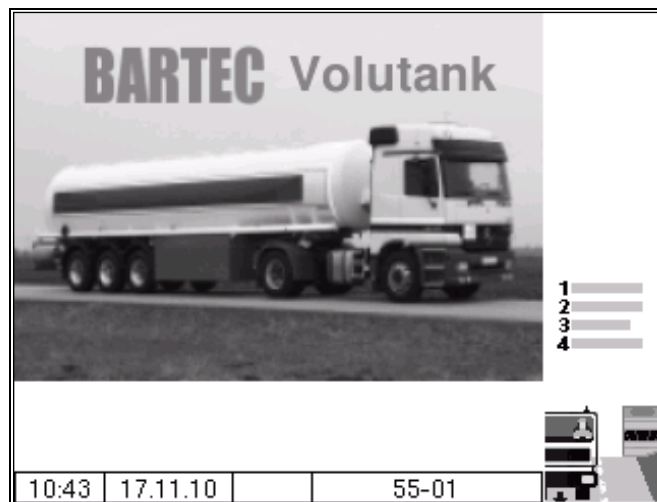


VOLUTANK 3003

Service instructions



SA 110927

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Exclusion of liability

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BARTEC BENKE accepts no liability for any damage resulting from non-observance of the safety regulations or from non-compliance with the operating instructions or operating conditions.
Secondary damage is excluded from the liability.

EU-Declaration of conformity

We, BARTEC BENKE GmbH, Schulstraße 30, D-94239 Gotteszell, hereby declare, that this product is in compliance with the essential requirements of the relevant EU-Directives

The EU-Declaration of conformity for this product can be obtained from BARTEC BENKE GmbH, Schulstraße 30, D-94239 Gotteszell, info@bartec.com

Waste disposal

Make sure that the product described here is disposed of in an environmentally sound manner. Observe the national and local safety regulations.

1 About this manual

The illustrations in this manual are intended to illustrate the information and descriptions. They cannot always be transferred unchanged and may differ slightly from the actual design of the device.

BARTEC GmbH reserves the right to make technical changes at any time. BARTEC GmbH is under no circumstances responsible or liable for any indirect or consequential damages resulting from the use, operation or application of this user manual.

Please read the operating instructions carefully before using the product.

Signs and symbols

The following characters and symbols are used in this manual to highlight passages that need special attention.



Notes

This arrow indicates special features to be observed during operation.



Warning

This symbol draws your attention to passages that, if not followed or followed inaccurately, may result in damage to or destruction of parts of the system or loss of data.



Danger!

This symbol marks passages that, if not followed, endanger the health or life of humans.

Special notes that appear within the text are marked with a frame.

2 Safety precautions

2.1 General Safety Regulations

The operator of the system is responsible for compliance with all the regulations that apply to the storage, transportation and transshipment of flammable liquids.

For safe installation and commissioning, the knowledge of the safety instructions and warnings in this service manual and their strict compliance are essential.

Careful handling and consistent adherence to instructions can help to prevent accidents, injuries and property damage.

Regulations and requirements lose none of their validity when the system is operated using PETRODAT units.

PETRODAT units were manufactured with due consideration to the regulations in force and left the factory in perfect condition. The equipment must be installed and maintained by qualified technical personnel.

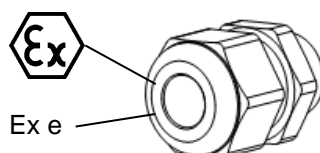
- Make sure that the data and operating conditions specified by the manufacturer (BARTEC BENKE) are observed.
- Follow the instructions for operating and servicing the units.
- If you discover any signs of damage or destruction to any parts of the system or if safe operation of the equipment cannot be guaranteed for any other reason, do not start up the system or, if already in operation, shut it down immediately.
Notify the local service centre.
- You should also contact our service specialists if you discover any faults or defects during operation or if you have cause to doubt whether the units are working properly.
- The PETRODAT units do not replace the safety facilities of the tanker or the customer (e.g. the overfill safety system).

2.2 Installation instructions

- Fit the units so that the specified climatic and temperature values are not exceeded. Protect them, if necessary, by covering, heating or cooling them.
- The installation location should be as free from vibration and shocks as possible. Protect all components from vibration through the use of sturdy mounts.
- The place where the printer is installed must provide continuous protection against dirt and moisture.
- When carrying out welding work on the vehicle, the power supply cable to the system must be disconnected (disconnect control gear).
- Protect the units, in particular the printer, against dirt during installation (metal chips, etc.).
- Seal cable glands that are not used with blanking plugs.
- Before installing, remove the fittings to protect the printer during transport.
- All solenoid valves fitted must be interference-suppressed (anti-surge diode).

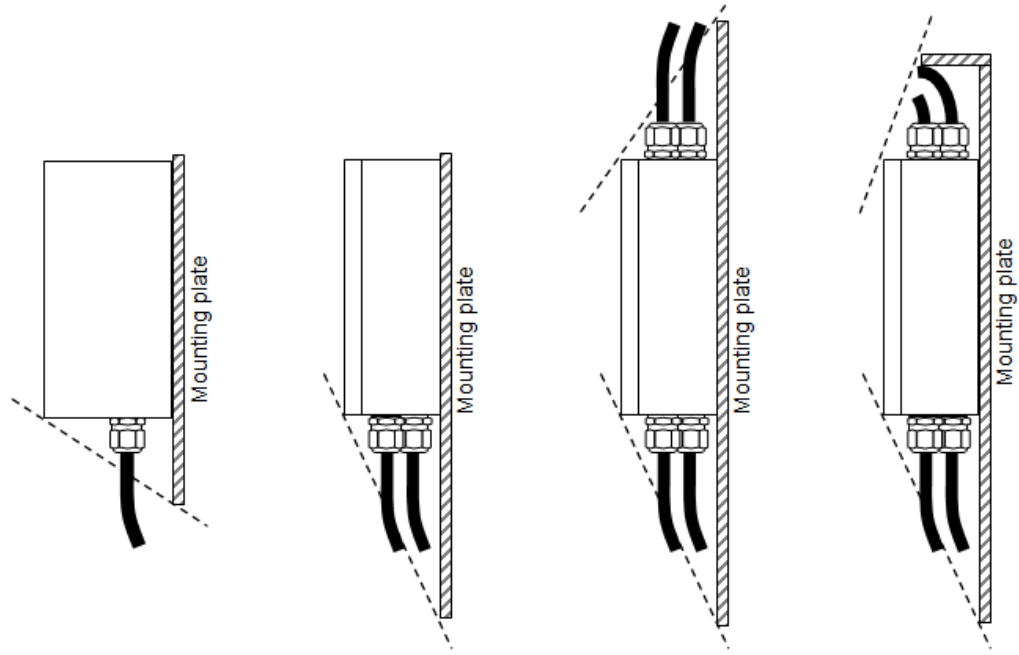
2.2.1 Installation explosionprotected cable glands "Increased safety" Ex e

Explosion-proof plastic cable glands in type of protection increased safety "Ex e" are suitable for low degree of mechanical hazard.

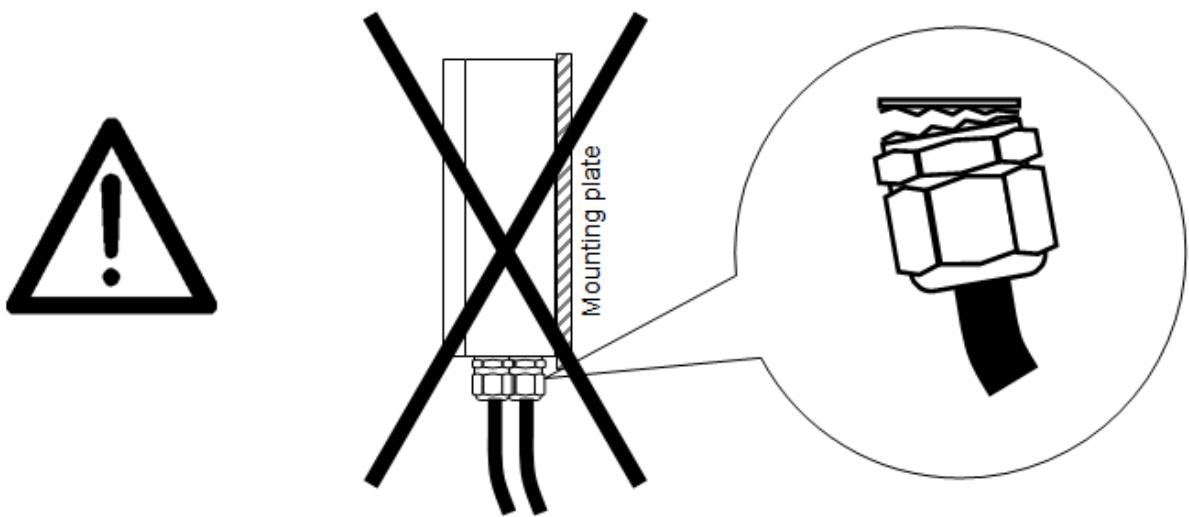


Plastic-cable glands „Ex e IIC Gb“

When installing the equipment, make sure that the cable glands are at no exposed areas and can not be damaged by moving objects. Therefore, the following installation situations are recommended.



recommended mounting



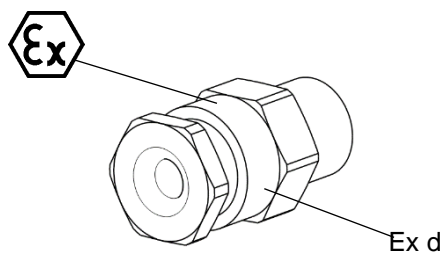
impermissible installation

- If a higher degree of mechanical hazard, an additional protection by a cover can be necessary.

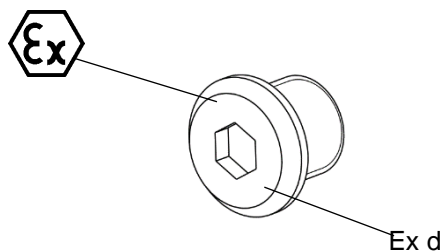
2.2.2 Installation explosionprotected cable glands "Flameproof enclosure" Ex ° d



The basic module is designed in type of protection "flameproof enclosure". Therefore, only the cable glands specified in the table below may be used for the base module according to the outer sheath diameter of the cable used. Unused threaded holes must only be closed with the cap specified in the table.

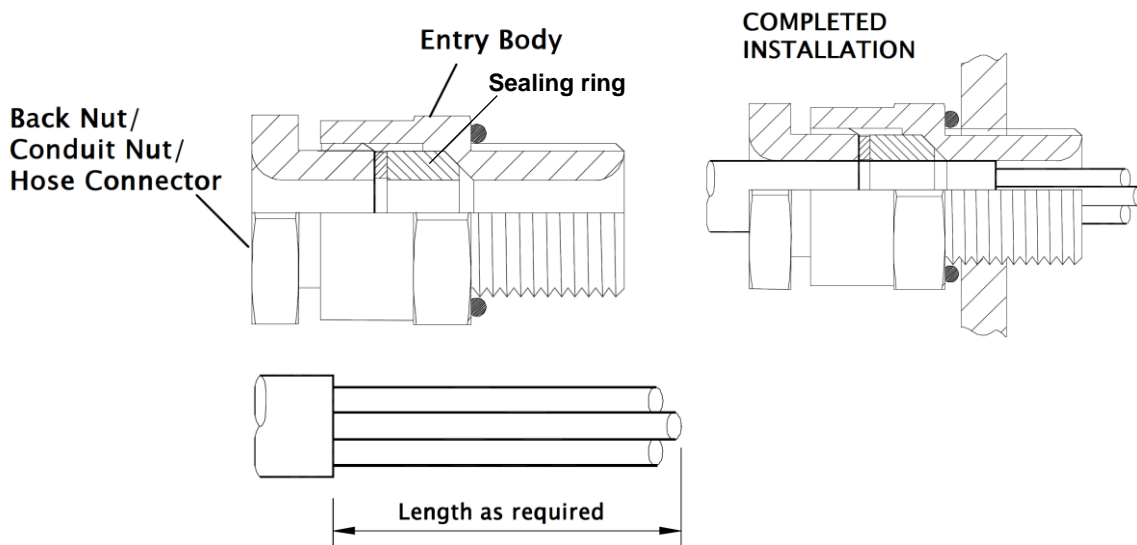


Brass cable gland „Ex d IIC Gb“



Brass shutter „Ex d IIC Gb“

Mounting of cable glands



2.3 Wiring instructions

- The wiring must be carried out by trained personnel.
- Installation must be in accordance with EN 60079-14 and ADR/GGVS as well as the relevant national regulations.
- The service instructions must be followed when wiring the unit.
- The connecting cable must be laid so that no individual sections of the cable sag.

It is appropriate to fasten the cable every approx. 15 - 20 cm using cable clips or cable ties.

Special care is required when laying the cable near the radiator, in the engine compartment, in the truck chassis members and in the delivery cabin.

Under no circumstances should areas of weakness be created where the cable may be bent or chafed.

- Fit wire end connector sleeves to the ends of cables for terminals.
- Tighten unassigned clamping screws.
- Unused wires must be isolated individually.

2.4 Information on maintenance and repair

- Maintenance and repair must be carried out by trained personnel.
- Before carrying out maintenance and repair work, switch off the units and protect them from being switched on again for the duration of the maintenance work.

2.5 Information on electrostatic discharge

Dangerous electrical charges can be triggered by the flow of non-conductive fluids. The product and vapour recovery hoses are capable of conducting away this charge. However, they are electrically insulated both on the tanker and the tank. The electrical charge is therefore conducted away to the tanker via the cable connecting the product and vapour recovery hose with the i-Box type 6912-1x and to the earthed tank via the discharge resistor R_{ESD} .

The connections "OUT1" to "OUT20" and "L1", "L2" and "L3" and "C1", "C2" and "C3" on the i-Box are each electrically connected to the metal housing via two 100 k Ω resistors. One $< 10^6 \Omega$ resistor is sufficient, according to TRBS 2153, para. 4.4.2 (Technical Rules for Operating Safety), for electrostatic discharge during filling processes on road tankers.



Attention:

Measures must be taken when installing the i-Box type 6912-1x to ensure that there is an electrically conductive connection between the metal housing of the i-Box and the vehicle chassis.

Fig. 1: Basic circuit diagram illustrating electrostatic discharge

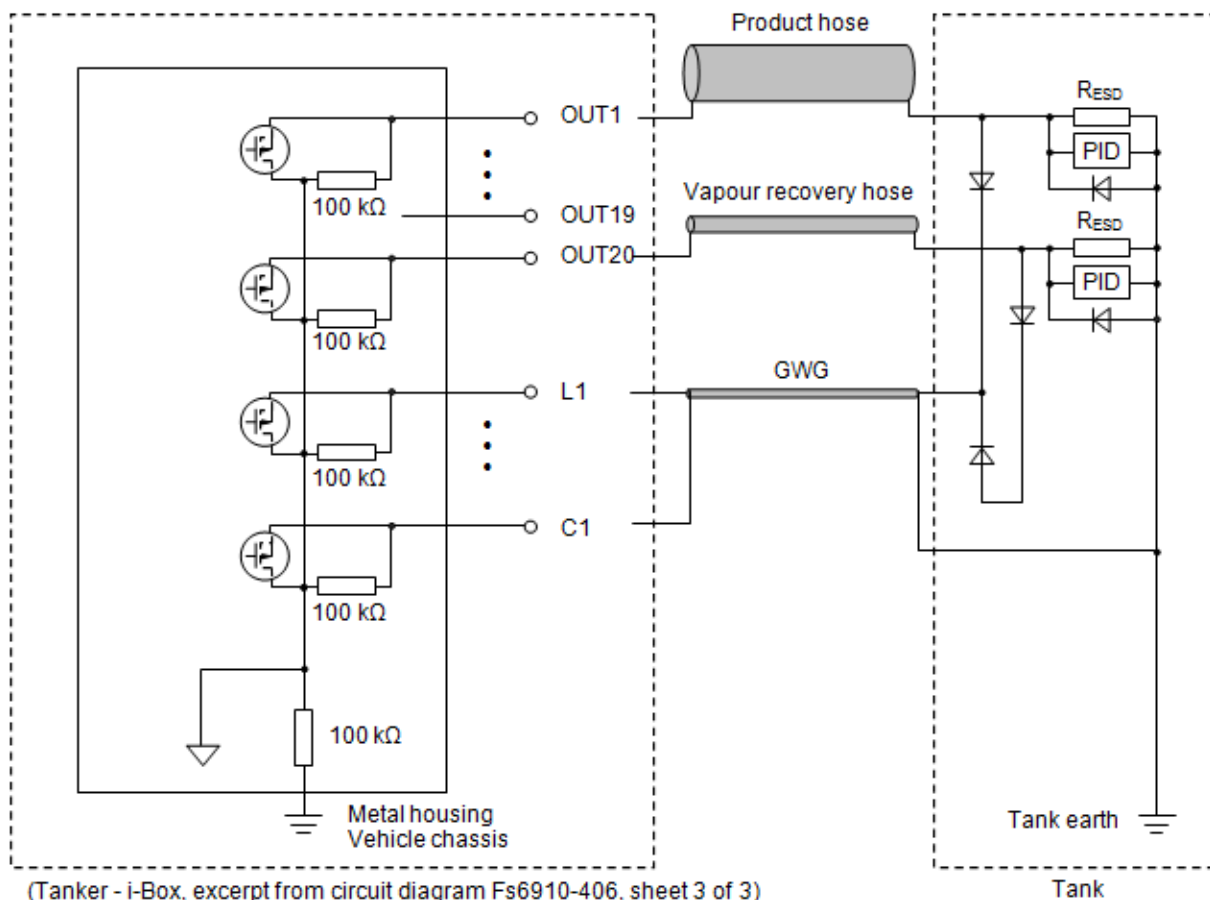
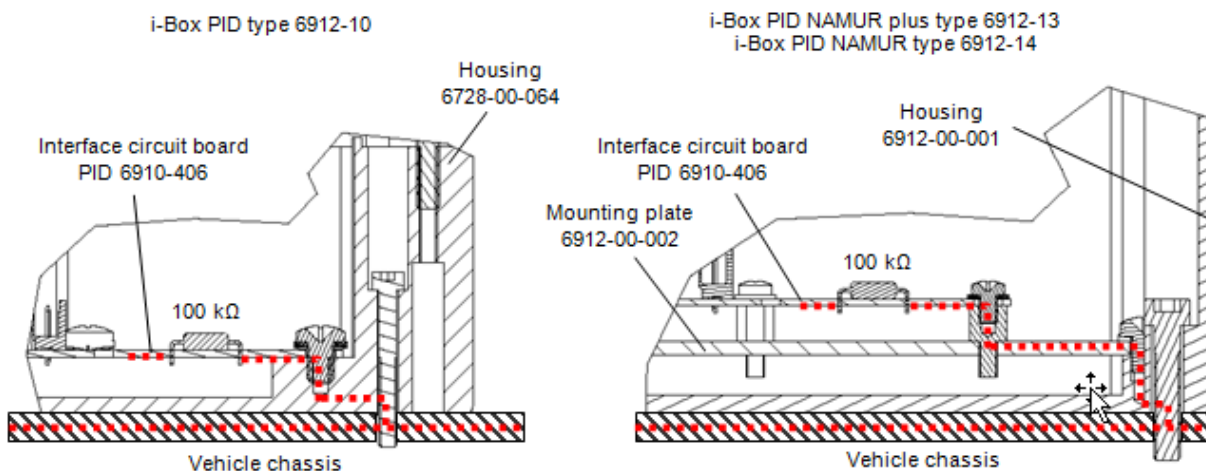


Fig. 2: Electrostatic discharge path in i-Box



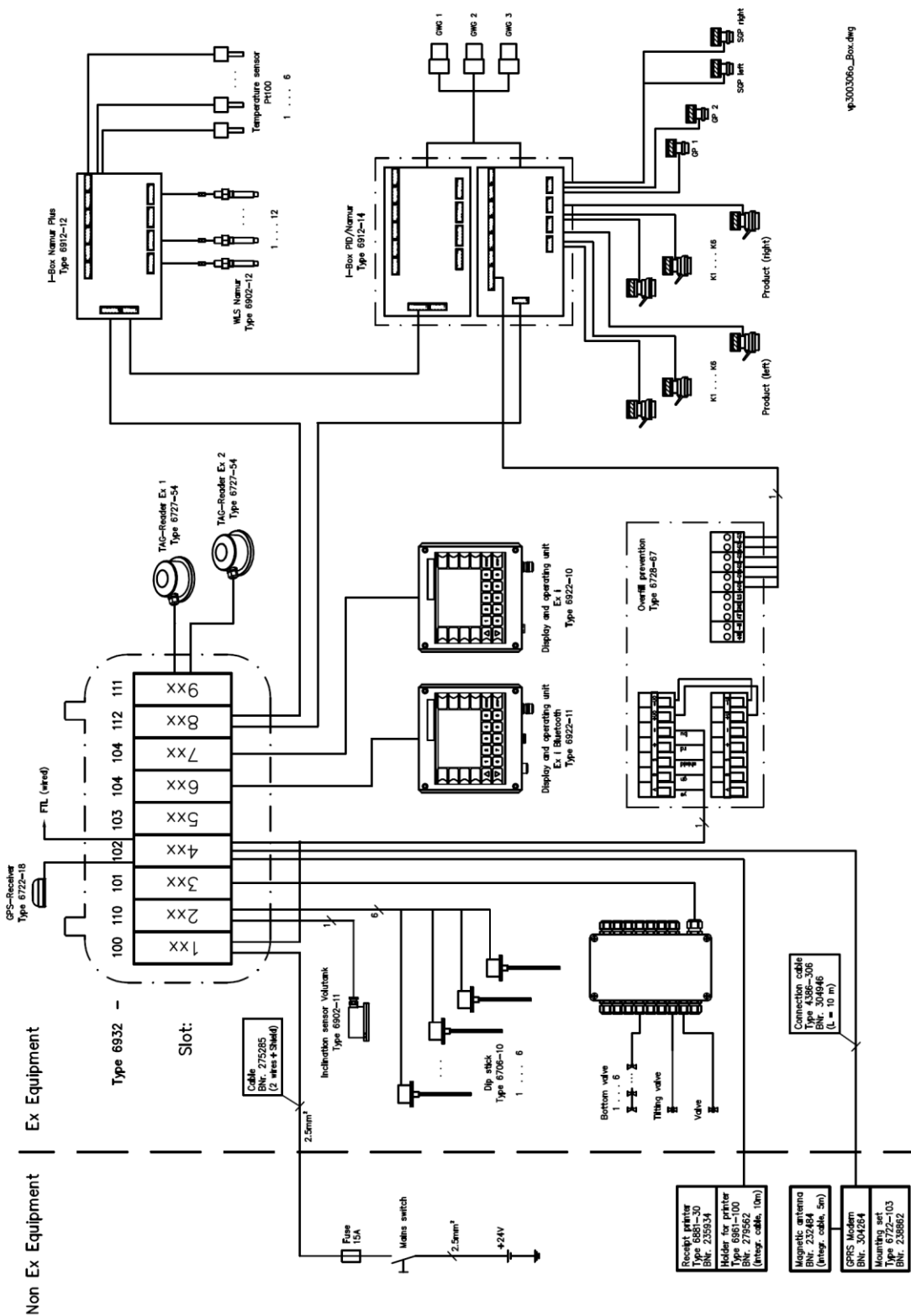
2.6 Legend Technical Data

See Technical Data

Maximum output voltage	U _o
Maximum input voltage	U _i
Maximum voltage	U _m
Maximum source voltage	U _q
Maximum output current	I _o
Maximum input current	I _i
Maximum stationary input voltage	I _s
Maximum output power	P _o
Maximum input power	P _i
Maximum external capacitance	C _o
Maximum internal capacitance	C _i
Maximum external inductance	L _o
Maximum internal inductance	L _i
Maximum source resistance	R _q
Internal resistance	R _i
Switching distance	S _n
Supply voltage	U _v
Nominal voltage	U _n

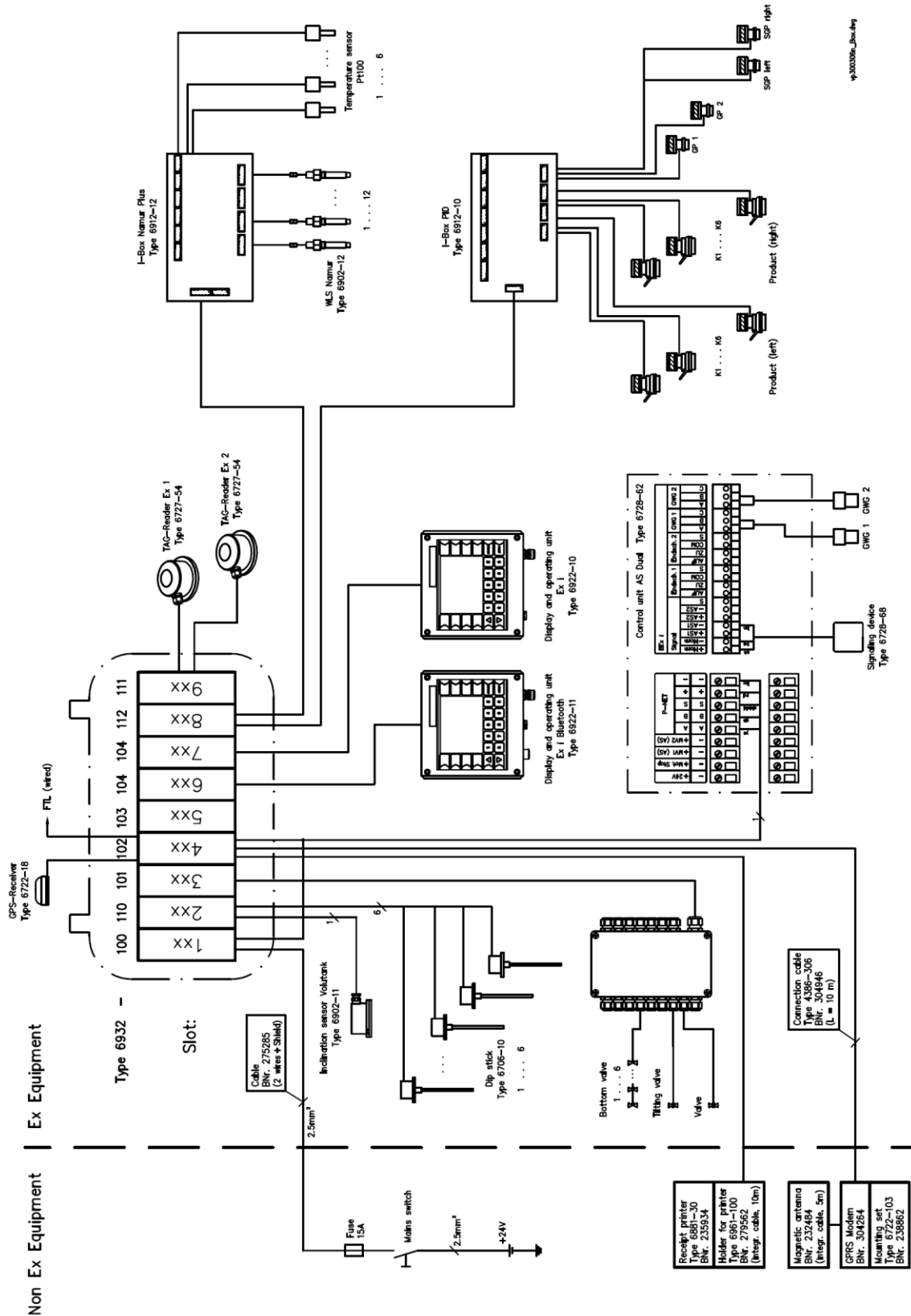
2.7 Wiring diagrams

2.7.1 Example VOLUTANK

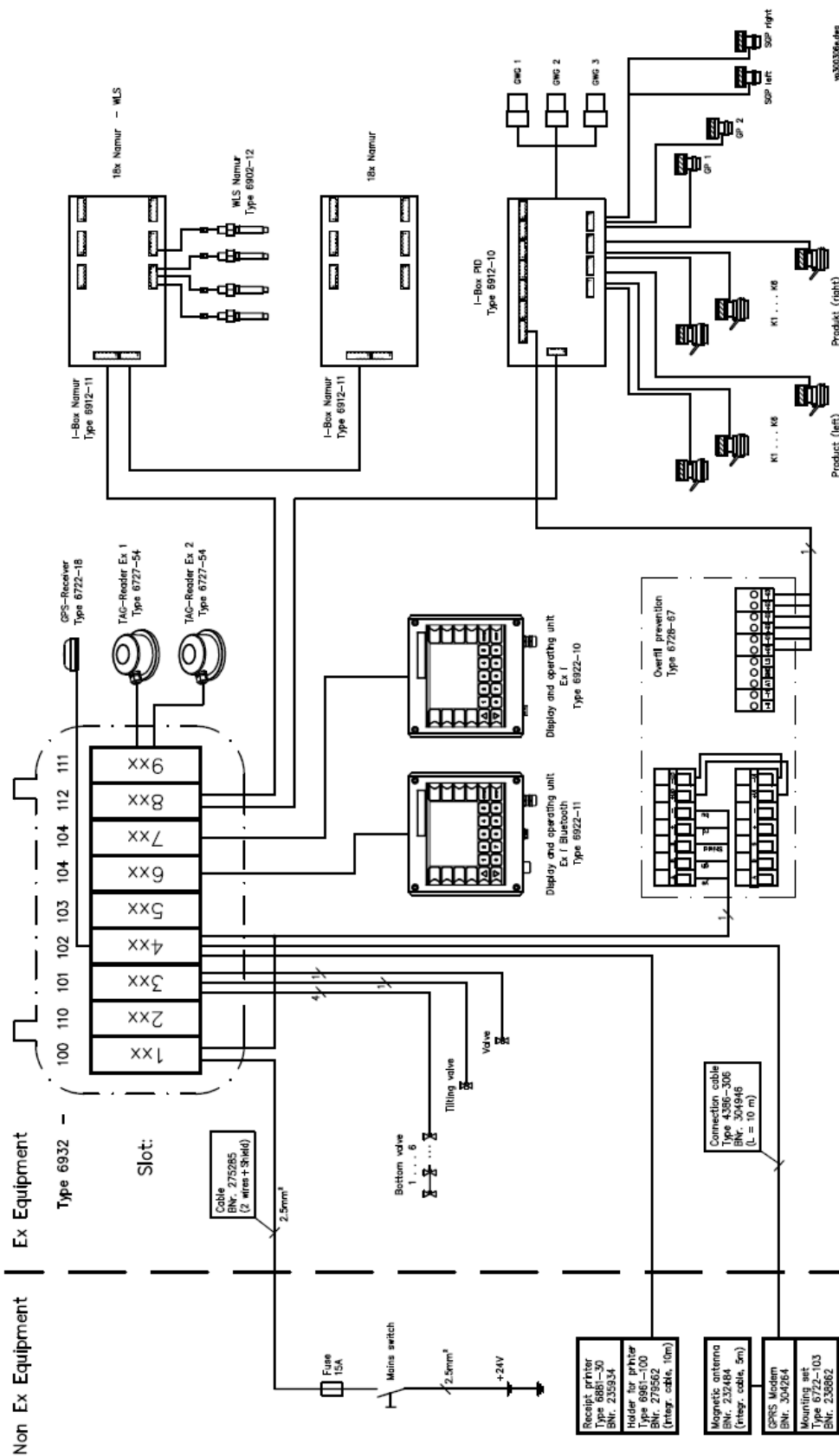


vp-300306a_Box.dwg

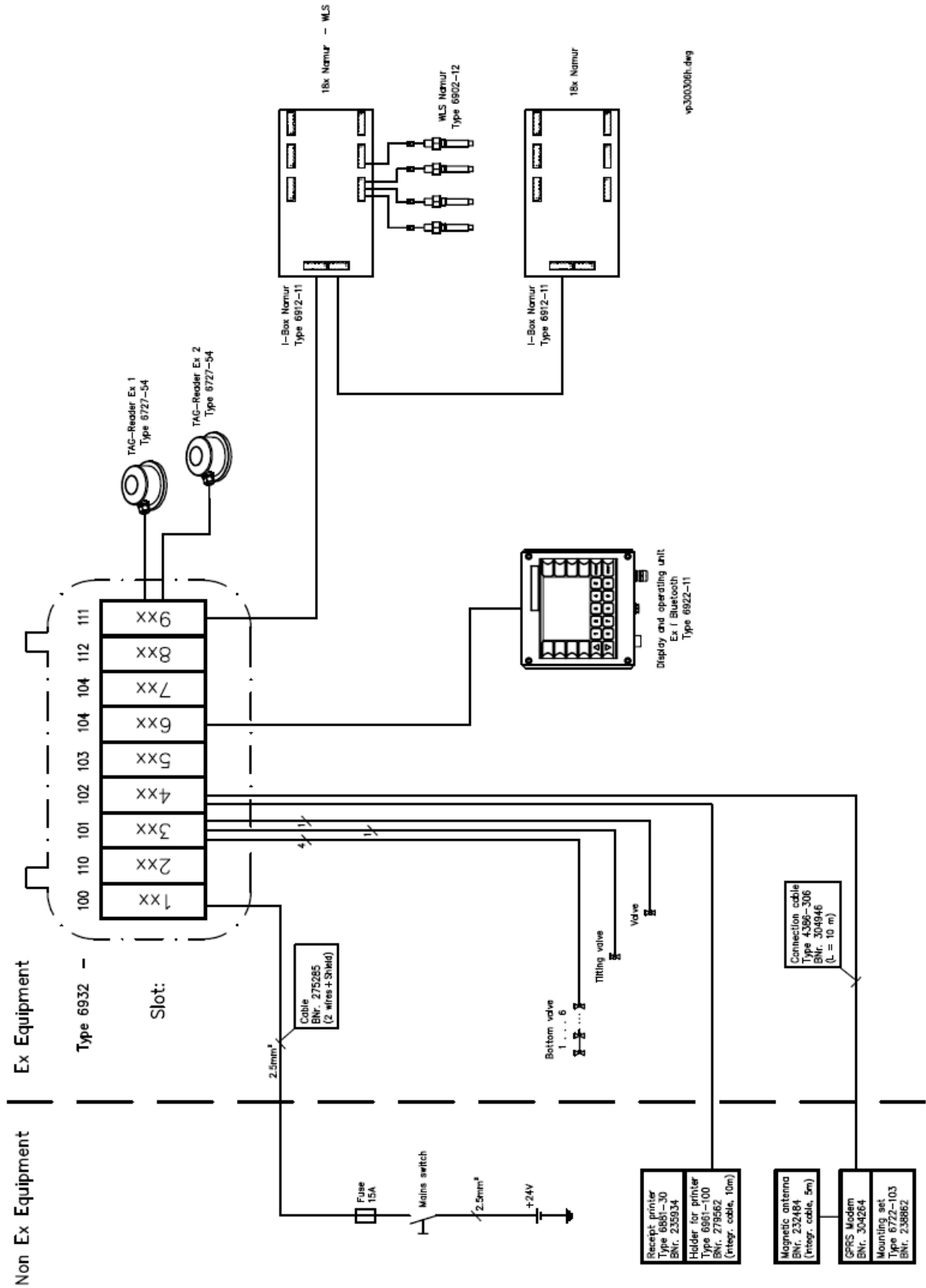
2.7.2 Example VOLUTANK with overflow prevention optically



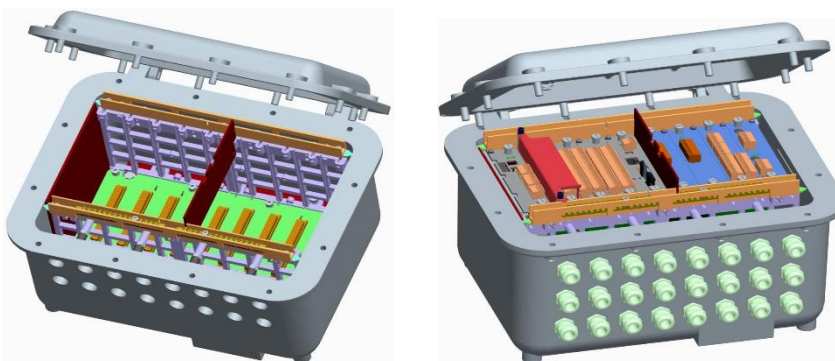
2.7.3 Example SAFE



2.7.4 Example SPDS



3 Basic module



Basic module 16 type 6932-10 Basic module 24 type 6932-11

3.1 Technical data

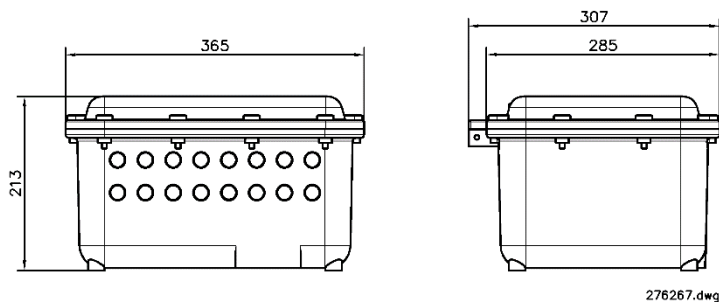
Electrical data	
Auxiliary energy	DC 24 V on-board power supply (depending on power supply plug-in unit)
Connection type	plug-in terminals, cable gland
Inputs and outputs	see modules
Interfaces	see modules
Ambient conditions	
Operating temperature	- 20 ... + 50 °C
Storage temperature	- 20 ... + 50 °C
Equipment group / category / type of protection	II 2 (1) G Ex d [ja IIB Ga] IIA + C ₂ H ₆ O T4
Certificates	PTB 12 ATEX 1023 X IECEX PTB 14 0009X
Standards	EN 60079-0, EN 60079-1, EN 60079-14 IEC 60079-0, IEC 60079-1, IEC 60079-14
Max. allowable power dissipation	135 W
Protection type	IP 65 in accordance with DIN 40050
Device-specific data	
Measurement ranges	see modules
Precision / resolution	see modules
Nominal conditions	23 °C ± 2 °C
Display	external HMI
Mechanical data	
Dimensions	see dimensional drawing
Mounting holes	see dimensional drawing
Weight	about 15.8 kg (without modules and without cable glands)
Enclosure material	aluminium cast
Ordering details	
Designation	Order number
Basic module 16, type 6932-10	276267
Basic module 24, type 6932-11	302531

3.2 Safety instructions

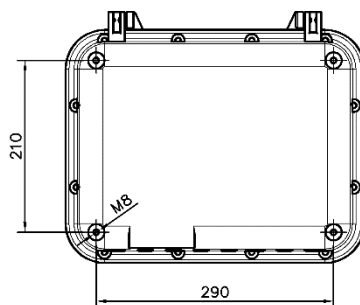
- The joint surfaces must be protected from corrosion with a non-hardening grease (see also EN 60079-14:2003, Para. 10.3)
- For components which are not specified in the examination documents, at least 20% of every cross-sectional area must remain clear. (see EN 60079-1:2004, Appendix D.4.2.7)
- Batteries may only be used in compliance with EN 60079-1:2004, Appendix E.
- Due to the cable glands used with an elastic sealing ring and the housing volume of over 2 dm³, no ignition sources must be present in normal operation (see EN 60079-14:2003, Para. 10.4.2, b and Appendix C.2.1.1 of EN 60079-1:2004)
- Cables and wires must be made of thermoplastic duroplastic or elastomeric materials which to a large extent are firm and circular, have extruded embedding material and whose filler materials, where present, are not hygroscopic (EN 60079-14:2003, Para. 10.4.2)
- Once installed do not dismantle except for routine inspection. An inspection should be conducted as per EN 60079-17. After inspection the gland should be re-assembled as instructed, ensuring the back nut is correctly tightened to ensure the cable is secure.
- If neither earthing nor potential equalisation are required, e.g. for equipment with double or reinforced insulation, the inner and outer connectors for potential equalisation can be dispensed with.
- The control unit Ex d should be connected using suitable cable glands or conduit systems which meet the requirements of EN 60079-1 Sections 13.1 and 13.2 and for which a separate examination certificate exists. When connecting the control unit Ex d using a conduit entry approved for this purpose, the associated capping system must be placed directly on the housing.
- Unused openings must be sealed in compliance with EN 60079-1 Section 11.9.
- The connecting cords of control unit Ex d should be rigid and laid in such a way as to be protected from damage.
- If the temperature at the entry point is more than 70°C, appropriate temperature-resistant connection lines must be used.
- The connection lines of control unit Ex d must be connected in a housing which meets the requirements of a recognised ignition protection type pursuant to EN 60079-0, Section 1 if the connection is performed in an explosive area.
- For the installation and fitting of components (connection boxes, feed-throughs, Ex cable glands, connectors) only ones which technically comply at least with standards EN 60079-0:2006 and EN 60079-1:2004 and for which there is a separate examination certificate are permitted. The conditions of use described in the corresponding component certificates must be strictly followed.
- **WARNING!** Cable glands of simple construction and sealing plugs of simple construction may not be used.
- **WARNING:** Do not open when energised!
- Please turn off the main switch during maintenance, not only the system.
- Do not open inside an explosive area!

- Fasten M8 cover screws for housing types 281xx0 and 281xx1 and 281xx2 with 18 Nm
- After opening, replace grease between bottom part and cover!

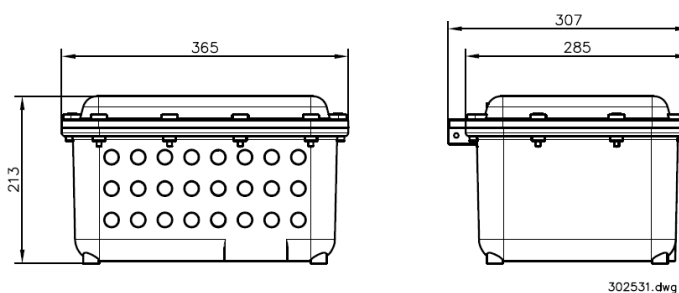
3.3 Dimensions basic module 16 type 6932-10



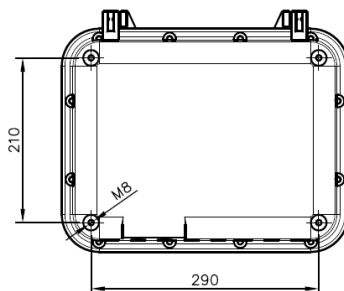
Installation holes:



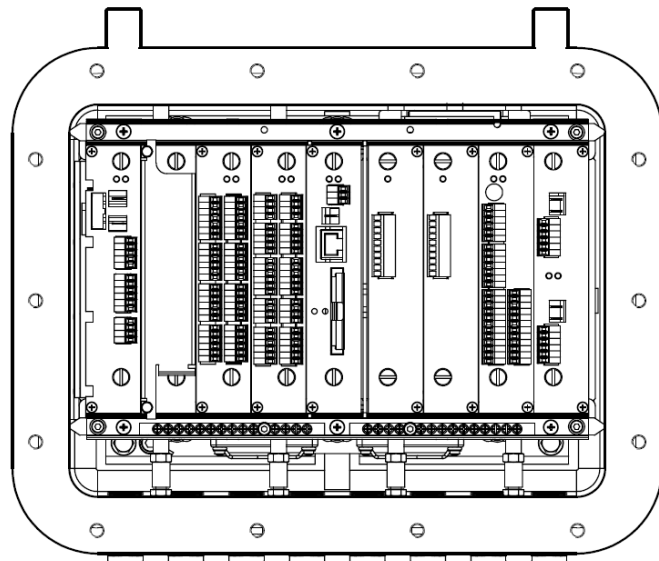
3.4 Dimensions basic module 24 type 6932-11



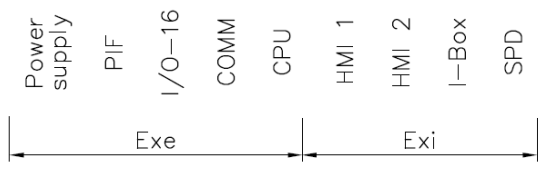
Mounting holes:



3.5 Connection plan



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Module slots:	1xx	2xx	3xx	4xx	5xx	6xx	7xx	8xx	9xx
---------------	-----	-----	-----	-----	-----	-----	-----	-----	-----

1xx	6932-100 Power supply 24 V, optional 6932-107 12 V
2xx	6932-110 Dipstick interface (6), 6932-114 (8)
3xx	6932-101 I/O-16 Ex e interface, 6932-115 I/O-24 Ex e interface
4xx	6932-102 COMM Ex e interface
5xx	6932-103 CPU
6xx	6932-104 HM-Interface Ex
7xx	6932-104 HM-Interface Ex
8xx	6932-112 i-Box-Interface
9xx	6932-108 SPD-Interface (Quad), 6932-111 (Dual)

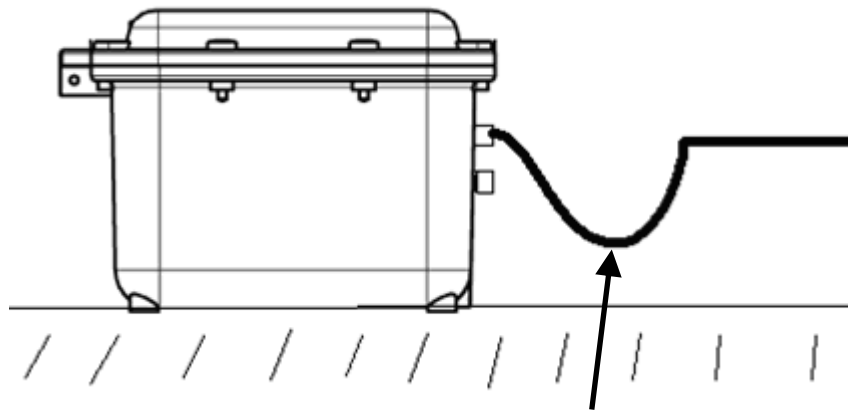


Note:
 Module slots **6xx, 7xx, 8xx, 9xx** only for intrinsically safe plug-in cards
 Module slot **2xx** is sealed during operation (Accessibility of complete unit)

3.6 Permissible installation positions

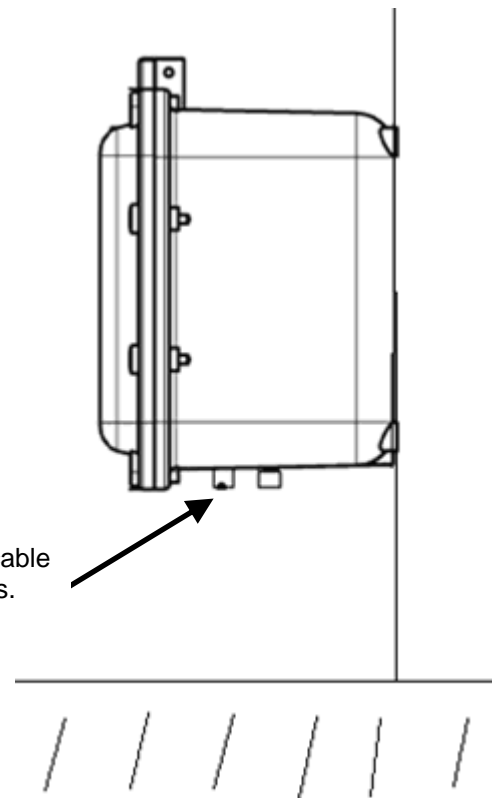
For each set-up a shaded position for the basic module is recommended.

Horizontal installation



Route the cables so that a “water sink” is created upstream of the cable gland.

