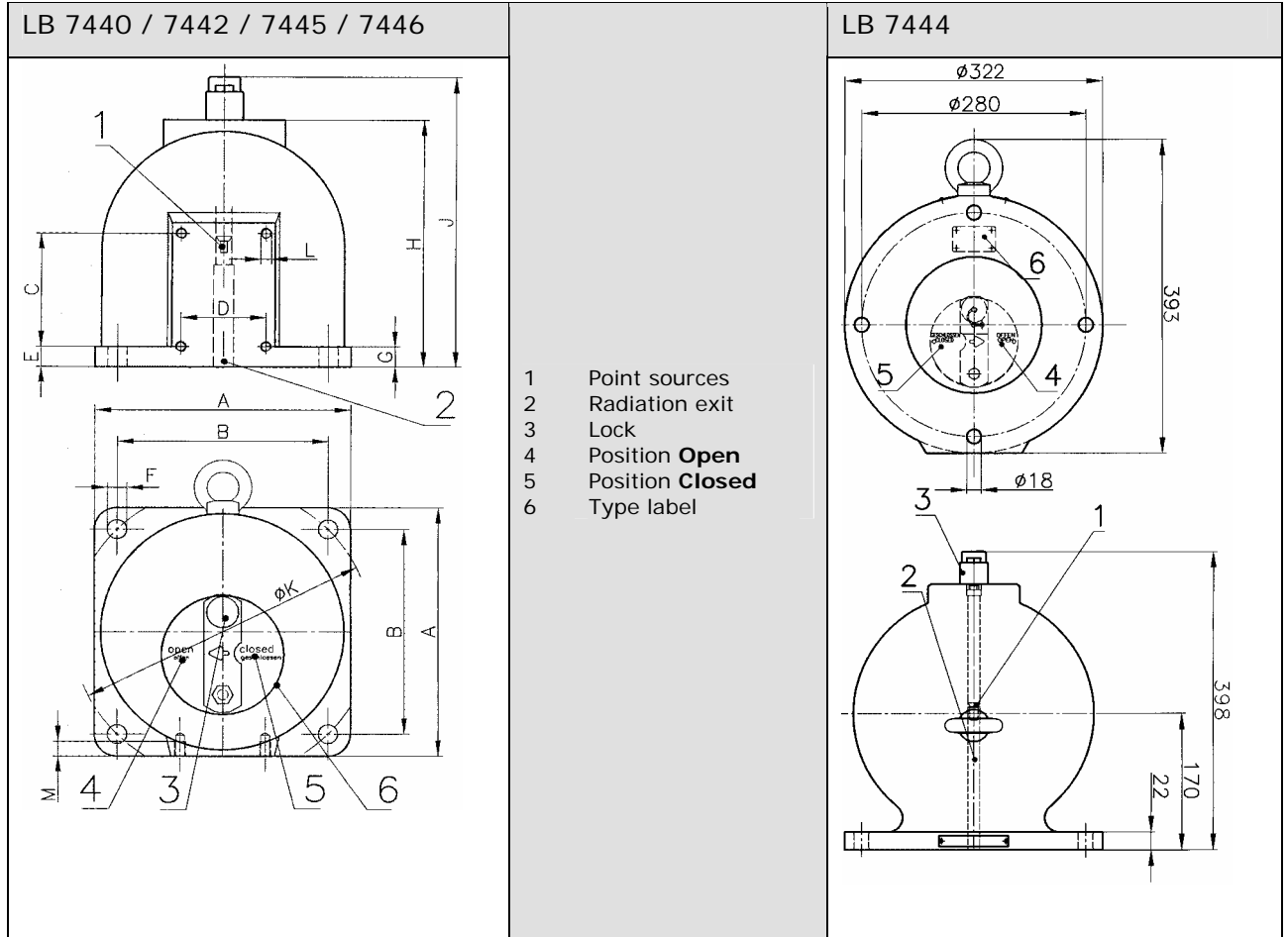
For installation, the shielding container includes a cast-on flange and in addition a fastening foot with threaded holes.

Two mounting proposals as following:

- Flange Installation
- Installation on Pedestal



3.2 Point Source Shielding LB 744X

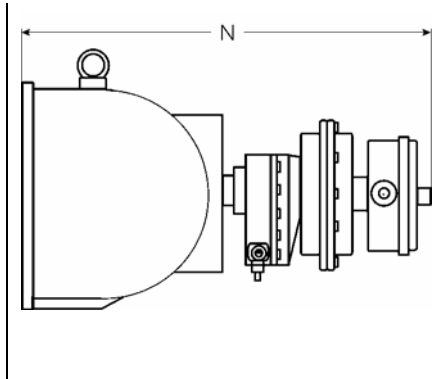


Type	Stainless steel housing	A	B	C	D	E	FØ	G	H	J	KØ	L	M	flange	✱	kg
LB 7440 F CR LB 7445 F CR	-	180	142	60	60	15	18	20	173	238	200	M 8	12	ND 125, PN 6	16°	31
LB 7440 FE CR LB 7445 FE CR	X															
LB 7442 F CR LB 7446 F CR	-	240	198	110	80	20	18	20	242	306	280	M10	14	ND 200, PN 6	9°	81
LB 7442 FE CR	X															
LB 7444 CR	-													ND 200, PN 6	6°	170

✱ Angle of radiation beam of shielding

3.3 Shielding LB 744X with Pneumatic Shutter

A pneumatic shutter device is available as an option to remote-control the shutter mechanism. The pneumatic shutter is also available with limit switch for position feedback, in different versions (see table below: Limit switch unit).