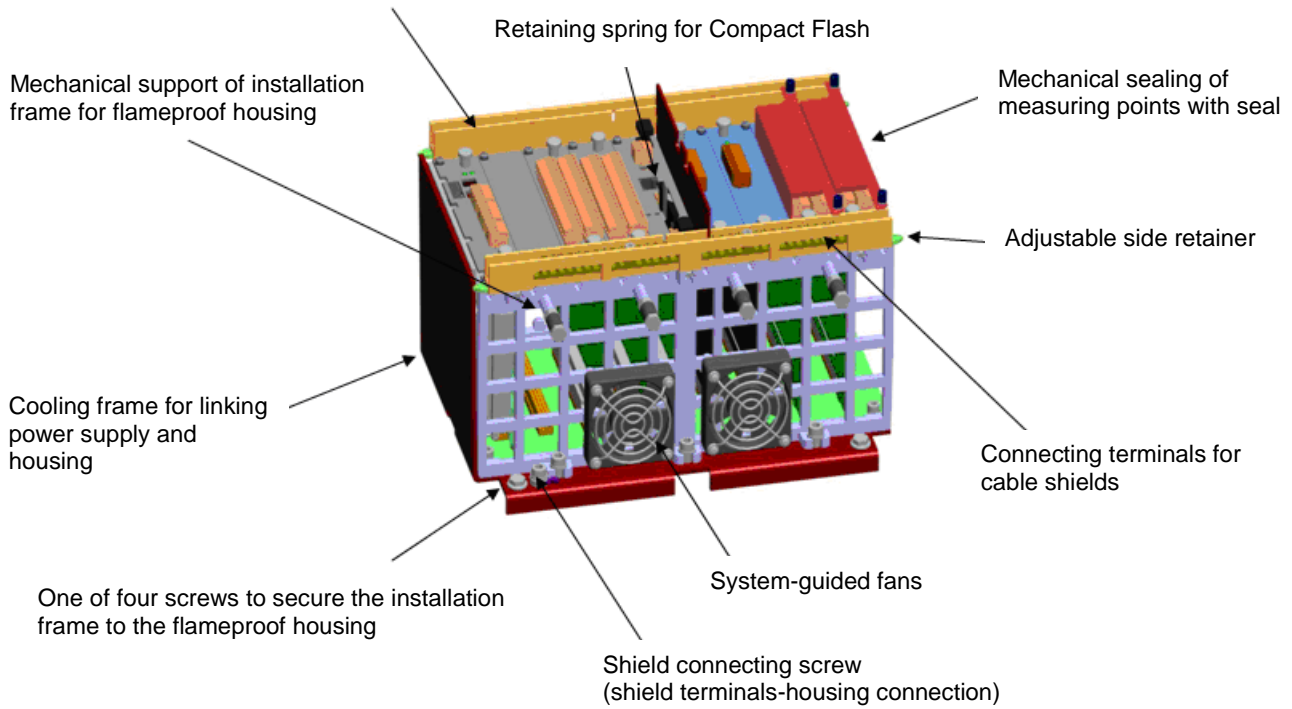
Vertical installation



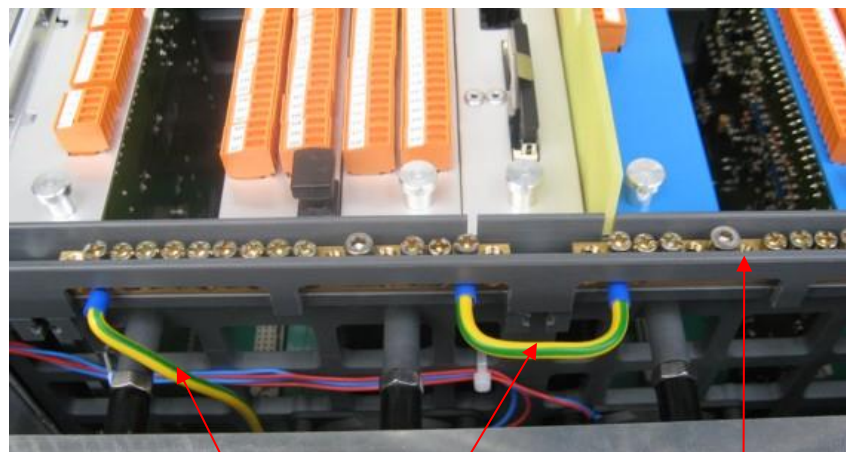
For vertical installation the cable glands must point downwards.

3.7 Installation frame

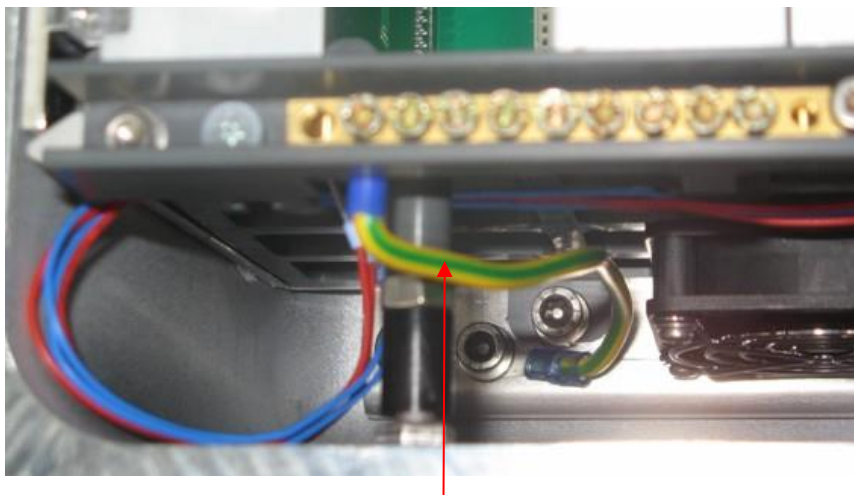
Mechanical mount for the plug-in units if exposed to extreme vibration (overlaps the plug-in units) and securing points for the shield terminals (isolating to the plug-in units)



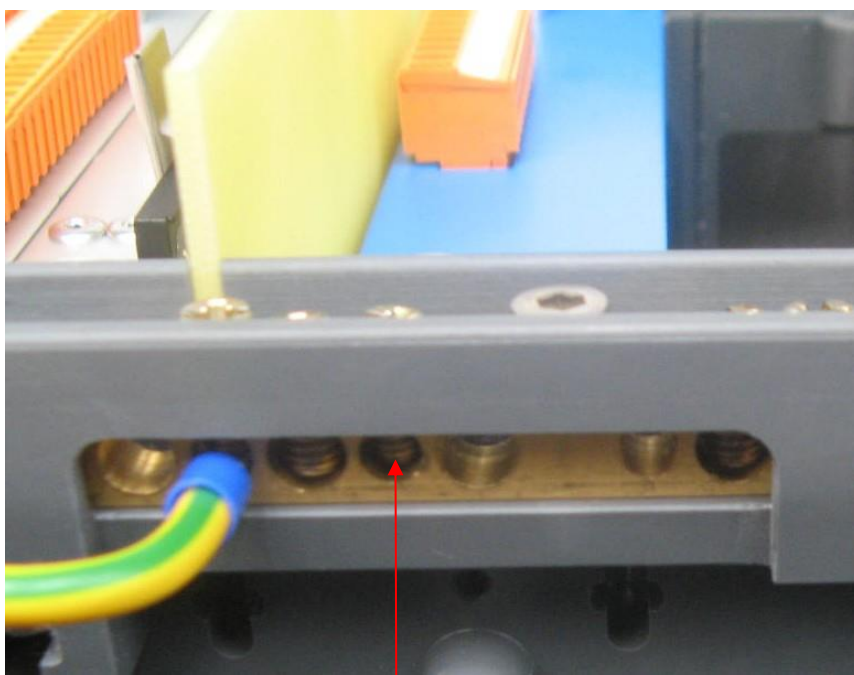
3.7.1 Retaining rails and shield terminals



Attention: When closing the cover, avoid catching the cables in the cover frames.

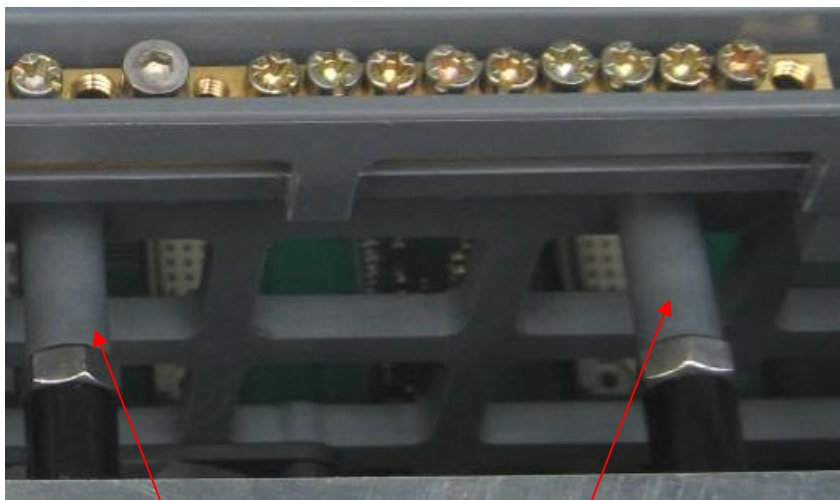


Connecting slots to housing



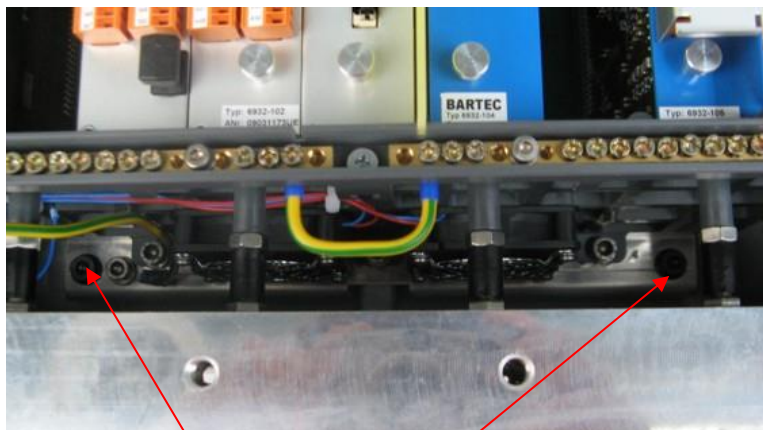
Connection of cable shields

3.7.2 Spacers

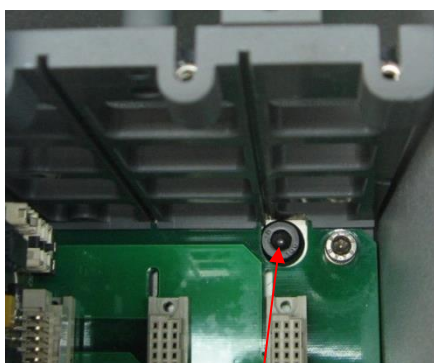


Installation frame spacers to the housing
(must not be loose)

3.7.3 Mounting screws



Mounting screws 1 and 2

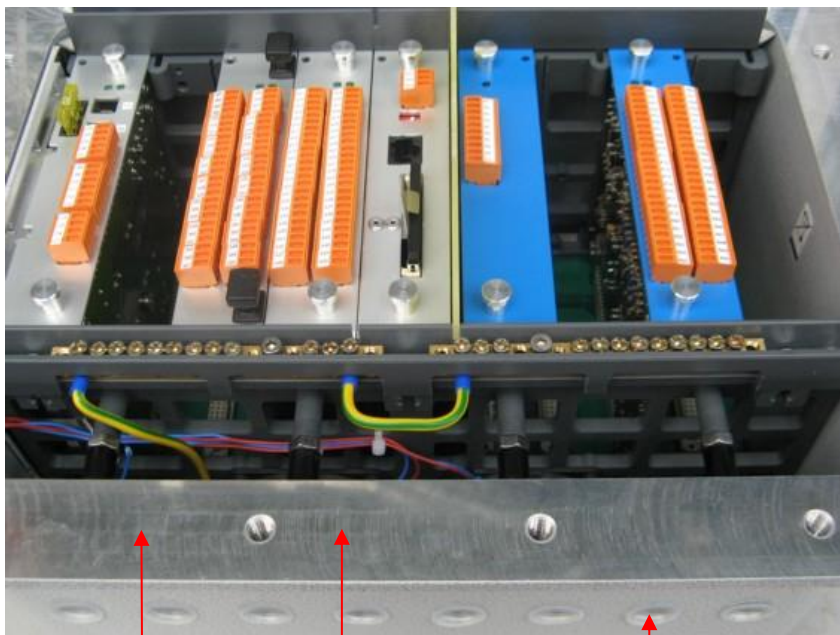


Mounting screw 3
Below module slot 9xx

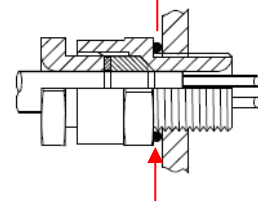


Mounting screw 4
Below module slot 1xx (the power supply
unit must be removed to release it.)

3.8 Sealing



The Ex surface of joint of the flameproof housing must have no scratches or damage and must be coated with the sealing compound provided. (Sealing and corrosion resistance of the Ex surface of joint)



The o-rings on the cable glands must not be damaged

3.8.1 Mounting of the cable glands

See chapter 2.2.2.

- Check there is no tension in the threads. It is not necessary to dismantle the gland.
- Fit the complete cable gland to the enclosure. Hand -tighten, then suitably secure with a wrench.
- Prepare cable as required for the installation. If required, fit the shroud over the cable.
- Insert cable through the cable gland. Position the cable correctly. The seal must grip the outer jacket of the cable when the cable gland is tightened.
- Tighten Back Nut/Conduit Nut to the Entry Body. Ensure the seal makes full contact with cable sheath and then tighten the Back Nut/Conduit Nut by the additional turns detailed in the table below. Support the cable to prevent it from twisting during tightening. If fitted, pull shroud over gland assembly.

Gland Size	Back Nut Turns	Outer Sheath / mm	
		Min	Max
16	2	4,0	8,4
20S	1	7,2	11,7
20	2	9,4	14,0

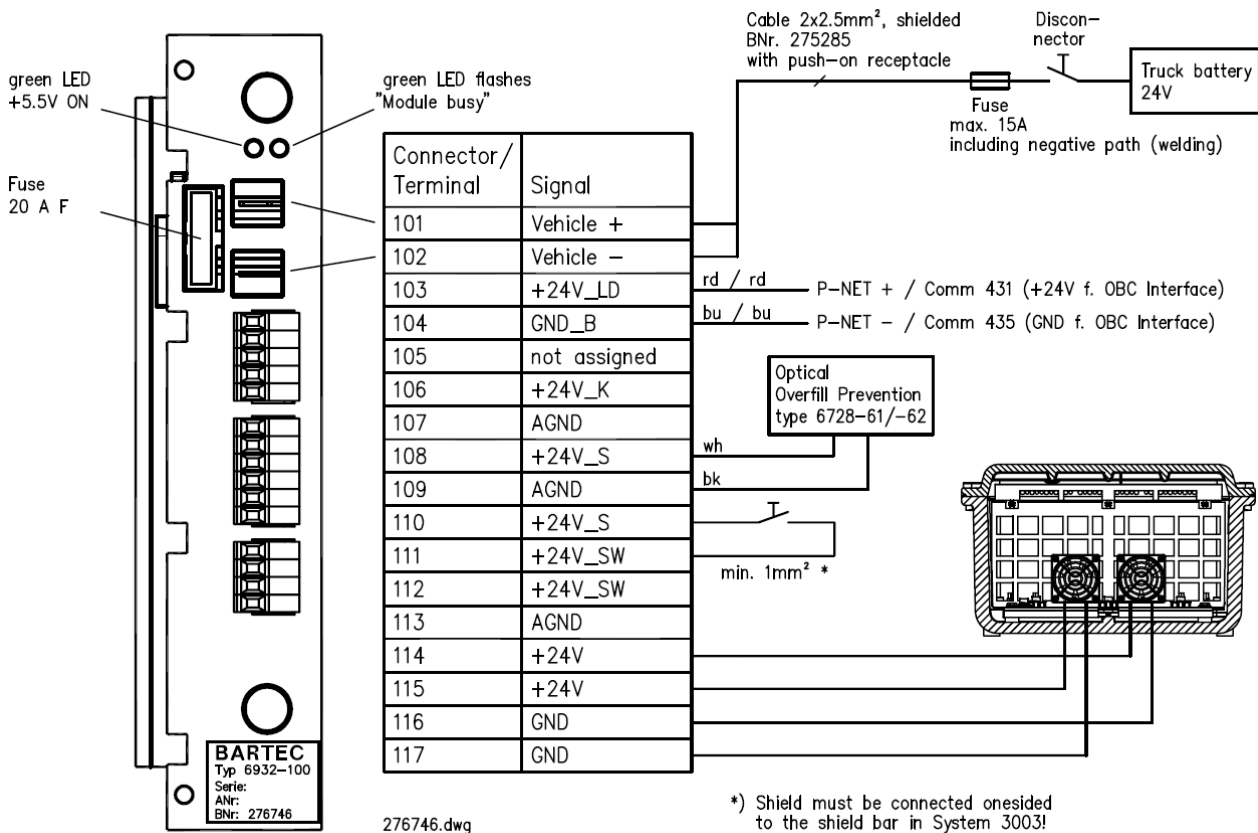
4 Power supply unit 24 V type 6932-100



4.1 Technical data

Electrical data	
Supply voltage	DC 24 V (DC 10 V ... DC 32 V)
Output voltage $U_{5.5V}$	DC 5.5 V \pm 1% max. 6 A
Output voltage U_{24V_S}	DC 24 V \pm 2 % max. 4 A
Output voltage U_{LD}	$U_{OUT} = U_{IN} - 1$ V max. 5 A, max. 40 V
Output voltage U_K	$U_{OUT} = U_{IN} - 1$ V max. 5 A, max. 40 V
Ambient conditions	
Ambient temperature	-20 ... +70 °C
Ambient temperature (inside the basic module)	-20 ... +50 °C
Storage temperature	-20 ... +50 °C
Mechanical data	
Weight	Approx. 6.8 N (0.68 kg)
Connection	Clamp-type terminal, push-on receptacle 101 - 102
Fuse	20 A-vehicle-blade terminal fuse (Order No. 215718)
Ordering details	
Designation	Order No.
Power supply unit 24 V, type 6932-100	276746

4.2 Terminal assignment



Attention:

Fit ferrite (Order No.: 275376) on the outside or inside over the wires of the basis module for the power supply cable!

When carrying out welding work or at jump starting, the truck power supply to the system must be disconnected (positive and negative path e.g. fuses).

The switch for non-hazardous components must be rated for 15 A DC.

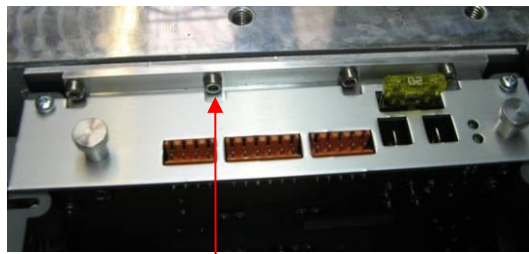
Terminals 6932-100 24V	Colour	Connection
101 (Power supply +)	bk 1	Truck battery +
102 (Power supply -)	bk 2	Truck battery -
103 (+24V_LD)	rd	P-Net +
	rd	OBC + (COMM 431)
104 (GND_B)	bu	P-NET -
	bu	OBC - (COMM 435)
108 (+24V_S)	wh	Optical overfill prevention +
109 (AGND)	bk	Optical overfill prevention -
114 (+24V)	rd	System fan 1 +
115 (+24V)	rd	System fan 2 +
116 (GND)	bu	System fan 1 -
117 (GND)	bu	System fan 2 -

Fan default values Switch-on point 70°C, switch-off point 62°C

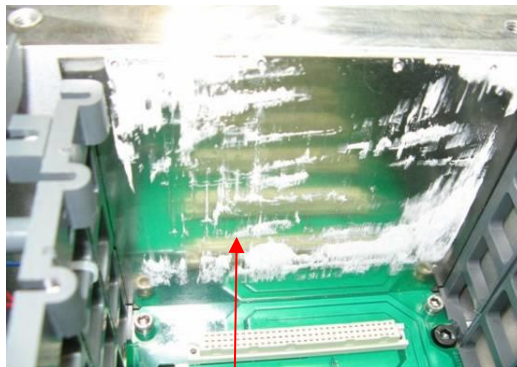
4.3 Power Supply Unit



Make sure heat-conducting compound is on power supply heat sink when changing



Mounting screws must not be slack (connection of cooling frame to power supply unit heat sink)



Cooling frame to power supply unit (heat-conducting compound must also be applied to the side towards the housing)

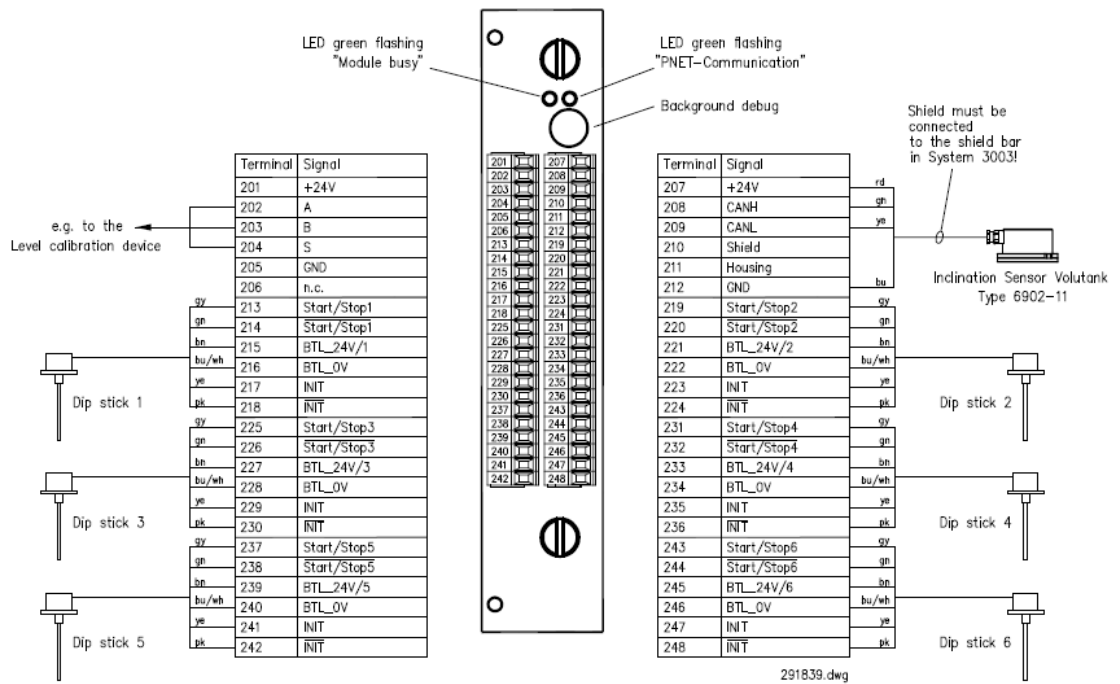
5 Dipstick interface 6 type 6932-110



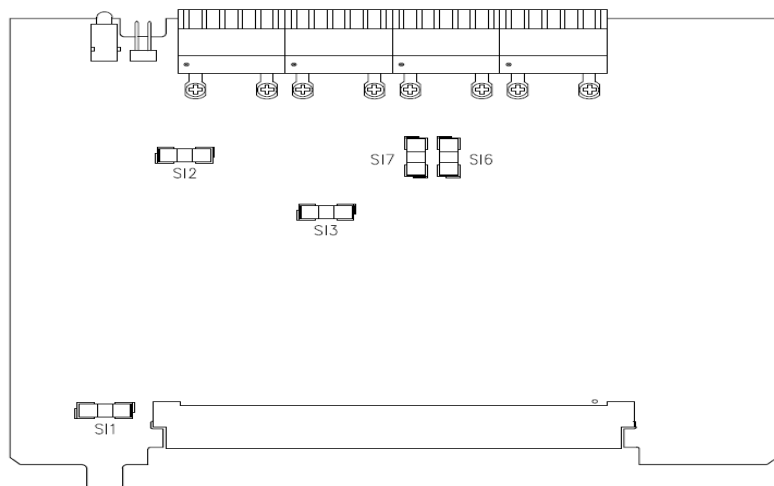
5.1 Technical data

Electrical data	
Supply voltage	DC 24 V; fuse 1,6A
Supply of dipsticks	DC 24 V; fuse 2 x 315mA
Supply of inclination sensor	DC 24 V; fuse 1A
System interface	PNET, serial, asynchronous, 76800 bit/s, RS485
Interfaces to dipsticks	6 x RS485
Interface to inclination sensor	proprietary CAN
Interface to volumetric measurement station	PNET, serial, asynchronous, 76800 bit/s, RS485
Ambient conditions	
Ambient temperature	-20 ... +70 °C
Ambient temperature (inside the basic module)	-20 ... +50 °C
Storage temperature	-20 ... +50 °C
Protection type	IP00 in accordance with DIN 40050
Mechanical data	
Connection	Terminals 1,5 mm ² pluggable
Weight	0,35 kg
System connection	plug-in card
Ordering details	
Designation	Order number
Dipstick interface 6, type 6932-110	291839

5.2 Terminal assignment



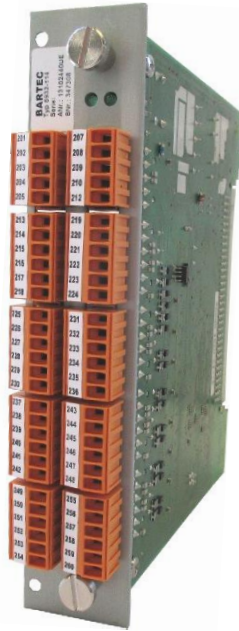
5.3 Fuse values



Fuse	Description	Value	Order No.
S11	Input 24V	T 1.6A	292547
S12	Input 24V	T 1.0A	292336
S13	CPU	T 500mA	292549
S16	Dip stick 1-3	T 315mA	292548
S17	Dip stick 4-6	T 315mA	292548

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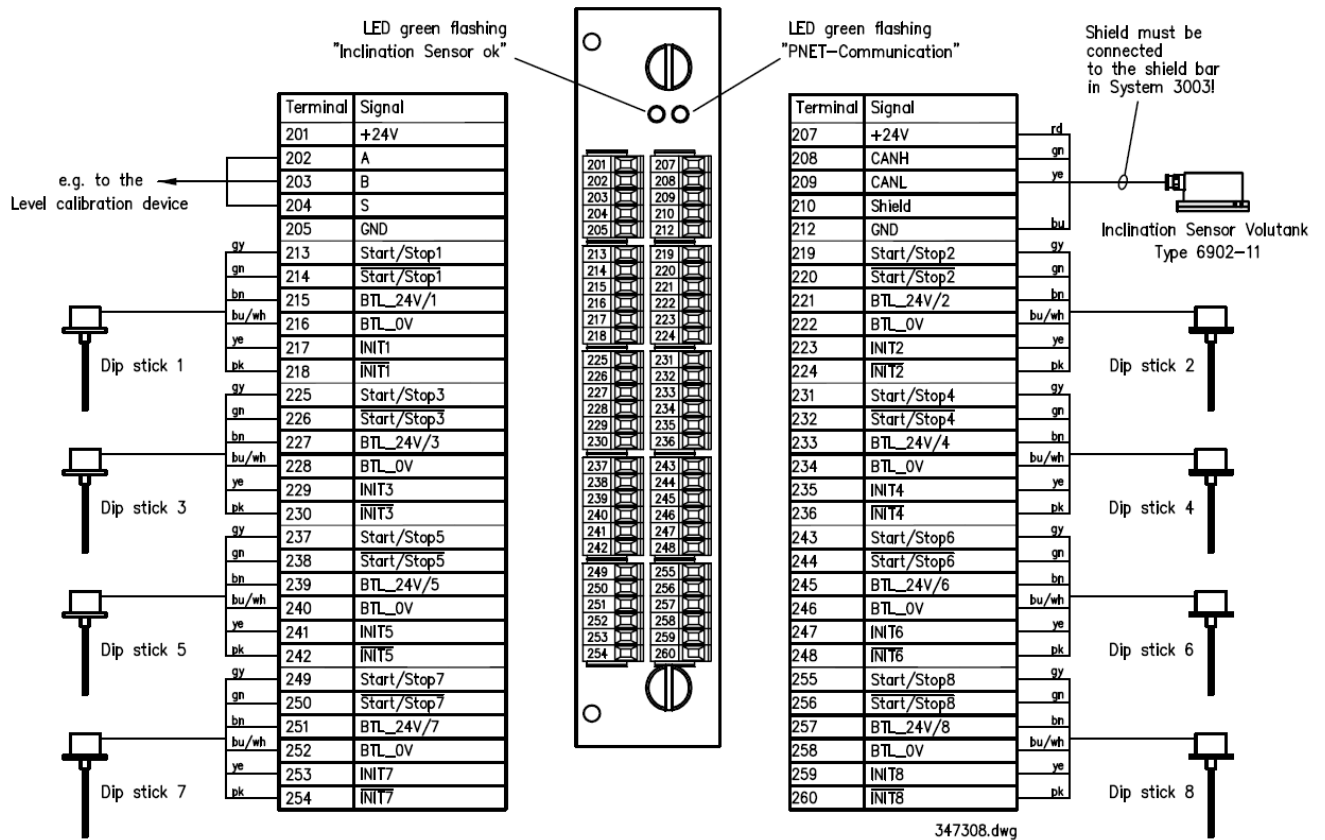
6 Dipstick interface 8 type 6932-114



6.1 Technical data

Electrical data	
Supply voltage	DC 24 V
Supply of dipsticks	DC 24 V; fuse reversible
Supply of inclination sensor	DC 24 V; fuse reversible
System interface	PNET, serial, asynchronous, 76800 bit/s, RS485
Interfaces to dipsticks	8 x RS485
Interface to inclination sensor	proprietary CAN
Interface to volumetric measurement station	PNET, serial, asynchronous, 76800 bit/s, RS485
Ambient conditions	
Ambient temperature	-20 ... +70 °C
Ambient temperature (inside the basic module)	-20 ... +50 °C
Storage temperature	-20 ... +50 °C
Protection type	IP00 in accordance with DIN 40050
Mechanical data	
Weight	0,35 kg
System connection	plug-in card
Connection	Terminals 1,5 mm ² pluggable
Ordering details	
Designation	Order number
Dipstick interface 8, type 6932-110	347308

6.2 Terminal assignment



7 Dipstick Ex, digital type 6706-10

For installation, it is imperative to observe the document "VOLUTANK Guide to the design of tankers with electronic level gauging equipment" (TB 140228).



Measurement of the level of liquid goods in mobile and stationary tanks with a high precision in zone 0.

7.1 Technical data

Technical data	
Electrical data	
Operating voltage	DC 24 V \pm 10% (stabilized)
Operating pressure	0,8 bar ... 1,1 bar max.
Ripple voltage	\leq 0.5%
Current consumption	\leq 80 mA
Power consumption	2 W
Resolution	\leq 10 μ m
Hysteresis	\leq 10 μ m
Reproducibility	\leq 20 μ m
System resolution	\leq 5 μ m
Measured data rate (max.)	f = 1kHz
Temperature coefficient	\leq 10 ppm/ $^{\circ}$ C
Interface	2 x RS 485
Connecting cable	7 x 0.25 shielded l = 15m
Shock load (according to DIN 60068)	50 g / 11 ms
Vibration (according to DIN 60068)	6 g, 10...150 Hz
Material	Flange and measured distance: Stainless steel 1.4571

Ambient conditions	
Ambient temperature	-20 ... +60 °C
Protection type	IP67
Equipment group/-category/ type of protection	II 1/2 G Ex d II B + H ₂ T3 ... T6 Ga/Gb
Certificates	PTB 98 ATEX 1096 X IECEX PTB 14.0010 X
Norms	EN 60079-0, EN 60079-1 IEC 60079-0, IEC 60079-1

7.2 Safety instructions

Special Conditions

- Repairs on the flame-proof joints may only be carried out in compliance with the manufacturer's construction specifications. A repair in accordance with the values in Tables 1 and 2 of EN 60079-1 is not permitted.
- For the installation and fitting of components (connection boxes, feed-throughs, ex-cable glands, connectors) only ones which technically comply at least with the standards on the cover sheet and for which there is a separate examination certificate are permitted. The conditions of use described in the corresponding component certificates must be strictly followed.

Connection Conditions

- Dipstick type 6706-1./.../. should be connected using suitable cable glands or conduit systems which meet the requirements of EN 60079-1 Sections 13.1 and 13.2 and for which a separate examination certificate exists.
- Cable glands of simple construction (PG glands) and sealing plugs of simple construction may not be used. When connecting dipstick type 6706-1./.../. using a conduit entry approved for this purpose, the associated capping system must be placed directly on the housing.
- Unused openings must be sealed in compliance with EN 60079-1 Section 11.9.
- The connecting cables of the dipsticks should be fixed and laid in such a way as to be protected from damage.
- Dipstick type 6706-1./.../ should be integrated in the local potential equalisation. When installing in metallic tanks, the potential equalisation takes place through direct metallic contact. For insulated installation, the earthing or potential equalisation cable must be connected directly. All earthing and potential equalisation cables must be bundled at an earthing point.
- The connection cables (cable tail) of dipstick type 6706-1./.../. must be connected in a housing which meets the requirements of a recognised ignition protection type pursuant to EN 60079-0, Section 1 if the connection is performed in an explosive area.
- The mechanical connection to a tank, container or conduit wall must be flameproof. This can be accomplished using M18x1.5 screw-in thread and a screw-in depth of ≥ 7.5 mm (= 5 thread turns).

Use is only permitted:

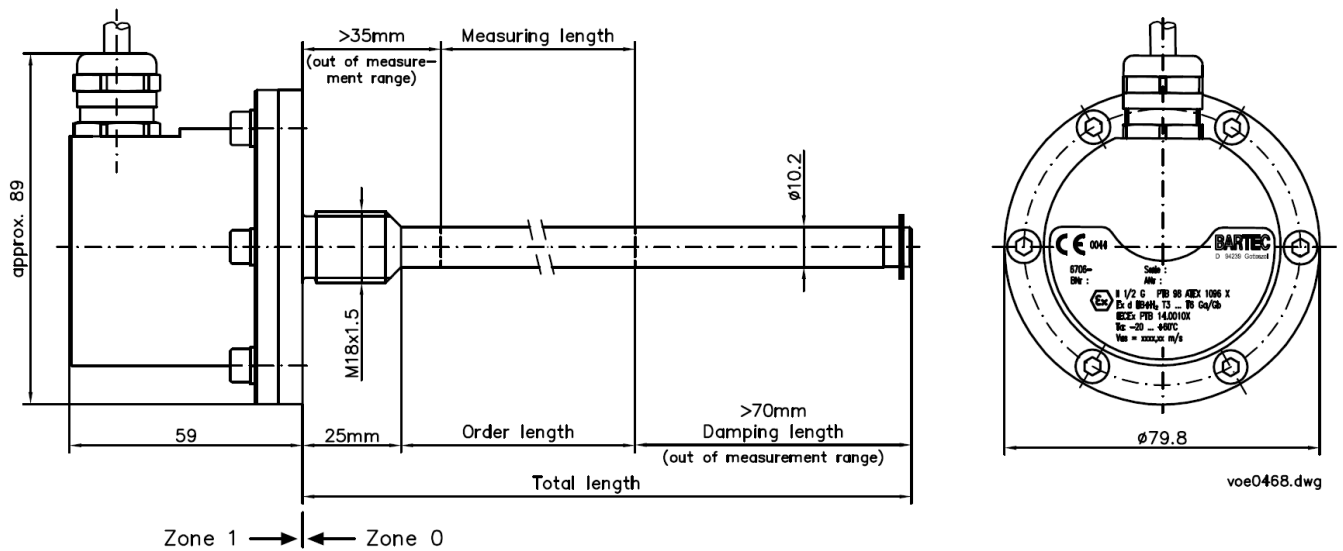
- Under atmospheric conditions.
- In group IIA or IIB (if H₂ is present, additional restrictions pertaining to the mechanical connection must be followed, for more information please see EN 60079-26, Para. 4.2.5, in connection with EN 60079-1, Tab. 2).
- For vertical installation.



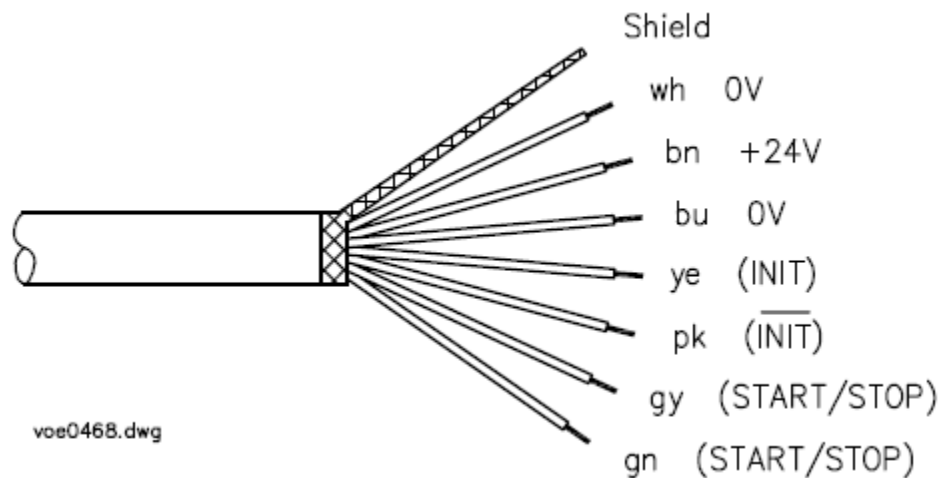
Attention:

- The dipstick housing should not be opened.
- The connection cable must not be shortened or lengthened.

7.3 Mounting and dimensions



7.4 Connection diagram



8 Inclination sensor VOLUTANK type 6902-11



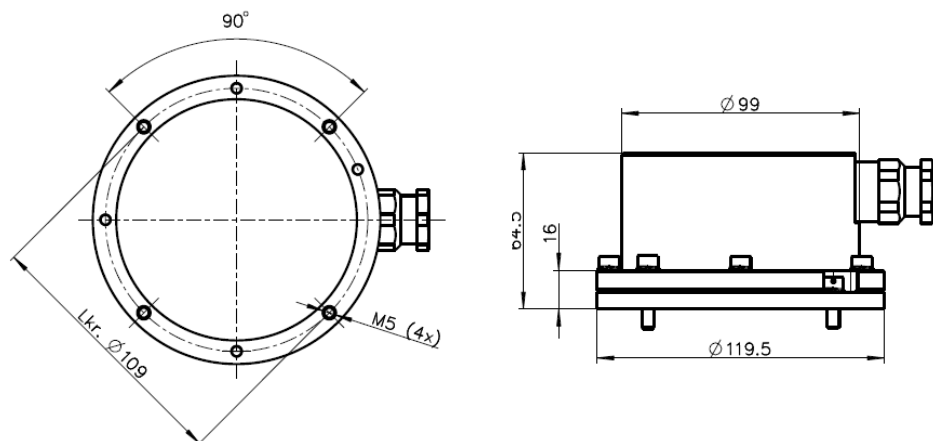
8.1 Technical data

Electrical data	
Auxiliary energy	DC 24 V from 6932-110, delay action fuse (T) 315 mA T
Connection type	6 m integrated cable
Ambient conditions	
Ambient temperature	-20 ... +50 °C
Storage temperature	-20 ... +50 °C
Equipment group / category / type of protection	II 2 G Ex d IIB T4 Gb
EC-type examination certificate	TÜV 10 ATEX 555640 X
Norms	EN 690079-0, EN 60079-1, EN 60079-14
Max. allowable power dissipation	20 W
Protection type (EN 60529)	IP66
Mechanical data	
Dimensions / mounting holes	see dimensional drawing
Mass	1,3 kg
Screw thread for cable and conduit entry	M20 x 1.5
Cover screws	M5 x 16, strength category A2-70 (700 N/mm ²)
Enclosure material	Aluminium, milled
Device-specific data	
Measurement ranges	+/-5°
Precision	+/-0,1° within measurement range
Nominal conditions	23 °C +/- 2 °C
Sensor type	MEMS
Ordering details	
Designation	Order number
Inclination sensor VOLUTANK, type 6902-11	291960

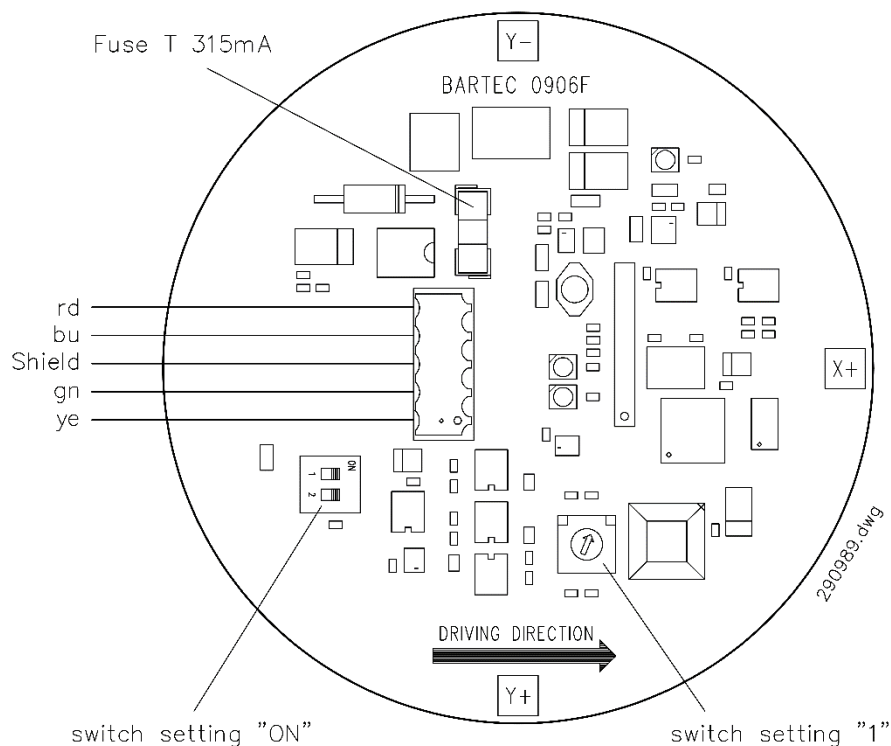
8.2 Safety instructions

- The joint surfaces between the housing bottom and top part must be protected from corrosion with a non-hardening grease (see also EN 60079-14:2003, Para. 10.3)
- After opening, replace grease between bottom part and cover!
- Protect joint surfaces from mechanical damage. Joint surfaces must be free of any grooves.
- Cables and wires must be made of thermoplastic duroplastic or elastomeric materials which to a large extent are firm and circular, have extruded embedding material and whose filler materials, where present, are not hygroscopic (EN 60079-14:2003, Para. 10.4.2)
- A certified cable gland of type A2LF 16 M20, SIRA 01 ATEX1272X, II 2 GD Ex d IIC is installed in the Volutank inclination sensor. This cable gland can be replaced with an equivalent cable gland which is pressure-resistant and certified for "Ex d" encapsulation. The thread of the cable gland is M20x1.5.
- The connecting cables should be fixed and laid in such a way as to be protected from damage.
- **WARNING: Do not open when energised!**
- Do not open inside an explosive area!
- Only use M5 cover screws with a structural strength of at least 700 N/mm² (A2-70).
- Fasten M5 cover screws with 6 Nm.
- The housing of the Volutank inclination sensor must installed to be metallically conductive and integrated in the potential equalisation. It cannot be installed with insulation.
- The safety level of the cylindrical joint and the threaded joint is higher than the safety level prescribed by standard EN 60079-1. A repair on the flame-proof joints may only be carried out in compliance with the manufacturer's construction specifications.

8.3 Dimensions



8.4 Connection to dipstick interface type 6932-110



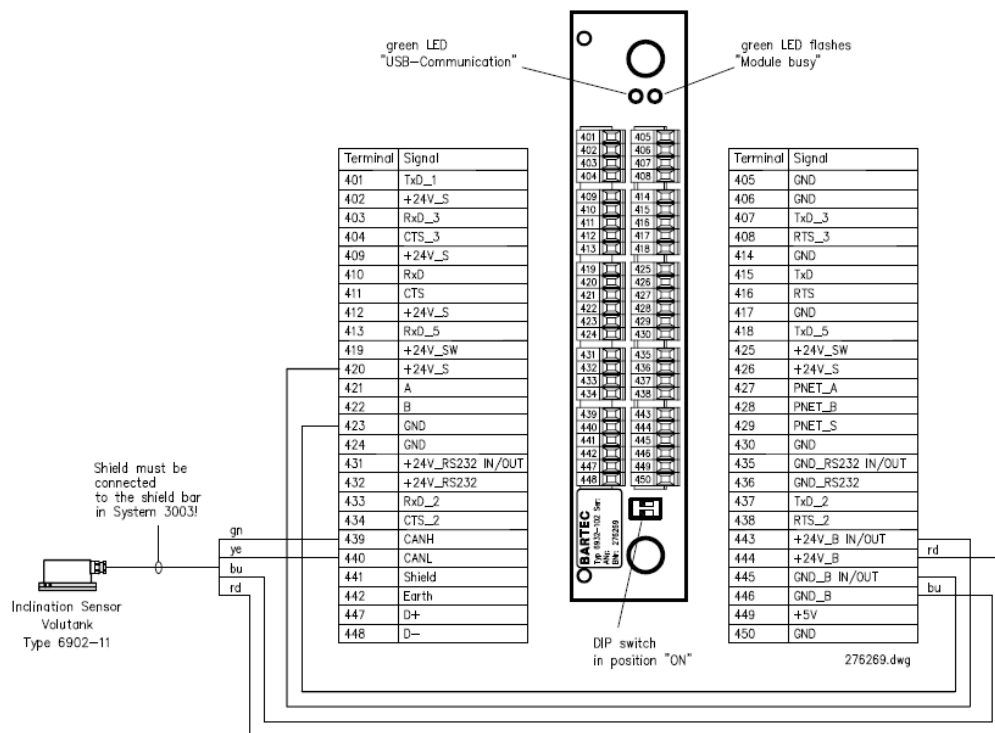
Dipstick interface type 6932-110	Inclination sensor type 6902-11
Terminal	Colour
207	rd
208	gn
209	ye
212	bu
Shield bar → Fit shield	shield



Attention:

- The holder of the inclination sensor must be precisely adapted to the longitudinal and transverse inclination of the tank.
- The inclination sensor must be precisely oriented on this holder in the direction of travel.
- The deviation of the installation angle must be corrected (Configuration/Hardware/PIF Parameter/Angle Deviation X and Angle Deviation Y)

8.5 Connection to COMM Ex e interface type 6932-102



Attention:
Connection for non-trade-related applications!

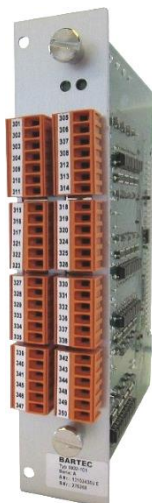
COMM Ex e interface type 6932-102	Inclination sensor type 6902-11
Terminal	Colour
444	rd
439	gn
440	ye
446	bu
Shield bar → Fit shield	shield
Jumper rd 420 - 443	
bu 423 - 445	



Attention:

- The holder of the inclination sensor must be precisely adapted to the longitudinal and transverse inclination of the tank.
- The inclination sensor must be precisely oriented on this holder in the direction of travel.
- The deviation of the installation angle must be corrected (Configuration/Hardware/Inclination sensor external/Angle Deviation X and Angle Deviation Y)

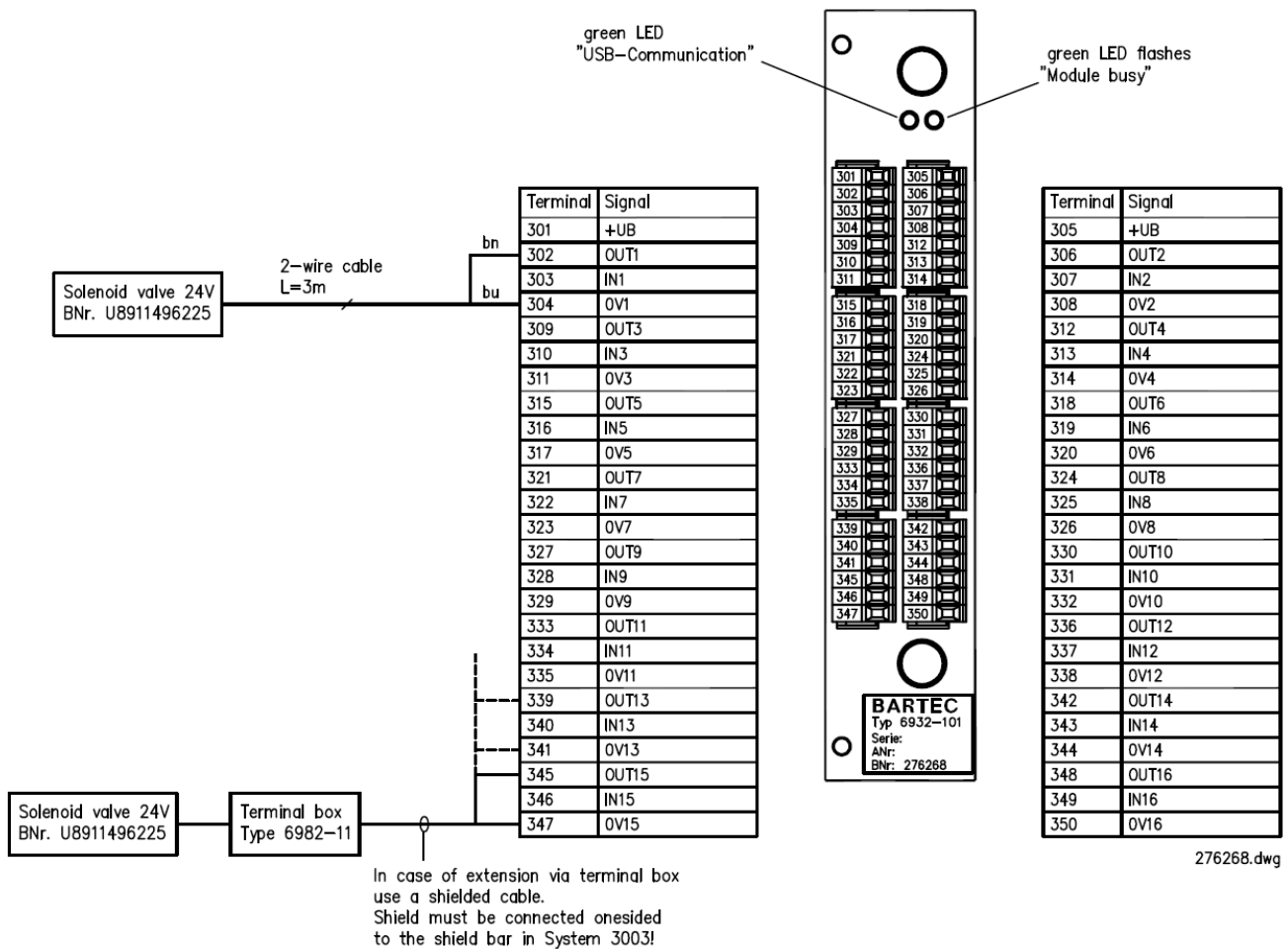
9 I/O-16 Ex e interface type 6932-101



9.1 Technical data

Electrical data	
Supply voltage electronics	DC 5,5 V, micro fuse 500 mA
Supply voltage I/O	Stabilized DC 24 V (from 6932-100 U _{24 v_s})
Fuse	4 x 6,3 A (four outputs join one fuse)
<i>Outputs</i>	
Number of channels	16, galvanic isolated with optocoupler (3750 Vrms)
Switch	High side solid state (MOSFET)
Voltage	Stabilized DC 24 V (from 6932-100 U _{24 v_s})
Load	160 mA per output (derating @ 70 °C)
R _{ON}	Max. 200 mΩ
<i>Inputs</i>	
Number of channels	16, galvanic isolated with optocoupler (3750 Vrms)
Input impedance	Approx. 3 kΩ
Voltage	Stabilized DC 24 V (from 6932-100 U _{24 v_s})
Switch	Bipolar solid state
Ambient conditions	
Ambient temperature	-20 ... +70 °C
Ambient temperature (inside the basic module)	-20 ... +50 °C
Storage temperature	-20 ... +50 °C
Mechanical data	
Weight	2,0 N (200 g)
Connection	Plug terminals
Ordering details	
Designation	Order number
I/O-16 Ex e interface, type 6932-101	276268

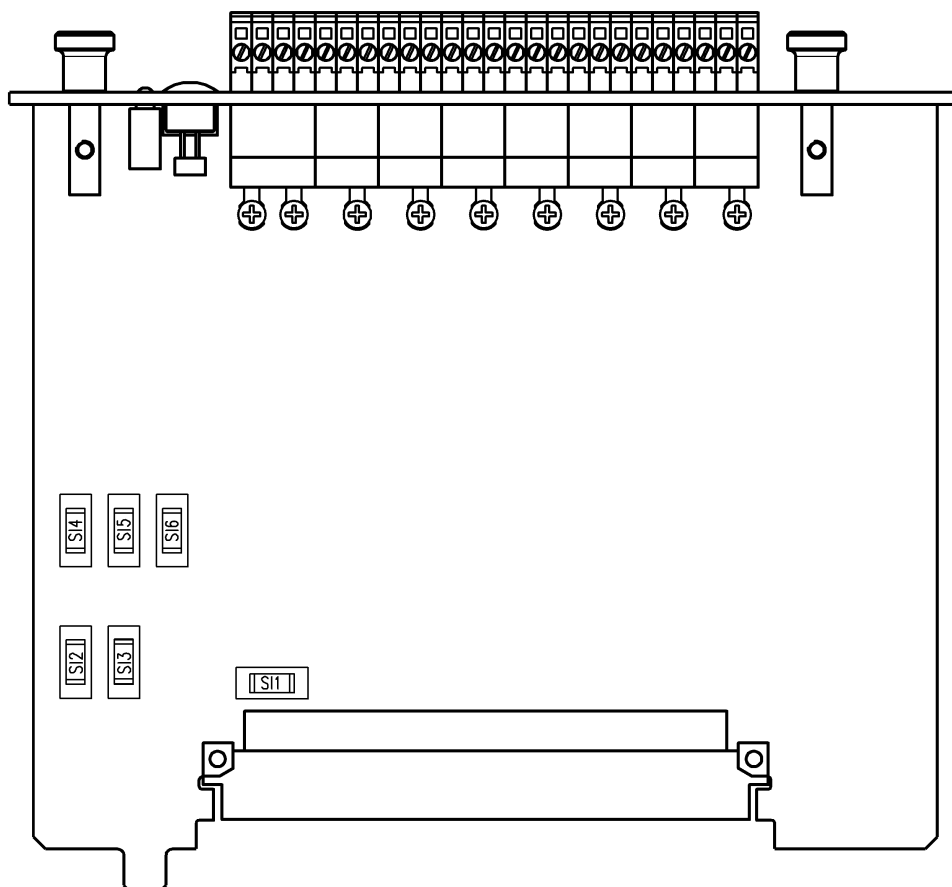
9.2 Terminal assignment



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- When connecting solenoid valves in the hazardous area, the license of the unit concerned must be taken into account.
- The output-voltage is stabilized and EMV-technically locked against the power supply to ensure all control tasks. Therefore, connections to other potentials (e.g. chassis in terms of mass and assignments of reverse voltages plus branches) always have to be galvanically decoupled (e.g. if necessary with additional relay).
- Only connect solenoid valves with a current consumption of max. 160 mA and which are equipped with a blocking diode.
- When replacing a I/O-16-interface against a I/O-24-interface, also replace the terminals.

9.3 Fuse values without series



Fuse	Description	Value	B No.
SI 1	CPU	F 0.5 A	235164
SI 2	Output 1 - 4	F 6.3 A	235210
SI 3	Output 5 - 8	F 6.3 A	235210
SI 4	Output 9 - 12	F 6.3 A	235210
SI 5	Output 13 - 16	F 6.3 A	235210
SI 6	+UB (e.g. inputs)	F 6.3 A	235210

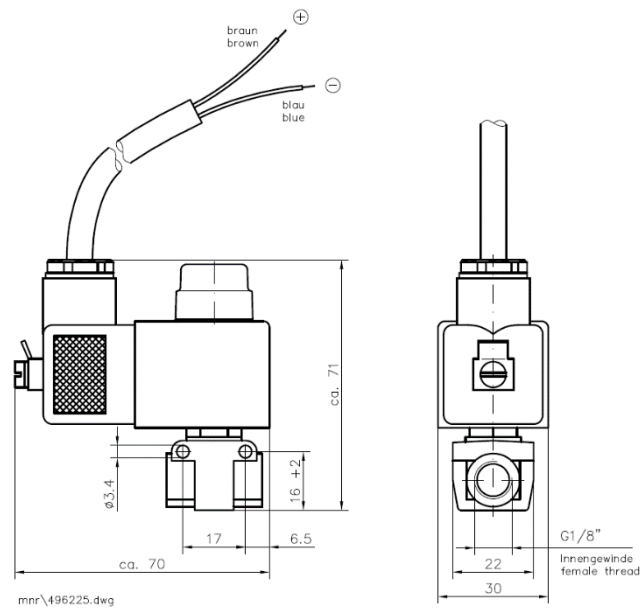


Attention:

For I/O-16 Ex e Interface type 6932-101 the changeable fuses are eliminated **from series A!**

9.4 Solenoid valve, 3/2-way, A1, 24 V

Pressure	0 - 10 bar
Ambient temperature	-15...+50°C
Auxiliary power	DC 24 V ± 10 %, DC 0.14 A
Temperature of medium	Max. 50°C/h
Seal	FKM (Viton)
Equipment group / category / type of protection	II 2 G Ex mb II T5
Certificates	PTB 03 ATEX 2018 X IECEX PTB 04.0002 X
Norms	EN 60079-0, EN 60079-18 IEC 60079-0, IEC 60079-18
Protection class (EN 60529)	IP 65
Ordering details	
Designation	Order number
Solenoid valve, 3/2-way, A1, 24 V	U891496225



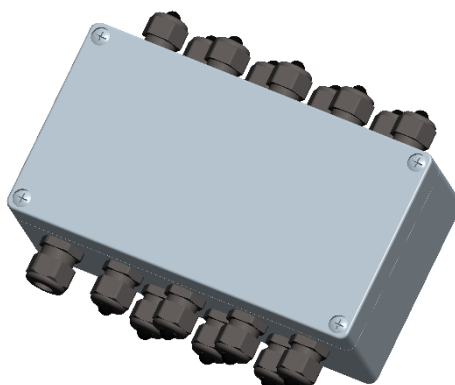
Connection to I/O-16 Ex e interface type 6932-101

	Solenoid valve 1		Solenoid valve 16	
	bn	bu	bn	bu
Terminal I/O-16 type 6932-101	302 (OUT1)	304 (0V1)	348 (OUT16)	350 (0V16)

Connection to I/O-24 Ex e interface type 6932-114

	Solenoid valve 1		Solenoid valve 24	
	bn	bu	bn	bu
Terminal I/O-24 type 6932-115	302 (OUT1)	304 (0V1)	372 (OUT24)	374 (0V24)

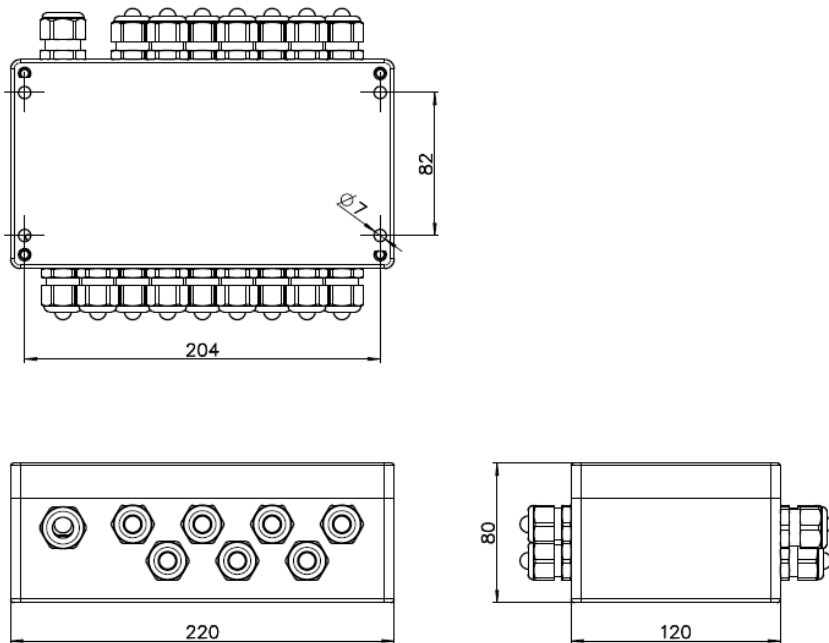
9.5 Terminal box 16x2, Ex e type 6982-11



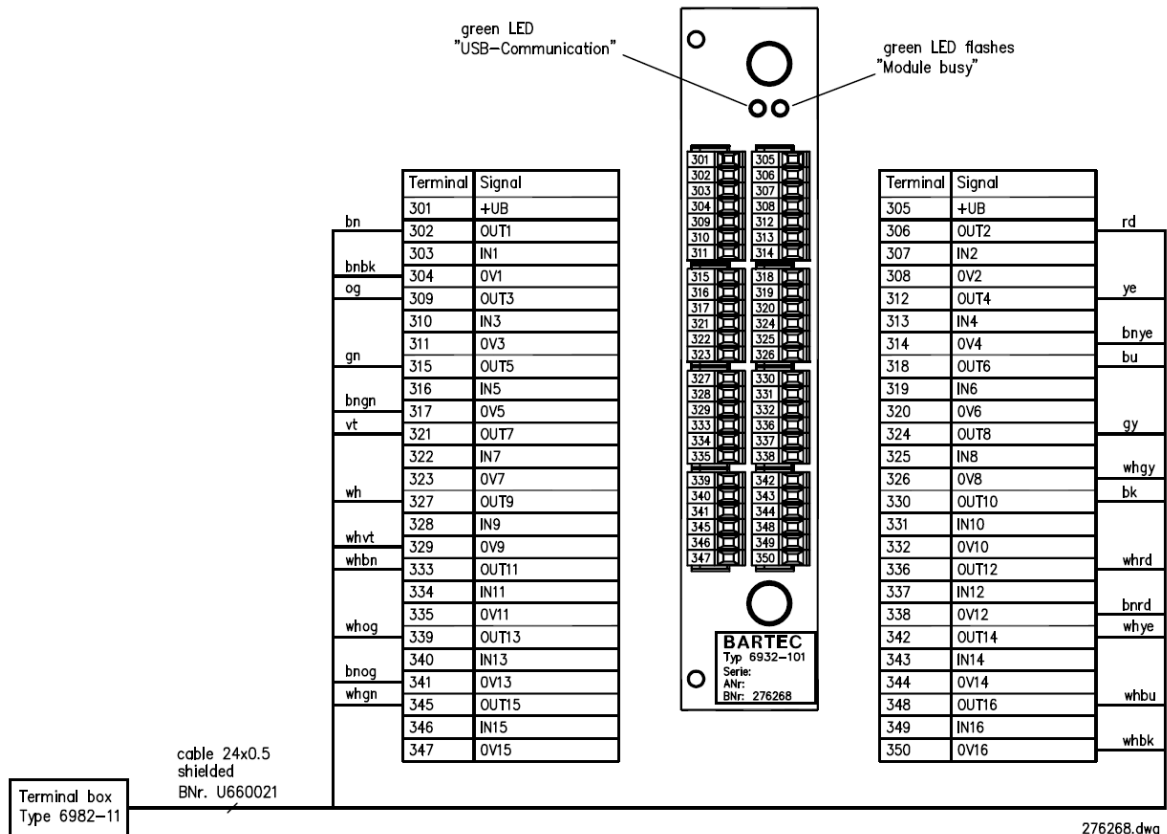
9.5.1 Technical data

Electrical data	
Connection type	16 double series terminals with screw connection max. 1,5 mm ² 4 ground terminals max. 1,5 mm ² 16 cable glands ATEX M16x1,5 bk/wh clamping range 5 ... 10 mm 1 cable gland ATEX M20x1,5 bk/wh clamping range 6,5 ... 12 mm
Ambient conditions	
Operating temperature	-20 ... + 50 °C
Storage temperature	-20 ... + 70 °C
Protection type	IP66 in accordance with DIN 40050
Climatic class	JWF in accordance with DIN 40050
Mechanical data	
Weight	approx.1,6 kg
Casing material	aluminium
Equipment group / category / type of protection	II 2 G Ex e IIC T6 Gb
Certificates	PTB 00 ATEX 1063
Norms	EN 60079-0, EN 60079-7
Dimensions	220 x 120 x 80 mm
Device-specific data	
Nominal conditions	23 ± 2 °C
Nominal voltage	24 V DC
Nominal current max.	11 A
Ordering details	
Designation	Order number
Terminal box 16x2, Ex e, type 6982-11	301743
Cable 24x0,5 shielded, petrol-resistant (not ready-made!)	U660021

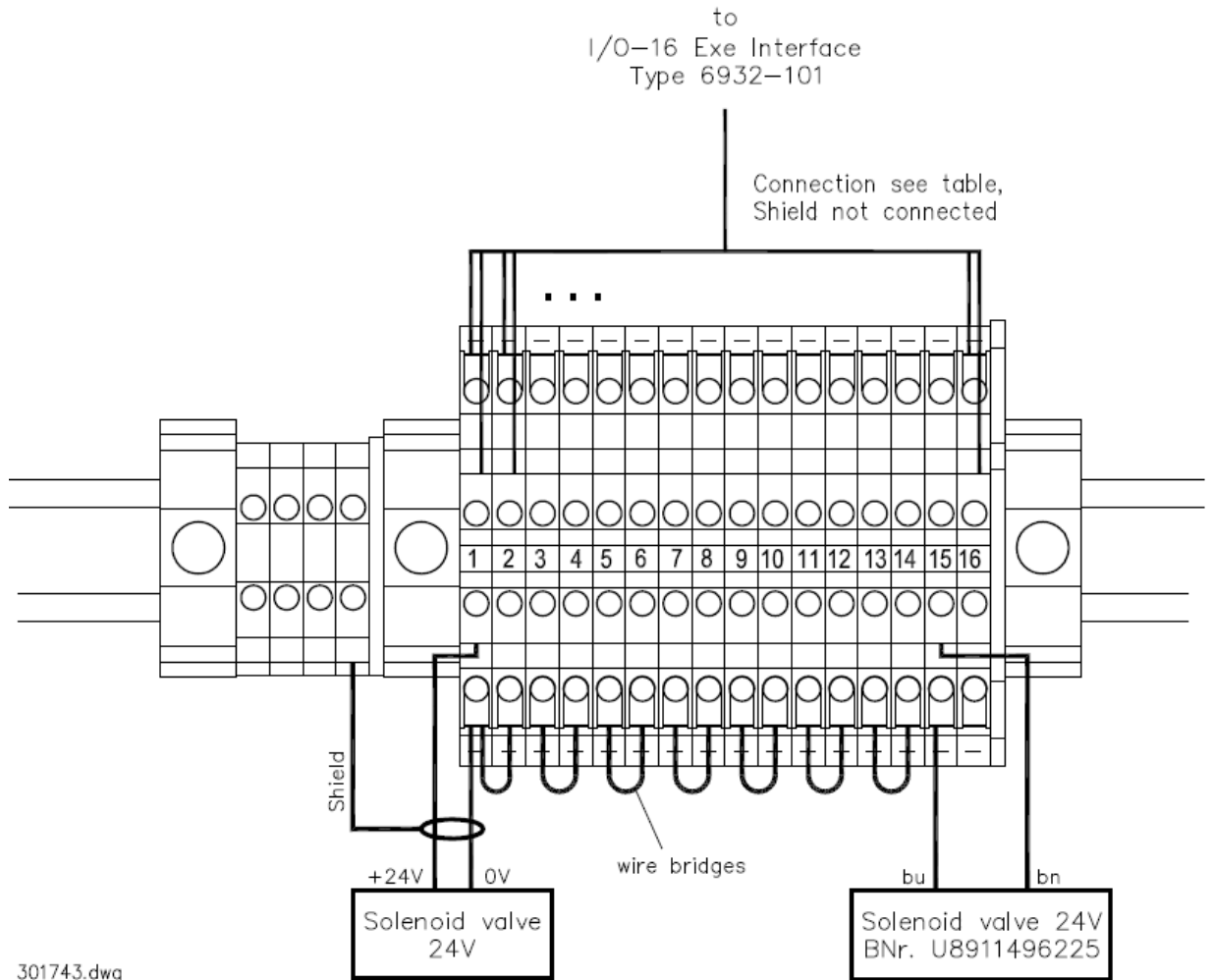
9.5.2 Dimensions



9.5.3 Terminal and cable assignment



Cable assignment



I/O-16 Ex e interface 6932-101		Cable U660021	Terminal box 16x2 6982-11
Terminal	Wire	Terminal	Terminal
302	OUT1	bn	1
304	0V1	bnbk	1-
306	OUT2	rd	2
			2-*
309	OUT3	or	3
			3-*
312	OUT4	ye	4
314	0V4	bny	4-
315	OUT5	gn	5
317	0V5	bngn	5-
318	OUT6	bu	6
			6-*
321	OUT7	vt	7
			7-*
324	OUT8	gn	8
326	0V8	whgy	8-
327	OUT9	wh	9
329	0V9	whvt	9-
330	OUT10	bk	10
			10-*
333	OUT11	whbn	11
			11-
336	OUT12	whrd	12
338	0V12	whrd	12-
339	OUT13	whor	13
341	0V13	bnor	13-
342	OUT14	why	14
			14-*
345	OUT15	whgn	15
			15-*
348	OUT16	whbu	16
350	0V16	whbk	16-

* If this output is used, the connection to the next 0-V terminal must be wired via a bridge. (see drawn bridges)

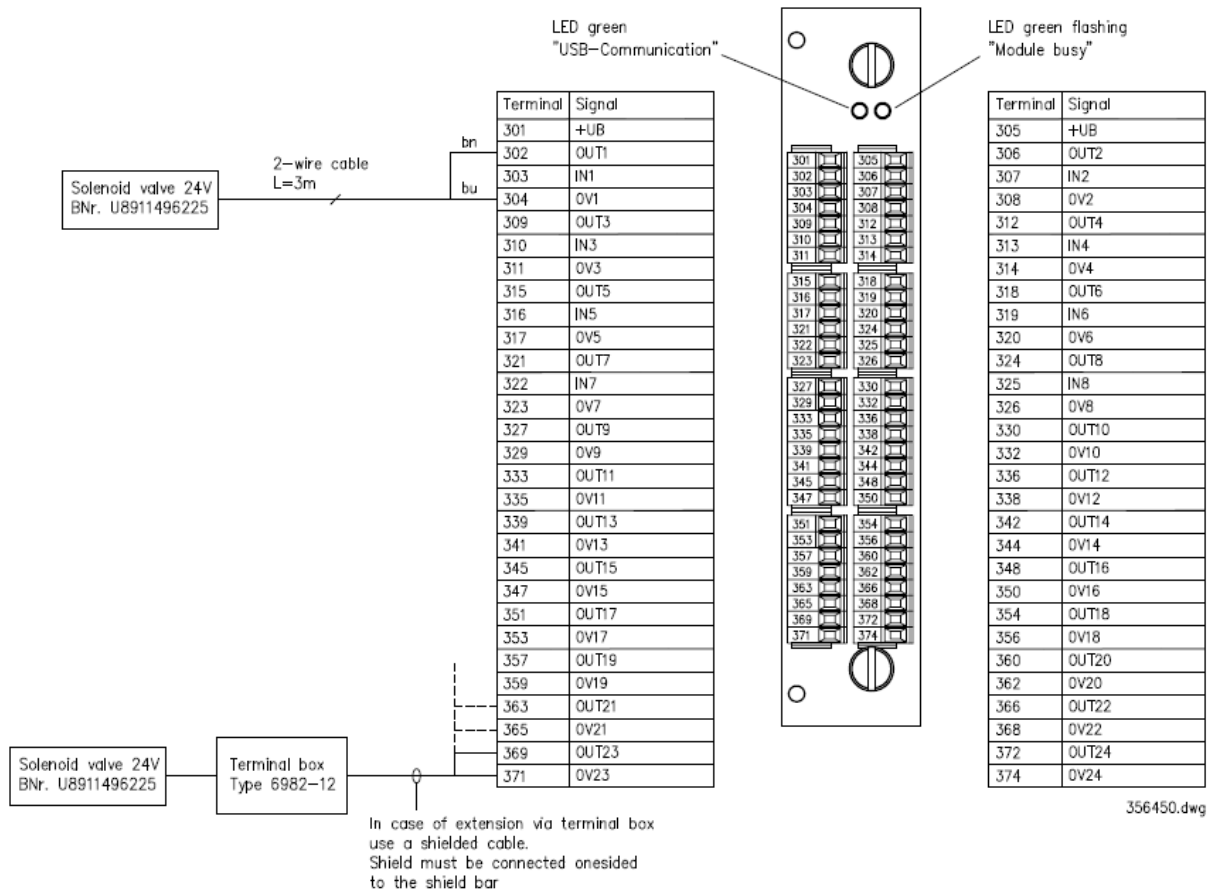
10 I/O-24 Ex e interface type 6932-115



10.1 Technical data

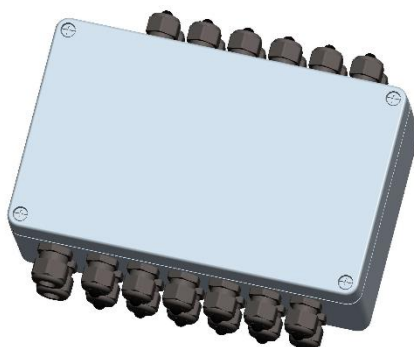
Electrical data	
Supply voltage electronics	DC 5,5 V, micro fuse 500 mA (internal)
Supply voltage I/O	Stabilized DC 24 V (from 6932-100 U _{24 v_s})
<i>Outputs</i>	
Number of channels	24, galvanic isolated with optocoupler (3750 Vrms)
Switch	High side solid state (MOSFET)
Voltage	Stabilized DC 24 V (from 6932-100 U _{24 v_s})
Load	160 mA per output (derating @ 70 °C)
R _{ON}	Max. 200 mΩ
<i>Inputs</i>	
Number of channels	8, galvanic isolated with optocoupler (3750 Vrms)
Input impedance	Approx. 3 kΩ
Voltage	Stabilized DC 24 V (from 6932-100 U _{24 v_s})
Switch	Bipolar solid state
Ambient conditions	
Ambient temperature	-20 ... +70 °C
Ambient temperature (inside the basic module)	-20 ... +50 °C
Storage temperature	-20 ... +50 °C
Mechanical data	
Weight	2,0 N (200 g)
Connection	Plug terminals
Ordering details	
Designation	Order number
I/O-24 Ex e interface, type 6932-115	356450

10.2 Terminal assignment



- When connecting solenoid valves in the hazardous area, the license of the unit concerned must be taken into account.
- The output-voltage is stabilized and EMV-technically locked against the power supply to ensure all control tasks. Therefore, connections to other potentials (e.g. chassis in terms of mass and assignments of reverse voltages plus branches) always have to be galvanically decoupled (e.g. if necessary with additional relay).
- Only connect solenoid valves with a current consumption of max. 160 mA and which are equipped with a blocking diode.
- When replacing a I/O-16-interface against a I/O-24-interface, also replace the terminals.

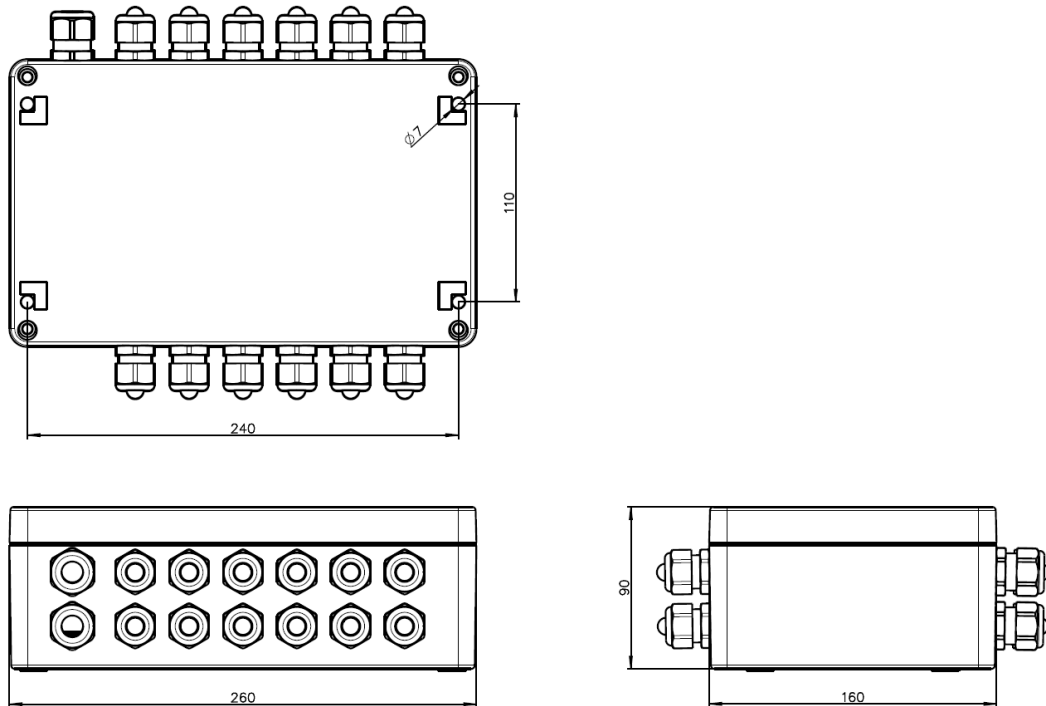
10.3 Terminal box 24x2, Ex e type 6982-12



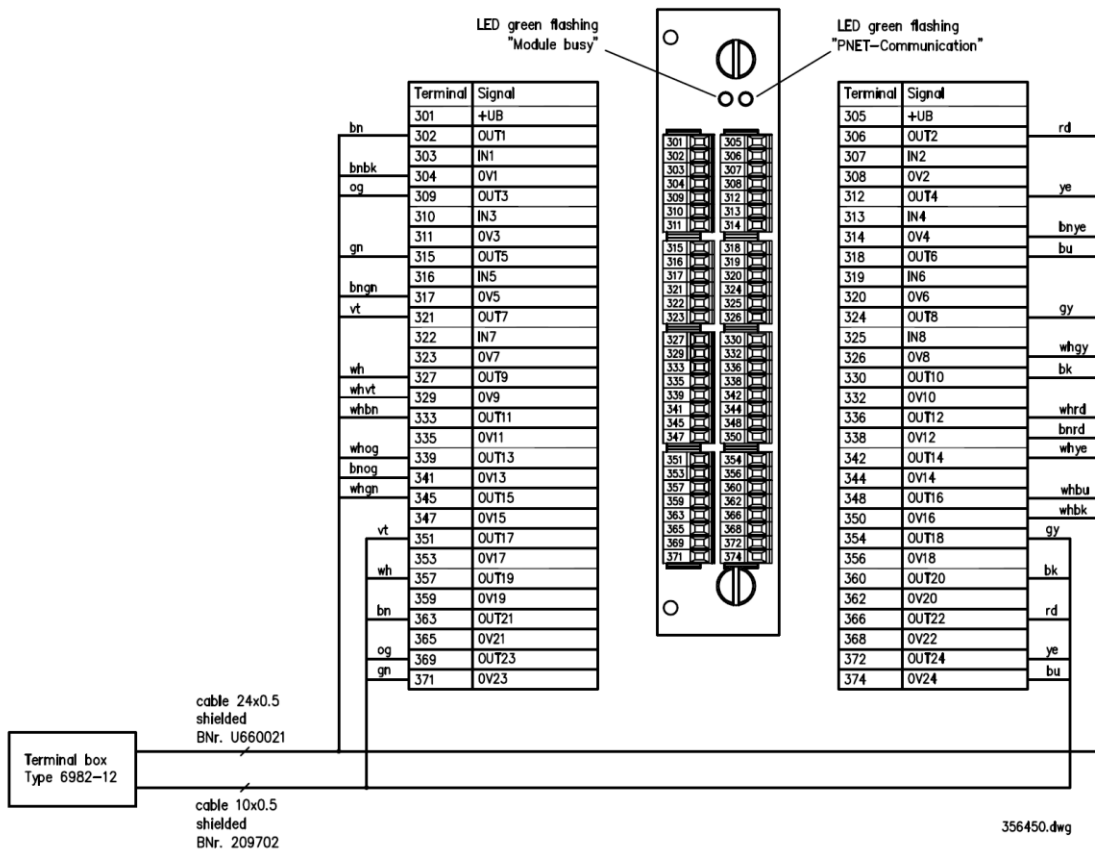
10.3.1 Technical data

Electrical data	
Connection type	24 double series terminals with screw connection max. 2,5 mm ² 4 ground terminals max. 2,5 mm ² 24 cable glands ATEX M16x1,5 bk/wh clamping range 5 ... 10 mm 2 cable gland ATEX M20x1,5 bk/wh clamping range 6,5 ... 12 mm
Ambient conditions	
Operating temperature	-20 ... + 50 °C
Storage temperature	-20 ... + 70 °C
Protection type	IP66 in accordance with DIN 40050
Climatic class	JWF in accordance with DIN 40050
Mechanical data	
Weight	approx.1,6 kg
Casing material	aluminium
Equipment group / category / type of protection	II 2 G Ex e IIC T6 Gb
Certificates	PTB 00 ATEX 1063
Norms	EN 60079-0, EN 60079-7
Dimensions	See drawing
Device-specific data	
Nominal conditions	23 ± 2 °C
Nominal voltage	24 V DC
Nominal current max.	11 A
Ordering details	
Designation	Order number
Terminal box 24x2, Ex e, type 6982-12	356451
Cable 24x0.5 shielded, petrol-resistant (not ready-made!)	U660021
Cable 10x0.5 shielded, petrol-resistant (not ready-made!)	209702

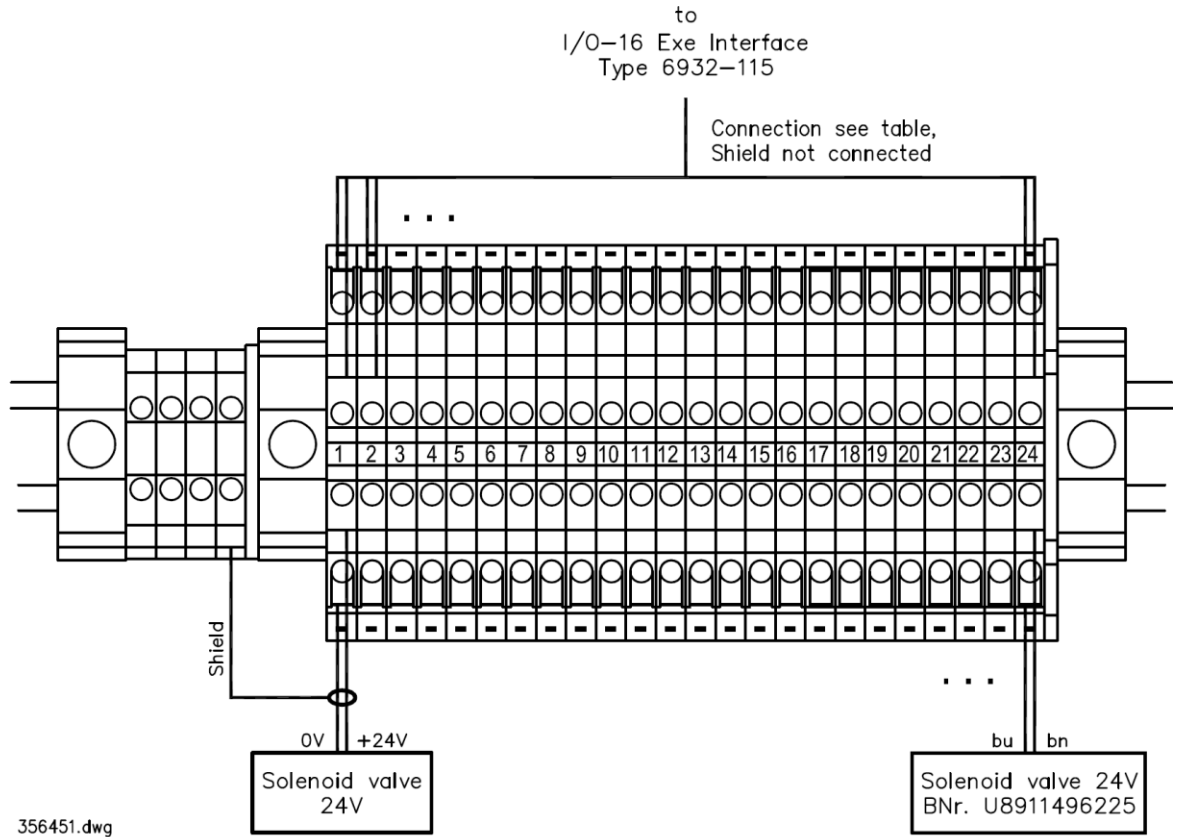
10.3.2 Dimensions



10.3.3 Terminal and cable assignment



Cable assignment



I/O-24 Ex e Interface type 6932-115		Cable U660021	Cable U660021	Terminal box 24x2 type 6982-12
Terminal	Signal	Wire	Wire	Terminal
302	OUT1	bn		1
304	0V1	bnwh		1- *
306	OUT2	rd		2
				2- *
309	OUT3	or		3
				3- *
312	OUT4	ye		4
314	0V4	bnye		4- *
315	OUT5	gn		5
317	0V5	bngn		5- *
318	OUT6	bu		6
				6- *
321	OUT7	vt		7
				7- *
324	OUT8	gy		8
326	0V8	whgy		8- *
327	OUT9	wh		9
329	0V9	whvt		9- *
330	OUT10	bk		10
				10- *
333	OUT11	whbn		11
				11- *
336	OUT12	whrd		12
338	0V12	bnrd		12- *
339	OUT13	whor		13
341	0V13	bnor		13- *
342	OUT14	whye		14
				14- *
345	OUT15	whgn		15
				15- *
348	OUT16	whbu		16
350	0V16	whbk		16- *
351	OUT17		vt	17
				17- *
354	OUT18		gy	18
				18- *
357	OUT19		wh	19
				19- *
360	OUT20		bk	20
				20- *
363	OUT21		bn	21
				21- *
366	OUT22		rd	22
				22- *
369	OUT23		or	23
371	0V23		gn	23- *
372	OUT24		ye	24
374	0V24		bu	24- *

* All 0V terminals are connected in the terminal box and the I/O interface.

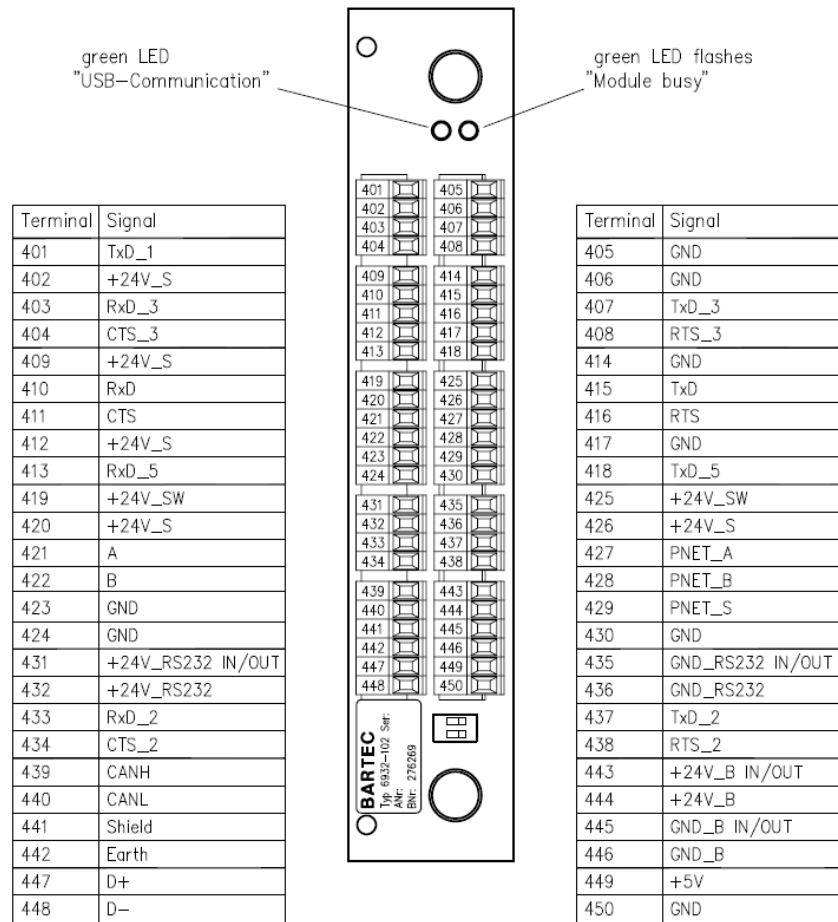
11 COMM Ex e interface type 6932-102



11.1 Technical data

Electrical Data	
Supply voltage electronic	DC 5,5 V, fuse 1 A
Supply voltage external devices	24 V stabilised (6932-100 U _{24V_S})
Interface USB	USB, Full speed, bus-powered, 12 Mbits/s
Interface RS232_1	Rx, Tx, CTS, RTS, 115 K, galvanically isolated
Interface RS232_2	Rx, Tx, CTS, RTS, 115 K, galvanically isolated
Interface RS232_3	Rx, Tx, CTS, RTS, 115 K, galvanically isolated
Interface RS232_4	Rx, Tx, galvanically isolated
Console (diagnosis)	Tx, 115 K, galvanically isolated
Interface RS 485	Serial, asynchron, 9600 bit/s, RS485 (max. 115 K)
Interface P-NET	Serial, asynchron, 76800 bit/s, RS485
Product ID	6004
System connection	USB, Full speed, self-powered, 12 Mbits/s via motherboard
Ambient conditions	
Ambient temperature	-20 ... +70 °C
Ambient temperature (inside the basic module)	-20 ... +50 °C
Storage temperature	-20 ... +50 °C
Mechanical Data	
Weight	2,5 N (250 g)
Cable connection	Clamp connection pluggable, 1,5 mm ²
Ordering details	
Designation	Order number
COMM Ex e interface, type 6932-102	276269

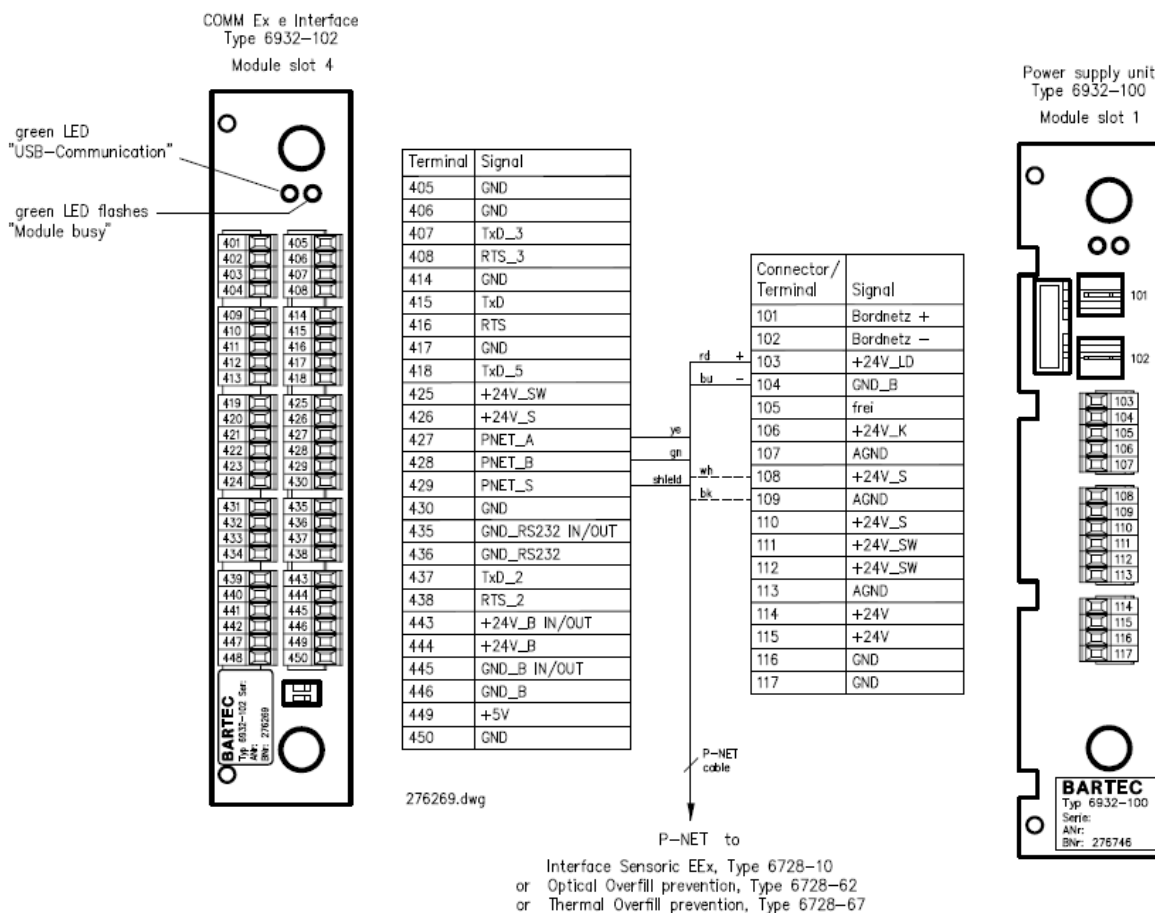
11.2 Terminal assignment



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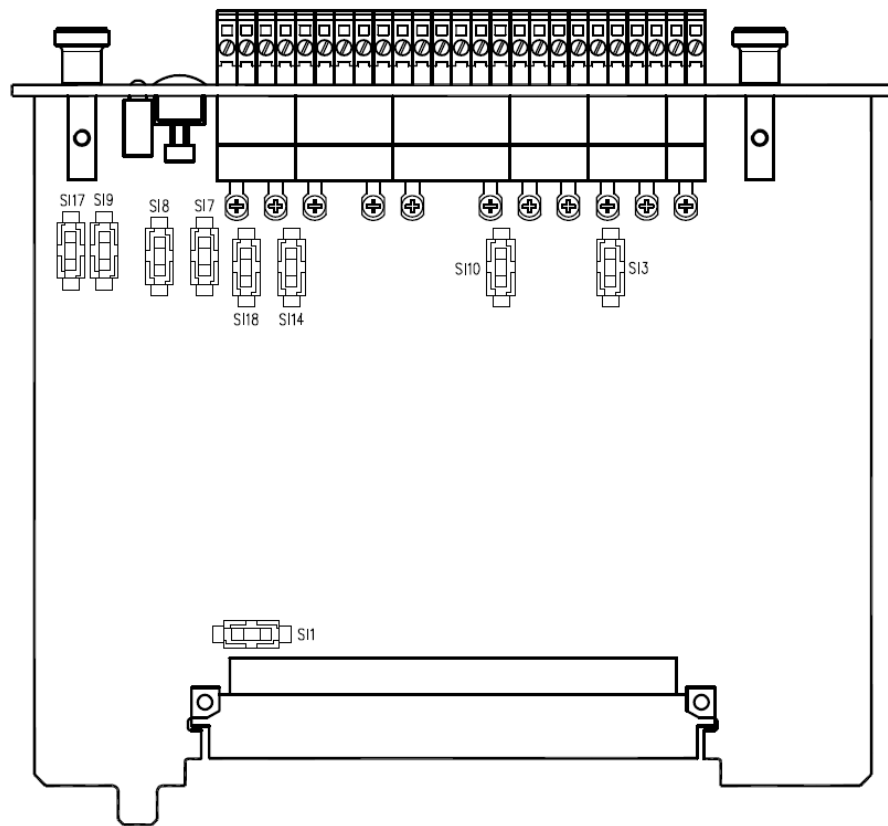
Printer	COMM type 6932-102	Printer holding type 6961-100
	425 (+24V_bk) (switchable) 410 (RxD) 414 (GND) 415 (TxD)	(rd and wh) +24V (ye) RxD (bu) and GND (bk) 0V (gn) TxD
GPRS Data modem	COMM type 6932-102	Modem cable type 4386-306
	403 (RxD_3) 404 (CTS_3) 406 (GND) 407 (TxD_3) 408 (RTS_3) 419 (+24V_bk) (switchable)	gn bu bn+gr ye wh pk
	Shield bar → Fit shield ye/gn	
GPS Receiver	COMM type 6932-102	Cable GPS Type 6722-18
	412 (+24V) 413 (RxD_5) 417 (GND) 418 (TxD_5)	rd wh bk/ye bu
	Shield bar → Fit shield	

11.3 Terminal assignment P-NET



COMM type 6932-102	Power supply unit type 6932-100	Sensor-Interface type 6728-10 Thermal Overfill prevention type 6728-67
427 (PNET_A) 428 (PNET_B) 429 (PNET_S)	103 (+24V_LD) 104 (GND_B)	(ye) A (gn) B Shield S (rd) + (bu) -
COMM type 6932-102	Power supply unit type 6932-100	Optical Overfill prevention type 6728-62
427 (PNET_A) 428 (PNET_B) 429 (PNET_S)	103 (+24V_LD) 104 (GND_B) 108 (+24V_S) 109 (AGND)	(rd) + (bu) - (wh) +24 V (bk) -

11.4 Fuse values to series B



Fuse	Description	Application	Value	Order No.
S11	CPU		F 1.0A	281772
S13	CAN	ext. Inclination sensor	F 1.0A	281772
S17	RS232 (5)	GPS	F 3.5A	286901
S18	RS232		F 3.5A	286901
S19	RS232 (3)		F 1.0A	281772
S110	RS232 (2)		F 1.0A	281772
S114	RS485		F 1.0A	281772
S117	+24V_SW	Printer + Modem	T 3.5A	233866
S118	P-NET		F 1.5A	286900

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Note:
For COMM Ex e Interface type 6932-102 the changeable fuses are eliminated **from series C!**

12 Interface sensoric EEx type 6728-10



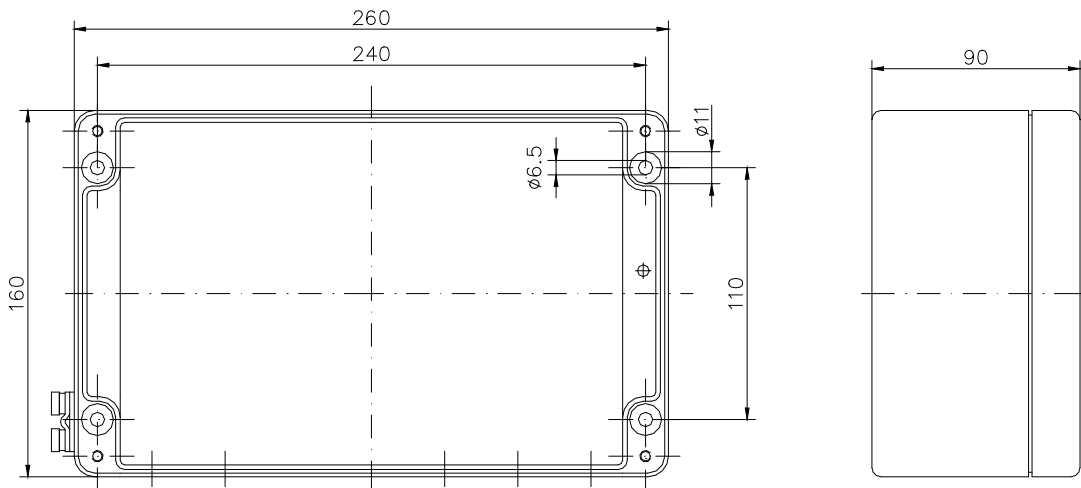
Identification of products via magnetic code during loading.