N approx.	Type
390	LB 7440 F CR LB 7440 D CR LB 7440 FE CR LB 7440 DE CR
460	LB 7442 F CR LB 7442 D CR LB 7442 FE CR LB 7442 DE CR
570	LB 7444 CR

ID No.	Description
36119	Pneumatic locking drive with limit switch IP 65
80919	Pneumatic locking drive with limit switch Ex de IIC T6

Data for pneumatic locking drive	
Compressed air:	min. 4 x 10 ⁵ Pa (4 bar) max. 4 x 10 ⁵ Pa (7 bar) connection: G 1/8
Air quality:	Clean, as usual for compressed air-tools, oil-free
Temperature range:	-20°C ... +80°C

Limit switch unit Options for signaling OPEN / CLOSED	
Option I:	IP 65 2 contact (OPEN/CLOSED) 48 V DC, 1A
Option II:	2 contact (OPEN/CLOSED) max. 250 V AC, 1A, Protection type of micro limit switch: EEx d IIC T6 Housing protection type: EEx e II T6
Option III:	2 proximity switches for intrinsically safe feeding

Individual parts of the pneumatic drive

Pneumatic drive

Pull-back spring (FAIL-SAFE) with pneumatic drive

Adjustable cam

External square for position indication or manual operation

Point source shielding LB 744X

Screwed cable gland

Limit switch unit IP 65 version

Limit switch unit Ex de version

Cable diameter 6 ... 12 mm

Cable diameter 9 ... 12 mm

Volt		Last (A)	
AC	DC	R	L
250		7	5
125		7	5
	30	7	5
	75	1	1
	125	0.5	0.06
	250	0.25	0.03

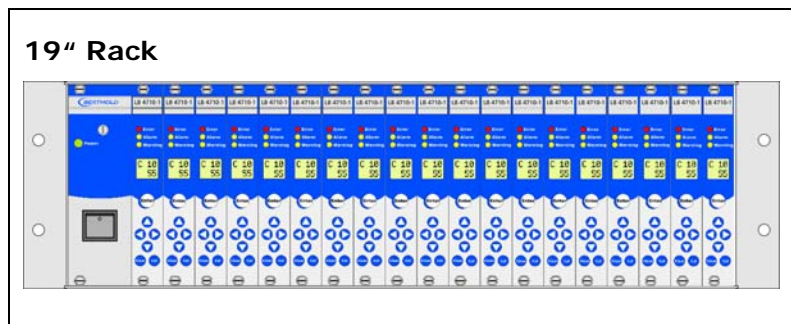
Contact ratings

Volt		Last (A)		
AC	DC	R	L	Lampe
250		15	3	1.5
125		15	3	1.5
	12	15	3	1.5
	24	10	2	1
	48	3	0.6	0.3
	250	0.25	0.05	0.025

4. Evaluation Unit

4.1 Mini Switch LB 471 Versions

The Mini Switch LB 471 can either be delivered in a 19" rack, in a wall housing, or in a cassette. The module for the 19" rack and for the wall mounted housing has 4TE. The cassette has 7TE.



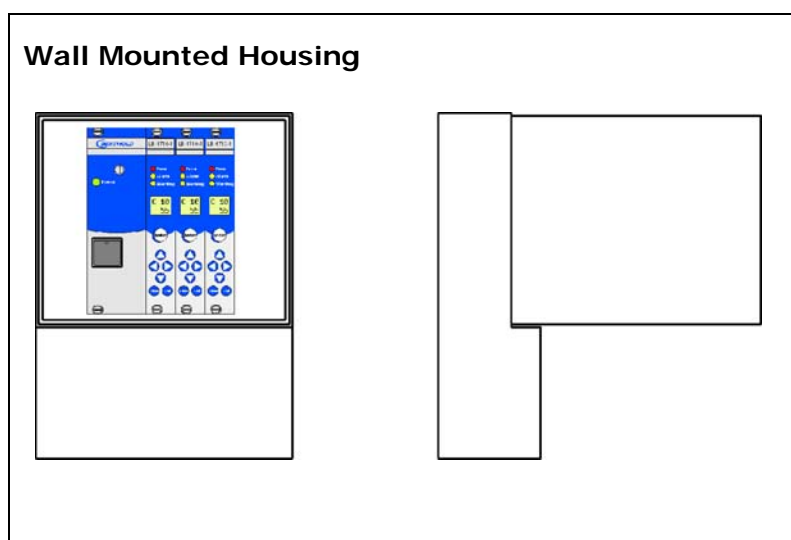
The 19" rack can be mixed with level switches 4TE for GM Detector and for NaI Detector. The 19" rack has a back plane.