12.1 Technical data

Electrical Data	
Supply voltage	DC 24 V / 0,1 A (tolerance range: 16 ... 36 V)
Nominal current at DC 24 V	0.15 A
Maximum voltage U_m	50 V
Max. current of through-wiring	7 A
Connection	Screw-type terminals EEx e TOP 1.5 GS, 0.5 mm ² - 1.5 mm ²
Number of sensors	Max. 2/4 x tank identification + hose monitoring
Product identification	Number: max. 12 product identification sensors 6729-10
Residual quantity detection	Number: max. 12 residual quantity sensors 6729-20
Tank identification	Number: max. 9 (product identification coupling, tank identification via GWG plug connector)
Error self-detection	Monitoring of the sensor electrical circuits for minimum and maximum values to detect outages
Interface	P-NET ID No. 5909
Terminal strip KL1: Tank /ASS identification	Nominal voltage DC 7 V, intrinsically safe electrical circuit Ex ia IIB $U_o \approx 8.5$ V, $I_o \approx 300$ mA, $P_o \approx 638$ mW, $R_i \approx 28.3$ Ω , $C_o \approx 5.5$ μ F, $L_o \approx 0.1$ mH or $C_o \approx 1,8$ μ F, $L_o \approx 1.5$ mH
Terminal strip KL2: Product identification	Nominal voltage DC 7 V, intrinsically safe electrical circuit Ex ia IIB $U_o \approx 8.5$ V, $I_o \approx 400$ mA, $P_o \approx 850$ mW, $R_i \approx 22$ Ω , $C_o \approx 3.9$ μ F, $L_o \approx 0.1$ mH or $C_o \approx 1.5$ μ F, $L_o \approx 0.9$ mH
Terminal strip KL3: Residual quantity identification	Nominal voltage DC 7 V, intrinsically safe electrical circuit Ex ia IIB $U_o \approx 8.5$ V, $I_o \approx 84$ mA, $P_o \approx 180$ mW, $R_i \approx 102$ Ω , $C_o \approx 6.5$ μ F, $L_o \approx 0.1$ mH or $C_o \approx 3.7$ μ F, $L_o \approx 1.5$ mH

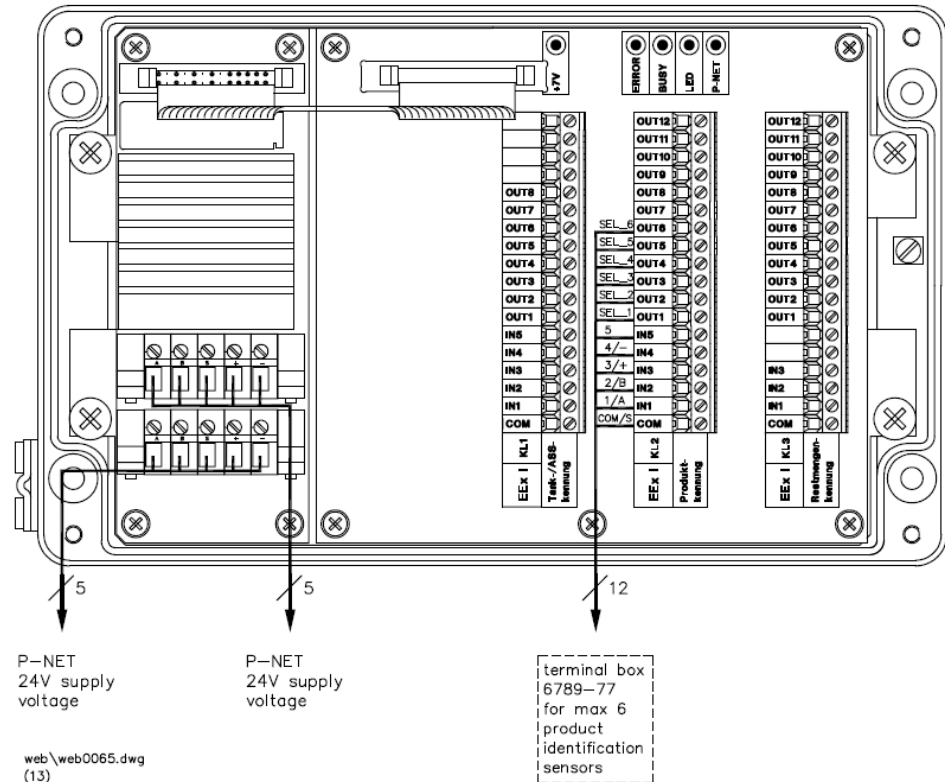
Environmental Conditions	
Operating temperature	- 20 ... + 50 °C
Climate class/protection type	JWD/IP 65
Equipment group/category Ignition-protection type	II (1) 2 G Ex eb mb [ib] [ia] IIB T4
EC-type examination certificate	BVS 03 ATEX E 220
Standards	EN 60079-0, EN 60079-7, EN 60079-11, EN 60079-18, EN 60079-26
Mechanical Data	
Housing	Alu die casting, surface untreated
Weight	approx. 3.0 kg
Installation position	As desired, cable inlets may not face up, however
Order details	
Designation	Order number
Interface sensor system EEx, type 6728-10	U89117672810

12.2 Dimensions and mounting



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12.3 Wiring for a maximum of six product identification sensors



P-NET connection cable U660102	
Signal	Colour
A	ye
B	gn
S	shield
+	rd
-	bu

13 Terminal box for sensors type 6789-77

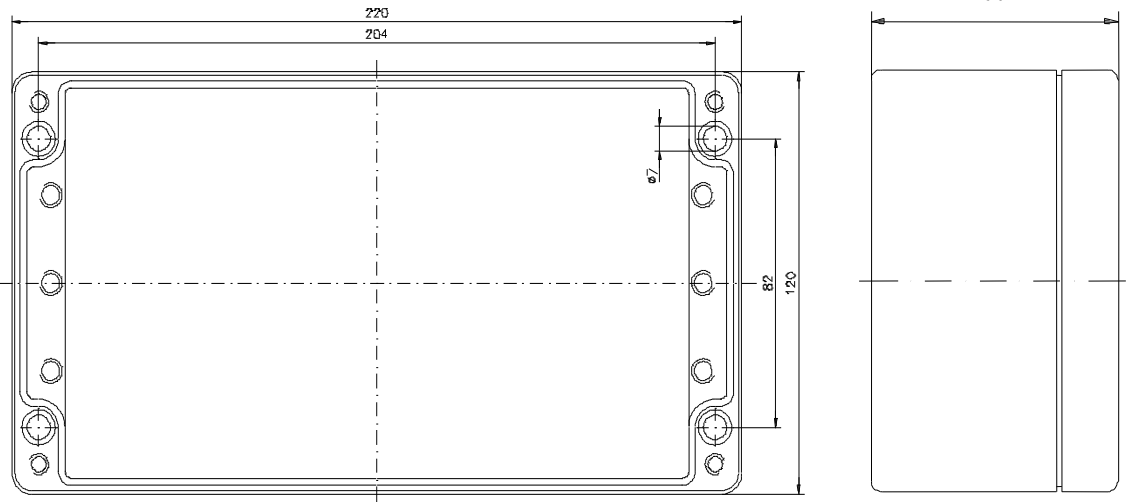


Connection of product identification sensors for detecting products via magnetic code during loading.

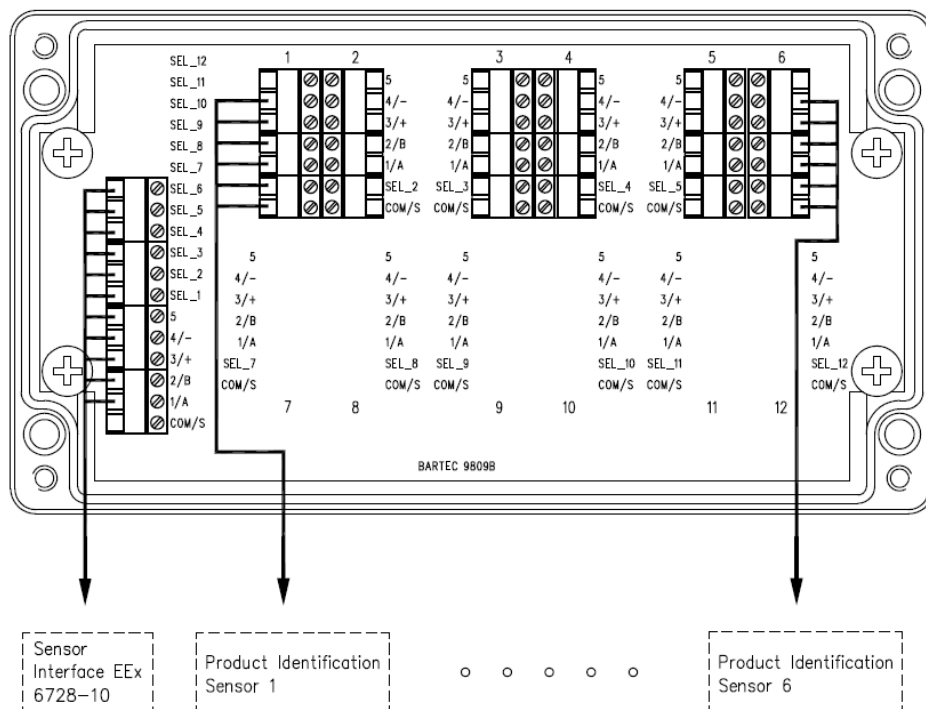
13.1 Technical data

Electrical data	
Electrical connection	EEx i TOP screw terminals max. 2,5 mm ²
Cable feed	12 x PG9, 1 x PG11
Ambient conditions	
Operating temperature	-20 ... +50 °C
Storage temperature	-30 ... +70 °C
Climatic classification/ protection type	HWD / IP 65
Ex protection type	Intrinsic safety
Mechanical data	
Casing	Aluminium diecast, surface untreated
Weight	Approx. 1,7 kg
Installation position	Any, but cable feeds mustn't point upwards
Ordering details	
Designation	Order number
Terminal box, type 6789-77	U8911678977

13.3 Dimensions and mounting



13.4 Connection of product identification sensors type 6729-11/-13



Terminal designation	Wire colour
5	—
4/-	gy
3/+	gn
2/B	ye
1/A	bn
SEL_x	bu
COM/S	pk

web\web0065.dwg
(14)

14 Thermal Overfill prevention Ex type 6728-67



14.1 Technical Data

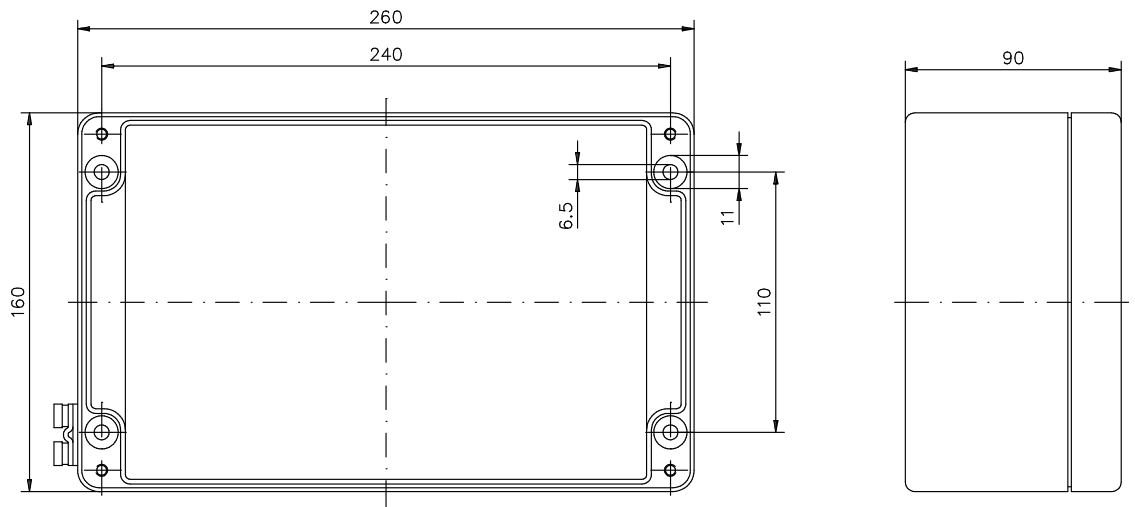
Electrical Data	
Conductor cross-section	Terminal KL 1 to KL14 0.5 ... 1.5 mm ²
Power supply	Terminals KL1, KL6 (+) and KL2, KL7 (-) nominal voltage DC 16 - 32 V, nominal current strength DC 0,1 A Um ≈ DC 50 V
PNET data interfaces	RS485 compatible- P-NET, asynchronous, 76800 bit/s terminals KL3, KL8 (A) and KL4, KL9 (B) and KL5, KL10 (S) nominal voltage DC 5 V, Um DC ≈ 50 V, current strength up to 0.1 A
Through wiring electrical circuits	Terminals KL1 to KL10, current strength up to 7 A
Internal supply circuit	Terminals KL11 (+UO) and KL12 (-UO) nominal voltage DC 16 - 32 V, nominal current strength up to DC 0.6 A (0.2 A per GWG module)
GWG module supply	Terminals KL13 (+UI) and KL14 (-UI) Nominal voltage DC 16 (18)-36 V nominal current at DC 24 V up to 0.6 A, Um ≈ DC 50 V
Intrinsically safe limit indicator circuits Ex ia IIB/IIC (GWG)	GWG 1: Terminals: KL15-1 (+G1), KL15-2 (-G1) GWG 2: Terminals: KL15-1 (+G2), KL15-2 (-G2) GWG 3: Terminals: KL17-1 (+G3), KL17-2 (-G3) nominal voltage DC 19,0 ± 0.1 V, nominal current up to 83 mA min. load resistance 70 Ω Uo ≈ DC 19.4 V, min. internal resistance 156 Ω, Io 125 mA Po ≈ 600 mW connection values for IIB Co ≈ 1.4 μF, Lo ≈ 9 mH connection values for group IIC Co ≈ 144 nF, Lo ≈ 2 mH
Intrinsically safe output circuit Ex ib IIB/IIC (HORN)	HORN: Terminals KL18-1 (+H), KL18-2 (-H) nominal voltage DC 7 V, Uo ≈ DC 8.5 V Io (ESB) ≈ 155 mA, R ≈ 18.9 Ω Io (linear characteristic line) ≈ 450 mA, Po ≈ 870 mW connection values for group IIB Co ≈ 60 μF, Lo ≈ 0.5 mH

	connection values for IIC Co ≈ 6.5 μF, Lo ≈ 0.12 mH
Intrinsically safe output circuit Ex ib IIB/IIC (ANA)	ANA: Terminals KL19-1 (AT), KL19-2 (GND), KL19-3 (LS) nominal voltage DC 7 V, U _o ≈ DC 8,5 V I _o (electronic) ≈ 155 mA, R ≈ 23.6 Ω I _o (linear characteristic line) ≈ 360 mA, P _o ≈ 750 mW connection value for group IIB Co ≈ 60 μF, Lo ≈ 1.1 mH connection values for group IIC Co ≈ 6.5 μF, Lo ≈ 0.05 mH
Cable glands	M16x1.5, cable diameter Ø 4 mm - Ø 9 mm light-blue for intrinsically safe circuits
Environmental Conditions	
Ambient temperature	-20 ... + 50 °C
Storage temperature	-20 ... + 60 °C
Climate class	HWD (DIN 40040)
Protection type	IP66 (EN 60529)
Equipment group/category Ignition-protection type	II (1) 2 G Ex eb mb [ib] [ia] IIB T4
EC-type examination certificate	BVS 99 ATEX E 018
Standards	EN 60079-0, EN 60079-7, EN 60079-11, EN 60079-18, EN 60079-26
Equipment-specific Data	
Rated conditions	23 ± 2 °C
Mechanical Data	
Housing	Alu die casting, surface untreated
Dimensions (L x W x H)	260 mm x 160 mm x 90 mm see Dimension Drawings
Measurements	3 kg
Order details	
Designation	Order number
Overfill protection triple 6728-67	U89117672867

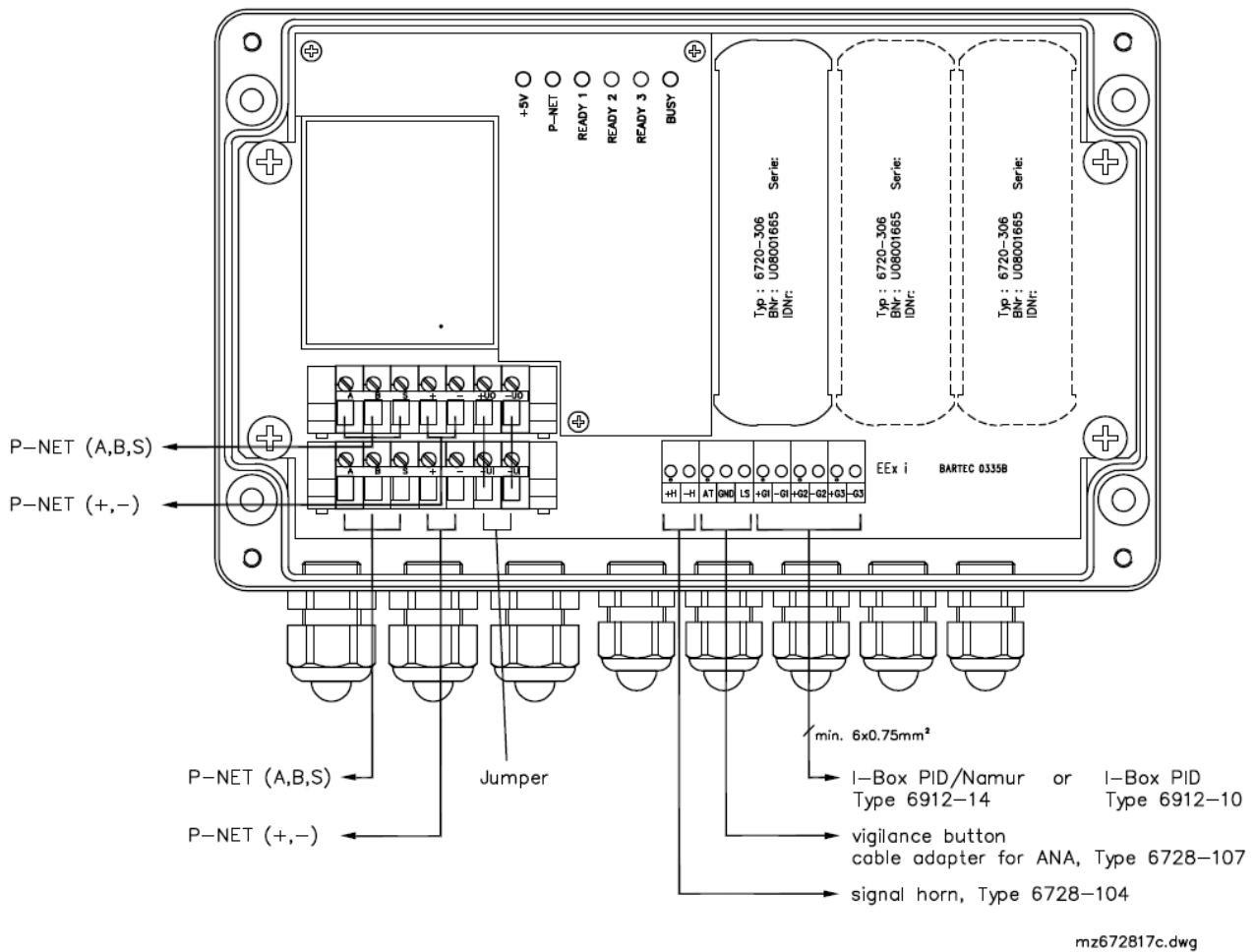
14.2 Safety instructions

- The connection cables must be protected from mechanical damage and firmly secured.
- When selecting and mounting the intrinsically safe connection cables, Paragraphs 12.2 and 12.3 of EN 60079-14:2008 must be followed.
- The installation and maintenance of the equipment must be performed by qualified technicians.
- Make sure that the information and operating conditions supplied by BARTEC BENKE are complied with.
- If there is reason to believe that the equipment can no longer be operated without faults, shut it down immediately and secure it against re-starting.
- All conditions and requirements applicable to road transport of dangerous goods retain their full validity (ADR, BetrSichV [Operating Safety Ordinance] TRbF [Technical Rules concerning Flammable Liquids], TRBS [Technical Rules for Operating Safety]). Dimensions and mounting

14.3 Mounting and dimensions



14.4 Wiring



P-NET connection cable U660102	
Signal	Colour
A	ye
B	gn
S	shield
+	rd
-	bu

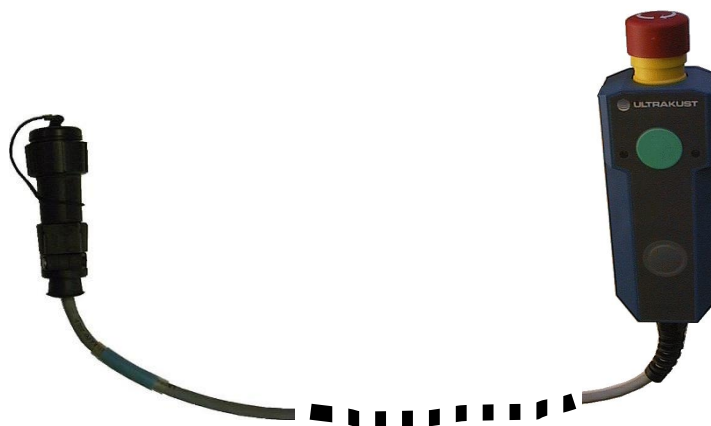
The supply voltage "+ 24 V (limiting value transmitter (GWG) modules)" for the filling safety device/ GWG modules has to be connected with the supply voltage "P-NET (+, -)". For this purpose, a **wire jumper has to be clamped** between the terminals +Uo and +Ui and between -Uo and -Ui (see drawing).

For systems equipped with more than one limiting value transmitter GWG the feed cables to these limiting value transmitters have to be laid separated from each other in a way that they can be assigned unequivocally to the measuring point which they are configured for. This can for instance be realized by arranging a separate cable drum for the supply line to the coupling socket of the limiting value transmitter, type 903 (TRbF 512).

15 Alert key

15.1 Operating unit type 6783-101

The alert key operating unit can optionally be connected to the overfill prevention device. It has an emergency-stop function for the immediate interruption of the filling procedure and a green key that has to be pressed in periodical intervals - every 40 seconds at the latest.



15.2 Technical data

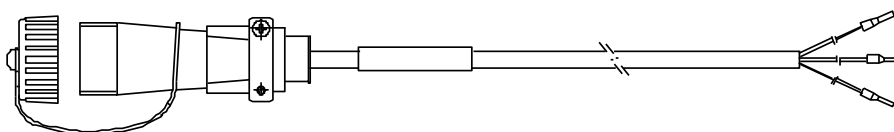
Electrical Data	
Plug connector, male 2 (A button) and male 1 (GND)	DC 5 V ... 24 V
Plug connector, male 3 (speaker) and male 1 (GND)	DC 5 V ... 24 V
Intrinsically safe signal and supply circuits (connection via 3-pole connector on 12 m connecting cable)	Ex ib IIB U _i = 28 V, I _i = 245 mA, P _i = 750 mW, C _i = 248 nF, L _i = 0,5 mH
Connecting cable	12 m with 7 pole connector plug
Environmental Conditions	
Operating temperature	- 20 ... + 50 °C
Storage temperature	- 40 ... + 85 °C
Climate class/protection type	HVD/IP 65
Equipment group/category Ignition protection type	II 2 G Ex ib IIB T3
EC-type examination certificate	PTB 04 ATEX 2039
Standards	EN 60079-0, EN 60079-11
Mechanical Data	
Housing	Impact-resistant plastic
Dimensions	156.5 x 52 x 36.5 mm ³
Weight	0.3 kg (with connecting cable 0.8 kg)
Order details	
Designation	Order number
Attention button, type 6783-101	U08001288

15.3 Wiring

The alert key operating unit can be connected to the overfill prevention device either via the cable adapter operating unit, type 6728-107, or via the extension unit, type 6783-103.

15.4 Cable adapter operating unit type 6728-107

Order no. U89116728107



Wiring cable adapter operating unit

Cable length: 0.5 m

		Function	Cable no.	Terminal overfill prevention
1	Socket	GND	1	GND
2	Blind plug			
3	Socket	A-key	2	AT
4	Blind plug			
5	Socket	Loudspeaker	ye/gn	LS
6	Blind plug			
\perp	Blind plug			

16 Optical overfill prevention (Switzerland) type 6728-61/62



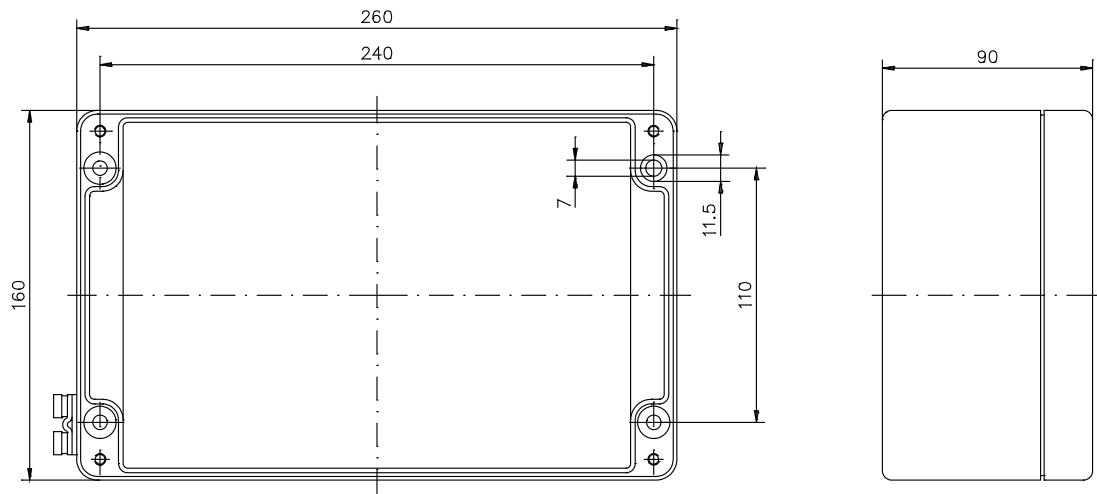
16.1 Technical Data

Electrical Data	
Supply voltage	DC 24 V (DC -10/+15%) from power supply unit type 6781-1x or from Basic module type 6932-1x
Power consumption of electronics	< 0.2 A, DC 24 V
Ignition protection type	Ex eb mb [ib IIC] [ia IIC] IIB T4
Switching output 3x (Mono: 2 x)	DC 24 V / 0.35 A, short-circuit proof. Max. 32 V DC - high side switching External supply
Signal output 1 x Signal transmitter	Ex ib IIB [$U_A < 7V$, $I_A < 25 \text{ mA}$, $U_A < 7V$, $I_A < 25 \text{ mA}$]
Probe connection 2 x (Mono: 1 x)	Ex ia IIC [U_a , R_i according to technical rules for overfill preventions]
Inputs 2 x 3 (1 x 3) Limit switch detection	Ex ib IIB, $R_i = 10 \text{ k}\Omega$
Interface	RS485 compatible- P-NET, asynchronous, 76800 bit/s terminals KL3, KL8 (A) and KL4, KL9 (B) and KL5, KL10 (S) nominal voltage DC 5 V, $U_m \text{ DC} \approx 50 \text{ V}$, current strength up to 0.1 A
Operating temperature	-20 ... +50°C
Storage temperature	-40 ... +85°C
Protection type	IP65 according to DIN 40050
Climatic Class	HWD according DIN 40040
Attachable conductor cross section	0.5 ... 1.5 mm ²
Cable entry	6x M16x1.5 Ex e (plastics black) 5x M16x1.5 Ex i (plastics blue)
Housing	Aluminium die casting, surface untreated
Dimensions	260 x 160 x 90 mm (L x B x H)
Weight	approx. 3 kg

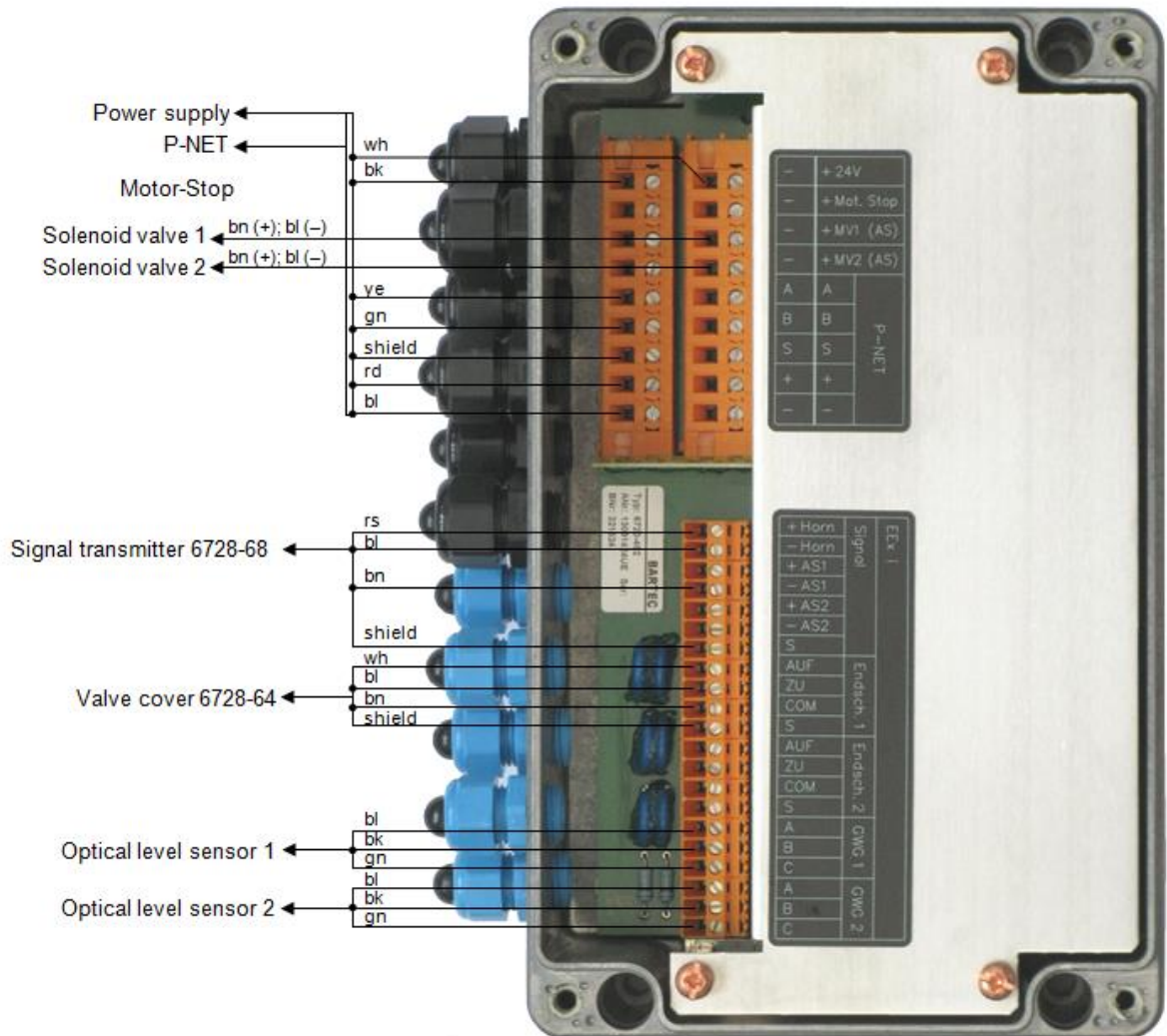
Parameters / Electrical Data				
Non Intrinsically Safe Supply circuit	Clamps	KL1, KL6 (+) and KL7 (-)		
	Nominal voltage	DC 16...32 V		
	max. voltage U_m	DC 50V		
	Nominal current	0.15 A		
Non Intrinsically Safe Data interface	Clamps	KL3, KL8 (A) and KL4, KL9 (B) und KL5, KL10 (S)		
	Nominal voltage	DC 5 V		
	max. voltage U_m	DC 7 V		
	Nominal current	up to 0.1 A		
Max. pass current for the power supply circuit and data interface	Clamps	KL1 up to KL10		
	Current value	up to 7A		
Supply circuit load (Solenoid valves)	Clamps	KL11 (+24V) and KL12 (-)		
	Nominal voltage	DC 16...32 V		
	max. voltage U_m	DC 50 V		
	Nominal current	up to 1.05 A		
Switching circuits	Clamps	KL13, KL14 (+Mot.Stop, -) and KL21, KL22 (+MV1 (AS), -) and KL24, KL25 (+MV2 (AS)-)		
	max. load current	DC 0.35 A		
Intrinsically safe Output circuit Ex ia IIB/IIC (GWG 1 und GWG 2)	Clamps	GWG1: KL26-1 (A) and KL26-2 (B), and KL26-3 (C) GWG2: KL27-1 (A) and KL27-2 (B), and KL27-3 (C)		
		Current circuit A-C (each)	Current circuit B-C (each)	
	Nominal voltage	DC 5 V	DC 6.8 V	
	Nominal current	0.2 mA (=const.)	42 mA ($R_{B-C} = 80 \Omega$)	
	Max. open-circuit voltage U_0	DC 7.2 V	DC 7.2 V	
	min. internal resistance R_i	720 Ω	80 Ω	
	Short-circuit current I_0	10 mA	90 mA	
	Max. power P_0	18 mW	162 mW	
	Maximum values of connectable external Capacitance C_0 and inductance L_0 for Application Ex ia IIB		$C_0 = 240 \mu F$ $L_0 = 15 mH$	
	Maximum values of connectable external Capacitance C_0 and inductance L_0 for Application Ex ia IIC		$C_0 = 13,5 \mu F$ $L_0 = 4 mH$	
Intrinsically safe output circuits Ex ib IIB/IIC (Limit switch 1, Limit switch 2, Signal AS1, Signal AS2)	Clamps	Limit switch 1:KL15-1 (AUF), KL15-2 (ZU), KL16 (COM) Limit switch 2:KL17-1 (AUF), KL17-2 (ZU), KL18 (COM) Signal AS1:KL20-1 (+AS1), KL20-2 (-AS1) Signal AS2:KL23-1 (+AS2), KL23-2 (-AS2)		
	Nominal voltage	DC 5 V		
	Max. open-circuit voltage U_0	DC 8.5 V		
	min. internal resistance R_i	240 Ω		

	Short-circuit current I_0	35 mA
	Max. power P_0	75 mW
	Maximum values of connectable external Capacitance C_0 and inductance L_0 for Application Ex ia IIB	$C_0 = 60 \mu\text{F}$ $L_0 = 70 \text{ mH}$
	Maximum values of connectable external Capacitance C_0 and inductance L_0 for Application Ex ia IIC	$C_0 = 6.5 \mu\text{F}$ $L_0 = 19 \text{ mH}$
Intrinsically safe output circuit Ex ib IIB/IIC (Signal transmitter)	Clamps	KL19-1 (+HORN), KL19-2 (-HORN)
	Nominal voltage	DC 7 V
	Max. open-circuit voltage U_0	DC 8.5 V
	min. internal resistance R_i	19.5 Ω
	Short-circuit current I_0	435 mA
	Short-circuit current limited by ESB	250 mA
	Max. power P_0	850 mW
	Maximum values of connectable external Capacitance C_0 and inductance L_0 for Application Ex ia IIB	$C_0 = 60 \mu\text{F}$ $L_0 = 0.5 \text{ mH}$
	Maximum values of connectable external Capacitance C_0 and inductance L_0 for Application Ex ia IIC	$C_0 = 6.5 \mu\text{F}$ $L_0 = 0.12 \text{ mH}$
Signal transmitter type 6728-68		
Supply voltage	DC 24 V \pm 10%	
Current consumption	110 mA	
Maximum voltage U_m	DC 50 V	
Intrinsically Safe Circuit [Ex i]: max. voltage U_i	DC 10 V	
Internal capacitance C_i	4.5 μF	
Internal inductance L_i	negligibly small	
Cable length	5 m	
Housing	Aluminium die casting, surface untreated	
Dimensions	120 x 122 x 90 (l x b x h)	
Weight	ca. 1.3 kg	
Cable entry	2 x PG9 Metal	
Operating temperature	-20 ... +50 $^{\circ}\text{C}$	
Storage temperature	-40 ... +85 $^{\circ}\text{C}$	
Protection type	IP43 according to DIN 40050	
Climatic class	HWD according to DIN 40040	
Special notes	The signal transmitter has to be mounted outside the hazardous area.	
Order Details		
Designation	Order number	
Control unit AS mono type 6728-61	U89117672861	
Control unit AS dual type 6728-62	U89117672862	
Signal transmitter type 6728-68	201803	
Solenoid valve 3/2-way, A1, 24 V	U891496225	

16.2 Dimensions



16.3 Wiring



Note: The terminals „+AS1, +AS2, -AS2“ are not used.

Colour		Terminal 24 V
white	wh	+24 V
black	bk	-
Colour		Terminal P-NET
yellow	ye	A
green	gn	B
shield		S
red	rd	+
blue	bl	-

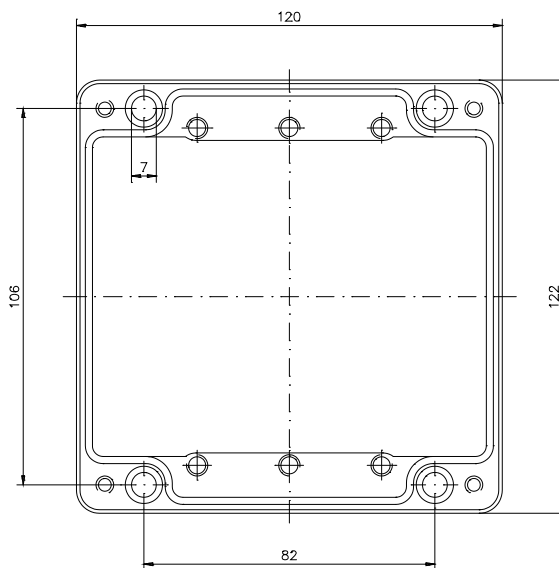
Colour		Terminal GWG 1 / GWG 2
blue	bl	A
black	bk	B
green	gn	C

16.4 Signal transmitter type 6728-68

The signal transmitter includes a horn (acoustic alarm) for the control unit AS mono / dual type 6728-61/62.



16.4.1 Mounting



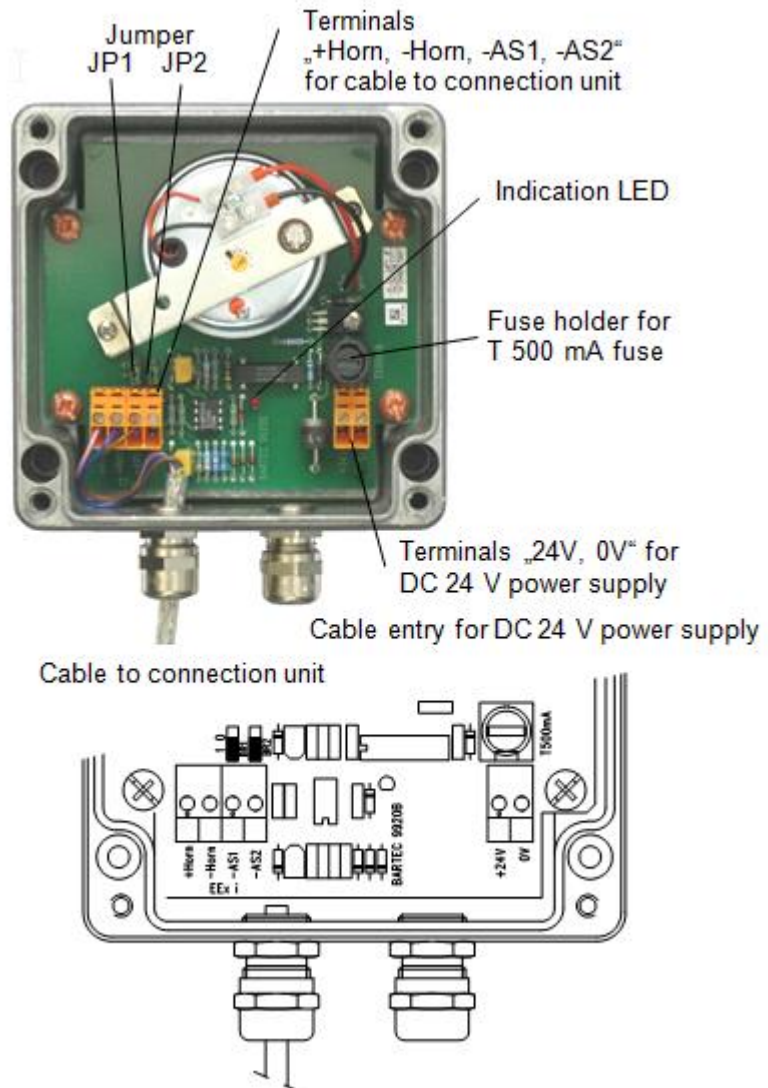
The cable must be connected to the control unit according to the wiring below. In addition, the signal transmitter requires a power supply of 24 V DC, 110 mA.



Attention:

The signal transmitter should not be mounted in hazardous areas of zone1!

16.4.2 Wiring



The horn is activated

- permanently with the signal „Horn“ of the control unit
- briefly with the signal „AS1“ of the control unit, if jumper JP1 is set to 1 (at Pumpablad)

Connection DC 24 V		
Colour		Terminal
...		+24 V
...		0 V
Connection to control unit		
Colour		Terminal Signal
rose	rs	+Horn
blue	bl	-Horn
brown	bn	-AS 1
not connected		-AS 2
		S

If the connection cable must be shortened, it should be done on the side of the signal transmitter, in this case there must not be established a new shield connection.

Jumper	Position JP1
Pumpablad at channel 1	1
Schwerkraftablad at channel 1	0

At Pumpablad on channel 1 the efficiency of the self-monitoring by optical and acoustic short signals must be asserted in accordance to the technical rules of overfill preventions, (Section 322 i).

Channel 2 (if configured) is always Schwerkraftablad. The terminal "AS2" is not connected. Jumper JP2 is irrelevant. In Schwerkraftablad no optical and acoustic short signals of self-monitoring are necessary.

16.5 Solenoid valve 3/2-way, A1, 24 V

Technical Data and Connections see Chapter 9.4.

17 Printer Type 6881-30

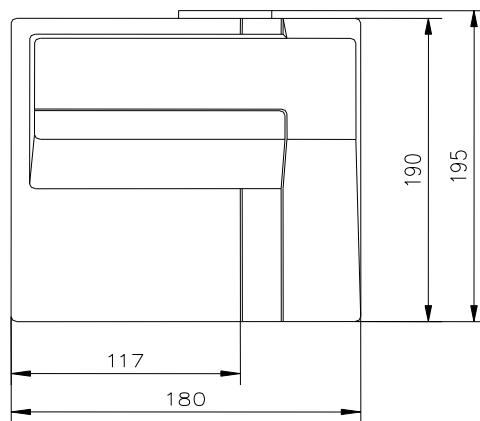
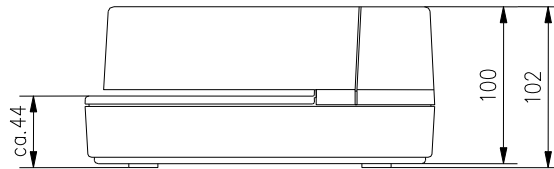


17.1 Technical data

Device-specific Data	
Printing format	Alphanumerical character set with 96 ASCII-characters (font 5 x 7 / 7 x 7) 32 international characters and 128 x 3 graphical characters (font 6 x 7 / 10 x 7) 4 letter sizes: Standard, font 5 x 7 (35 characters/line), Normal, font 7 x 7 (42 characters/line), Wide, font 5 x 7 (17 characters/line), Wide, font 7 x 7 (21 characters/line) Line feed: 4,2 mm
Printing procedure	Needle printer 7 x 7 printing direction unidirectional
Printing speed	1,9 ... 2,3 lines per second
Printing paper	Standard-, carbon- and self-copying paper Entire thickness 0,09 ... 0,35 mm Paper width at least 80 mm Paper length at least 80 mm Printing width max. 60 mm Max. of 4 copies with self-copying paper (25° C)
Colour ribbon	Colour ribbon cassette black, Life expectancy approx 1,5 x 10 ⁶ characters
Data interface type 6961-100	Serial interface (RS 232) Cable length max. 10 m

Electrical Data	
Power supply	DC 24 V ± 10 %, max. 1,0 A, ripple ≤ 150 mV eff.
Connection	25 pole socket (RS 232), 3 pole plugs (power supply DC 24 V)
Ambient Conditions	
Operating temperature	+5° C ... +40 °C
Storage temperature	-10° C ... +50 °C
Climatic class	KYF
Protective system	IP 40
Mechanical Data	
Dimensions	180 x 102 x 195 mm (B x H x T)
Weight	approx. 20 N (≅ 2 kg)
Housing	Plastics table-top housing, grey
Ordering details	
Designation	Order number
Printer, type 6881-30	235934
Printer mount, type 6961-100	279562

17.2 Dimensions Printer type 6881-30



db68811.dwg

17.3 Printer Mount type 6961-100



Attention:

The printer mount may only be installed and operated in the non-hazardous area.

17.3.1 Connection Printer Mount 6961-100

Connection Printer Mount before series A

Terminal	Terminal Connection Printer Mount Type 6961-100
24 V	rd
RxD	ye
TxD	gn
GND	bu

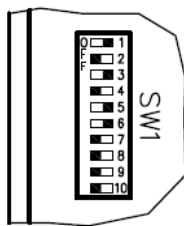
Connection Printer Mount from series A

Terminal	Terminal Connection Printer Mount Type 6961-100
24 V	rd + wh
RxD	ye
TxD	gn
GND	bu + bk

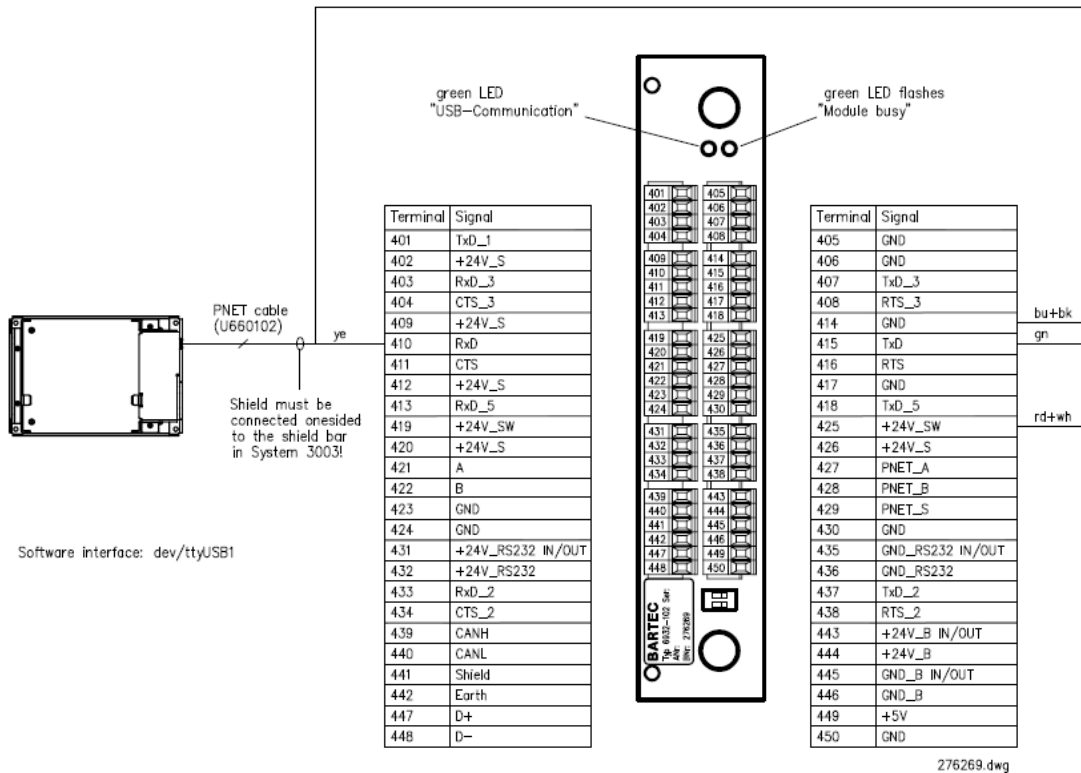
Dip-switch setting (bottom side):

Remove the adhesive label to change the dip-switch setting.