A filter module is used for 24 V AC/DC supply (remaining space for maximum 19 Mini Switch units). It features:

- a power switch
- a power on LED
- two fuses
- a filter

A power supply unit 85W is installed for 115/230V supply (remaining space for maximum 18 Mini Switch units). Additional to the filter module it features:

- a transformer with a power range selector 115V/230V

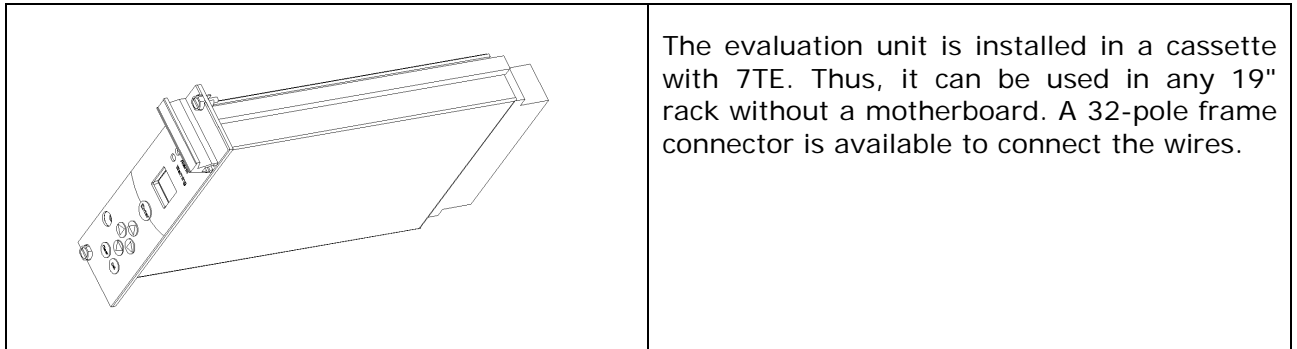


The wall mounted housing can be mixed with level switches 4TE for GM Detector and for NaI Detector. The wall mounted housing has a back plane. Up to 3 Mini Switch units can be installed.

The same **filter module** as for the 19" rack is used for 24 V AC/DC supply.

A **power supply** unit is installed for 115/230VAC supply. Additional to the filter module it features a transformer wie power range selector 115V/230V