Dip-switch No	Printer Mount Type 6961-100
1	ON
2	OFF
3	ON
4	OFF
5	ON
6	ON
7	OFF
8	OFF
9	OFF
10	OFF



17.3.2 Terminal assignment



**Note:**

Terminal assignment rd+wh (+24 V) **effective from printer mount series A!** (see table terminal assignment)

Terminal assignment before series A

Terminals COMM 6932-102		Terminals printer mount 6961-100	
425	(+24V_SW) (switchable)	(rd)	+24 V
410	(RxD)	(ye)	RxD
414	(GND)	(bu) and GND	0 V
415	(TxD)	(bk)	
	Shield bar → Fit shield	(gn)	TxD
Fuse SI17 for terminal 425 (+24V) Order No.: 281772			

Terminal assignment from series A

Terminals COMM 6932-102		Terminals printer mount 6961-100	
425	(+24V_SW) (switchable)	(rd+wh)	+24 V
410	(RxD)	(ye)	RxD
414	(GND)	(bu) and GND	0 V
415	(TxD)	(bk)	
	Shield bar → Fit shield	(gn)	TxD
Fuse SI17 for terminal 425 (+24V) Order No.: 281772			

**Attention:**

Only if the Ex-switch (power supply unit 6932-100, terminal 110 and terminal 111) is closed, there will be an output of 24 V on terminal 425 (+24V_SW).

18 GPRS data modem type Telit GT864-Quad

- The modem housing (DGND) must not contact the chassis at any point. For this, the modem is fitted with the isolation set.
- Please also check the floating ground of the aerial adapter or the aerial.
- The shield bar must also not be in contact with the aerial adapter or the modem housing.
- The length of the modem cable is limited to 10 m. Any measures to lengthen the cable must be avoided.
- The components may only be installed and operated in the non-hazardous area.

18.1 Technical data

Operating voltage	5 - 36 V DC	
Dimensions	77 mm x 67 mm x 26 mm	
Weight	Approx. 100 g	
Mounting	With two oval countersunk head screws M 3x8 mm	
Operating temperature	-30 °C ... +75 °C	
Storage temperature	-40 °C ... +85 °C	
Ordering details		
Designation	Order number	
GPRS data modem type Telit GT864-Quad	304264	

18.2 Connections

Front view



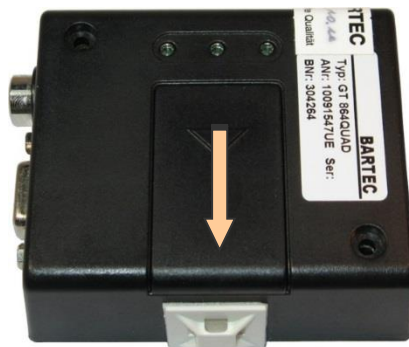
↑
Power cable
connection

Rear view



↑ ↑
Aerial connector (FME Plug)
RS 232 Interface
(9-pin D-Sub)

Inserting the SIM card



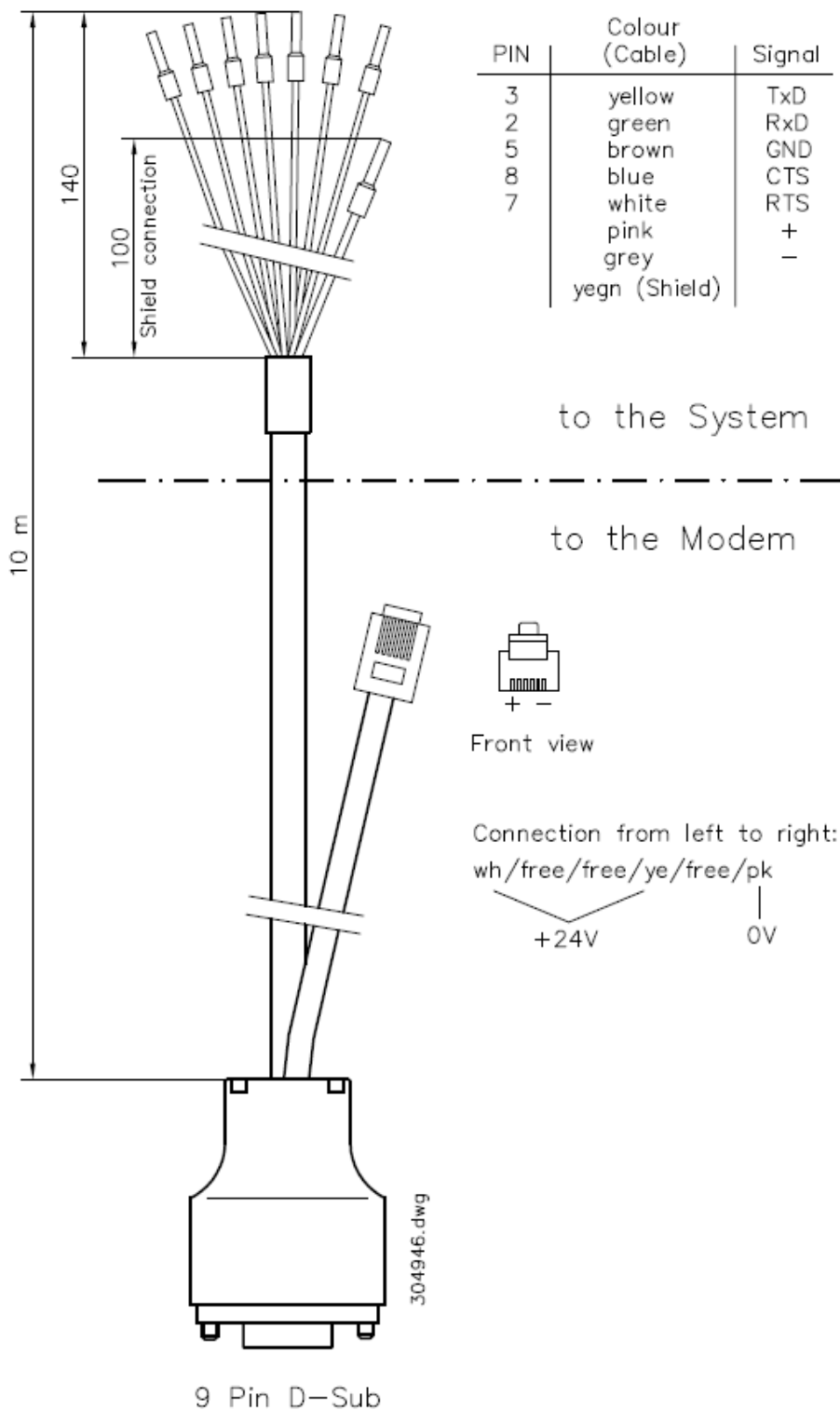
1. Open the cover.



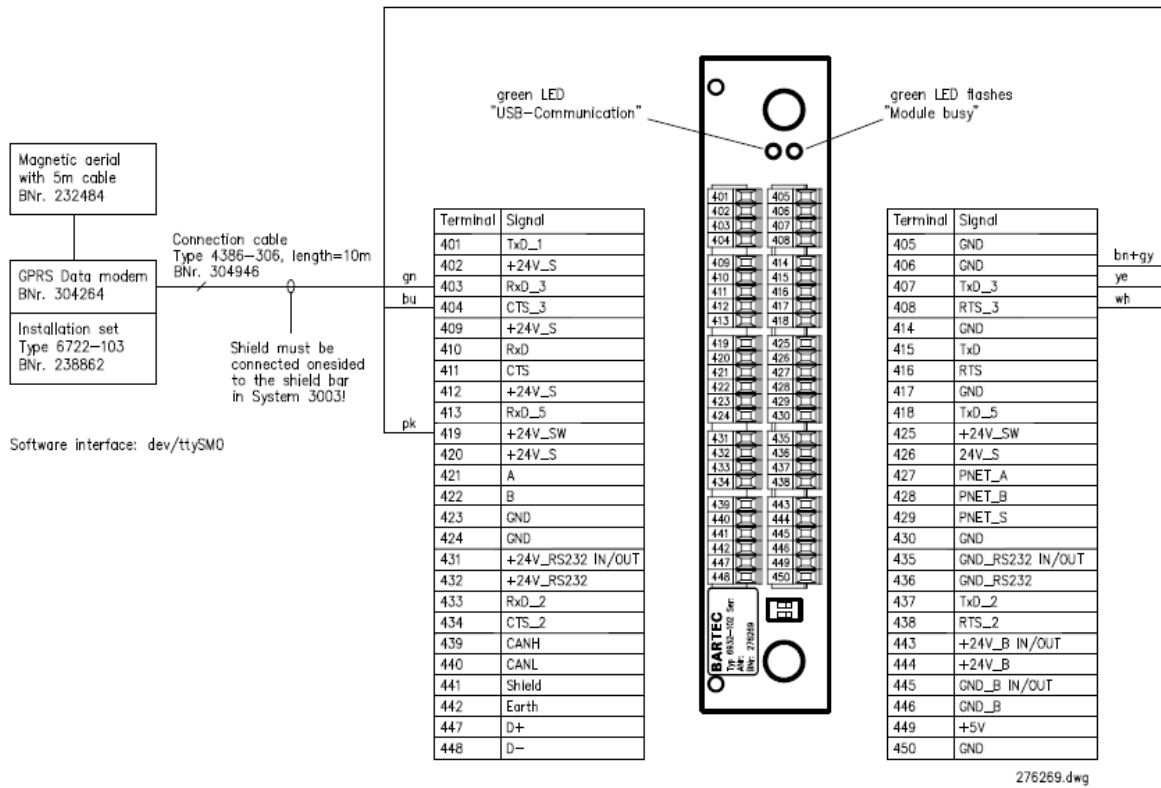
2. Open the card slot and insert the SIM card.

18.2.1 Connection cable GPRS data modem Telit GT864-Quad type 4386-306

(Order no. 304946, length 10 m)



18.3 Terminal assignment

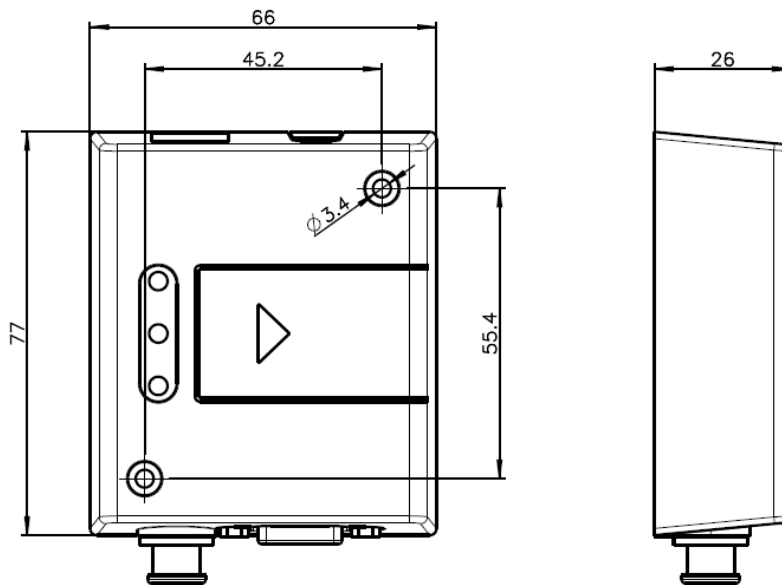


Terminals COMM 6932-102	Modem cable 4386-306
403 (RxD_3)	gn
404 (CTS_3)	bu
406 (GND)	gr/bn
407 (TxD_3)	ye
408 (RTS_3)	wh
419 (+24 V_SW) (switchable)	pk
Shield bar → Fit shield ye/gn	

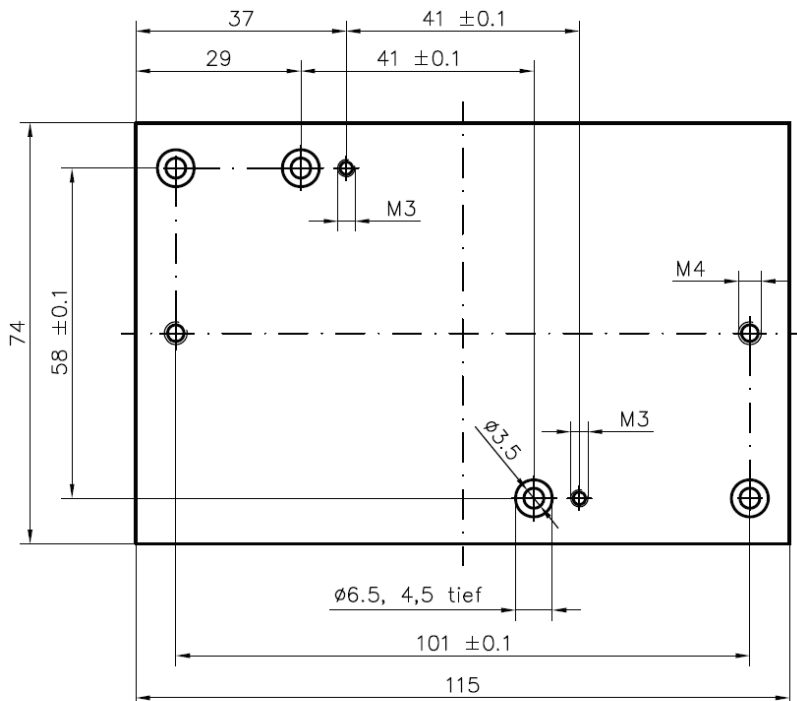
18.4 Dimensions and mounting

Fit the modem in a dry, dust-free and dirt-free area in a non-hazardous area where it is not exposed to much vibration.

Dimensions and mounting holes



Installation set, type 6722-103 (Order no. 238862)



$$t = 10 \pm 0.5$$

18.5 Magnetic aerial

Order no. 360422

60 mm dia./H: 13 mm

Connection cable with FME connector, Length: 5 m

Mount the aerial at a point where it will obtain good reception.
It is not permitted to operate magnetic aerials in hazardous areas.

Only change the SIM card with the power switched off.

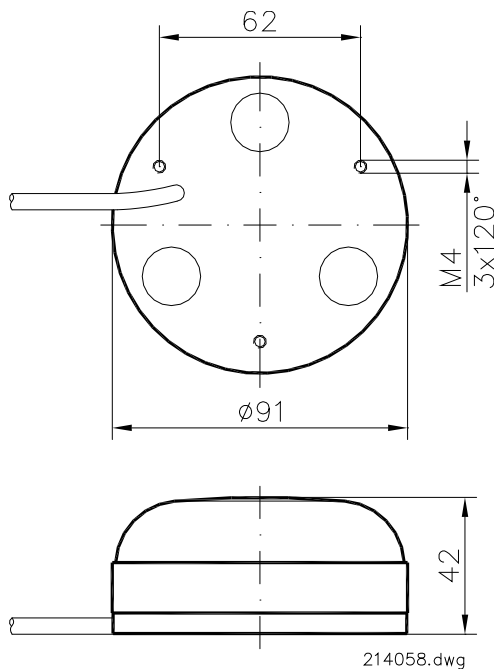


19 GPS receiver type 6722-18

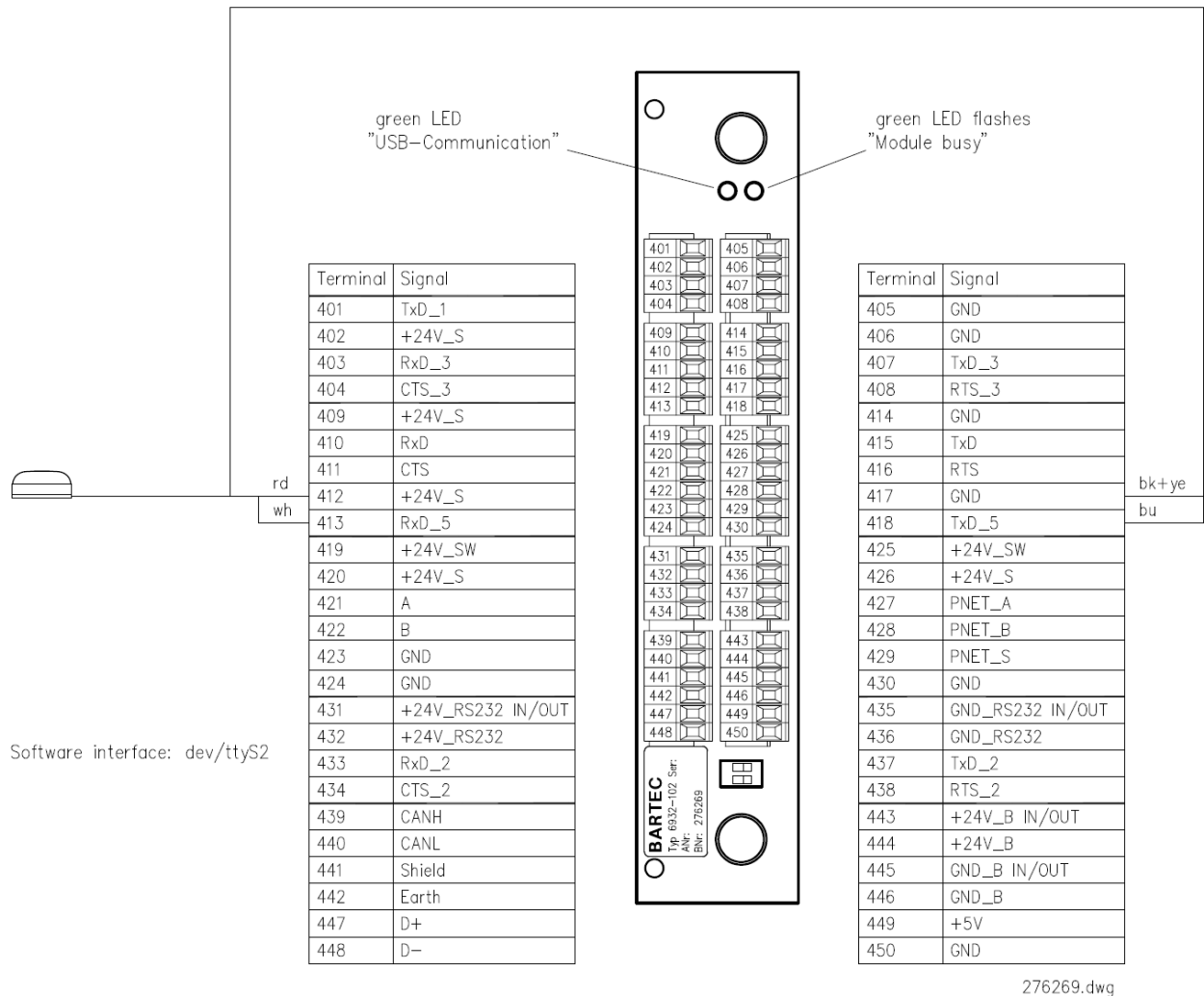
19.1 Technical data

Electrical data	
Auxiliary energy	DC 6 ... 40 V
Power consumption, typical	50 mA at DC 24 V
Receiver antenna	installed
Interfaces	RS 232
Electrical connection	5 m cable length, open lead ends
Ambient conditions	
Operating temperature	-30 ... +80 °C
Protection type	IP 67 (1 meter immersion depth for 30 minutes)
Mechanical data	
Dimensions	See drawing
Mounting screws	3 x M4, do not exceed the maximum depth of thread of about 8,0 mm (risk of breakage)
Weight	330 g including 5 m cable
Ordering details	
Designation	Order number
GPS receiver, type 6722-18	241920

19.2 Dimensions and mounting



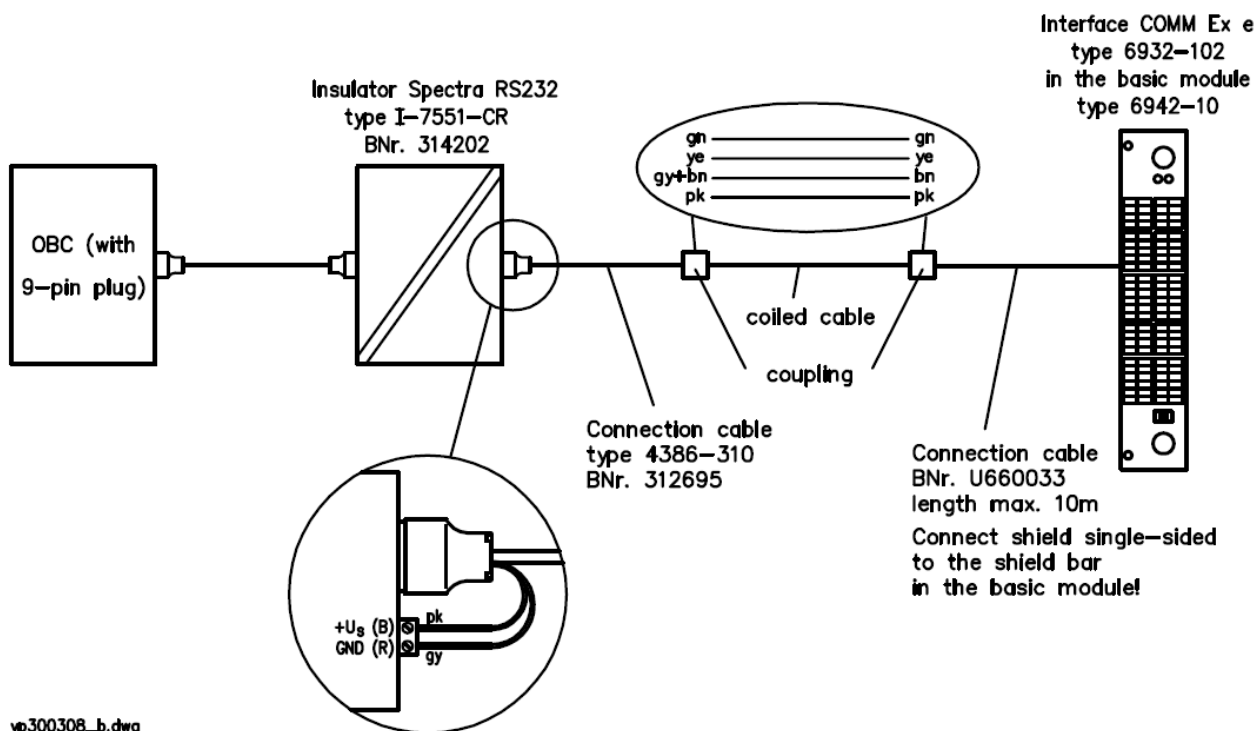
19.3 Terminal assignment



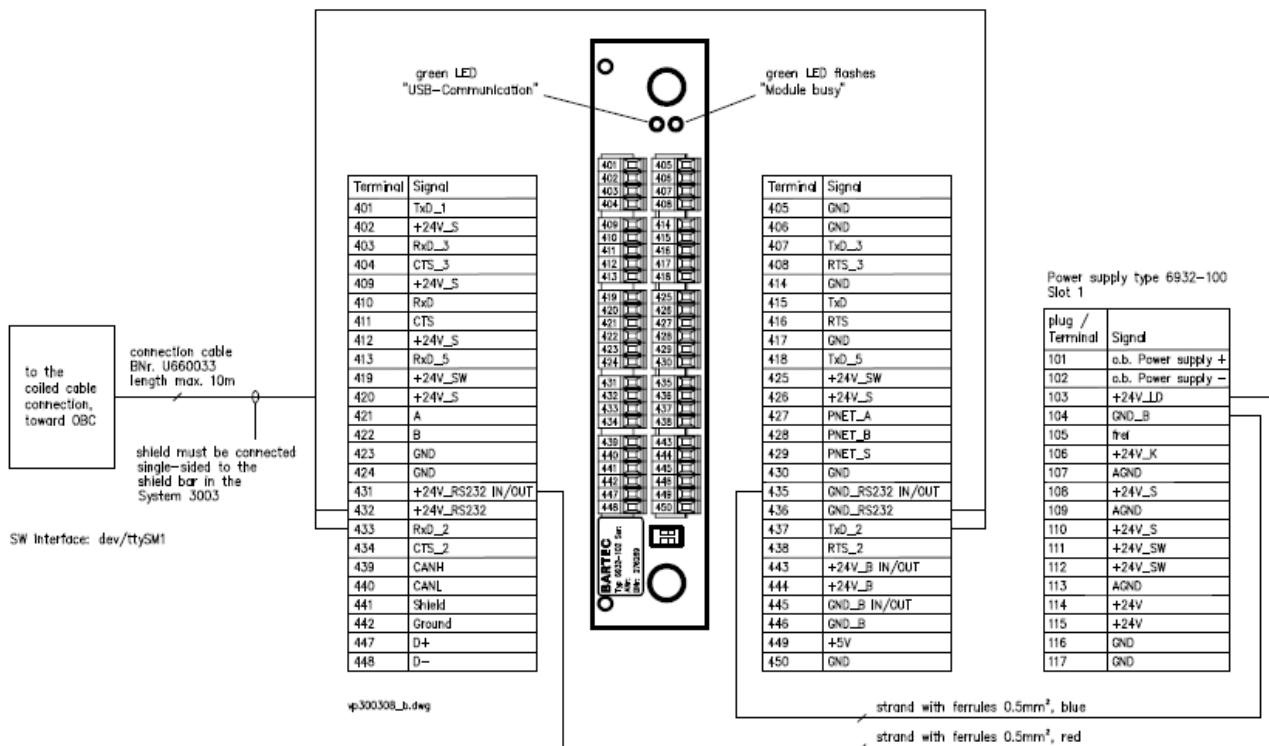
Terminal COMM 6932-102	Cable GPS 6722-18
412 (+24V)	rd
413 (RxD_5)	wh
417 (GND)	bk, ye
418 (TxD_5)	bu
Fuse SI7 for terminal 412 (+24V) order no.: 286901	

20 Onboard-Computer

20.1 Wiring with serial isolator in the vehicle



Spectra (Out)	Connecting cable 312695 with socket			Spiral cable	Connecting cable U660033, COMM	COMM interface type 6932-102
	Signal	Colour	Pin	Connection left / Connection right		
1 (R) + Vs 2 (B) GND	TxD RxD GND 24V_LD GND_RS232	gn ye bn pk gr	2 3 5 (free) (free)	gn/gn ye/gn gr+bn/bn pk/pk gr/bn	gn ye bn pk	437 (TxD_2) 433 (RxD_2) 436 (GND_RS232) 432 (24V_LD)

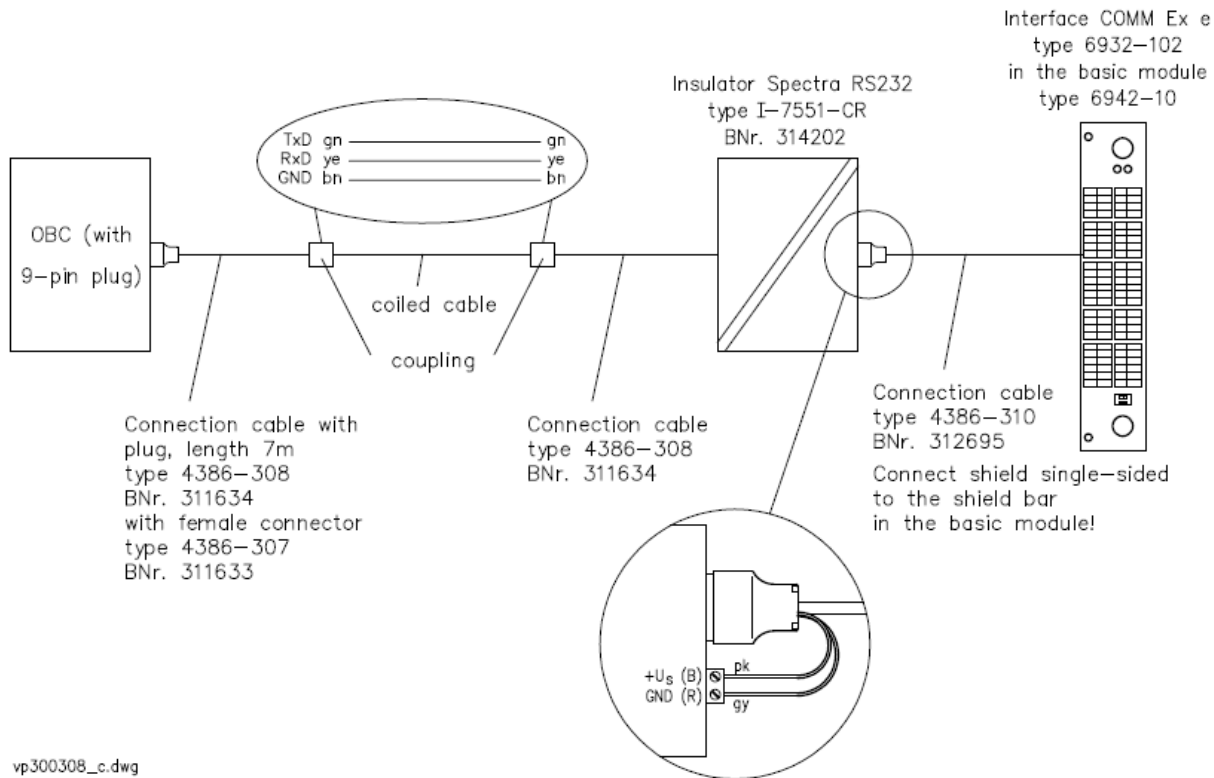


Attention:

The connecting cable (Order No.: U660033) from the COMM interface to the coupling of the onboard computer must not exceed a length of 10 m.

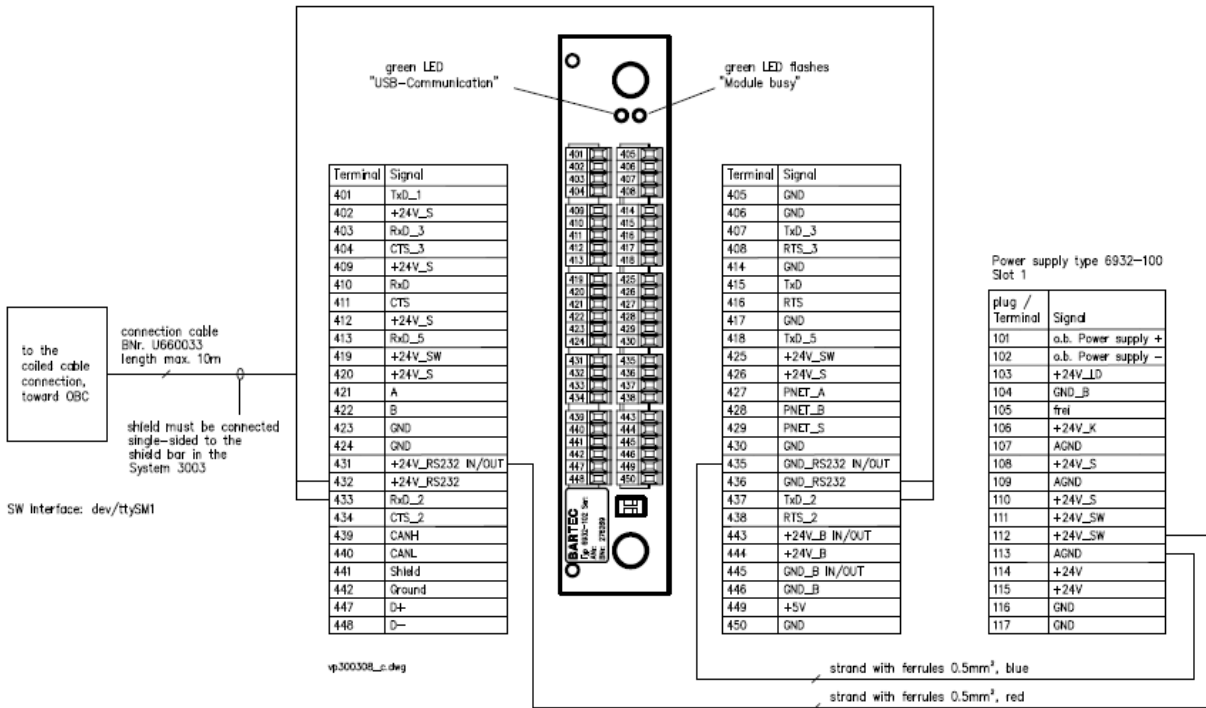
The serial isolator (Order No.: 314202) must be installed and operated only in a dry, dust and dirt-free, low-vibration and non-hazardous area.

20.2 Wiring with serial isolator on the trailer



Connecting cable 311634 with socket		Spiral cable		Connecting cable 311634 with socket			Connecting cable 312695			COMM Interface type 6932-102	Power supply type 6932-100
Signal	Colour	PIN	Connection left/ Connection right	Signal	Colour	PIN	Signal	Colour	PIN		
RxD TxD GND	ye gn bn	3 2 5	gn/gn ye/ye bn/bn	TxD RxD GND	gn ye bn	2 3 5	RxD TxD GND - +	gn ye bn gr pk	2 3 5 / /	437 (TxD_2) 433 (RxD_2) 436 GND_RS232) 436 GND_RS232) 432 (+24V_RS232) 431 (+24V_RS232 IN/OUT) 435 (GND_RS232 IN/OUT)	112 (24 V SW) 113 (AGND)

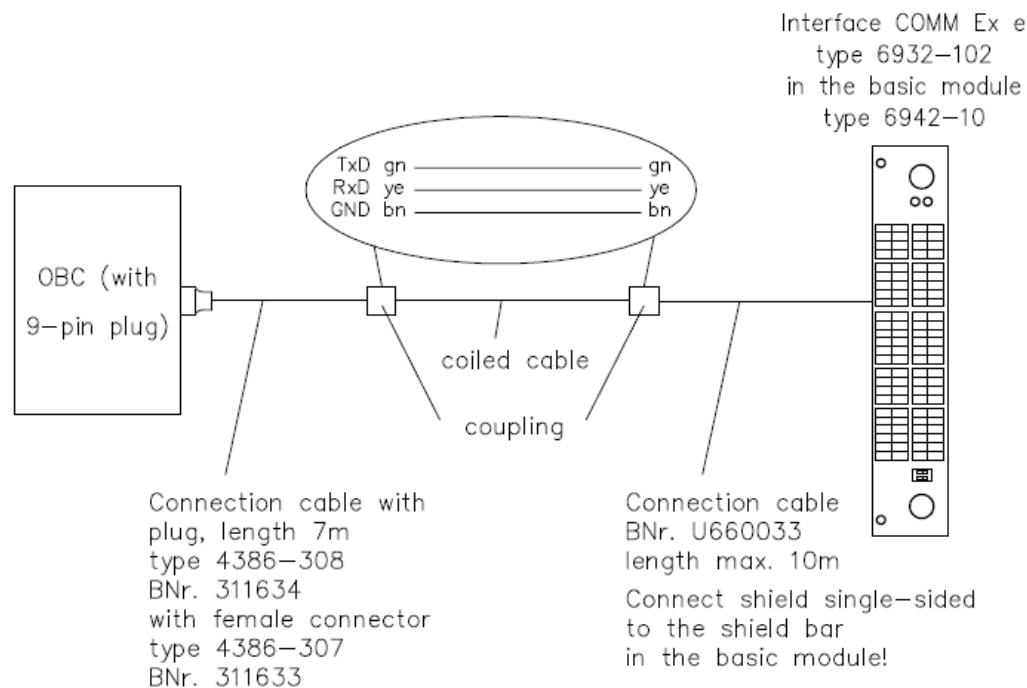
Connecting cable 311633 with socket e		Spiral cable		Connecting cable 311634 with socket			Connecting cable 312695			COMM Interface type 6932-102	Power supply type 6932-100
Signal	Colour	PIN	Connection left/ Connection right	Signal	Colour	PIN	Signal	Colour	PIN		
TxD RxD GND	gn ye bn	2 3 5	gn/gn ye/gn bn/bn	TxD RxD GND	gn ye bn	2 3 5	RxD TxD GND - +	gn ye bn gr pk	2 3 5 / /	437 (TxD_2) 433 (RxD_2) 436 GND_RS232) 436 GND_RS232) 432 (+24V_RS232) 431 (+24V_RS232 IN/OUT) 435 (GND_RS232 IN/OUT)	112 (24 V SW) 113 (AGND)



Attention:

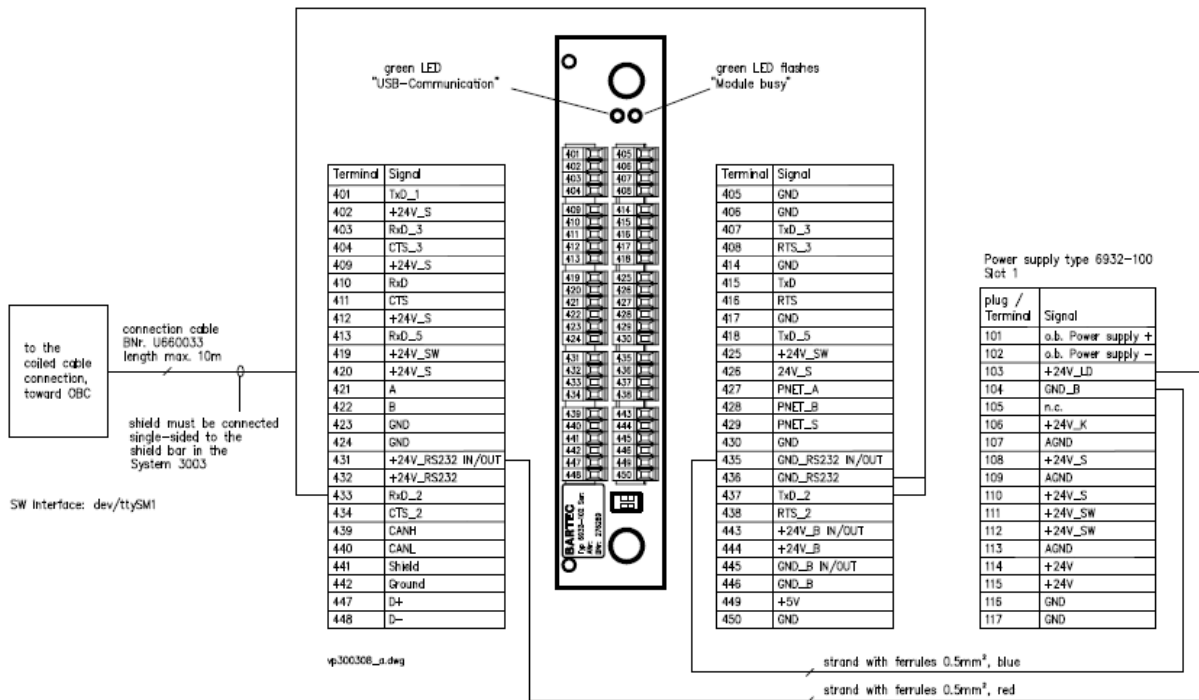
The serial isolator (Order No.: 314202) must be installed and operated only in a dry, dust and dirt-free, low-vibration and non-hazardous area.

20.3 Wiring with fuse in the signal ground line



Connection cable 311633 with socket, OBC			Spiral cable	Connection cable U660033, COMM	COMM interface type 6932-102
Signal	Colour	Pin	Connection left / Connection right		
TxD	gn	2	gn/gn	gn	437 (TxD_2)
RxD	ye	3	ye/ye	ye	433 (RxD_2)
GND	bn	5	bn/bn	bn	436 (GND_RS232)

Connection cable 311634 with connector, OBC			Spiral cable	Connection cable U660033, COMM	COMM interface type 6932-102
Signal	Colour	Pin	Connection left / Connection right		
TxD	gn	2	gn/gn	gn	433 (RxD_2)
RxD	ye	3	ye/ye	ye	437 (TxD_2)
GND	bn	5	bn/bn	bn	436 (GND_RS232)



Attention:

- In the signal ground line a fast-action fuse 500 mA must be installed.
- This fuse must be installed outside of the basic module.
- If the fuse is installed in the hazardous area, it must be equipped with the corresponding explosion protection.

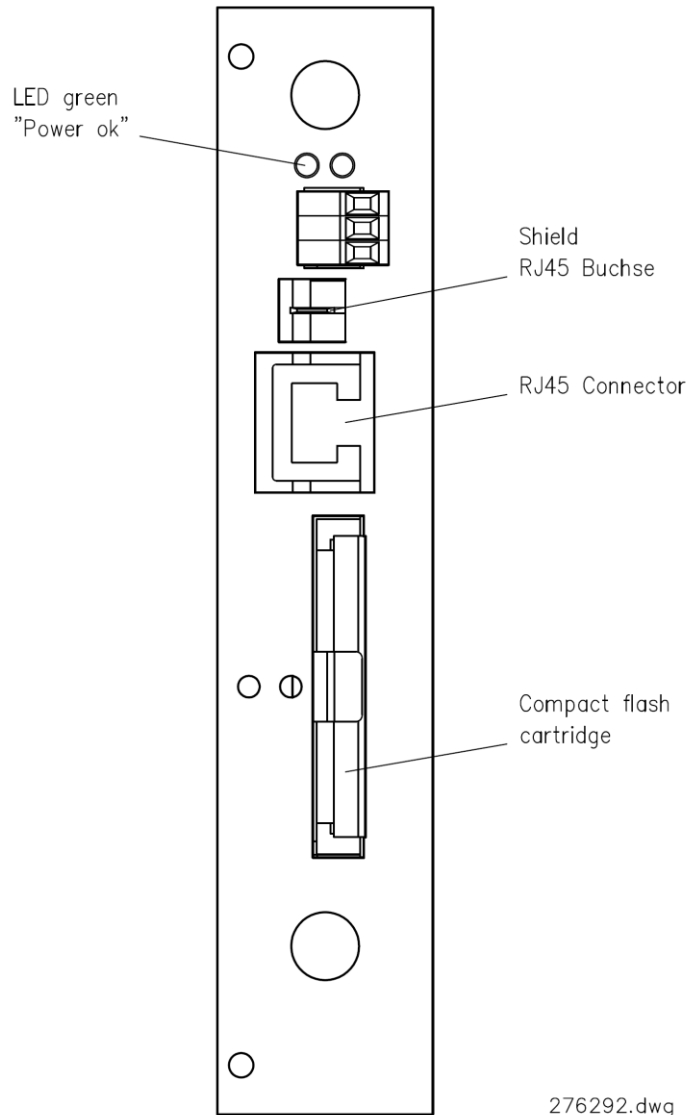
21 CPU type 6932-103



21.1 Technical data

Electrical data	
Supply voltage	DC 5,5 V (800 mA)
<i>Electronic</i>	
Processor	MPC8270 Power PC (266 MHz)
Flash	256 MB on board flash
SDRAM	128 MB (CL3)
EEPROM	4 x 32 k on board over SPI
Realtime clock	32,768 kHz (battery buffered)
Compact Flash	All sizes
SRAM (battery buffered)	4 MB on board SRAM for sensitive Data and files
<i>Interfaces</i>	
USB 2.0 Host	OHCI
Ethernet	100 Mbit
Serial ports	5 x up to 115200 bit/s; 3,3 V LVTTTL 2 x up to 460800 bit/s; 3,3 V LVTTTL
Display/Monitoring	up to 24 bit flat plane and/or crt
Output/Inputs	8 outputs, 8 inputs (3,3 V LVTTTL)
Ambient conditions	
Ambient temperature	-20 ... +70 °C
Ambient temperature (inside the basic module)	-20 ... +50 °C
Storage temperature	-20 ... +50 °C
Mechanical data	
Weight	2,3 N (230 g)
Connection	RJ45 Jack (Ethernet), Compact Flash Socket
Ordering details	
Designation	Designation
CPU, type 6932-103	276292

21.2 Terminal assignment



22 HM Interface Ex type 6932-104



22.1 Technical data

Electrical Data	
Supply voltage	Non-intrinsically safe supply circuit U_IN, GND_IN (via 96 pole female multipoint connector SL1-1A/B/C, SL1-32A/B/C) nominal voltage DC 5,5 V \pm 2 %, Um \approx 50 V max. short-circuit protection 100 A (supply-limited)
Current	Max. 1.5 A
Safety	2 x 250 mA
Warning light	1 LED green (lock) per HMI touch screen
Interfaces	
Non-intrinsically safe data interface	via 96 pole female multipoint connector SL1-7 - SL1-31 nominal voltage DC 5 V, Um \approx 50 V
Intrinsically safe output current circuit +U_B, -U_B Intrinsically safe output current circuit	Connections / terminals 601 (+U_B, SL3-6) and 602 (-U_B, SL3-5) or connections / terminals 701 (+U_B, SL3-6) and 702 -U_B, SL3-5) nominal voltage 5.0 V, nominal current 180 mA U _o \approx DC 6 V, I _o \approx 600 mA, I _s (fuse 250 mA) \approx 425 mA P _o \approx 1.5 W, trapezoid characteristic line (U _q = 10 V, R = 16.6 Ω) C _i \approx 85 μ F, L _i negligibly small intrinsically safe output current circuit Ex ia IIB C _o \approx 1000 μ F, L _o \approx 0.4 mH In case of simultaneous capacitances and inductances, the following applies: C _o \approx 915 μ F at L _o \approx 2 μ H, C _o \approx 9 μ F bei L _o \approx 10 μ H Intrinsically-safe output current circuit Ex ia IIA C _o \approx 1000 μ F, L _o \approx 0.79 mH In case of simultaneous capacitances and inductances, the following applies: C _o \approx 915 μ F bei L _o \approx 2 μ H, C _o \approx 55 μ F at L _o \approx 10 μ H

<p>Intrinsically-safe output current circuit +U_E, -U_E with data interface R+, R-</p>	<p>Connections/terminals 604 (+U_E, SL3-8), 605 (-U_E, SL3-7), 606 (R+, SL3-2), 607 (R-, SL3-1) or connections/terminals 704 (+U_E, SL3-8), 705 (-U_E, SL3-7), 706 (R+, SL3-2), 707 (R-, SL3-1) nominal voltage 5.0 V, nominal current 75 mA U_o ≈ DC 6 V, I_o ≈ 450 mA . P_o ≈ 1.1 W trapezoid characteristic line (U_q = 9.23 V, R = 20.5 Ω) C_i ≈ 15 μF, L_i negligibly small</p> <p>intrinsically-safe output current circuit Ex ia IIB Co ≈ 1000 μF, Lo ≈ 0.7 mH In case of simultaneous capacitances and inductances, the following applies: Co ≈ 985 μF at Lo ≈ 2 μH, Co ≈ 195 μF - Ci at Lo ≈ 5 μH Co ≈ 95 μF - Ci at Lo ≈ 9 μH, Co ≈ 80 μF - Ci at Lo ≈ 10 μH Co ≈ 56 μF - Ci at Lo ≈ 15 μH, Co ≈ 10 μF - Ci at Lo ≈ 0.1 μH</p> <p>intrinsically-safe output current circuit Ex ia IIA Co ≈ 1000 μF, Lo ≈ 1.4 mH In case of simultaneous capacitances and inductances, the following applies: Co ≈ 985 μF at Lo ≈ 2 μH, Co ≈ 125 μF at Lo ≈ 10 μH Co ≈ 85 μF at Lo ≈ 15 μH, Co ≈ 68 μF at Lo ≈ 20 μH Co ≈ 21 μF at Lo ≈ 100 μH</p>
<p>Intrinsically safe data protection circuit T+, T-</p>	<p>Connections / terminals 609 (T+, SL3-3), 610 (T-, SL3-4) or connections/terminals 709 (T+, SL3-3), 710 (T-, SL3-4) nominal voltage 5.0 V, U_o ≈ DC 6 V, I_o ≈ 440 mA, P_o ≈ 1.1 W trapezoid characteristic line (U_q = 10 V, R = 22.7 Ω), C_i ≈ 30 μF L_i negligibly small</p> <p>Intrinsically-safe output current circuit Ex ia IIB Co ≈ 1000 μF, Lo ≈ 0.73 mH In case of simultaneous capacitances and inductances, the following applies: Co ≈ 970 μF at Lo ≈ 2 μH, Co ≈ 65 μF at Lo ≈ 10 μH</p> <p>Intrinsically-safe Ex ia IIA Co ≈ 1000 μF, Lo ≈ 1.4 mH In case of simultaneous capacitances and inductances, the following applies: Co ≈ 970 μF at Lo ≈ 2 μH, Co ≈ 110 μF at Lo ≈ 10 μH Co ≈ 6 μF at Lo ≈ 0.1 mH</p>
<p>Environmental Conditions</p>	
<p>Ambient temperature</p>	<p>-20 ... +70 °C</p>
<p>Ambient temperature (for installation in basic module)</p>	<p>-20 ... +50 °C</p>
<p>Storage temperature</p>	<p>-20 ... +50 °C</p>
<p>Protection type</p>	<p>IP00 as per DIN 40050</p>
<p>Equipment group/category / Ignition protection type</p>	<p>II (1) G [Ex ia Ga] IIB</p>
<p>EC-type examination certificate IECEx-certificate Standards</p>	<p>BVS 07 ATEX E 178 X IECEx BVS 14.0054X IEC / EN 60079-0, IEC / EN 60079-11</p>

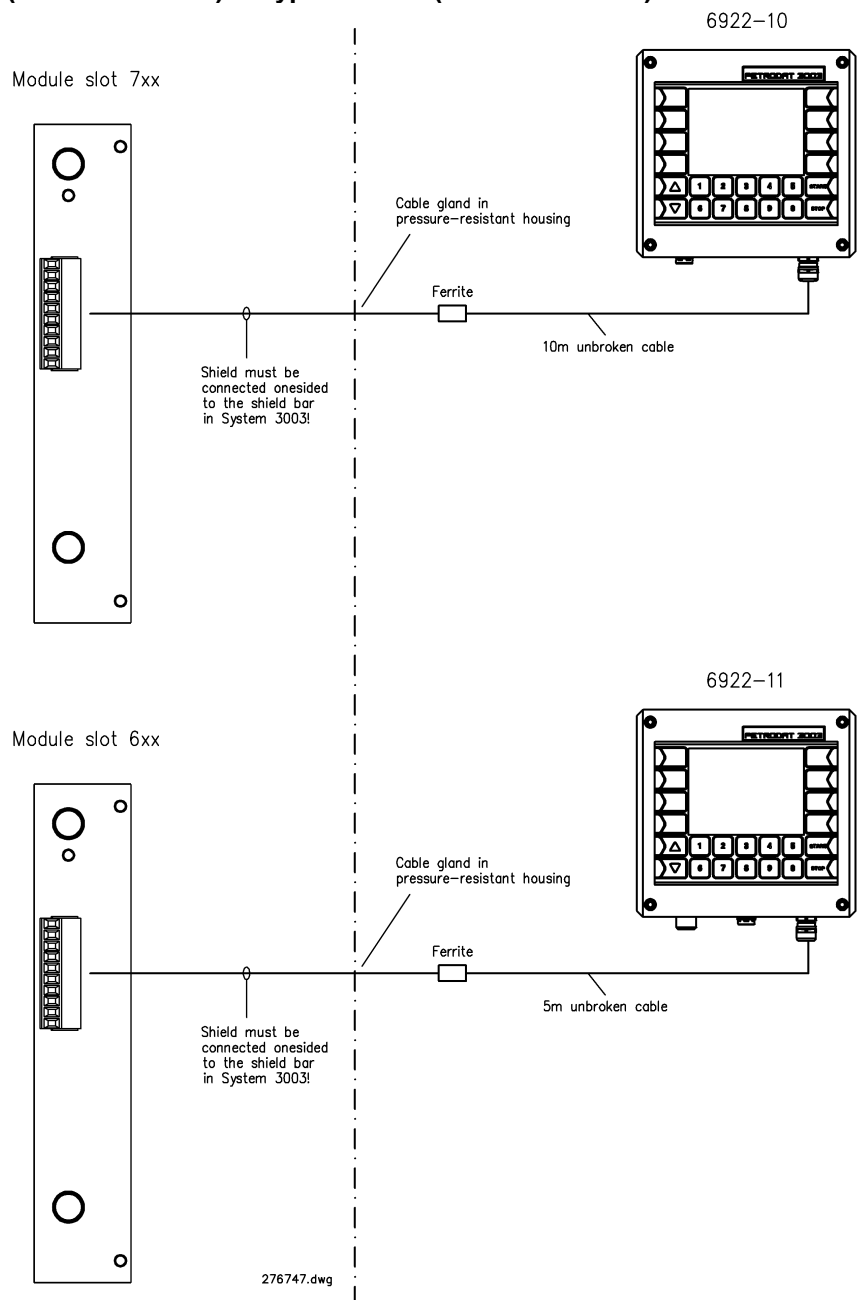
Mechanical Data	
Weight	2.0 N (200 g)
Connection	Plug-in terminal
Order details	
Designation	Order number
HM Interface Ex, type 6932-104	276747

22.2 Safety instructions

- The HM interface must be set up outside the explosive area.
- The HM interface must be installed in an enclosure with a protection grade of IP 20 pursuant to EN 60529.
- The HM interface is suited for use in a temperature range at the installation point of -20°C to + 70°C.
- The installation of the HM interface must be done so that the clearance of bare parts of intrinsically-safe circuits vis-a-vis metallic enclosure parts is at least 1.5 and vis-a-vis bare parts of non-intrinsically safe circuits is at least 4 mm and that the creepage distances of bare parts of intrinsically-safe circuits vis-a-vis bare parts of non-intrinsically safe circuits is at least 4 mm.
- The connector parts for the external intrinsically safe electrical circuits must be separated from the connector parts of non-intrinsically safe electrical circuits pursuant to Para. 6.2.1 of EN 60079-11:2007.
- The prospective maximum short-circuit current of the supply current circuit +5.5V (SL1) must be externally limited to a value of 100 A.