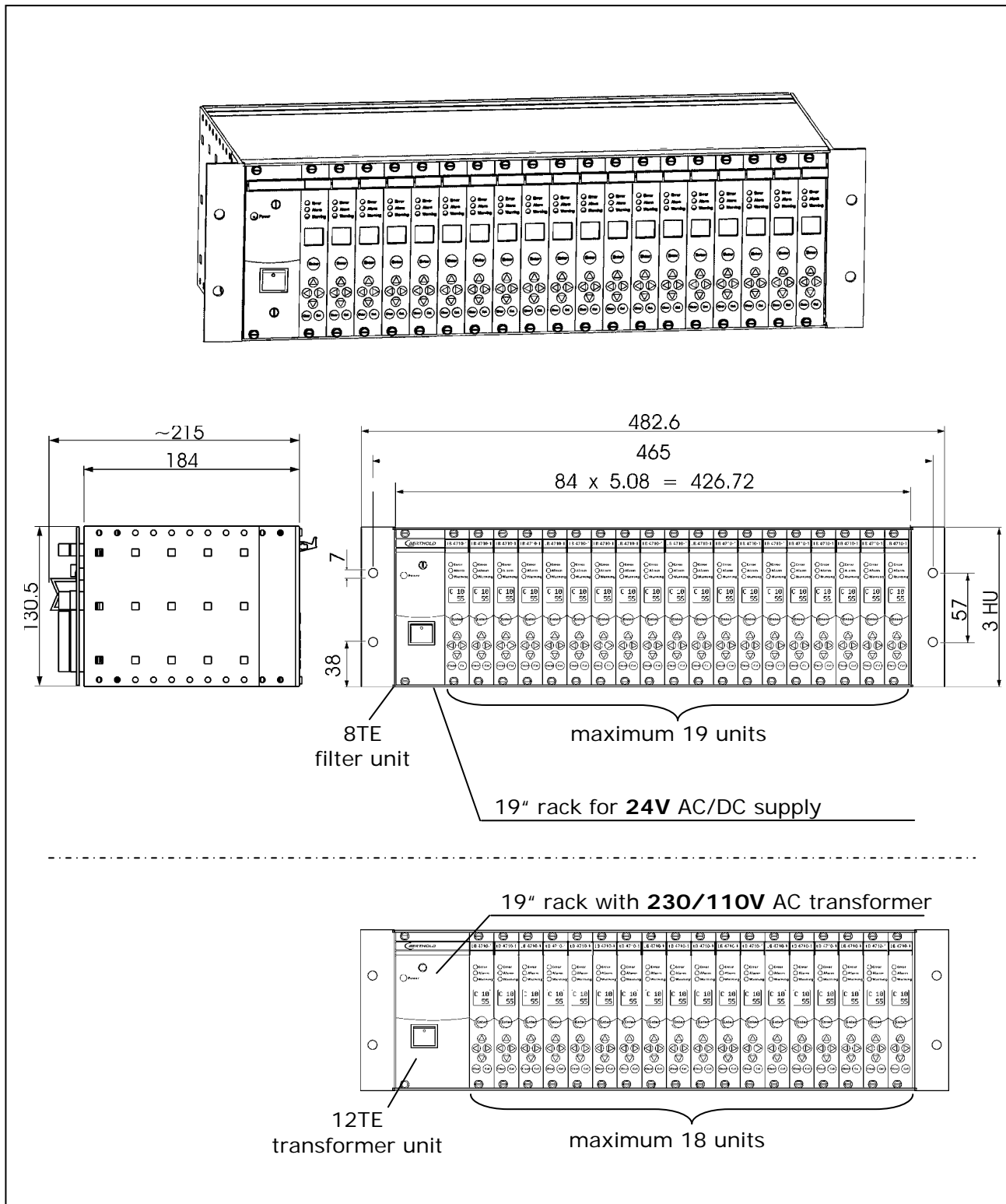
Cassette 7TE



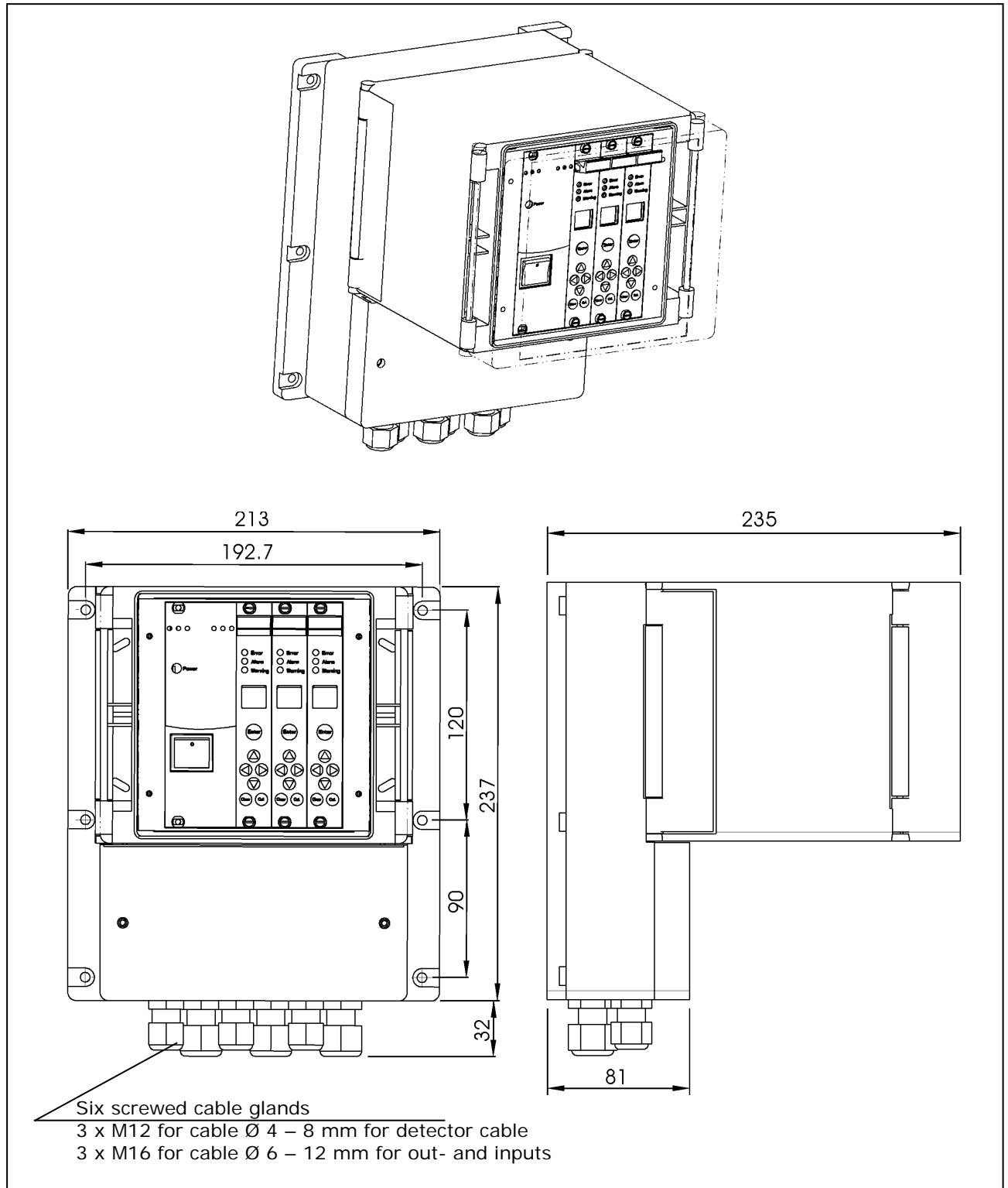
4.2 Type Code of the Evaluation Unit

Type	Detector Connection	Version
LB4710-150	II (2) G [EEx ib] IIC and I M2 [EEx ib] I	19" rack / wall mounted housing
LB4710-160	II (2) G [EEx ib] IIC and I M2 [EEx ib] I	cassette
LB4710-180	none Ex	19" rack / wall mounted housing
LB4710-190	none Ex	cassette

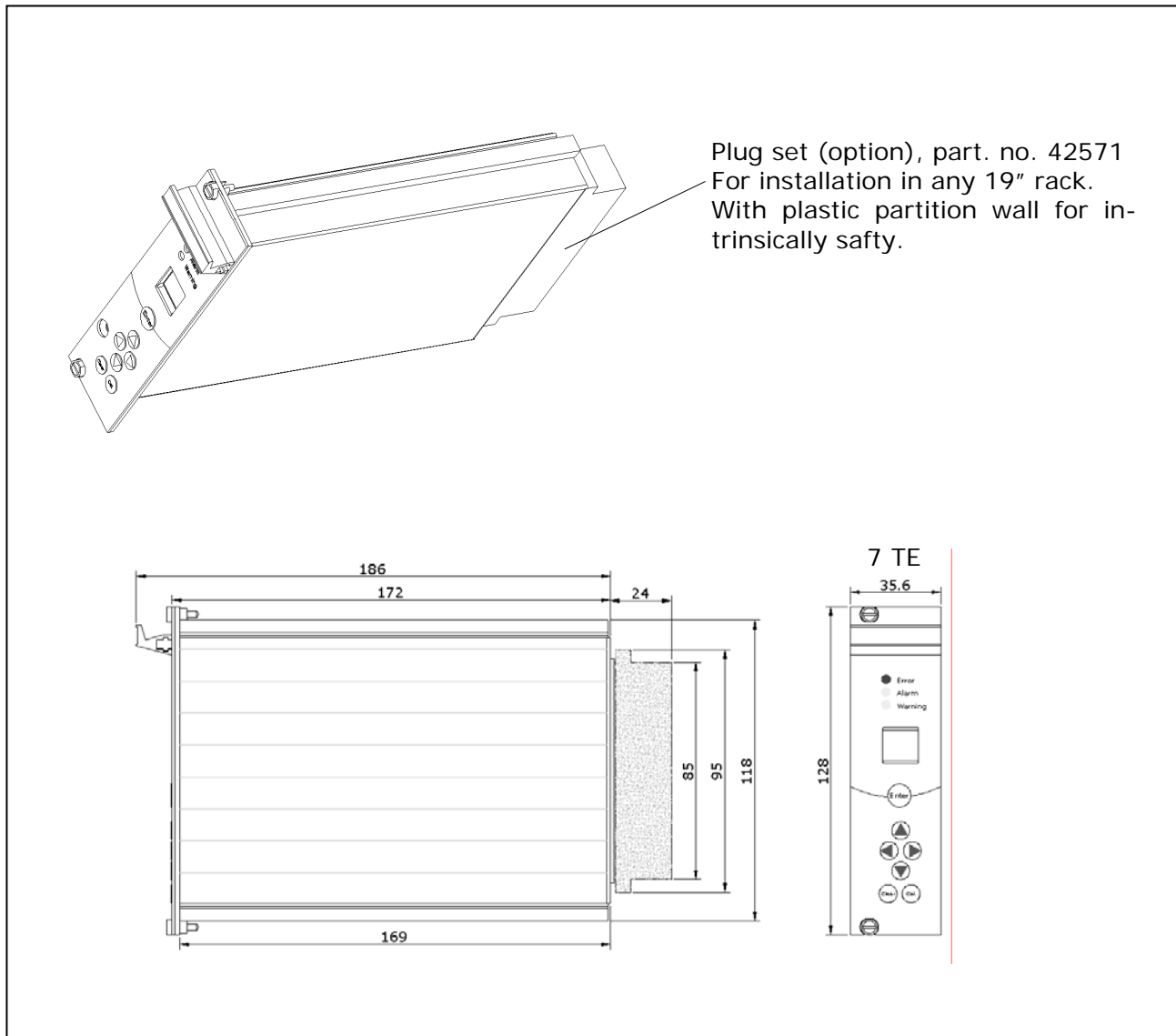
4.3 Dimensions of the 19" Rack



4.4 Dimensions of the Wall Mounted Housing



4.5 Dimensions of the Cassette



4.6 Connection Diagrams