22.3 Connection plan for type 6922-10

(Module slot 7xx) or type 6922-11 (module slot 6xx)

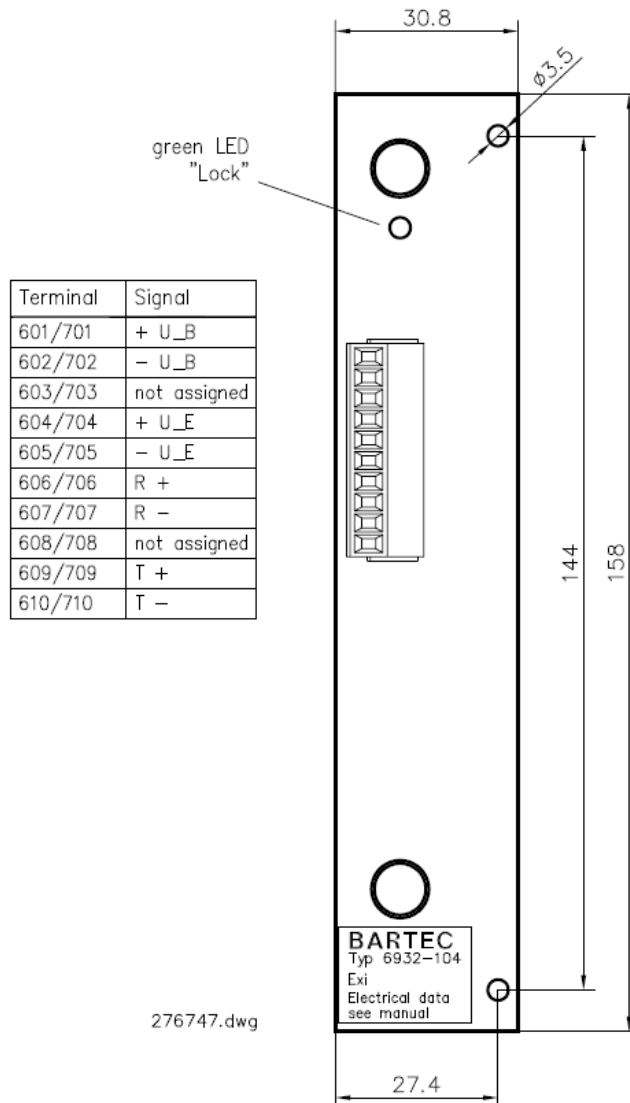


Attention:

Fit ferrite (order no.: 275368) externally on the housing of the display and operating unit directly after the cable gland and secure using heat-shrink sleeving.

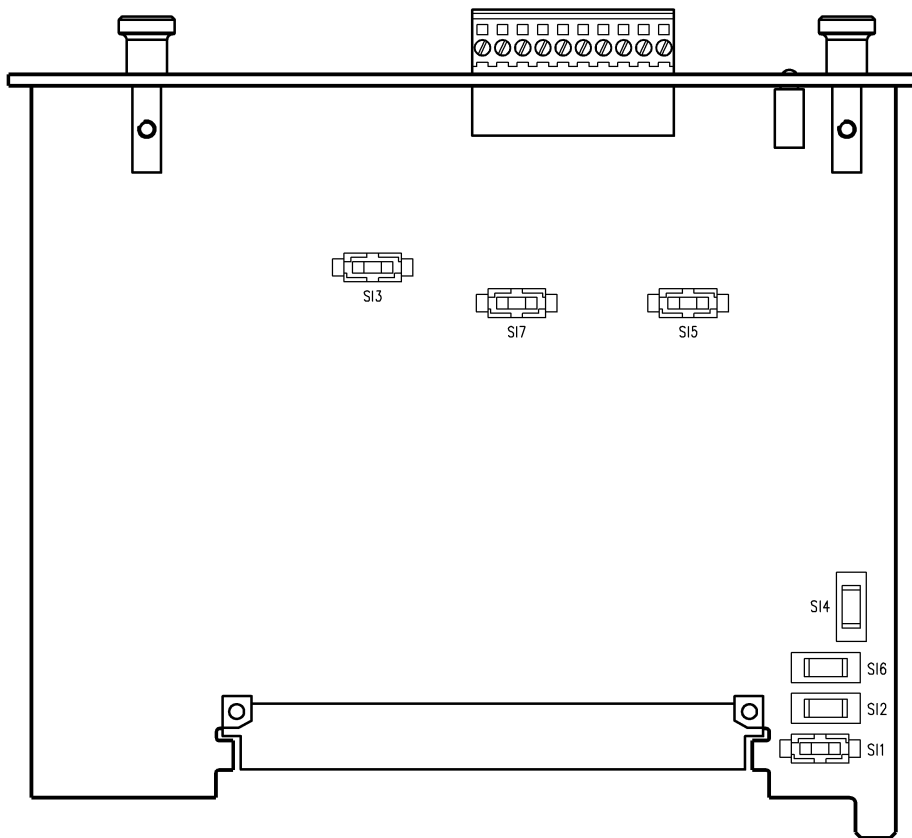
When replacing the HM interface the black plug must be replaced with the orange plug if necessary.

Terminal assignment



Terminals 6932-104	Display and operating unit 6922-10/-11
601 / 701	+U _B (or)
602 / 702	- U _B (or/wh) 5V → SI5 and SI4
603 / 703	n.c.
604 / 704	+U _E (rd/rd)
605 / 705	- U _E (rd/wh) 5V → SI6 and SI7
606 / 706	R+ (gn)
607 / 707	R (gn/wh)
608 / 708	n.c.
609 / 709	T + (bl)
610 / 710	T - (bl/wh)

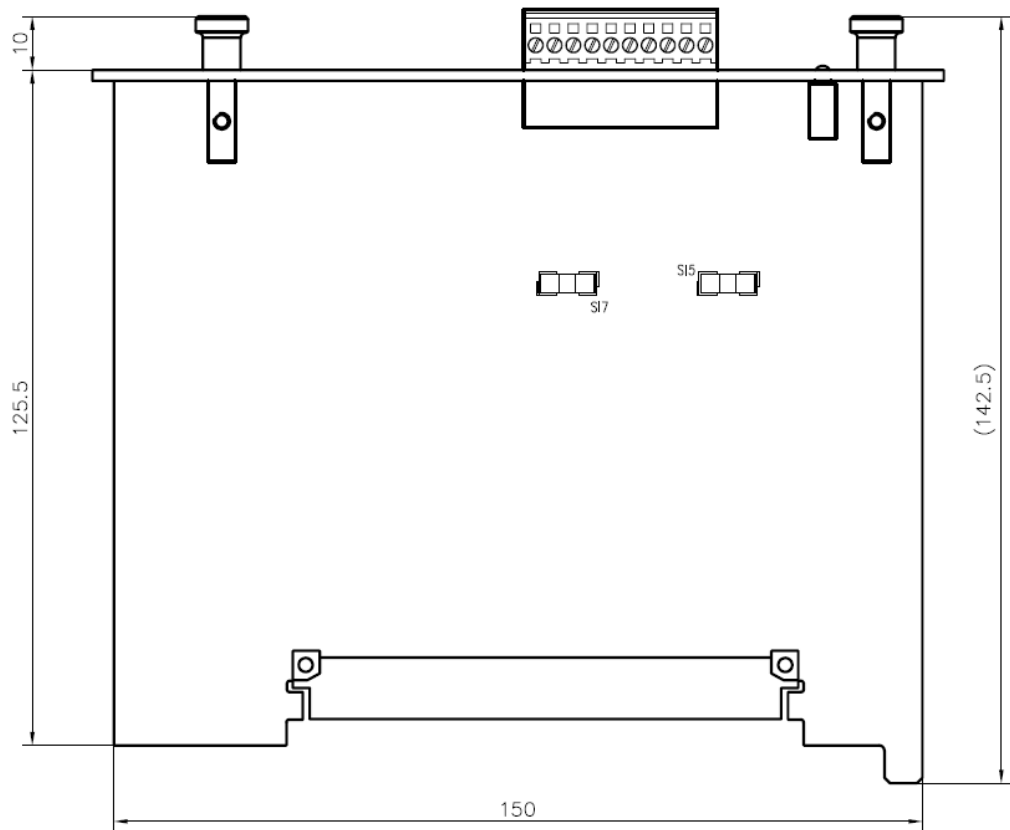
22.4 Fuse values without series



Fuse	Description	Value	B No.
SI 1	Supply, electronics**	F 250 mA	281771
SI 2	5.5 V_I primary (LVDS Transmitter + receiver)	T 1.0 A	220273
SI 3	5.5 V_I secondary (LVDS Transmitter + receiver)	F 250 mA	288255
SI 4	U_B primary (Background lighting HMI) **	T 1.0 A	220273
SI 5	U_B secondary (Background lighting HMI) *	F 250 mA	288255
SI 6	U_B primary (Electronics + Display HMI) **	T 1.0 A	220273
SI 7	U_B secondary (Electronics + Display HMI) *	F 250 mA	288255

- * intrinsically safe
- ** not intrinsically safe

22.5 Fuse values from series B



Fuse	Description	Value	Order No.
SI5	U_B secondary (Backlight HMI *)	T 250mA	288255
SI7	U_B secondary (electronics + display HMI *)	T 250mA	288255

*) intrinsically safe

276747.dwg

23 Display and operating unit Ex i type 6922-10



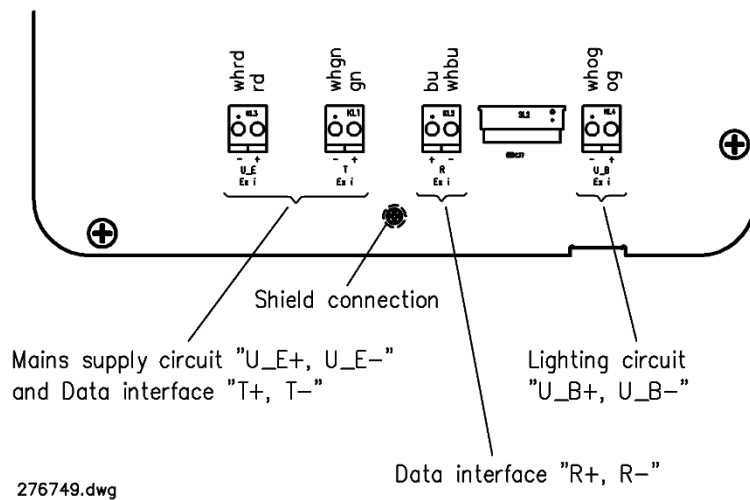
Attention:
Handling „fingers only“

23.1 Technical data

Equipment-specific Data	
Keyboard	Touch screen
Display	LCD graphics cable, backlit, 120 x 89 mm Visual field, 320 x 240 dot transfective
Line of vision	6 o'clock
Viewing angle	Addition viewing angle: back 12:00 o'clock - front 6:00 o'clock R - F = 90° type.
Backlighting	LED colour: white
Electrical Data	
Supply circuit "U_E" and data interface "T"	Ex ib IIB Nominal voltage DC 5 V, nominal power consumption 165 mA $U_i \approx 6V$, $I_i \approx 500\text{ mA}$, $P_i \approx 1.1\text{ W}$, $C_i \approx 80\text{ }\mu\text{F}$, $L_i \approx 0\text{ }\mu\text{H}$
Data interface "R"	Ex ib IIB $U_i \approx 6\text{ V}$, $I_i \approx 500\text{ mA}$, $P_i \approx 3\text{ W}$, $C_i \approx 0.1\text{ }\mu\text{F}$, $L_i \approx 0\text{ }\mu\text{H}$, $U_o \approx 6.0\text{ V}$, $I_o \approx 80\text{ mA}$, $P_o \approx 0.12\text{ W}$, $R \approx 75\text{ }\Omega$ Linear characteristic line, $C_o \approx 1\text{ }\mu\text{F}$, $L_o \approx 50\text{ }\mu\text{H}$
Illumination circuit "UB"	Ex ib IIB Nominal voltage DC 5 V, nominal current consumption 180 mA $U_i \approx 6\text{ V}$, $U_q \approx 10\text{ V}$, $R_q \approx 16.6\text{ }\Omega$, $I_i \approx 0.6\text{ A}$, $I_s \approx 0.425\text{ A}$, $P_i \approx 1.5\text{ W}$, $C_i \approx 6\text{ }\mu\text{F}$, $L_i \approx 0\text{ }\mu\text{H}$
Shielded connection X	Maximum internal capacitance vis-à-vis housing: $C_i \approx 11\text{ nF}$
Connection type	10 m continuous; slot 7xx
Environmental Conditions	
Operating temperature	- 20 ... + 50 °C
Storage temperature	- 30 ... + 60 °C
Protection type	IP 65 per EN 60529
Climate class	ISF per DIN 40040
Equipment group/category Ignition-protection type	II 2 G Ex ib IIB T4

EC-type examination certificate	BVS 05 ATEX E 122	
Standards	EN 60079-0, EN 60079-11	
Mechanical Data		
Dimensions	W x H x D: 210 x 222 x 52 mm	
Material	Alu die casting, painted blue	
Weight	25 N	
Order details		
Designation	Order number	
Display and control unit Ex i type 6922-10	276749	

23.2 Terminal Connections

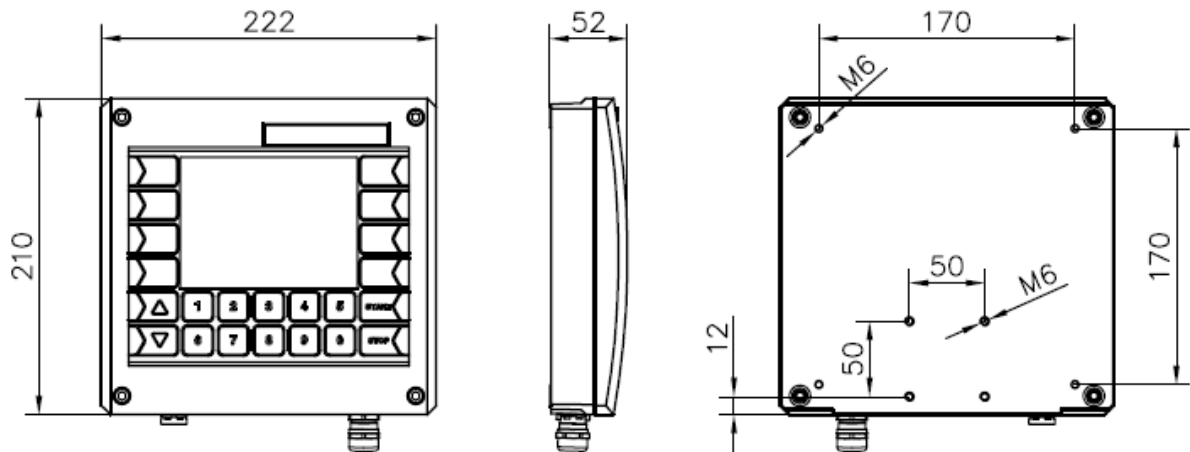




Attention:

Please mount the display and operating unit on shaded position!
Please pay attention to a particularly careful installation of the cable!

23.3 Dimensions and mounting

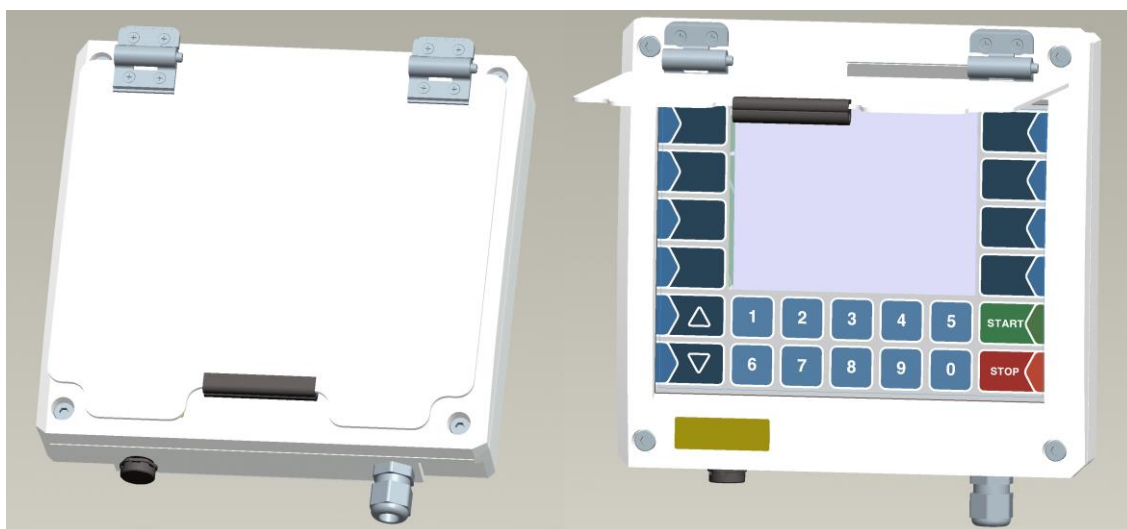


24 Display and operating unit Ex i sun protected type 6922-10



Attention:

To protect against direct sunlight the display and operating unit Ex i has an optional sun protection.



Attention:
Handling „fingers only“

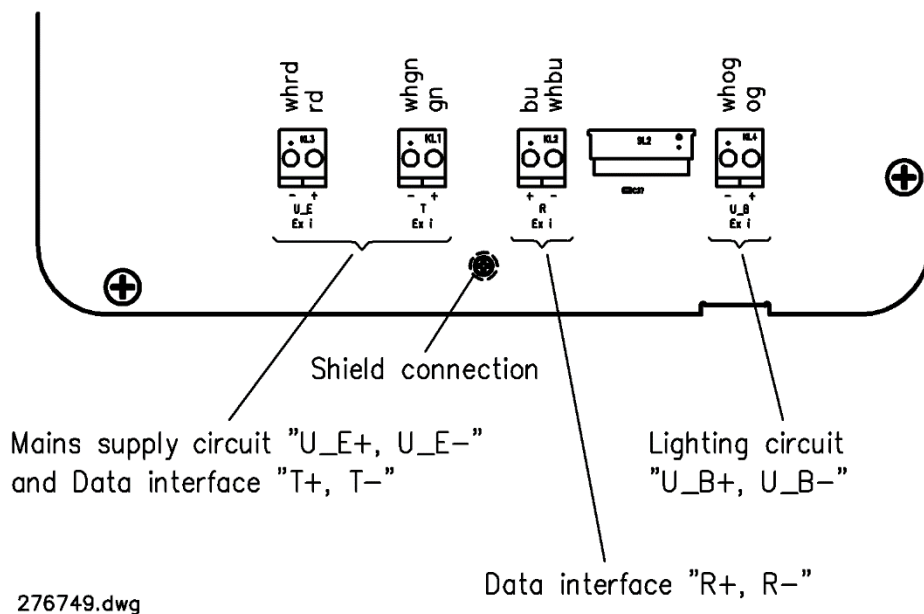


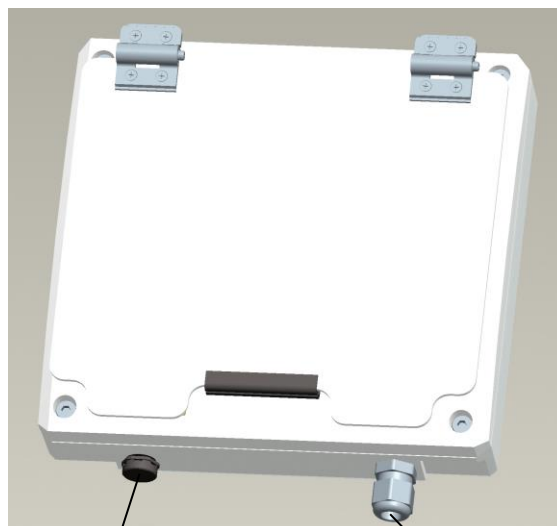
24.1 Technical data

Equipment-specific Data	
Keyboard	Touch screen
Display	LCD graphics cable, backlit, 120 x 89 mm Visual field, 320 x 240 dot transfective
Line of vision	6 o'clock
Viewing angle	Addition viewing angle: back 12:00 o'clock - front 6:00 o'clock R - F = 90° type.
Backlighting	LED colour: white
Electrical Data	
Supply circuit "U_E" and data interface "T"	Ex ib IIB Nominal voltage DC 5 V, nominal power consumption 165 mA U _i ≈ 6V, I _i ≈ 500 mA, P _i ≈ 1.1 W, C _i ≈ 80 μF, L _i ≈ 0 μH

Data interface "R"	Ex ib IIB $U_i \approx 6 \text{ V}$, $I_i \approx 500 \text{ mA}$, $P_i \approx 3 \text{ W}$, $C_i \approx 0.1 \mu\text{F}$, $L_i \approx 0 \mu\text{H}$, $U_o \approx 6.0 \text{ V}$, $I_o \approx 80 \text{ mA}$, $P_o \approx 0.12 \text{ W}$, $R \approx 75 \Omega$ Linear characteristic line, $C_o \approx 1 \mu\text{F}$, $L_o \approx 50 \mu\text{H}$
Illumination circuit "UB"	Ex ib IIB Nominal voltage DC 5 V, nominal current consumption 180 mA $U_i \approx 6 \text{ V}$, $U_q \approx 10 \text{ V}$, $R_q \approx 16.6 \Omega$, $I_i \approx 0.6 \text{ A}$, $I_s \approx 0.425 \text{ A}$, $P_i \approx 1.5 \text{ W}$, $C_i \approx 6 \mu\text{F}$, $L_i \approx 0 \mu\text{H}$
Shielded connection X	Maximum internal capacitance vis-à-vis housing: $C_i \approx 11 \text{ nF}$
Connection type	10 m continuous; slot 7xx
Environmental Conditions	
Operating temperature	- 20 ... + 50 °C
Storage temperature	- 30 ... + 60 °C
Protection type	IP 65 per EN 60529
Climate class	ISF per DIN 40040
Equipment group/category Ignition-protection type	II 2 G Ex ib IIB T4
EC-type examination certificate	BVS 05 ATEX E 122
Standards	EN 60079-0, EN 60079-11
Mechanical Data	
Dimensions	W x H x D: 210 x 222 x 52 mm
Material	Alu die casting, painted blue
Weight	25 N
Order details	
Designation	Order number
Display and control unit Ex i sun protected type 6922-10	388393

24.2 Terminal connections





Pressure equalize element

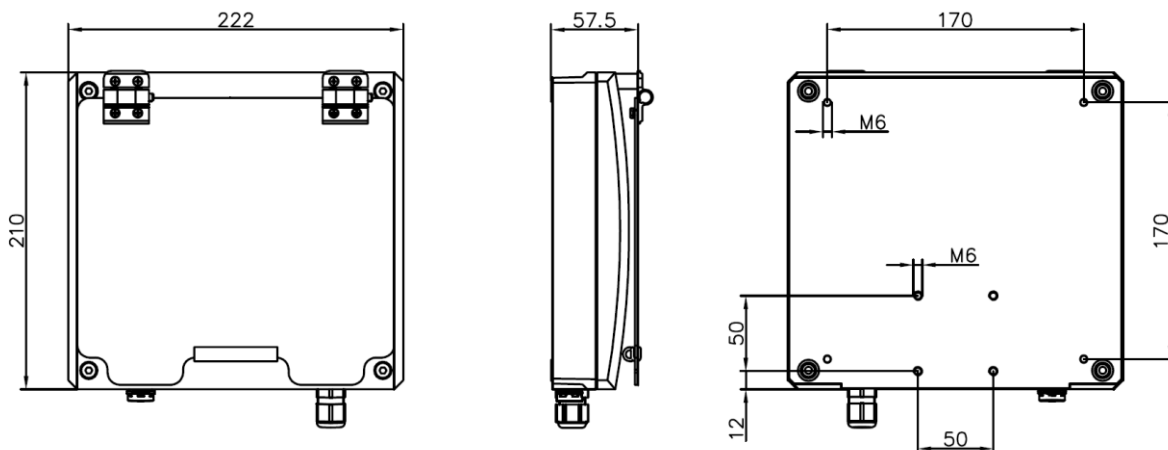
Cable connection



Attention:

Please mount the display and operating unit on shaded position!
Please pay attention to a particularly careful installation of the cable!

24.3 Dimensions and mounting



25 Display and operating unit Ex i (Bluetooth) type 6922-11



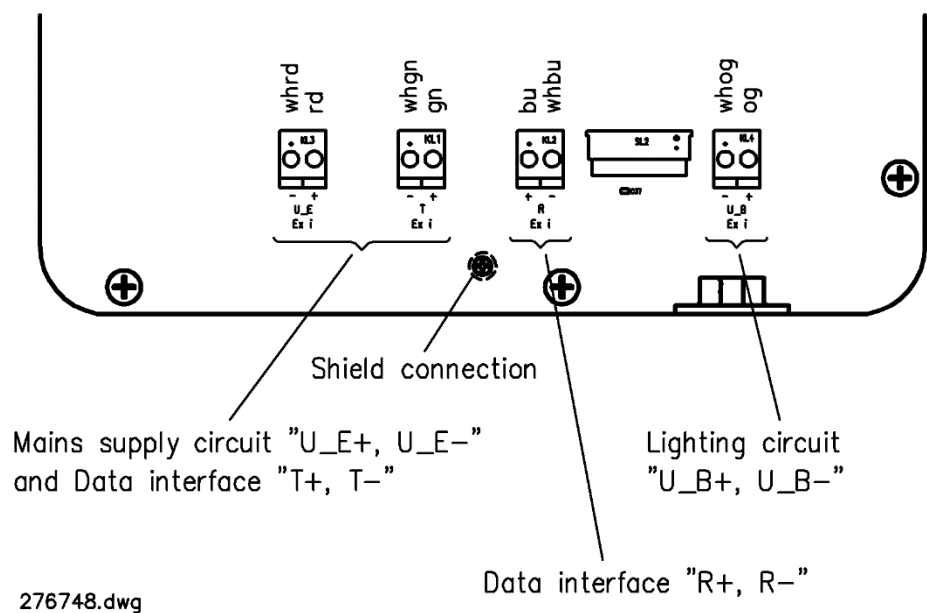
Attention:
Handling „fingers only“

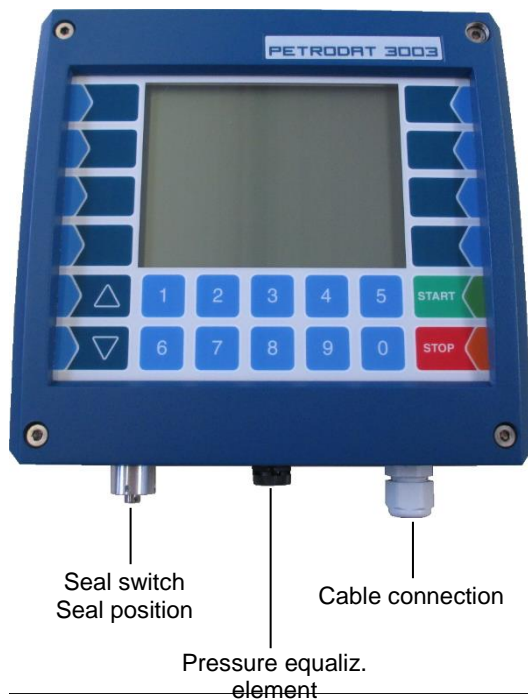
25.1 Technical data

Equipment-specific Data	
Keyboard	Touch screen
Display	LCD graphics cable, backlit, 120 x 89 mm Visual field, 320 x 240 dot transfective
Line of vision	6 o'clock
Viewing angle	Additional viewing angle: back 12:00 o'clock - front 6:00 o'clock R - F = 90° type.
Backlighting	LED colour: white
Bluetooth	Class 2; max. range 5 m; slot 6xx
Calibration memory	EEPROM 64 Kbyte; 57600 Baud; slot 6xx
Electrical Data	
Supply circuit "U_E" and data interface "T"	Ex ib IIB Nominal voltage DC 5 V, nominal current consumption 165 mA $U_i \approx 6V$, $I_i \approx 500\text{ mA}$, $P_i \approx 1.1\text{ W}$, $C_i \approx 80\text{ }\mu\text{F}$, $L_i \approx 0\text{ }\mu\text{H}$
Data interface "R"	Ex ib IIB $U_i \approx 6\text{ V}$, $I_i \approx 500\text{ mA}$, $P_i \approx 3\text{ W}$, $C_i \approx 0.1\text{ }\mu\text{F}$, $L_i \approx 0\text{ }\mu\text{H}$, $U_o \approx 6.0\text{ V}$, $I_o \approx 80\text{ mA}$, $P_o \approx 0.12\text{ W}$, $R \approx 75\text{ }\Omega$ Linear characteristic line, $C_o \approx 1\text{ }\mu\text{F}$, $L_o \approx 50\text{ }\mu\text{H}$
Illumination circuit "UB"	Ex ib IIB Nominal voltage DC 5 V, nominal current consumption 180 mA $U_i \approx 6\text{ V}$, $U_q \approx 10\text{ V}$, $R_q \approx 16.6\text{ }\Omega$, $I_i \approx 0.6\text{ A}$, $I_s \approx 0.425\text{ A}$, $P_i \approx 1.5\text{ W}$, $C_i \approx 6\text{ }\mu\text{F}$, $L_i \approx 0\text{ }\mu\text{H}$
Bluetooth® radio transmission	Frequency 2.4 GHz, typ. transmission output 0dBm (1 mW), max. emitted output 3 dBm (2mW) < 100 mW
Shielded connection X	Maximum internal capacitance vis-à-vis housing: $C_i \approx 11\text{ nF}$
Connection type	5 m continuous, slot 6xx

Environmental Conditions	
Operating temperature	- 20 ... + 50 °C
Storage temperature	- 30 ... + 60 °C
Protection type	IP 65 per EN 60529
Climate class	ISF per DIN 40040
Ignition-protection type	II 2 G Ex ib IIB T4
EC-type examination certificate	BVS 05 ATEX E 122
Standards	EN 60079-0, EN 60079-11
Mechanical Data	
Dimensions	W x H x D: 210 x 222 x 52 mm
Material	Alu die casting, painted blue
Weight	25 N
Order details	
Designation	Order number
Display and control unit Ex i Bluetooth type 6922-11	276748

25.2 Terminal Connections



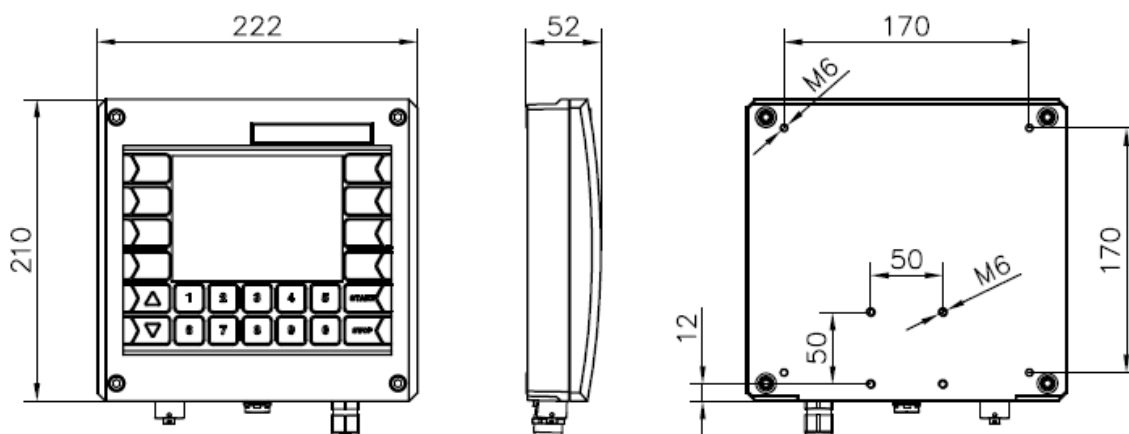


Attention:

Before opening the display and operating unit type 6922-11 Exi (Bluetooth), the seal switch must be opened first (pull out seal switch).

Please mount the display and operating unit on a shaded position!
Please pay attention to a particularly careful installation of the cable!

25.3 Dimensions and mounting

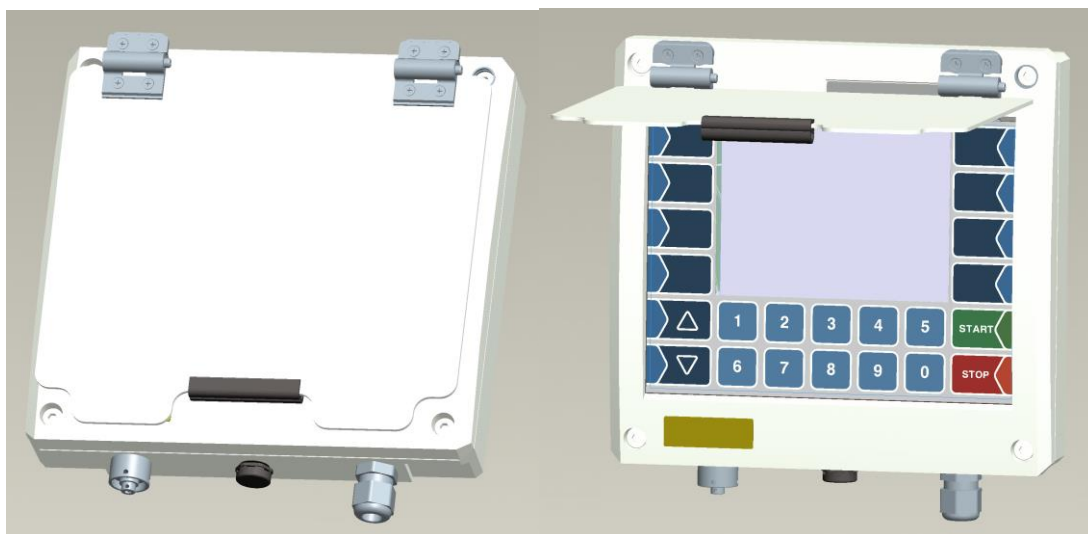


26 Display and operating unit Ex i (Bluetooth) sun protected type 6922-11



Attention:

To protect against direct sunlight the display and operating unit Ex i Bluetooth has an optional sun protection.



Attention:
Handling „fingers only“

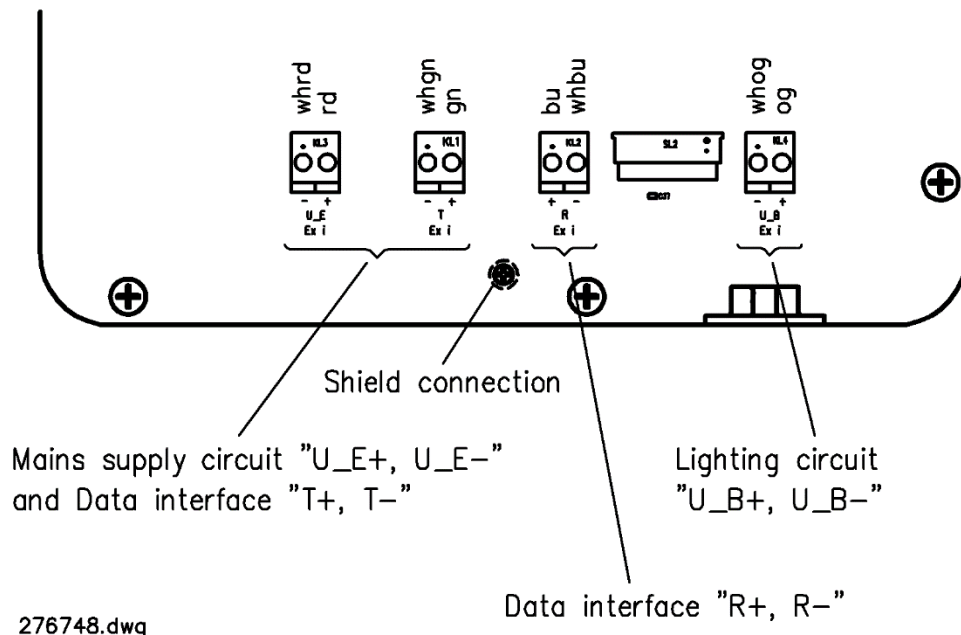


26.1 Technical data

Equipment-specific Data	
Keyboard	Touch screen
Display	LCD graphics cable, backlit, 120 x 89 mm Visual field, 320 x 240 dot transfective
Line of vision	6 o'clock
Viewing angle	Additional viewing angle: back 12:00 o'clock - front 6:00 o'clock R - F = 90° type.
Backlighting	LED colour: white
Bluetooth	Class 2; max. range 5 m; slot 6xx
Calibration memory	EEPROM 64 Kbyte; 57600 Baud; slot 6xx
Electrical Data	
Supply circuit "U_E" and data interface "T"	Ex ib IIB Nominal voltage DC 5 V, nominal current consumption 165 mA, U _i ≈ 6V, I _i ≈ 500 mA, P _i ≈ 1.1 W, C _i ≈ 80 μF, L _i ≈ 0 μH

Data interface "R"	Ex ib IIB $U_i \approx 6 \text{ V}$, $I_i \approx 500 \text{ mA}$, $P_i \approx 3 \text{ W}$, $C_i \approx 0.1 \text{ }\mu\text{F}$, $L_i \approx 0 \text{ }\mu\text{H}$, $U_o \approx 6.0 \text{ V}$, $I_o \approx 80 \text{ mA}$, $P_o \approx 0.12 \text{ W}$, $R \approx 75 \text{ }\Omega$ Linear characteristic line, $C_o \approx 1 \text{ }\mu\text{F}$, $L_o \approx 50 \text{ }\mu\text{H}$
Illumination circuit "UB"	Ex ib IIB Nominal voltage DC 5 V, nominal current consumption 180 mA, $U_i \approx 6 \text{ V}$, $U_q \approx 10 \text{ V}$, $R_q \approx 16.6 \text{ }\Omega$, $I_i \approx 0.6 \text{ A}$, $I_s \approx 0.425 \text{ A}$, $P_i \approx 1.5 \text{ W}$, $C_i \approx 6 \text{ }\mu\text{F}$, $L_i \approx 0 \text{ }\mu\text{H}$
Bluetooth® radio transmission	Frequency 2.4 GHz, typ. transmission output 0dBm (1 mW), max. emitted output 3 dBm (2mW) < 100 mW
Shielded connection X	Maximum internal capacitance vis-à-vis housing: $C_i \approx 11 \text{ nF}$
Connection type	5 m continuous, slot 6xx
Environmental Conditions	
Operating temperature	- 20 ... + 50 °C
Storage temperature	- 30 ... + 60 °C
Protection type	IP 65 per EN 60529
Climate class	ISF per DIN 40040
Ignition-protection type	II 2 G Ex ib IIB T4
EC-type examination certificate	BVS 05 ATEX E 122
Standards	EN 60079-0, EN 60079-11
Mechanical Data	
Dimensions	W x H x D: 210 x 222 x 52 mm
Material	Alu die casting, painted blue
Weight	25 N
Order details	
Designation	Order number
Display and control unit Ex i Bluetooth, sun protection, type 6922-11	364150

26.2 Terminal connections

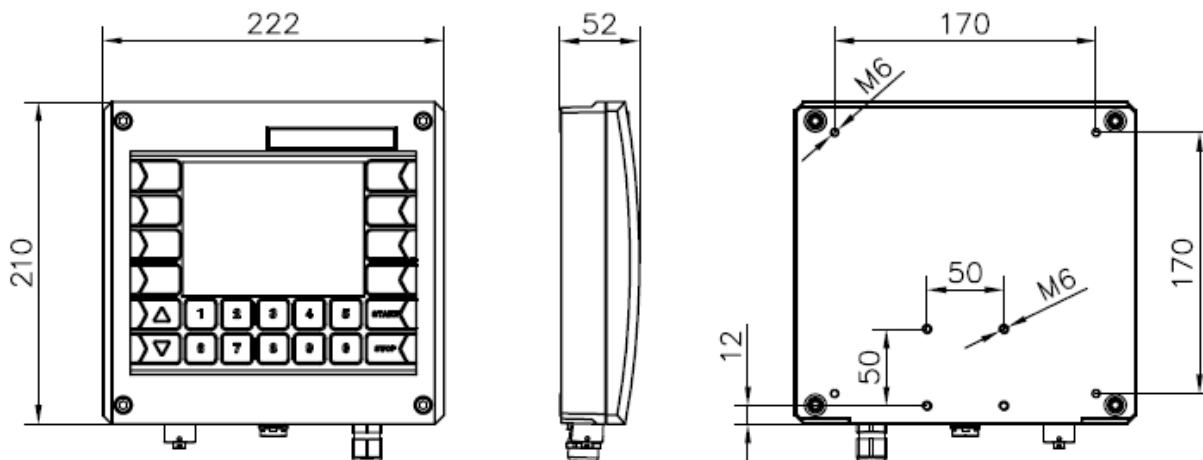


Attention:

Before opening the display and operating unit type 6922-11 Exi (Bluetooth), the seal switch must be opened first (pull out seal switch).

Please mount the display and operating unit on a shaded position!
Please pay attention to a particularly careful installation of the cable!

26.3 Dimensions and mounting



27 i-Box Interface type 6932-112



27.1 Technical data

Electrical Data	
Operating voltage	<p>Non-intrinsically safe supply circuit +24V (via 96 pole female multipoint connector SL1-5A/B/C (+24V_S), SL1-6A/B/C (AGND)) nominal voltage DC 24V \pm 10 %, Um \approx 50 V, Power consumption 0.3 A</p> <p>Non-intrinsically safe supply circuit +5.5V (via 96 pole female multipoint connector SL1-30A/B/C (+5.5V), SL1-32A/B/C (DGND)) nominal voltage DC 5,5 V \pm 2 %, Um \approx 50 V current consumption 0.3 A</p>
Interfaces	
Non-intrinsically safe data signal circuit, Modem	<p>(via 96 pole female multipoint connector SL1-7A (modem+) - SL1-7C (modem-)) nominal voltage DC 5 V, Um \approx 50 V</p>
Non-intrinsically safe data circuit, USB	<p>(via 96 pole female multipoint connector SL1-28A (D6+) - SL1-28C (D6-), nominal voltage DC 5 V, Um \approx 50 V</p>
Intrinsically safe interfaces	
Intrinsically safe output current circuits "+8,4V_1", "+8,4V_2"	<p>Terminals 801 (+8,4V_1), 802 (0V_1) or terminals 803 (+8,4V_2), 804 (0V_2) each Ex ia IIB nominal voltage DC 8.4 V, Uo \approx DC 10 V, Io \approx 480 mA internal resistance 20.8 Ω, max. output power 1.2 W linear characteristic line Co \approx 20 μF, Lo \approx 0.01 mH or Co \approx 10 μF, Lo \approx 0.1 mH or Co \approx 3.4 μF, Lo \approx 1 mH, Ci \approx 0 μF, Li \approx 0 mH</p>

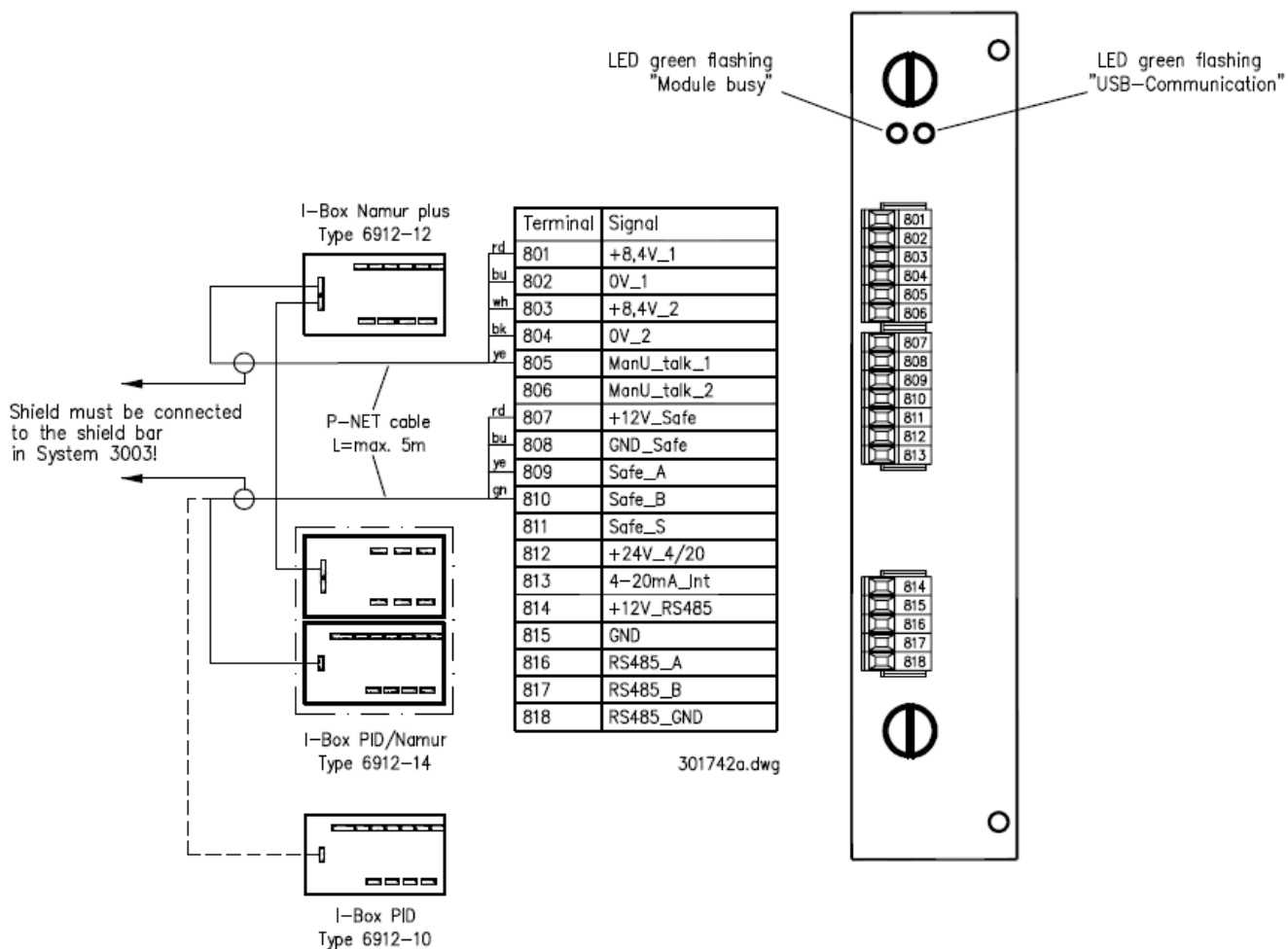
<p>Intrinsically safe bidirectional data interfaces "ManU_talk_1", "ManU_talk_2"</p>	<p>Terminals 805 (ManU_talk_1), 802 (0V_1), or terminals 806 (ManU_talk_2), 804 (0V_2) each Ex ia IIB nominal voltage DC 8.4 V, $U_i \approx$ DC 10 V, $C_i \approx 0 \mu\text{F}$ $L_i \approx 0 \mu\text{H}$, $U_o \approx$ DC 10 V, $I_o \approx 100 \text{ mA}$ internal resistance 100 Ω linear characteristic line $P_o \approx 250 \text{ mW}$, $C_o \approx 20 \mu\text{F}$, $L_o \approx 0.01 \text{ mH}$ or $C_o \approx 11 \mu\text{F}$, $L_o \approx 0.1 \text{ mH}$ or $C_o \approx 5.4 \mu\text{F}$, $L_o \approx 1 \text{ mH}$, $C_i \approx 0 \mu\text{F}$, $L_i \approx 0 \text{ mH}$</p>
<p>Intrinsically safe supply circuit "Safe"</p>	<p>Terminals 807 (+12V_Safe), 808 (GND_Safe) Ex ia IIB nominal voltage DC 12 V, $U_o \approx$ DC 15 V, $I_o \approx 1.88 \text{ A}$ $I_S \approx 213 \text{ mA}$, internal resistance 8 Ω linear characteristic line $P_o \approx 2.83 \text{ W}$, $C_i \approx 0 \mu\text{F}$, $L_i \approx 0 \mu\text{H}$ In case of simultaneous capacitances and inductances, the following applies: $C_o \approx 2.5 \mu\text{F}$, $L_o \approx 43 \mu\text{H}$</p>
<p>Intrinsically safe data circuit "Safe"</p>	<p>Terminals 809 (Safe_A), 810 (Safe_B), 811 (Safe_S) Ex ia IIB nominal current DC 5 V, U_o DC 6 V, $I_o \approx 150 \text{ mA}$ internal resistance 40 Ω linear characteristic line $P_o \approx 225 \text{ mW}$, $C_i \approx 0 \mu\text{F}$, $L_i \approx 0 \mu\text{H}$ In case of simultaneous capacitances and inductances, the following applies: $C_o \approx 38 \mu\text{F}$, $L_o \approx 50 \mu\text{H}$</p>
<p>Intrinsically safe signal circuit 4-20mA, HART</p>	<p>Terminals 812 (+ 0/4-20mA), 813 (- 0/4-20mA) Ex ia IIB nominal voltage 24 V, $U_o \approx$ DC 28 V, $I_o \approx 100 \text{ mA}$ $P_o \approx 0.7 \text{ W}$ linear characteristic line ($R = 280 \Omega$) C_i negligibly small, L_i negligibly small In case of simultaneous capacitances and inductances: $C_o \approx 650 \text{ nF}$, $L_o \approx 0.1 \text{ mH}$ or $C_o \approx 350 \text{ nF}$, $L_o \approx 1 \text{ mH}$</p>
<p>Intrinsically safe data circuit "RS485"</p>	<p>Terminals 816 (RS485_A), x17 (RS485_B), 818 (RS485_GND) Ex ia IIB nominal voltage DC 5 V, $U_o \approx$ DC 6 V, $I_o \approx 88 \text{ mA}$ internal resistance 68 Ω linear characteristic line $P_o 132 \text{ mW}$ In case of simultaneous inductances and capacitances, the following applies: $C_o \approx 38 \mu\text{F}$, $L_o \approx 50 \mu\text{H}$ or $C_o \approx 17 \mu\text{F}$, $L_o \approx 500 \mu\text{H}$, U_i DC 14.6 V, $C_i \approx 0 \mu\text{F}$, $L_i \approx 0 \mu\text{H}$</p>
<p>Intrinsically safe supply circuit "RS485"</p>	<p>Terminals 814 (+12V_RS485), 815 (GND_RS485) Ex ia IIB</p>

	nominal voltage DC 12 V, $U_o \approx$ DC 14.6 V, $I_o \approx$ 1.83 A $I_S \approx$ 213 mA, internal resistance 8 Ω linear characteristic line $P_o \approx$ 2.75 W, $C_i \approx$ 0 μ F, $L_i \approx$ 0 μ H In case of simultaneous capacitances and inductances, the following applies: $C_o \approx$ 3.1 μ F, $L_o \approx$ 55 μ H, $C_o \approx$ 3.7 μ F, $L_o \approx$ 20 μ H $C_o \approx$ 3.97 μ F, $L_o \approx$ 10 μ H
System interface	USB full speed, self-powered, 12 Mbit/s via motherboard
Product ID	6005
i-Box Namur/i-Box Namur plus - data interface	2 x gain-modulated, 200 baud
i-Box PID data interface	RS485, 153600 baud
HART	Internal HART modem (4-20mA, 1200 Bit/sec)
RS 485 data interface	RS485
Environmental Conditions	
Ambient temperature	- 20 ... + 70 °C
Ambient temperature (for installation in basic module)	- 20 ... + 50 °C
Storage temperature	- 20 ... + 50 °C
Protection type	IP 00 per EN 40050
Equipment group/category / Ignition protection type	II (1) G [Ex ia] IIB
EC-type examination certificate	BVS 10 ATEX E 094
Standards	EN 60079-0, EN 60079-11, EN 60079-14, EN 60079-26
Mechanical Data	
Weight	2.5 N (250 g)
System connection	Expansion card
Connection	Terminals 1,5 mm ² , pluggable
Order details	
Designation	Order number
i-Box interface type 6932-112	301742

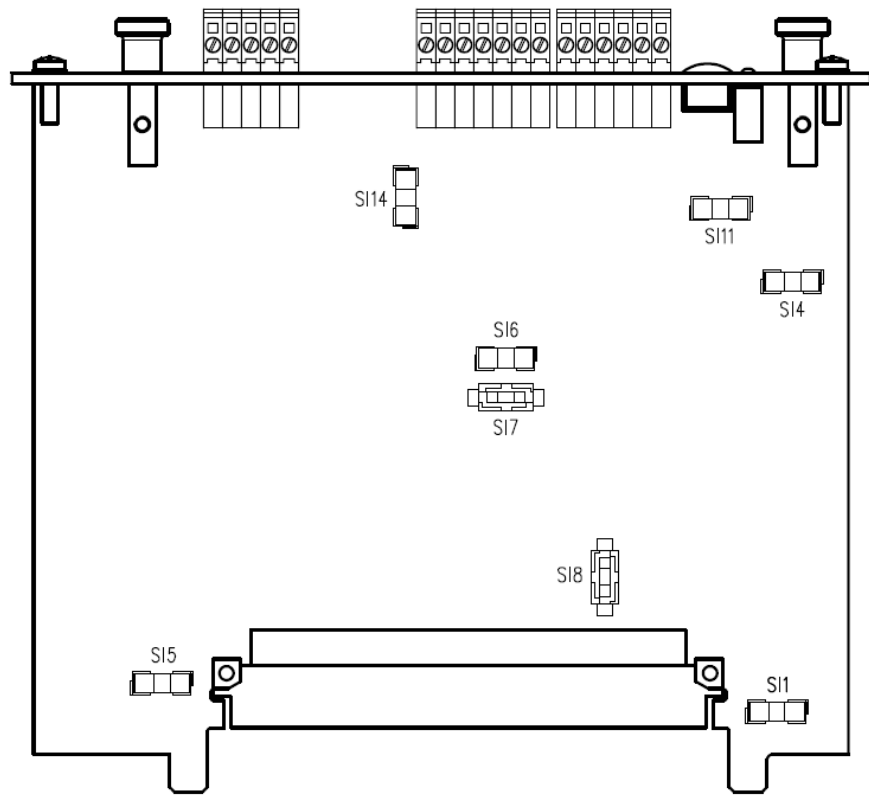
27.2 Safety instruction

- The i-Box interface must be set up outside the explosive area. Note: For operation inside the explosive area, the i-Box interface can be installed in a pressure-resistant housing per EN 60079-1 (pressure-resistant encapsulation "d"), which must be examined separately for this purpose.
- The i-Box interface must be installed in an enclosure with a protection grade of IP 20 pursuant to EN 60529.
- The i-Box interface is suited for use in a temperature range at the installation point of -20°C to + 70°C.
- The installation of the i-Box interface must be done so that the clearance of bare parts of intrinsically-safe circuits vis-a-vis metallic enclosure parts is at least 1.5 mm and vis-a-vis bare parts of non-intrinsically safe circuits is at least 4 mm and that the creepage distances of bare parts of intrinsically-safe circuits vis-a-vis bare parts of non-intrinsically safe circuits is at least 4 mm.
- The connector parts for the external intrinsically safe electrical circuits must be separated from the connector parts of non-intrinsically safe electrical circuits pursuant to Para. 6.2.1 of EN 60079-11:2007.

27.3 Terminal assignment



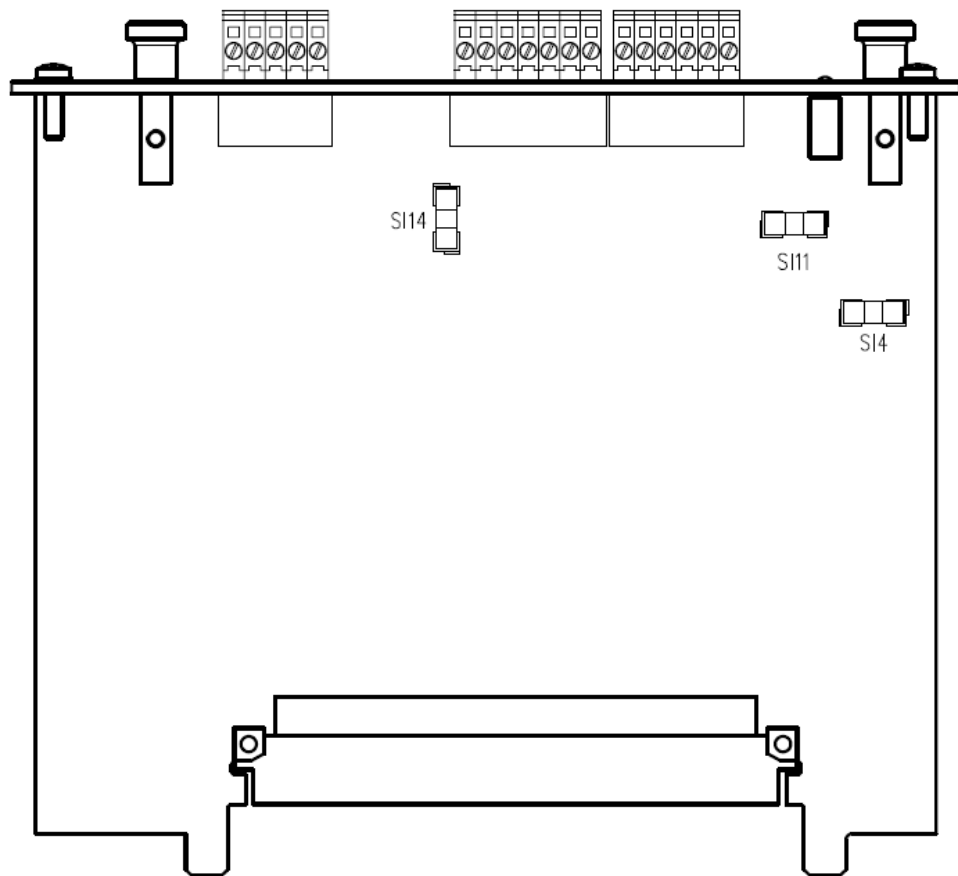
27.4 Fuse values without series



Fuse	Description	Value	Order No.
SI1	Mains in fuse (Voltage I-Boxes: +8,4V, +12V, +24V)	T 1.0A	292336
SI4	+12V_SAFE (I-Box PID)	T 125mA	292349
SI5	CPU	T 250mA	288255
SI6	Communication voltage I-Boxes	T 125mA	292349
SI7	+24V_4/20mA	F 63mA	281769
SI8	Communication HART-Modem	F 63mA	281769
SI11	+8,4V_1/2 für I-Boxes Namur or Namur Plus	T 100mA	291908
SI14	+12V_RS485	T 125mA	292349

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27.5 Fuse values from series A



Fuse	Description	Value	Order No.
SI4	+12V_SAFE (I-Box PID)	T 125mA	292349
SI11	+8,4V_1/2 für I-Boxes Namur or Namur Plus	T 100mA	291908
SI14	+12V_RS485	T 125mA	292349

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28 i-Box Namur plus 6 type 6912-12



28.1 Technical data

Electrical Data	
Power supply	<p>"Intrinsically safe supply circuit "+8.4V_1" for connection to I-Box interface type 6932-109 / -112 or SPD Interface Quad type 6932-108 or SPD Interface Dual type 6932-111 Connection "+8.4V_1" and "0V_1" Ex ia IIB nominal voltage: DC 8.4 V, nominal current consumption: 0.05 A $U_i \approx$ DC 10 V, $I_i \approx$ 500 mA, $P_i \approx$ 1.2 W, $L_i \approx$ 0 mH C_i at one countable error: \approx 0 μF C_i at two countable errors: \approx 18 μF</p>
Data interfaces	<p>Intrinsically safe bidirectional data protection interface "ManU_talk" for connection to I-Box interface type 6932-109 / -112 or SPD Interface Quad type 6932-108 or SPD Interface Dual type 6932-111 Connection "ManU_talk" and "0V_1" or "ManU_talk" and "0V_1" Ex ia IIB nominal voltage \approx DC 8.4 V, $U_o \approx$ DC 10 V, $I_o \approx$ 100 mA, $P_o \approx$ 250 mW, $R \approx$ 100 Ω, $C_o \approx$ 20 μF, $L_o \approx$ 0.01 mH or $C_o \approx$ 11 μF, $L_o \approx$ 0.1 mH or $C_o \approx$ 5.4 μF, $L_o \approx$ 1 mH for connection to a data circuit $U_i \approx$ DC 10 V, $R_i \approx$ 100 Ω, $C_i \approx$ 0 μF, $L_i \approx$ 0 mH</p>
NAMUR sensors	<p>Intrinsically safe sensor circuits "OUT1/IN1" through "OUT18/IN18" Connections "OUT_1" / "IN1" to "OUT18" / "IN18" each Ex ia IIB nominal voltage \approx DC 8.4 V, $U_o \approx$ DC 10 V, $I_o \approx$ 34 mA $P_o \approx$ 85 mW, $R_i \approx$ 300 Ω, $C_o \approx$ 20 μF, $L_o \approx$ 0.01 mH or</p>

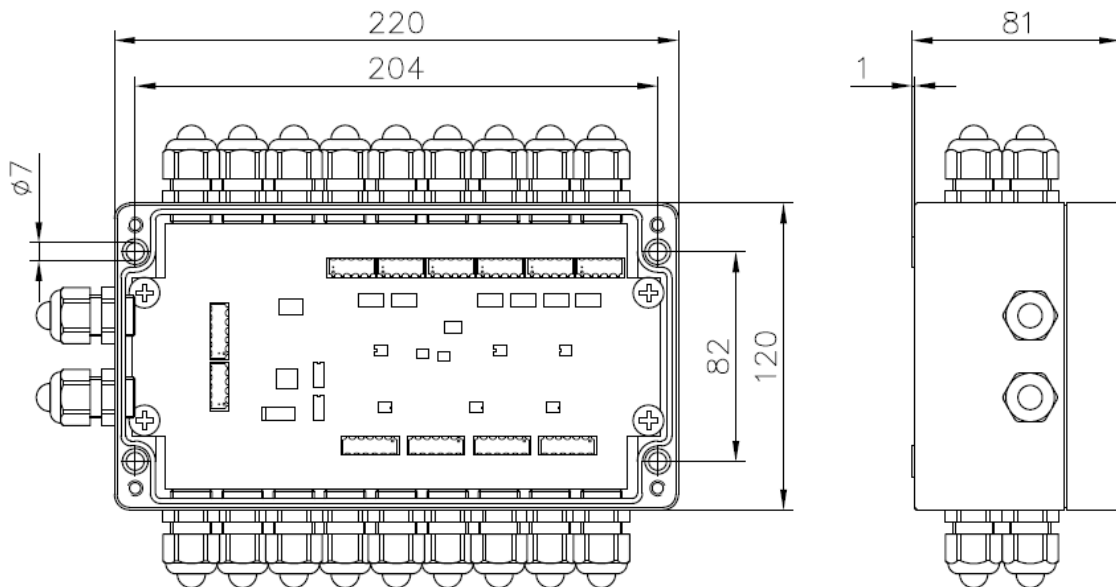
	Co \approx 11 μ F, Lo \approx 0.1 mH or Co \approx 5.7 μ F, Lo \approx 1 mH
PT100 temperature sensors	Intrinsically safe measuring circuit "PT100_1" to "PT100_8" connections PT100_1: „I_OUT_1“ (5), „IN+_1“ (4), „IN-_1“ (3), „GND_1“ (2) and PT100_2: „I_OUT_2“ (5), „IN+_2“ (4), „IN-_2“ (3), „GND_2“ (2) and PT100_3: „I_OUT_3“ (5), „IN+_3“ (4), „IN-_3“ (3), „GND_3“ (2) and PT100_4: „I_OUT_4“ (5), „IN+_4“ (4), „IN-_4“ (3), „GND_4“ (2) and PT100_5: „I_OUT_5“ (5), „IN+_5“ (4), „IN-_5“ (3), „GND_5“ (2) and PT100_6: „I_OUT_6“ (5), „IN+_6“ (4), „IN-_6“ (3), „GND_6“ (2) and PT100_7: „I_OUT_7“ (5), „IN+_7“ (4), „IN-_7“ (3), „GND_7“ (2) and PT100_8: „I_OUT_8“ (5), „IN+_8“ (4), „IN-_8“ (3), „GND_8“ (2) each with nominal voltage \approx 5 V intrinsically safe Ex ia IIB Uo \approx DC 10 V, Io \approx 50 mA, Po \approx 125 mW linear characteristic line (R = 200 Ω) Ci \approx 50 nF, Co \approx 5.6 μ F; Lo \approx 0.9 mH or Co \approx 4.7 μ F, Lo \approx 1.9 mH
Through wiring electrical circuits	Intrinsically safe through-wiring circuit "+8.4V_2" connections "+8.4V_2" and "0V_2" Ex ia IIB nominal voltage: DC 8.4 V, Ui/Uo \approx DC 10 V, li/Io \approx 500 mA Ci \approx 0 μ F, Li \approx 0 mH
Potential-free shielded connections	Intrinsically safe shielded connection circuits "Sh" Sh each Ex ia IIB Ci \approx 6 nF, Li \approx 0 mH
Shielded connections	Shielded connections "1" (housing potential) connections for Pt100 temperature sensors (1)
Cable gland	20 x M16 x 1.5 plastic
Connection	Terminals 1,5 mm ² , pluggable
Environmental Conditions	
Operating temperature	- 20 ... + 50 °C (Ex-approval to 60 °C)
Storage temperature	- 20 ... + 50 °C (60 °C)
Climatic Class	JWF according to DIN 40040
Protection type	IP65 (IP66)
Ex approval	RL 94/9/EG
Equipment group/category / Ignition protection type	II 2 (1) G Ex ia [ia Ga] IIB T4 Gb
EC-type examination certificate	BVS 10 ATEX E 106 IECEX BVS 14.0059
Standards	EN 60079-0, IEC 60079-0, EN 60079-11, IEC 60079-11
Device-specific Data	
Nominal conditions	Nominal conditions

Mechanical Data	
Dimensions	See Dimension Drawing
Weight	16 N (1.6 kg)
Order details	
Designation	Order number
i-Box Namur plus 6 type 6932-12	292976

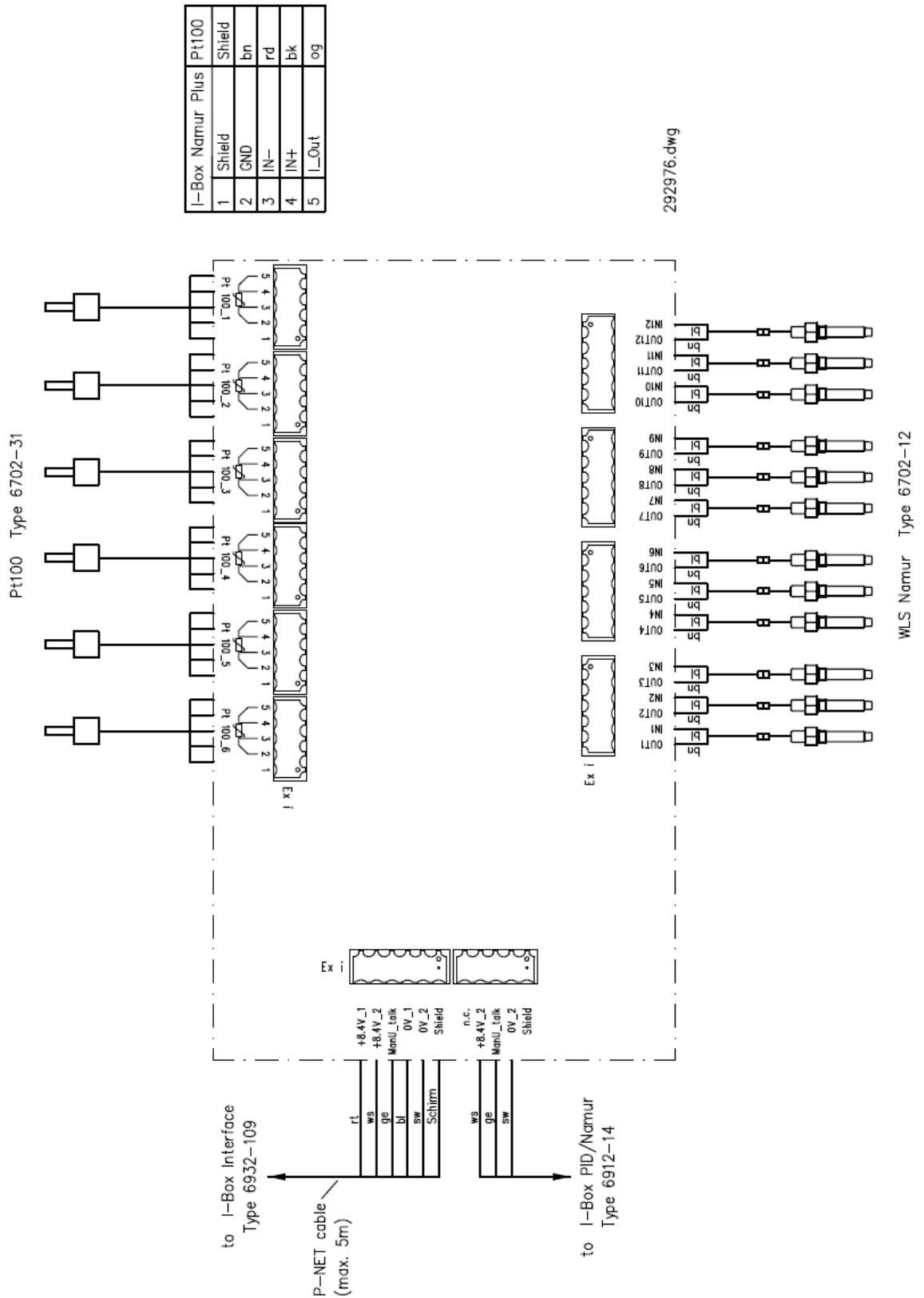
28.2 Safety instructions

- The connection cable and wires of the I-Box must be fixed and protected from mechanical damage.
- When selecting and mounting the intrinsically safe connection cables and wires, Paragraphs 12.2 and 12.3 of EN 60079-14 must be followed.

28.3 Dimensions



28.4 Wiring



29 WLS Namur type 6902-12



Monitoring of the fluid level is based on an optical principle. The sensor's infrared light, which is emitted by infrared luminescent diodes, is directed through a cone. If the cone is located in air, the infrared light will be reflected in such a way that it hits phototransistors. If the cone is located in a fluid

(= quantity remaining = not empty), the infrared light is not reflected.

The WLS Namur is mounted by means of a G1/2" threaded connector attached to the tank, reservoir or pipeline wall.

Installation guide

In the ex-area, the norms EN 60079-14, EN 60079-11 and EN 60079-26 must be observed. The WLS Namur should be incorporated into the pressure testing system of the tank, reservoir or pipeline.

The sensor must be screwed with a maximum locking torque of 50 Nm.

Installation depth

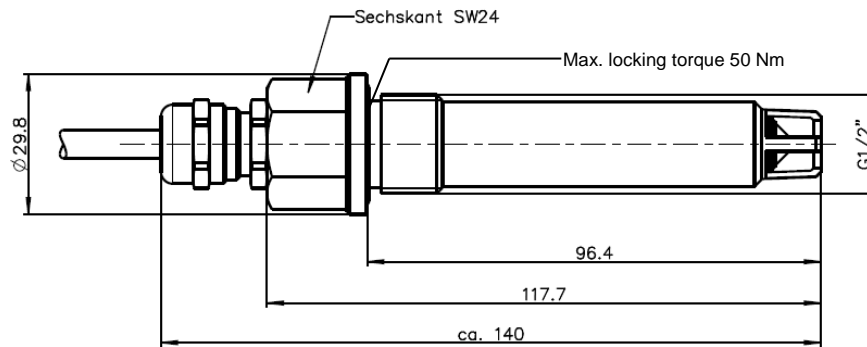
The sensor head should be located at a distance of 2/3 of the pipe diameter to the tube sheet.

29.1 Technical data

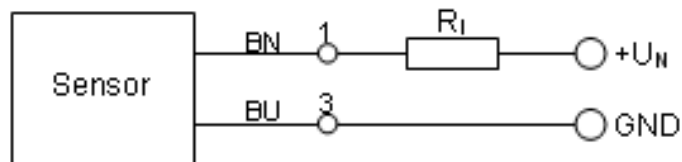
Electrical data				
Supply voltage (Uv)	DC 5 V ... 12 V			
Rated voltage (Un)	DC 8.2V			
Ripple	≤ 0.5%			
Current consumption (typ.)	≤ 1mA			
Sensor is not wet	min. 2.5mA			
Sensor is wet				
Connecting cable	0.80m with M12 plug			
Terminal layout	<p>1: BN 2: - 3: BU 4: BK</p>	PIN	Colour	Function
		1	brown	+UN
		2		NC
		3	blue	GND
		4	(black)	NC

Ex- technical data			
	Intrinsically safe signal and supply circuit Category Ex ia IIB		
	U _i = 10 V		
	I _i = 85 mA		
	P _i =	Ex ia IIB	P _i
		Temperature class	
		T3	85 mW
	T4	180 mW	
C _i = negligibly small; L _i = negligibly small			
Ambient conditions			
Permissible ambient temperature atmospheric conditions	- 20 °C.....+ 60 °C 0.8 bar ... 1.1 bar		
Protection class (in compliance with EN 60529)	IP 67		
Permissible operating pressure pN	0.8 bar 20 bar		
Equipment group/-category Protection type	II 1/2 G, Ex ia IIB T3-T4 Ga/Gb		
EC-type examination certificate	PTB 99 ATEX 2040		
Norms	EN 60079-0, EN 60079-11, EN 60079-26		
Mechanical data			
Dimensions	See drawing		
Housing material	Glass/brass		
Resistance	Petrol, diesel, heating oil, ethanol, mineral oil		
Device-specific data			
Sensing distance (S _n)	-8 mm		
Readiness delay	≤ 20 ms		
Ordering details			
Designation	Order number		
WLS Namur, type 6902-12	292977		
Accessories			
Welded sleeve (6729-00-008)	U05006928		
O-ring 22.0 x 2.0	U220753		
Protective cover	U05006748		
Sensor cable with 5 m connector	292978		

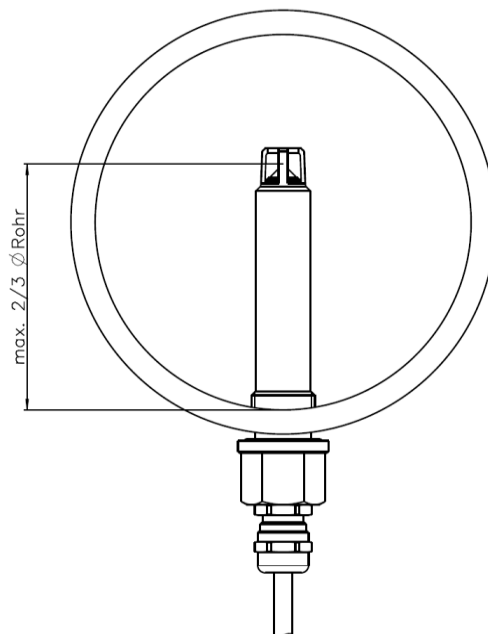
29.2 Dimensions



29.3 Circuit diagram



29.4 Installation instructions



Note:
The installation of WLS Namur must be from below.

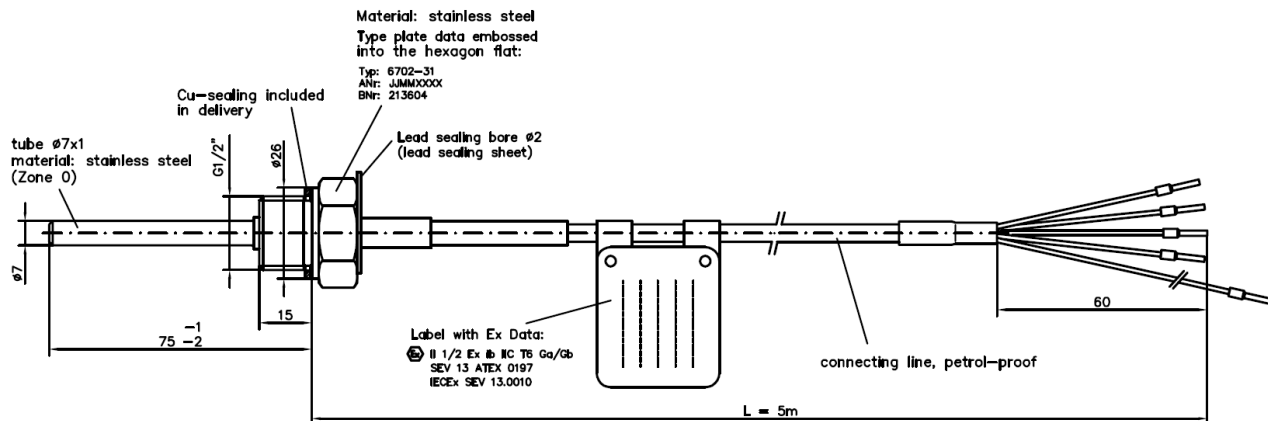
30 Temperature sensor Ex G1/2" type 6702-31



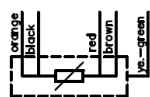
30.1 Technical data

Device-specific data	
Measuring element	Pt 100 in accordance with DIN IEC 751, class B
Measurement range	-30 °C ... +100 °C
Response time	$t_{90} < 15$ s
Calibration points	at 0 °C and 50 °C
Electrical data	
Cable connection	5 m cable, four-wire, shielded, with open ends for connection to evaluation electronics
Ambient conditions	
Operating temperature of connecting head	-40 ... +60 °C
Operating temperature of connecting line	-30 ... +60 °C
Protection type	IP 65 in accordance with EN 60529
Equipment group/-category Protection type	II 1/2 G Ex ib IIC T6 Ga/Gb
Certificates	SEV 13 ATEX 0197 IECEX SEV 13.0010
Norms	EN 60079-0, EN 60079-11, EN 60079-26 IEC 60079-0, IEC 60079-11, IEC 60079-26
Mechanical data	
Mounting/casing	Installation with screwing thread G 1/2"
Installation length	75 mm
Installation position	Any
Measuring tip	Stainless steel
Weight	Approx. 6 N (= 0,6 kg)
Ordering details	
Designation	Order number
Temperature sensor, type 6702-31	213604

30.2 Dimensions



connecting diagram



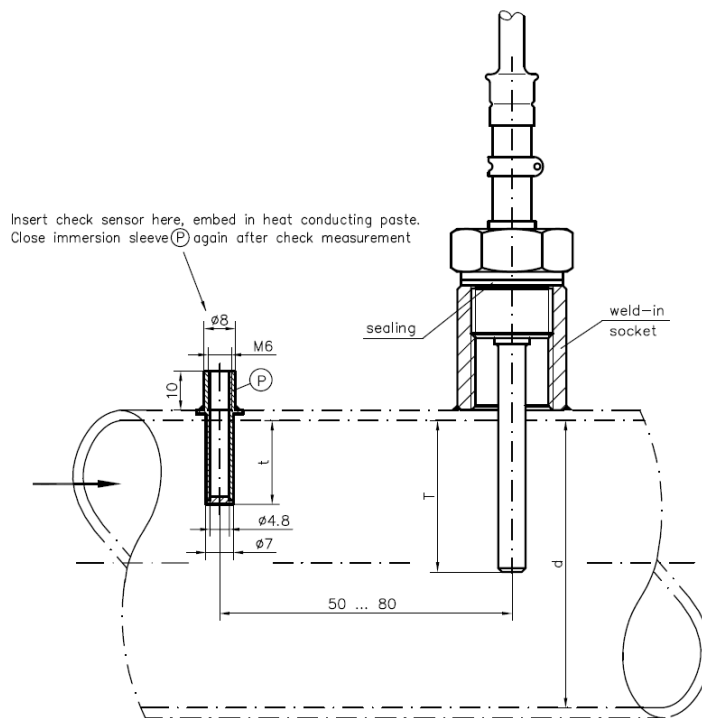
calibration values

0°C	X Ohm
50°C	X Ohm

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calibration data and connection plan on rear side of Ex plate or on additional labeling grommet

30.3 Installation instructions



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Caution:

- Use only zone 1 devices for check measurements at A1 systems!
- Never use mercury thermometers (high inertia!)

31 i-Box PID/Namur type 6912-14



31.1 Technical data

Electrical Data	
Power supply	<p>Intrinsically safe supply circuit "SAFE" for connection to I-Box interface type 6932-109 / -112 Connection "+12_SAFE" and "GND_SAFE" nominal voltage \approx DC 12 V, nominal current consumption \approx 0.1 A</p> <p>Ex ia IIB $U_i \approx$ DC 14.6 V, max. stationary short-circuit current \approx 213 mA $C_i \approx$ 1 μF, $L_i \approx$ 10 μH</p> <p>"Intrinsically safe supply circuit "+8.4V_1" for connection to I-Box interface type 6932-109 / -112 or SPD Interface Quad type 6932-108 or SPD Interface Dual type 6932-111 Connection "+8.4V_1" and "0V_1" Ex ia IIB nominal voltage: DC 8.4 V, nominal current consumption: 0.05 A $U_i \approx$ DC 10 V, $I_i \approx$ 500 mA, $P_i \approx$ 1.2 W, $L_i \approx$ 0 mH C_i at one countable error: \approx 0 μF C_i at two countable errors: \approx 18 μF</p>
Data interfaces	<p>Intrinsically safe data circuit "SAFE" for connection to I-Box interface type 6932-109 / -112 Connection "SAFE_B" and "SAFE_A" nominal voltage: DC 5 V Ex ia IIB $U_o \approx$ DC 14.6 V, $I_o \approx$ 223 mA, $P_o \approx$ 450 mW, internal resistance R (for $7.3 \text{ V} < U \leq 14.6 \text{ V}$) \approx 360 Ω internal resistance R (for $U \leq 7.3 \text{ V}$) \approx 40 Ω</p> <p>$C_o \approx$ 3.97 μF, $L_o \approx$ 0.2 mH or $C_o \approx$ 2.1 μF, $L_o \approx$ 2 mH</p>

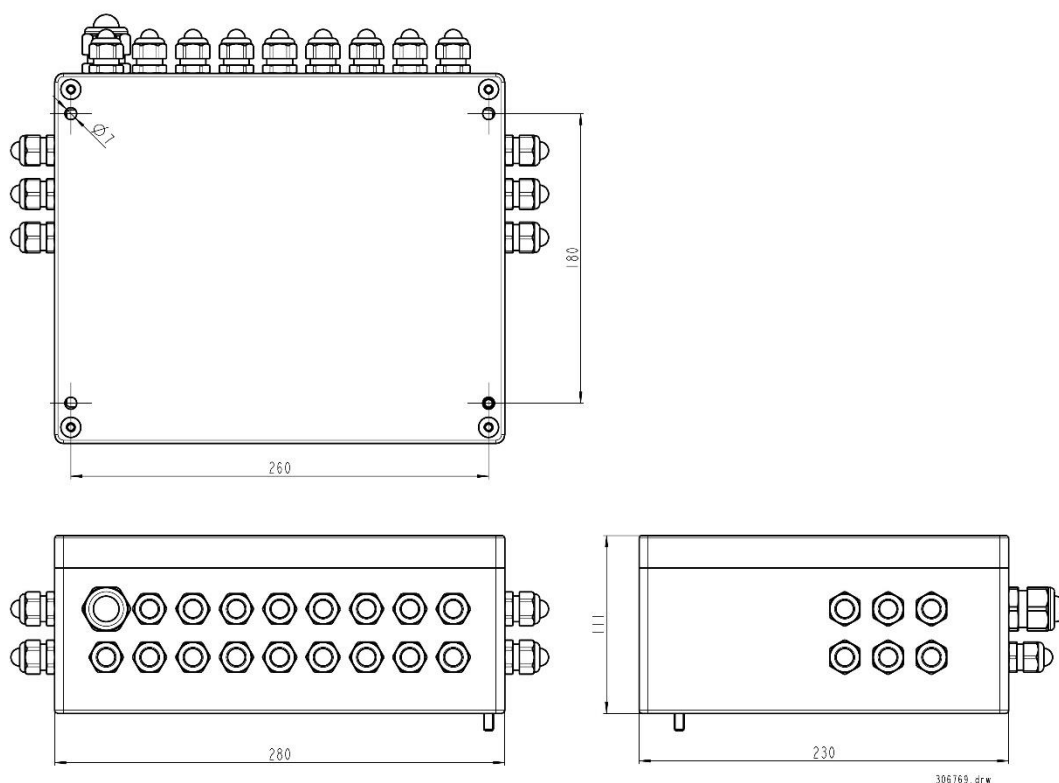
	<p>for connection of a data circuit Ex ia IIB $U_i \approx \text{DC } 7.3 \text{ V}$, $R_i \approx 40 \ \Omega$, $C_i \approx 0 \text{ nF}$, $L_i \approx 0 \text{ mH}$ Intrinsically safe bidirectional data interface "ManU_talk" for connection to I-Box interface type 6932-109 / -112 or SPD Interface Quad type 6932-108 or SPD Interface Dual type 6932-111 Connection to "ManU_talk" and "0V_1" or "ManU_talk" and "0V_1" Ex ia IIB nominal voltage $\approx \text{DC } 8.4 \text{ V}$, $U_o \approx \text{DC } 10 \text{ V}$, $I_o \approx 100 \text{ mA}$ $P_o \approx 250 \text{ mW}$, $R_i \approx 100 \ \Omega$, $C_o \approx 20 \ \mu\text{F}$, $L_o \approx 0.01 \text{ mH}$ or $C_o \approx 11 \ \mu\text{F}$, $L_o \approx 0.1 \text{ mH}$ or $C_o \approx 5.4 \ \mu\text{F}$, $L_o \approx 1 \text{ mH}$</p> <p>for connection to a data circuit Ex ia IIB $U_i \approx \text{DC } 10 \text{ V}$, $R_i \approx 100 \ \Omega$, $C_i \approx 0 \ \mu\text{F}$, $L_i \approx 0 \text{ mH}$</p>
PID sensors	<p>Intrinsically safe output current circuit "PID" Connections "OUT1" to "OUT20" and "L1" and "L2" and "L3" and "C1", "C2", "C3" Ex ia IIB nominal voltage $\approx \text{DC } 12 \text{ V}$, $U_o \approx \text{DC } 15 \text{ V}$, $I_o \approx 300 \text{ mA}$ $P_o \approx 1.1 \text{ W}$, $R_i \approx 50 \ \Omega$, $C_o \approx 3.55 \ \mu\text{F}$, $L_o \approx 0.2 \text{ mH}$, $C_i \approx 0 \ \mu\text{F}$, $L_i \approx 0 \text{ mH}$ Note: PID circuit is highly resistive ($100 \text{ k}\Omega < R_{\text{RESD}} < 1 \text{ M}\Omega$) connected to the metallic housing.</p>
NAMUR sensors	<p>Intrinsically safe sensor circuits "OUT1/IN1" to "OUT18/IN18" Connections "OUT_1" / "IN1" to "OUT18" / "IN18" each Ex ia IIB nominal voltage $\approx \text{DC } 8.4 \text{ V}$, $U_o \approx \text{DC } 10 \text{ V}$, $I_o \approx 34 \text{ mA}$ $P_o \approx 85 \text{ mW}$, $R_i \approx 300 \ \Omega$, $C_o \approx 20 \ \mu\text{F}$, $L_o \approx 0.01 \text{ mH}$ or $C_o \approx 11 \ \mu\text{F}$, $L_o \approx 0.1 \text{ mH}$ or $C_o \approx 5.7 \ \mu\text{F}$, $L_o \approx 1 \text{ mH}$</p>
Through-wiring electrical circuits	<p>Intrinsically safe through-wiring circuit "+8.4V_2" connections "+8.4V_2" and "0V_2" Ex ia IIB nominal voltage: $\approx \text{DC } 8.4 \text{ V}$, $U_i/U_o \approx \text{DC } 10 \text{ V}$, $I_i/I_o \approx 500 \text{ mA}$, $C_i \approx 0 \ \mu\text{F}$, $L_i \approx 0 \text{ mH}$</p> <p>Intrinsically safe feed-through circuits "GWG1", "GWG2", "GWG3" connections GWG1+, GWG1- or GWG2+, GWG2- or GWG3+, GWG3- each</p> <p>Ex ia IIB nominal voltage $\approx \text{DC } 19 \text{ V}$, $U_i/U_o \approx \text{DC } 25 \text{ V}$, $I_i/I_o \approx \text{DC } 165 \text{ mA}$, $C_i \approx 0 \text{ nF}$, $L_i \approx 0 \text{ mH}$</p>

Potential-free shielded connections	Intrinsically safe shielded connection circuits "GWG1_S", "GWG2_S", "GWG3_S" connections GWG1_S or GWG2_S or GWG3_S Intrinsically safe shielded connections "Sh" Sh each Ex ia IIB Ci ≈ 6 nF, Li ≈ 0 mH
Cable gland	23 x M16 x 1.5 plastic 1 x M20 x 1.5 plastic
Connection	Terminals 1,5 mm ² , pluggable
Environmental Conditions	
Ambient temperature	- 20 ... + 50 °C (Ex-approval to +60 °C)
Storage temperature	- 20 ... + 50 °C (+60 °C)
Climatic Class	JWF according to DIN 40040
Protection type	IP65 (IP66)
Ex approval	RL 94/9/EG
Equipment group/category / Ignition protection type	II 2 (1) G Ex ia [ia Ga] IIB T4 Gb
EC-type examination certificate	BVS 10 ATEX E 106 IECEX BVS 14.0059
Standards	EN 60079-0, IEC 60079-0, EN 60079-11, IEC 60079-11
Device-specific Data	
Nominal conditions	23 ± 2 °C
Mechanical Data	
Dimensions	See Dimension Drawing
Weight	40 N (4.0 kg)
Order details	
Designation	Order number
i-Box PID/Namur type 6712-14	306769

31.2 Safety instructions

- The connection cables and wires of I-Box must be fixed and protected from mechanical damage.
- When selecting and mounting the intrinsically safe connection cables and wires, Paragraphs 12.2 and 12.3 of EN 60079-14 must be followed.
- To dissipate electrical charges that may arise at non-conductive flowing liquids the intrinsically safe output circuit "PID" is highly resistive (100 kΩ < R_{ESD} < 1 MΩ) connected to the metallic housing of the types 6912-10/-14. The housing must be electrically connected to the vehicle chassis. The housing and the mounting surface must therefore not be painted.