4.6.1 19" Rack

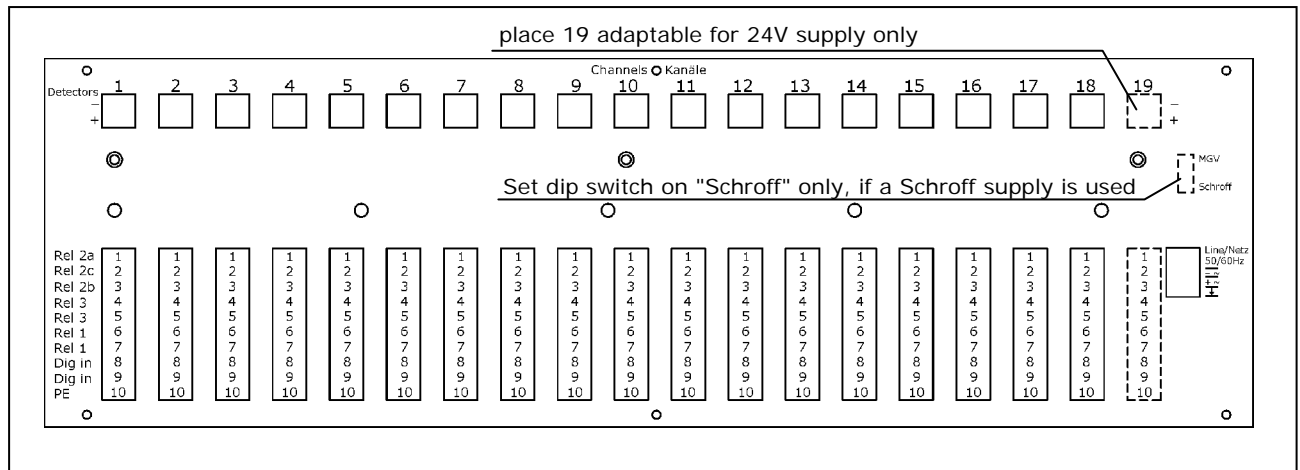


Figure 1: Pin assignment 19" rack

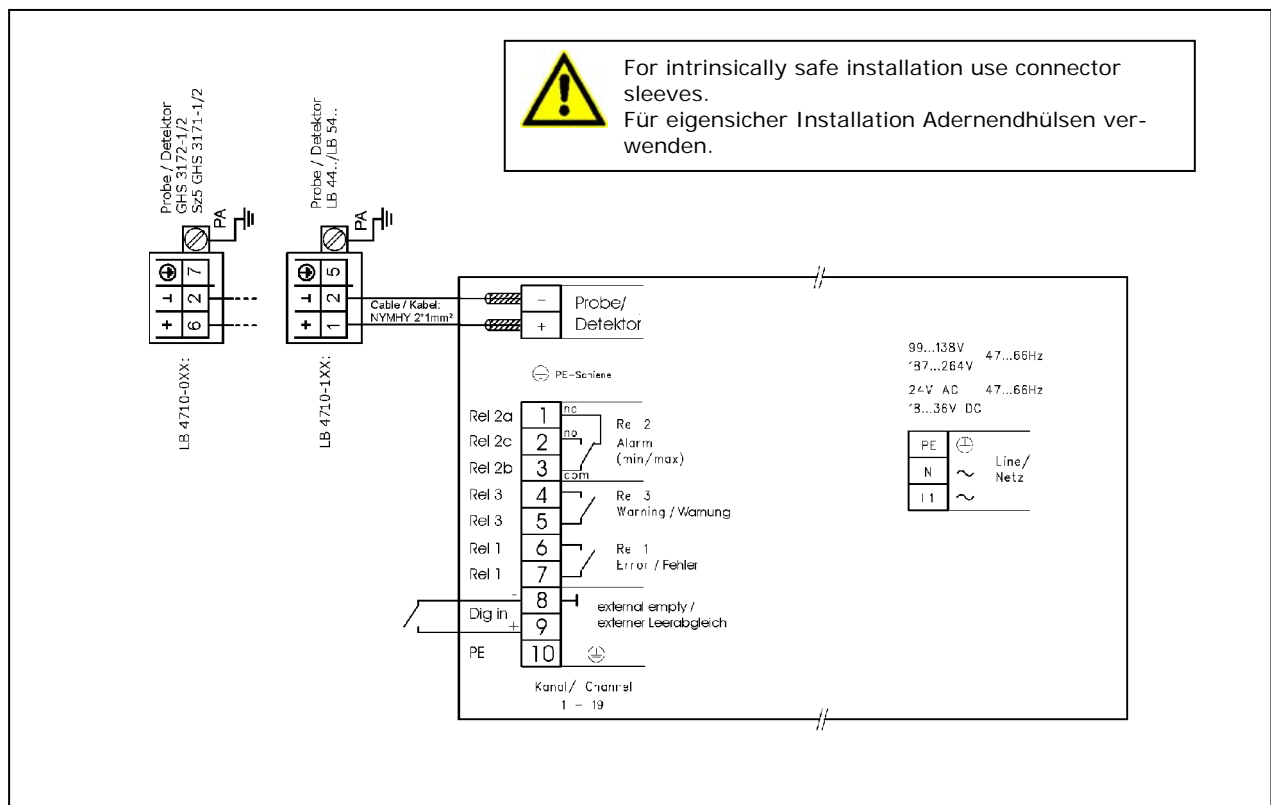


Figure 2: Connection diagram 19" rack

4.6.2 Wall Mounted Housing

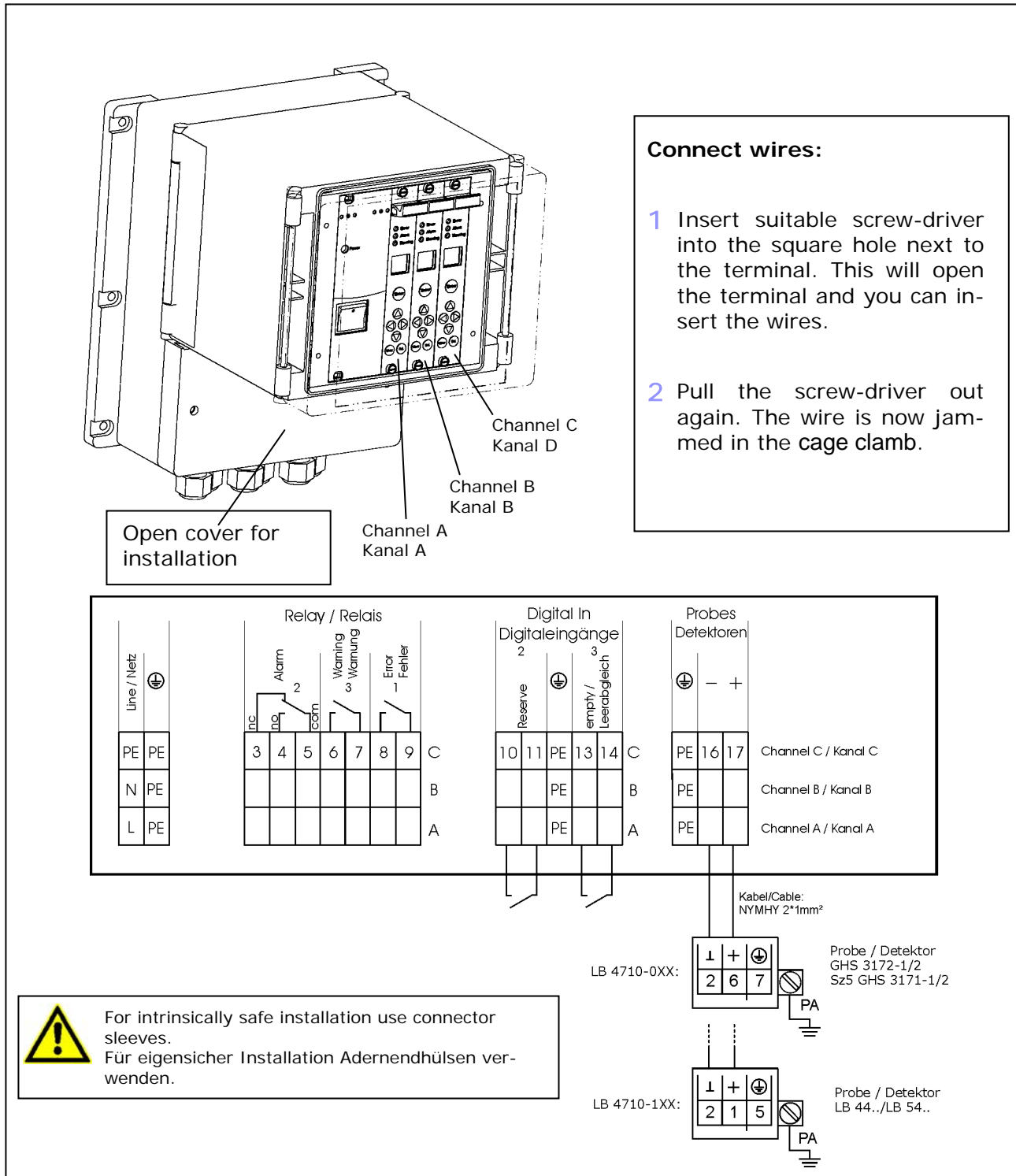


Figure 3: Connection diagram wall mounted housing

4.6.3 Cassette

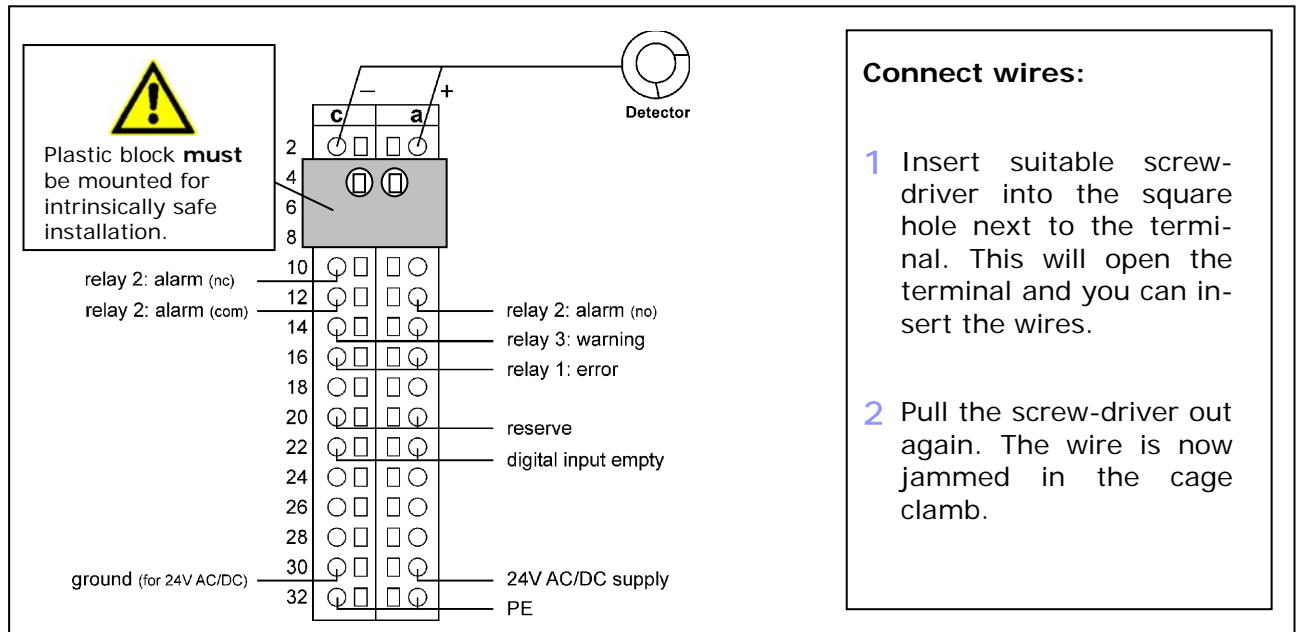


Figure 4: Pin assignment of frame connector

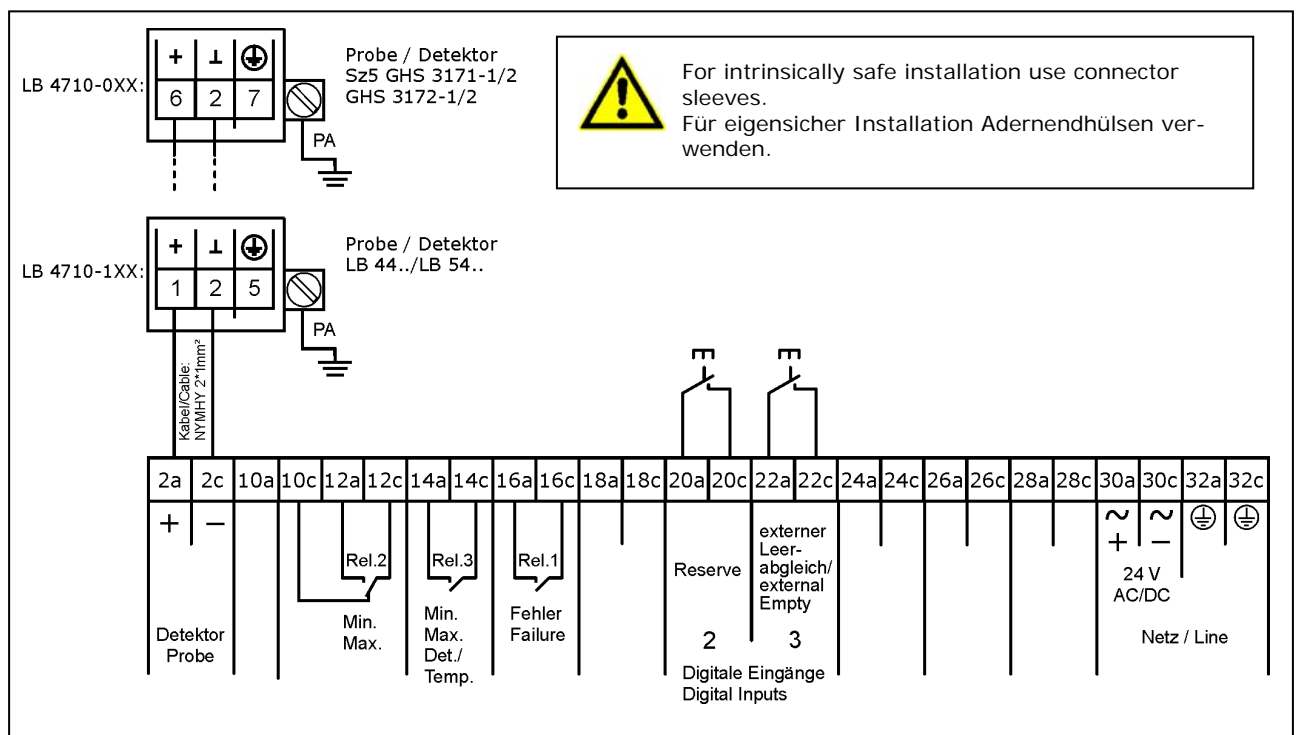


Figure 5: Connection diagram of frame connector