31.3 Dimensions and mounting



Attention:

Pay attention to switch position:

Connection to 6932-112 → Switch position 1 (tank identification)

Connection to 6932-108/-111 → Switch position 0 (tank identification)

31.4 Wiring

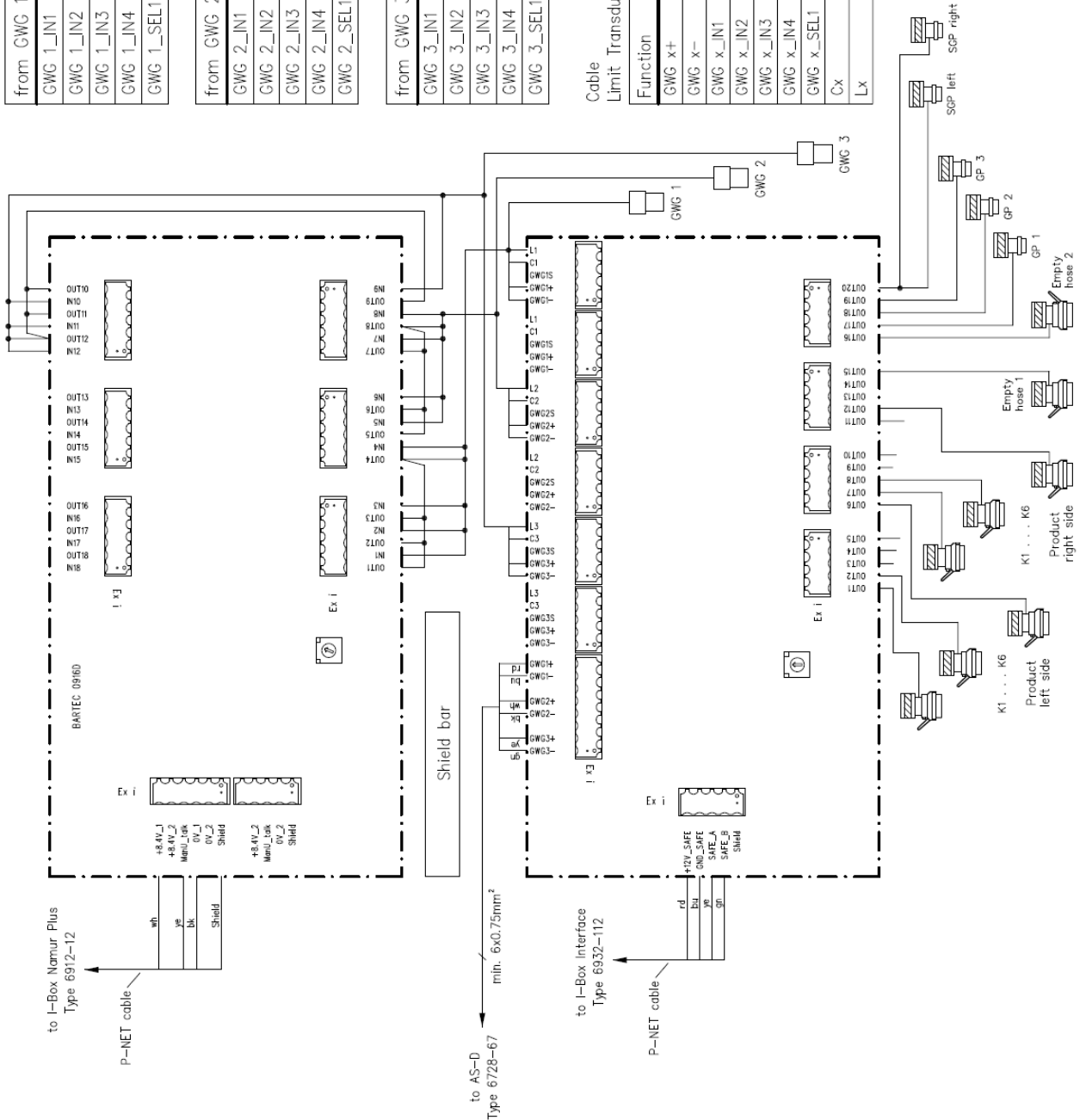
from GWG 1	Tank ident.	Colour
GWG 1_IN1	IN1	gn
GWG 1_IN2	IN2	ye
GWG 1_IN3	IN3	pk
GWG 1_IN4	IN4	bn
GWG 1_SEL1	OUT1-OUT4	gy

from GWG 2	Tank ident.	Colour
GWG 2_IN1	IN5	gn
GWG 2_IN2	IN6	ye
GWG 2_IN3	IN7	pk
GWG 2_IN4	IN8	bn
GWG 2_SEL1	OUT5-OUT8	gy

from GWG 3	Tank ident.	Colour
GWG 3_IN1	IN9	gn
GWG 3_IN2	IN10	ye
GWG 3_IN3	IN11	pk
GWG 3_IN4	IN12	bn
GWG 3_SEL1	OUT9-OUT12	gy

Cable Limit Transducer (GWG)

Function	Colour
GWG x+	wh
GWG x-	bu
GWG x_IN1	gn
GWG x_IN2	ye
GWG x_IN3	pk
GWG x_IN4	bn
GWG x_SEL1	gy
Cx	bk
Lx	rd



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32 i-Box PID type 6912-10



32.1 Technical data

Electrical Data	
Power supply	<p>Intrinsically safe supply circuit "SAFE" for connection to I-Box interface type 6932-109 / -112 Connection "+12_SAFE" and "GND_SAFE" nominal voltage \approx DC 12 V, nominal current consumption: 0.1 A Ex ia IIB $U_i \approx$ DC 14.6 V, max. stationary short-circuit current \approx 213 mA $C_i \approx 1 \mu\text{F}$, $L_i \approx 10 \mu\text{H}$</p>
Data interfaces	<p>Intrinsically safe data circuit "SAFE" for connection to I-Box interface type 6932-109 / -112 Connection "SAFE_B" and "SAFE_A" nominal voltage: DC 5 V Ex ia IIB $U_o \approx$ DC 14.6 V, $I_o \approx 223 \text{ mA}$, $P_o \approx 450 \text{ mW}$, internal resistance R (for $7.3 \text{ V} < U \leq 14.6 \text{ V}$) $\approx 360 \Omega$ internal resistance R (for $U \leq 7.3 \text{ V}$) $\approx 40 \Omega$</p> <p>$C_o \approx 3.97 \mu\text{F}$, $L_o \approx 0.2 \text{ mH}$ or $C_o \approx 2.1 \mu\text{F}$, $L_o \approx 2 \text{ mH}$</p> <p>for connection of a data circuit Ex ia IIB $U_i \approx$ DC 7.3 V, $R_i \approx 40 \Omega$, $C_i \approx 0 \text{ nF}$, $L_i \approx 0 \text{ mH}$</p>
PID sensors	<p>Intrinsically safe output current circuit "PID" connections "OUT1" to "OUT20" and "L1" and "L2" and "L3" and "C1", "C2", "C3" Ex ia IIB nominal voltage \approx DC 12 V, $U_o \approx$ DC 15 V, $I_o \approx 300 \text{ mA}$ $P_o \approx 1.1 \text{ W}$, $R_i \approx 50 \Omega$, $C_o \approx 3.55 \mu\text{F}$, $L_o \approx 0.2 \text{ mH}$, $C_i \approx 0 \mu\text{F}$, $L_i \approx 0 \text{ mH}$ Note: PID circuit is highly resistive ($100 \text{ k}\Omega < R_{\text{RESD}} < 1 \text{ M}\Omega$) connected to the metallic housing.</p>

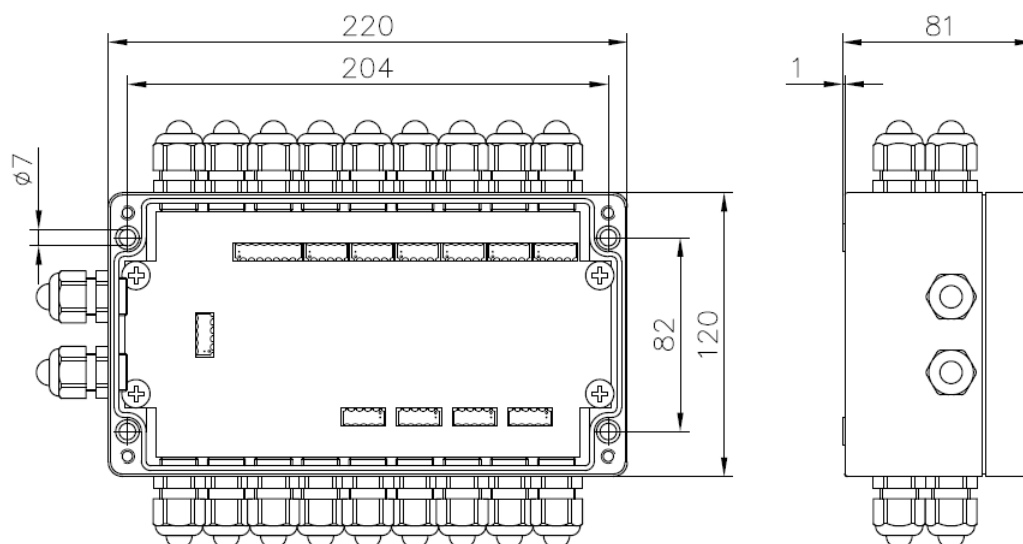
Through-wiring electrical circuits	Intrinsically safe feed-through circuits "GWG1", "GWG2", "GWG3" connections GWG1+ GWG1- or GWG2+ GWG2- or GWG3+ GWG3- each Ex ia IIB nominal voltage \approx DC 19 V, $U_i/U_o \approx$ DC 25 V $I_i/I_o \approx$ DC 165 mA, $C_i \approx$ 0 nF, $L_i \approx$ 0 mH
Potential-free shielded connections	Intrinsically safe shielded connection circuits "GWG1_S", "GWG2_S", "GWG3_S" connections GWG1_S or GWG2_S or GWG3_S Intrinsically safe shielded connections "Sh" Sh each Ex ia IIB $C_i \approx$ 6 nF, $L_i \approx$ 0 mH
Cable gland	20 x M16 x 1.5 plastic
Connection	Terminals 1,5 mm ² , pluggable
Environmental Conditions	
Ambient temperature	- 20 ... + 50 °C (Ex-approval to 60°C)
Storage temperature	- 20 ... + 50 °C
Climatic Class	JWF according to 40040
Protection type	IP65 (IP66)
Ex approval	RL 94/9/EG
Equipment group/category / Ignition protection type	II 2 (1) G Ex ia [ia Ga] IIB T4 Gb
EC-type examination certificate	BVS 10 ATEX E 106 IECEX BVS 14.0059
Standards	EN 60079-0, IEC 60079-0, EN 60079-11, IEC 60079-11
Device-specific Data	
Nominal conditions	23 \pm 2 °C
Mechanical Data	
Dimensions	See Dimension Drawing
Weight	16 N (1.6 kg)
Order details	
Designation	Order number
i-Box PID type 6712-10	292964

32.2 Safety instructions

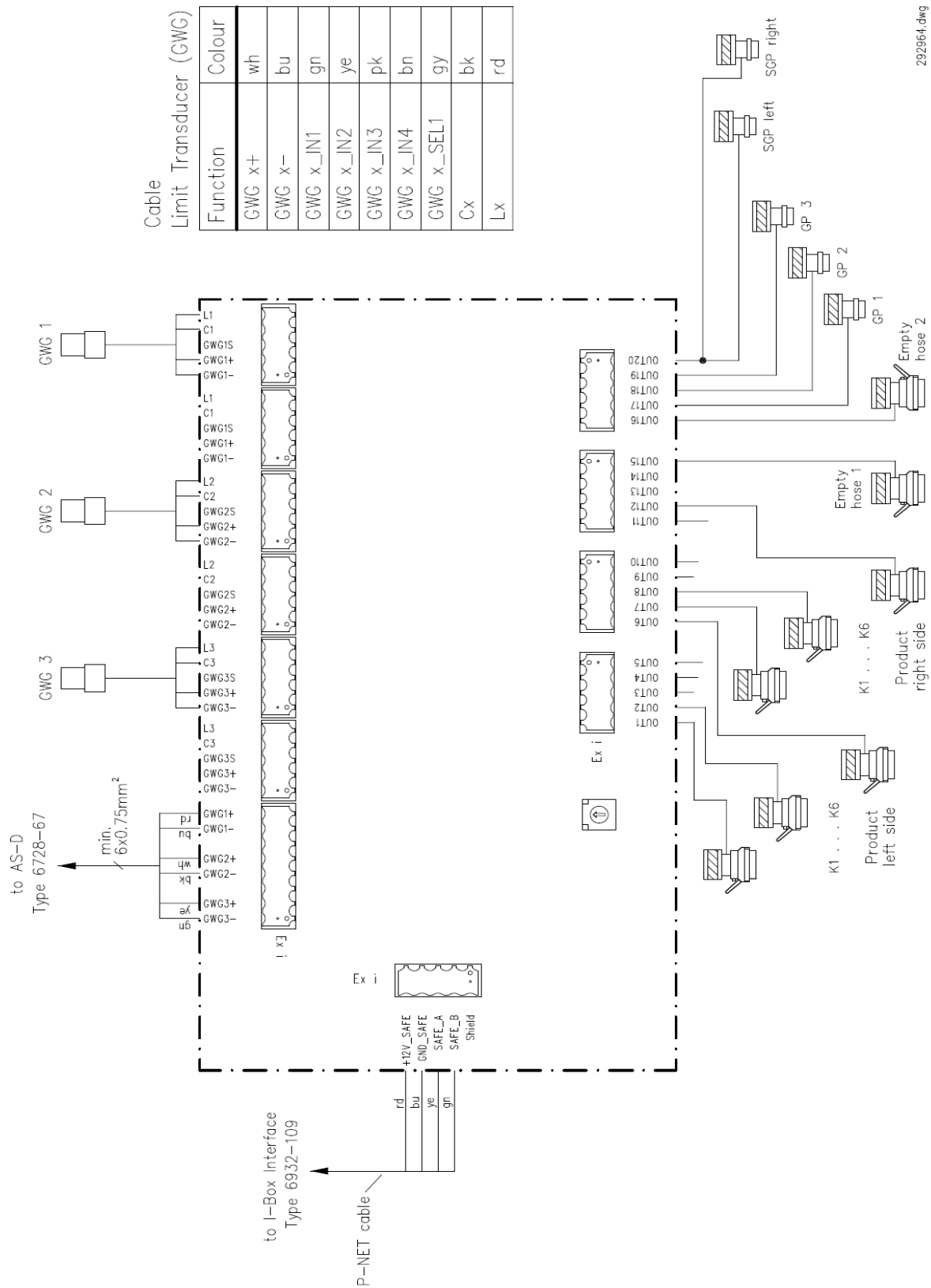
- The connection cable and wires of the I-Box must be fixed and protected from mechanical damage.
- When selecting and mounting the intrinsically safe connection cables and wires, Paragraphs 12.2 and 12.3 of EN 60079-14 must be followed.
- To dissipate electrical charges that may arise at non-conductive flowing liquids the intrinsically safe output circuit "PID" is highly resistive ($100 \text{ k}\Omega < R_{RESD} < 1 \text{ M}\Omega$) connected to the metallic housing of the types 6912-10/-14. The housing must be electrically connected to the vehicle chassis. The housing and the mounting surface must therefore not be painted.

32.3 Dimensions

(without cable glands)



32.4 Wiring



Cable Limit Transducer (GWG)

Function	Colour
GWG x+	wh
GWG x-	bu
GWG x_IN1	gn
GWG x_IN2	ye
GWG x_IN3	pk
GWG x_IN4	bn
GWG x_SEL1	gy
Cx	bk
Lx	rd

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33 SPD interface dual type 6932-111



33.1 Technical data

Electrical Data	
Supply voltage	DC 24V, Fuse 1A
Supply i-Box Namur/ RFID tag reader	2 x DC 8,4V; Fuse 100mA
Battery	DC 4.8 V / 1.85 Ah; Fuse 1,5A
System interface	PNET, serial, asynchronous, 76800 bit/s, RS485
i-Box Namur/ RFID tag reader data interface	2 x gain-modulated, 200 baud
Power supply +24_S, AGND	
Connections SL1-5A/B/C, (+24V_S) and SL1-6A/B/C, (AGND)	Nominal voltage DC 24 V \pm 10% power consumption 0.2 A at DC 24 V (input wattage 5 W), $U_m \approx 50$ V
Data interface A, B, S	
Connections SL1-24A (A), SL1-24C (B). SL1-25A (S)	Nominal voltage DC 5 V, Maximum voltage $U_m \approx 50$ V
Intrinsically safe limit output current circuit Ex ia IIB "8V_1" or "8V_2" each	
Terminals x03 (+8,4V_1), x04 (0V_1) or Terminals x05 (+8,4V_2), x06 (0V_2) or Terminals x13 (+8,4V_2), x14 (0V_2) each	Nominal voltage DC 8.4 V, $U_o \approx 10$ V, $I_o \approx 480$ mA $P_o \approx 1.2$ W, linear characteristic line, $R \approx 20.8 \Omega$ $C_o \approx 20 \mu\text{F}$ at $L_o \approx 0.01$ mH or $C_o \approx 10 \mu\text{F}$ at $L_o \approx 0.1$ mH or $C_o \approx 3.4 \mu\text{F}$ at $L_o \approx 1$ mH, $C_i \approx 0$, $L_i \approx 0$ mH
Intrinsically safe bidirectional data interface Ex ia IIB "ManU_talk_1" , "ManU_talk_2"	
Terminals x07 (ManU_talk_1), x04 (0V_1) x08 (ManU_talk_2), x06 (0V_2) each	Nominal voltage DC 8.4 V, $U_o \approx 10$ V, $I_o \approx 100$ mA $P_o \approx 250$ mW, linear characteristic line, $R \approx 100 \Omega$ $C_o \approx 20 \mu\text{F}$ at $L_o \approx 0.01$ mH or $C_o \approx 11 \mu\text{F}$ at $L_o \approx 0.1$ mH or $C_o \approx 5.4 \mu\text{F}$ at $L_o \approx 1$ mH, $C_i \approx 0$, $L_i \approx 0$ mH

Environmental Conditions	
Ambient temperature	- 20 ... + 70 °C
Ambient temperature (for installation in basic module)	- 20 ... + 50 °C
Storage temperature	- 20 ... + 50 °C
Protection type	IP00 as per DIN 40050
Equipment group/category / Ignition protection type	II (1) G [Ex ia Ga] IIB
EC-type examination certificate	ZELM 03 ATEX 0178 X
Standards	EN 60079-0, EN 60079-11, EN 60079-14, EN 60079-26
Mechanical Data	
Dimensions	See Dimension Drawing
Weight	2.5 N (250 g)
System connection	Expansion card
Connection	Terminals 1,5 mm ² , pluggable
Order details	
Designation	Order number
SPD Interface dual type 6932-111	295637
Replacement parts	
Battery pack 4.8 V / 1.85 Ah, 6932-00-030	307395
Dual battery pack 4.8 V / 1.85 Ah, 6932-00-031	307396

33.2 Safety instructions

- The following standards and provisions must also be complied with:
 - EN 60079-14
 - GGVS / ADR, Para. 5, Marginal note 220 500 through Marginal note 220 516
- The SPD interface must be installed in a housing. A protection grade for the housing of IP 20 (EN 60529) is sufficient if use only takes place in a clean and dry environment. Otherwise a housing with a protection grade of IP 54 (EN 60529) is recommended.
- The SPD interface unit is suited for installation at an ambient temperature of - 20°C to + 70°C.
- Clearances and creepage distances between the conductive parts of intrinsically safe circuits and the conductive parts of non-intrinsically safe circuits must comply with the requirements of EN 60079-11:2007, Para. 6.2 and Table 5. This means, a clearance of 4 mm and a creepage distance of 4 mm.
- Clearances and creepage distances between the conductive parts of intrinsically safe circuits and the metallic or electrically conductive parts of the housing must pass the dielectric strength test pursuant to EN 60079-11:2007, Para. 6.3.12 and 10.3.
- Terminals for external cables must be divided into intrinsically safe circuits and non-intrinsically safe circuits. If the separation is achieved with a distance, the clearance between the terminals must be at least 50 mm. If the separation is achieved with a partition, the requirements of EN 60079-11:2007, Para. 6.2.1 must be met.
- Connection options, terminals, plugs and sockets for external cables from intrinsically safe circuits must be clearly labelled and recognisable

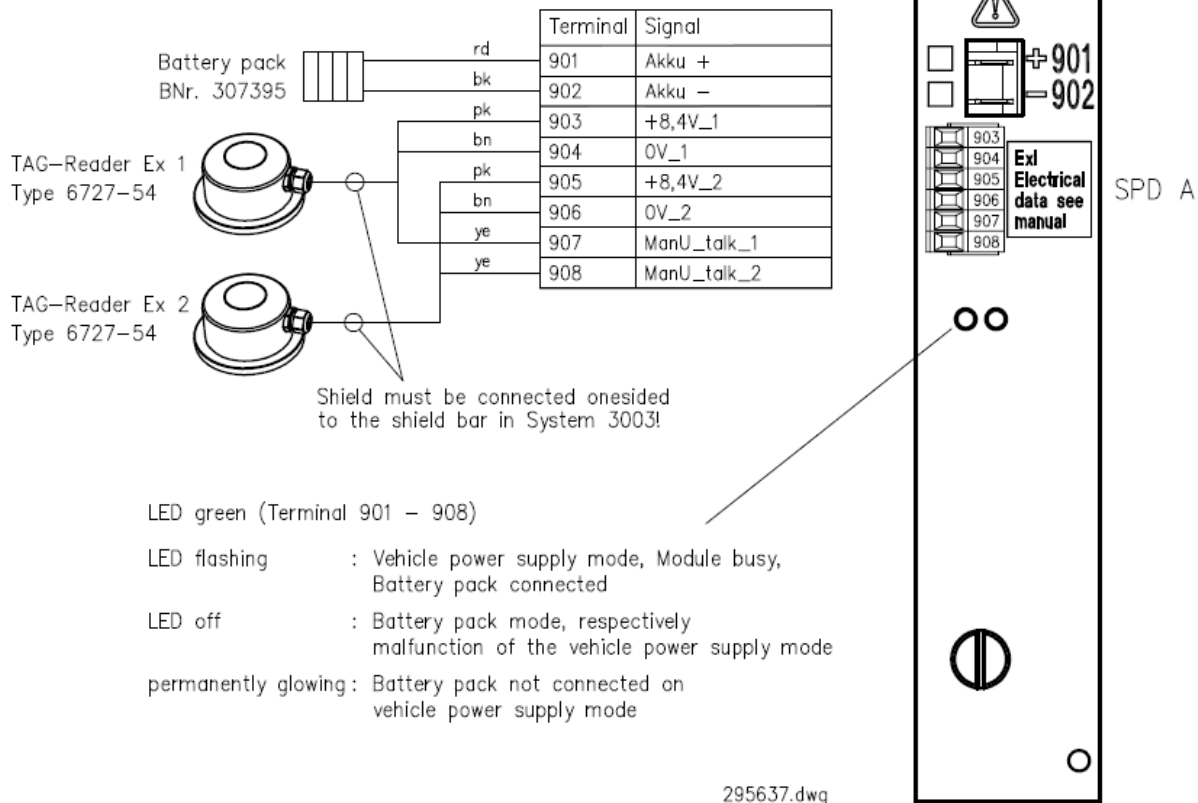
as intrinsically safe. This can be indicated with "Ex i" or "i" or light-blue colouring.

- For the connection of the intrinsically safe bidirectional data interface "ManU_talk" with the intrinsically safe output current circuit "+ 8.4 V_1" or "+ 8.4 V_2", the earth lead is used for both circuits. The maximum current rating of the earth lead will equal the sum of the maximum current rating of the individual current ratings of the individual circuits, i.e. 580 mA.
In this case, the maximum capacitance and inductance
 $C_o = 20 \mu\text{F}$ at $L_o = 0.01 \text{ mH}$ or
 $C_o = 10 \mu\text{F}$ at $L_o = 0.1 \text{ mH}$ or
 $C_o = 4.8 \mu\text{F}$ at $L_o = 0.5 \text{ mH}$.
- The external housing must be labelled with appropriate details (i.e. II (1) G, [Ex ia Ga] IIB) and/or in addition with the appropriate marking of the the housing). In particular, the electrical data must be indicated (e.g. electrical data, see Certificate ZELM 03 ATEX 0178 X).
- The cables and wires must be fixed and protected from mechanical damage.
- The SPD interface contains one or two rechargeable 4.8 V battery packs (four NiMH cells). The capacitance is 1.8 Ah and they have a volume of 30 cm³ each. The cell voltage in the battery pack is monitored by an electronic switch which prevents overloading and exhaustive discharge.
- Under normal operating conditions, the SPD interface does not have any possible sources of ignition. Surface temperatures do not exceed temperature class T4.
- The external battery pack must be replaced without delay whenever a defect is detectable. In all cases, the battery pack must be replaced every two years. The battery pack "4.8 V, 1.8 Ah" can be ordered from BARTEC.
- The SPD interface must be mounted outside of hazardous areas! The interface can be mounted in dangerous areas classified as Zone 1 and in which Category 2 devices are required if it is installed in a fireproof housing.
- Replace the fuse only with the type indicated!

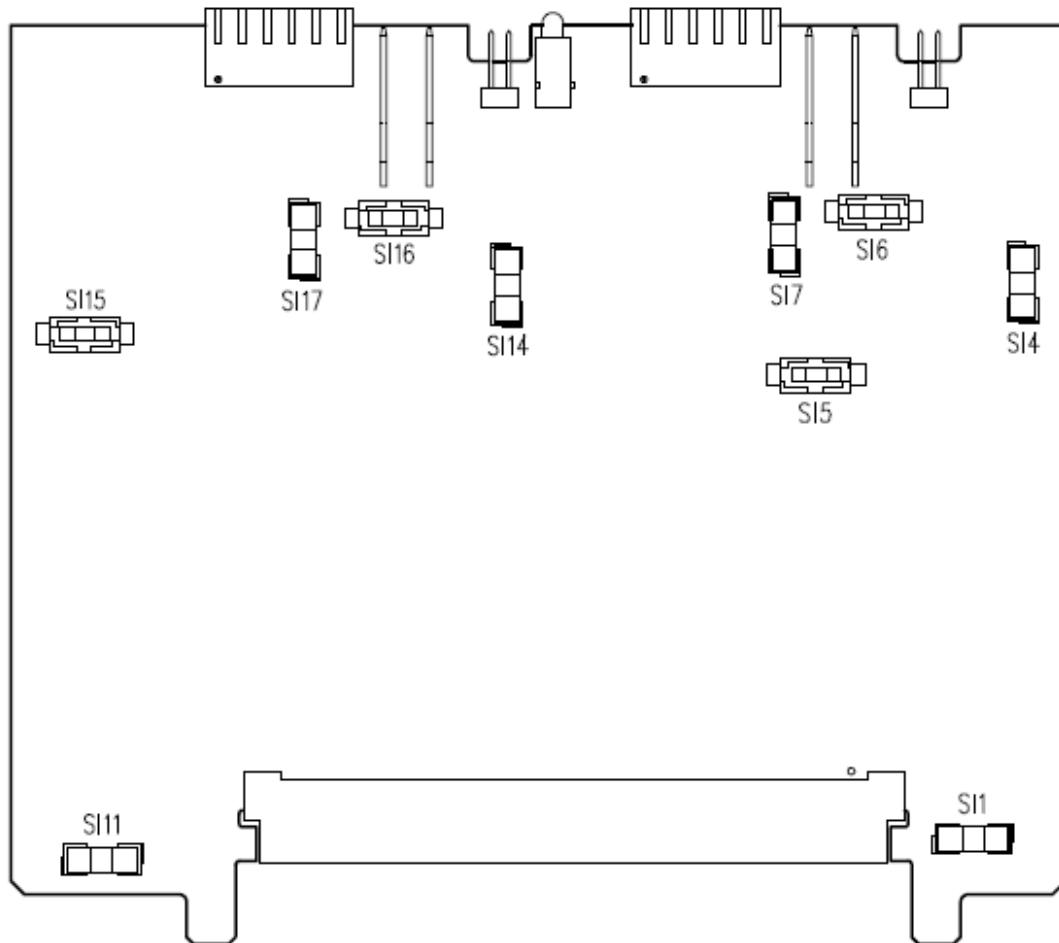
**Attention:**

- The battery must be disconnected before the expansion of the SPD interfaces
 - Ensure correct polarity of the battery
-

33.3 Terminal assignment



33.4 Fuse values



Fuse	Description	Value	Order No.
SI1	Mains in fuse SPD A	T 1.0A	292336
SI4	Charging voltage battery pack SPD A	T 250mA	288255
SI5	Charging controller SPD A	F 1.0A	281772
SI6	Battery pack SPD A	F 1.5A	286900
SI7	+8,4V_1/2 SPD A	T 100mA	291908
SI11	Mains in fuse SPD B	T 1.0A	292336
SI14	Charging voltage battery pack SPD B	T 250mA	288255
SI15	Charging controller SPD B	F 1.0A	281772
SI16	Battery pack SPD B	F 1.5A	286900
SI17	+8,4V_1/2 SPD B	T 100mA	291908

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34 SPD interface quad type 6932-108



34.1 Technical data

Electrical Data	
Supply voltage	DC 24V, Fuse 2 x 1A
Supply i-Box Namur/ RFID tag reader	4 x DC 8,4V; Fuse 2 x 100mA
Battery	2 x DC 4.8V / 1.85 Ah; Fuse 1.5A
System interface	PNET, serial, asynchronous, 76800 bit/s, RS485
i-Box Namur/ RFID tag reader data interface	4 x gain-modulated, 200 baud
Power supply +24_S, AGND	
Connections SL1-5A/B/C, (+24V_S) and SL1-6A/B/C, (AGND)	Nominal voltage DC 24 V \pm 10% power consumption 0.4 A at DC 24 V (input wattage 10 W), $U_m \approx 50$ V
Data interface A, B, S	
Connections SL1-24A (A), SL1-24C (B). SL1-25A (S)	Nominal voltage DC 5 V, Maximum voltage $U_m \approx 50$ V
Intrinsically safe limit output current circuit Ex ia IIB "8V_1" or "8V_2" each	
Terminals x03 (+8,4V_1), x04 (0V_1) or Terminals x05 (+8,4V_2), x06 (0V_2) or Terminals x11 (+8.4V_1), x12 (0V_1) or Terminals x13 (+8.4V_2), x14 (0V_2) each	Nominal voltage DC 8.4 V, $U_o \approx 10$ V, $I_o \approx 480$ mA $P_o \approx 1.2$ W, linear characteristic line, $R \approx 20.8 \Omega$ $C_o \approx 20 \mu\text{F}$ at $L_o \approx 0.01$ mH or $C_o \approx 10 \mu\text{F}$ at $L_o \approx 0.1$ mH or $C_o \approx 3.4 \mu\text{F}$ at $L_o \approx 1$ mH, $C_i \approx 0$, $L_i \approx 0$ mH

Intrinsically safe bidirectional data interface Ex ia IIB "ManU_talk_1" , "ManU_talk_2"	
Terminals x07 (ManU_talk_1), x04 (0V_1) x08 (ManU_talk_2), x06 (0V_2) or x15 (ManU_talk_1), x12 (0V_1) x16 (ManU_talk_2), x14 (0V_2) each	Nominal voltage DC 8.4 V, $U_o \approx 10$ V, $I_o \approx 100$ mA $P_o \approx 250$ mW, linear characteristic line, $R \approx 100$ Ω $C_o \approx 20$ μ F at $L_o \approx 0.01$ mH or $C_o \approx 11$ μ F at $L_o \approx 0.1$ mH or $C_o \approx 5.4$ μ F at $L_o \approx 1$ mH, $C_i \approx 0$ μ F, $L_i \approx 0$ mH
Environmental Conditions	
Ambient temperature	- 20 ... + 70 °C
Ambient temperature (for installation in basic module)	- 20 ... + 50 °C
Storage temperature	- 20 ... + 50 °C
Protection type	IP00 as per DIN 40050
Equipment group/category / Ignition protection type	II (1) G [Ex ia Ga] IIB
EC-type examination certificate	ZELM 03 ATEX 0178 X
Standards	EN 60079-0, EN 60079-11, EN 60079-14, EN 60079-26
Mechanical Data	
Dimensions	See Dimension Drawing
Weight	2.5 N (250 g)
System connection	Expansion card
Connection	Terminals 1,5 mm ² , pluggable
Order details	
Designation	Order number
SPD interface quad type 6932-108	282981
Replacement parts	
Dual battery pack 4.8 V / 1.85 Ah, 6932-00-031	307396

34.2 Safety instructions

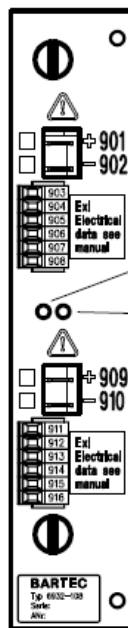
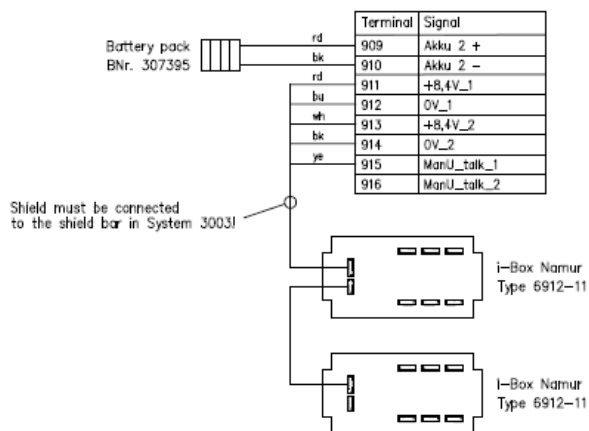
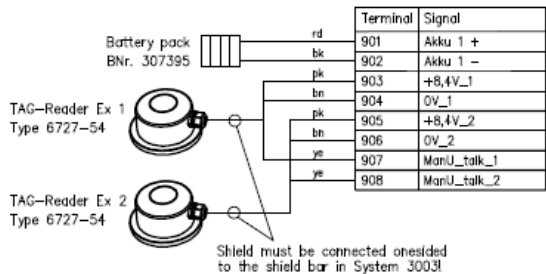
- The following standards and provisions must also be complied with:
 - EN 60079-14
 - GGVS / ADR, Para. 5, Marginal note 220 500 through Marginal note 220 516
- The SPD interface must be installed in a housing. A protection grade for the housing of IP 20 (EN 60529) is sufficient if use only takes place in a clean and dry environment. Otherwise a housing with a protection grade of IP 54 (EN 60529) is recommended.
- The SPD interface unit is suited for installation at an ambient temperature of - 20°C to + 70°C.
- Clearances and creepage distances between the conductive parts of intrinsically safe circuits and the conductive parts of non-intrinsically safe circuits must comply with the requirements of EN 60079-11:2007, Para. 6.2 and Table 5. This means, a clearance of 4 mm and a creepage distance of 4 mm.
- Clearances and creepage distances between the conductive parts of intrinsically safe circuits and the metallic or electrically conductive parts of the housing must circuits must pass the dielectric strength test pursuant to EN 60079-11:2007, Para. 6.3.12 and 10.3.

- Terminals for external cables must be divided into intrinsically safe circuits and non-intrinsically safe circuits. If the separation is achieved with a distance, the clearance between the terminals must be at least 50 mm. If the separation is achieved with a partition, the requirements of EN 60079-11:2007, Para. 6.2.1 must be met.
- Connection options, terminals, plugs and sockets for external cables from intrinsically safe circuits must be clearly labelled and recognisable as intrinsically safe. This can be indicated with "Ex i" or "i" or light-blue colouring.
- For the connection of the intrinsically safe bidirectional data interface "ManU_talk" with the intrinsically safe output current circuit "+ 8.4 V_1" or "+ 8.4 V_2", the earth lead is used for both circuits. The maximum current rating of the earth lead will equal the sum of the maximum current rating of the individual current ratings of the individual circuits, i.e. 580 mA.
In this case, the maximum capacitance and inductance
 $C_o = 20 \mu\text{F}$ at $L_o = 0.01 \text{ mH}$ or
 $C_o = 10 \mu\text{F}$ at $L_o = 0.1 \text{ mH}$ or
 $C_o = 4.8 \mu\text{F}$ at $L_o = 0.5 \text{ mH}$.
- The external housing must be labelled with appropriate details (i.e. II (1) G, [Ex ia Ga] IIB) and/or in addition with the appropriate marking of the the housing). In particular, the electrical data must be indicated (e.g. electrical data, see Certificate ZELM 03 ATEX 0178 X).
- The cables and wires must be fixed and protected from mechanical damage.
- The SPD interface contains one or two rechargeable 4.8 V battery packs (four NiMH cells). The capacitance is 1.8 Ah and they have a volume of 30 cm³ each. The cell voltage in the battery pack is monitored by an electronic switch which prevents overloading and exhaustive discharge.
- Under normal operating conditions, the SPD interface does not have any possible sources of ignition. Surface temperatures do not exceed temperature class T4.
- The external battery pack must be replaced without delay whenever a defect is detectable. In all cases, the battery pack must be replaced every two years. The battery pack "4.8 V, 1.8 Ah" can be ordered from BARTEC.
- The SPD interface must be mounted outside of hazardous areas! The interface can be mounted in dangerous areas classified as Zone 1 and in which Category 2 devices are required if it is installed in a fireproof housing.
- Replace the fuse only with the type indicated!

**Attention:**

- The battery must be disconnected before the expansion of the SPD interfaces
 - Ensure correct polarity of the battery
-

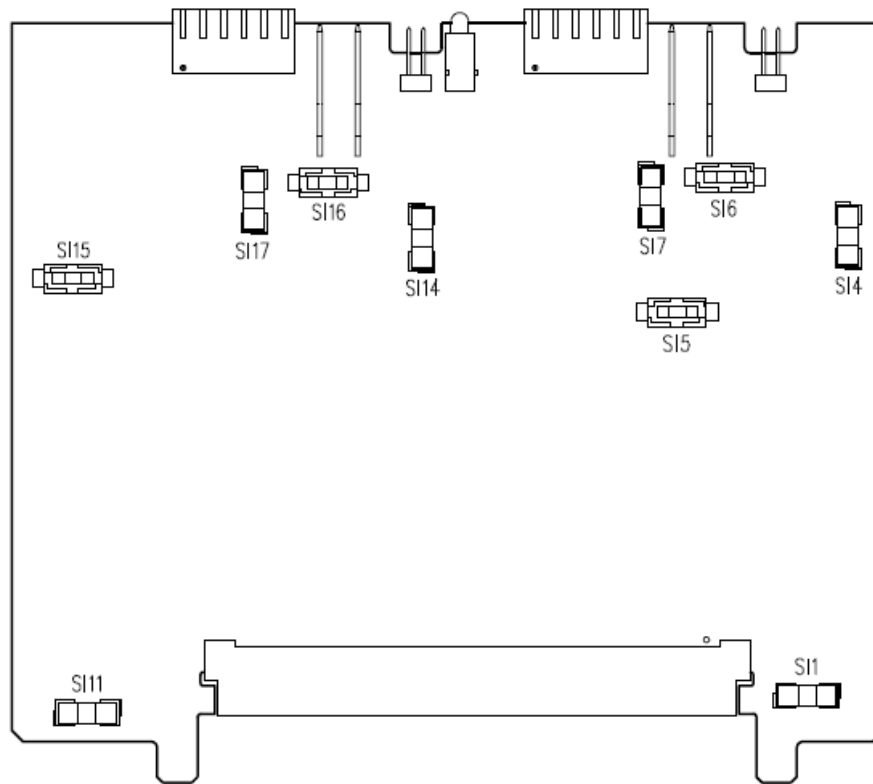
34.3 Terminal assignment



- LED green (Terminal 901 – 908) SPD A
- LED green (Terminal 909 – 916) SPD B
- LED flashing : Vehicle power supply mode, Module busy, Battery pack connected
- LED off : Battery pack mode, respectively malfunction of the vehicle power supply mode
- permanently glowing : Battery pack not connected on vehicle power supply mode

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34.4 Fuse values



Fuse	Description	Value	Order No.
SI1	Mains in fuse SPD A	T 1.0A	292336
SI4	Charging voltage battery pack SPD A	T 250mA	288255
SI5	Charging controller SPD A	F 1.0A	281772
SI6	Battery pack SPD A	F 1.5A	286900
SI7	+8,4V_1/2 SPD A	T 100mA	291908
SI11	Mains in fuse SPD B	T 1.0A	292336
SI14	Charging voltage battery pack SPD B	T 250mA	288255
SI15	Charging controller SPD B	F 1.0A	281772
SI16	Battery pack SPD B	F 1.5A	286900
SI17	+8,4V_1/2 SPD B	T 100mA	291908

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35 TAG-Reader Ex type 6727-54



TAG-Sensor Ex
Type 6729-51



TAG-Reader Ex
Type 6727-54

Reading unit for transponder (TAG), applied for instance for the supervision of the cabinet flap at the tank truck.

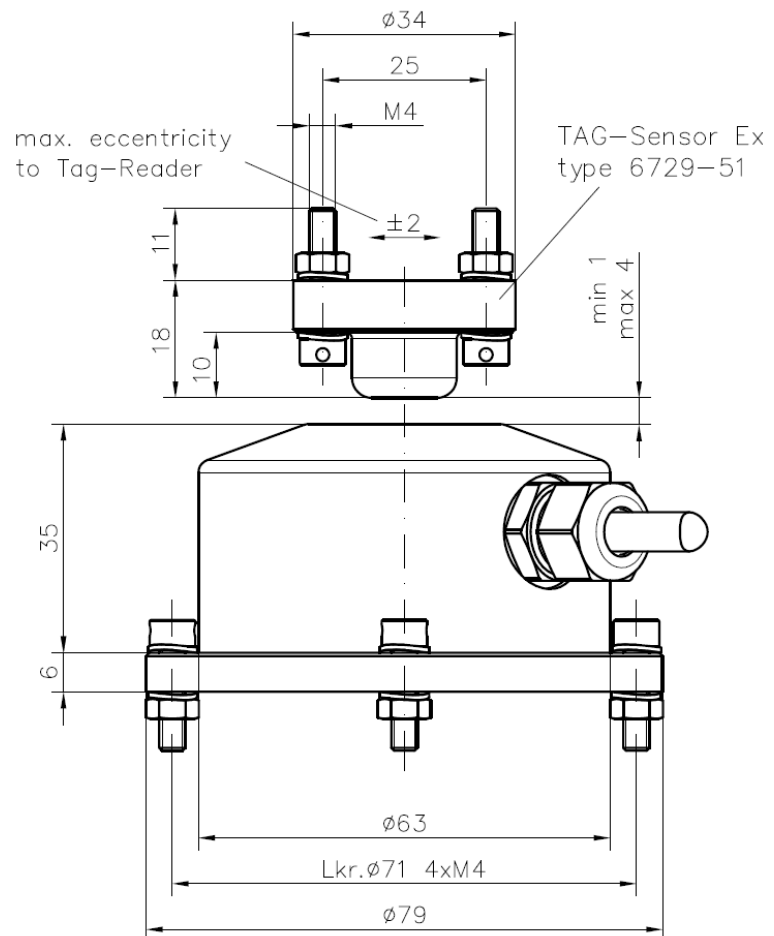
35.1 Technical data

Electrical Data	
Supply circuit 8.4 V (pink) with or without data circuit ManU_talk (yellow), 0 V (brown)	Input voltage DC 8.4 V ($U_s = DC 7 V \dots 10 V$) Current consumption 30 mA $U_i \approx DC 10 V$, $I_i \approx 500 mA$, $P_i \approx 1,25 W$, $C_i \approx 0 nF$ $L_i \approx 0 \mu H$
Data circuit ManU_talk (yellow), 0V (brown) in case of use as separated intrinsically safe data circuit	Nominal voltage DC 8.4 V, Data rate 200 bit/s 1 V, 7 mA (1k Ω Pull-Up), 7 V, 0.2 V, 50 mA, $U_s - 1.4V$ (1k Ω Pull-Up) $U_i \approx DC 10 V$, $C_i \approx 0 nF$, $L_i \approx 0 \mu H$, $U_o \approx 10 V$, $I_o \approx 100 mA$, $P_o \approx 250 mW$ linear characteristic line ($R \approx 100 \Omega$) $C_o \approx 20 \quad 11 \quad 5.4 \quad 1.7 \mu F$ $L_o \approx 0.02 \quad 0.1 \quad 1.0 \quad 20mH$
Environmental Conditions	
Operating temperature	- 20 ... + 60 °C
Storage temperature	- 20 ... + 40 °C
Climate class/protection type	JUD / IP 65
Equipment group/category	II 2 G
Type of protection	Ex ib IIB T4
EU-Type Examination Certificate Standards	IBExU 05ATEX1038 EN 60079-0, EN 60079-11
EU-Type Examination Certificate Standards	IECEX IBE 17.0006 IEC 60079-0, IEC 60079-11
Mechanical Data	
Housing	Polyacetalharz (POM/Delrin)
Weight TAG-Reader Ex	0.3 kg
Weight TAG-Sensor Ex	20 g
Order details	
Designation	Order number
TAG-Reader Ex, Type 6727-54	235047
TAG-Sensor Ex (read only) Type 6729-51	215490

35.2 Safety instructions

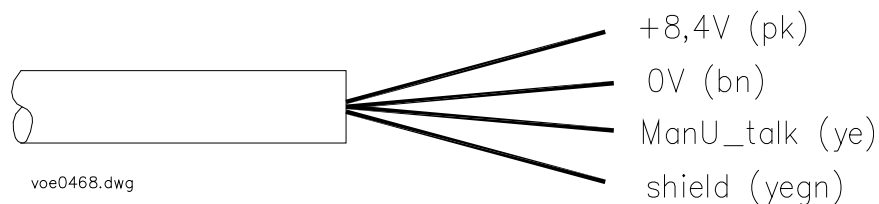
- During installation, the requirements of IEC/EN 60079-14 must be observed.
- The TAG-Reader Ex Type 6727-54 and TAG-Sensor Ex type 6729-51 can be used in an ambient temperature range from -20°C to $+60^{\circ}\text{C}$
- At the strands ends, wire end ferrules have to be used for non-splicing the single conductors (clause 9.6.2 of IEC/EN 60079-14:2014)
- Connection facilities for intrinsically safe circuits have to be separated from terminals of non-intrinsically safe circuits according to clause 6.2.1 of EN 60079-11: 2012 (by 50 mm distance or partition wall).
- The shield of the interconnecting cable can be tied directly to earth potential, since the shield is isolated in the TAG-Reader Ex.
- When using the data circuit as a separate intrinsically safe circuit, the interconnecting cable must be fixed installed and protected against mechanical damage. In this case, the intrinsically safe supply circuit and the intrinsically safe data circuit must be galvanically isolated from each another, or it must be ensured that no potential difference can occur between the circuits.
- Connecting facilities for separate intrinsically safe circuits must be separated from each another and against metal housing parts in accordance with section 6.2.1 of EN 60079-11: 2012.

35.3 Dimensions and mounting

**Attention:**

The TAG-Sensor Ex type 6729-51 must be screwed central to the TAG-Reader type 6727-54. The sticking of the TAG-Sensor is not allowed!

35.4 Wiring

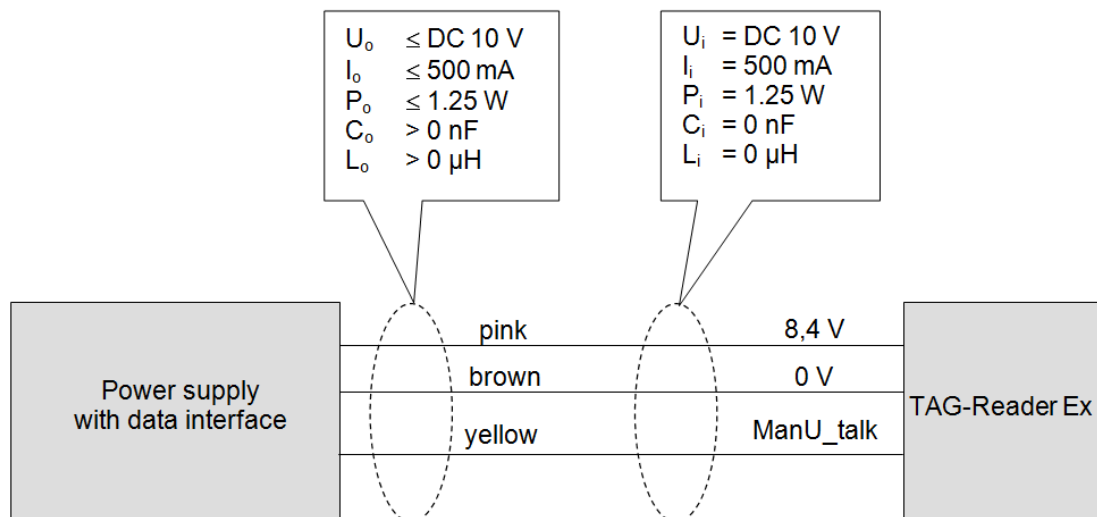


35.5 Interconnection of Ex i-circuits

For use of a separate intrinsically safe circuit for the data interface.

Caution:

In this application a stationary and mechanically protected laying of the connecting cable is required.



36 i-Box Namur type 6912-11



36.1 Technical data

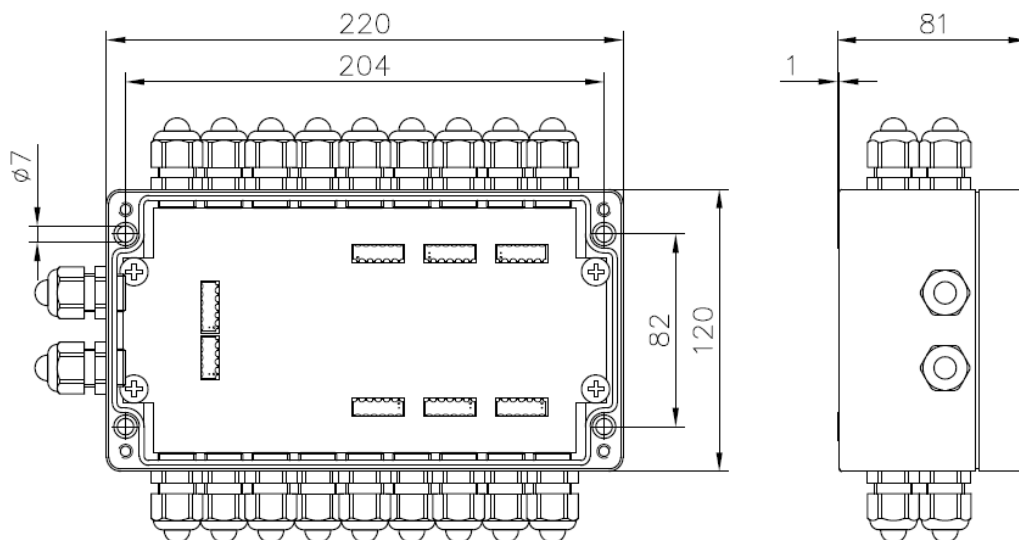
Electrical Data	
Power supply	<p>"Intrinsically safe supply circuit "+8.4V_1" for connection to I-Box interface type 6932-109 / -112 or SPD Interface Quad type 6932-108 or SPD Interface Dual type 6932-111 Connection "+8.4V_1" and "0V_1" Ex ia IIB nominal voltage: DC 8.4 V, nominal current consumption: 0.05 A $U_i \approx$ DC 10 V, $I_i \approx$ 500 mA, $P_i \approx$ 1.2 W, $L_i \approx$ 0 mH C_i at one countable error: \approx 0 μF C_i at two countable errors: \approx 18 μF</p>
Data interfaces	<p>Intrinsically safe bidirectional data protection interface "ManU_talk" for connection to I-Box interface type 6932-109 / -112 or SPD Interface Quad type 6932-108 or SPD Interface Dual type 6932-111 Connection "ManU_talk" and "0V_1" or "ManU_talk" and "0V_1" Ex ia IIB nominal voltage \approx DC 8.4 V, $U_o \approx$ DC 10 V, $I_o \approx$ 100 mA, $P_o \approx$ 250 mW, $R_i \approx$ 100 Ω, $C_o \approx$ 20 μF, $L_o \approx$ 0.01 mH or $C_o \approx$ 11 μF, $L_o \approx$ 0.1 mH or $C_o \approx$ 5.4 μF, $L_o \approx$ 1 mH for connection to a data circuit $U_i \approx$ DC 10 V, $R_i \approx$ 100 Ω, $C_i \approx$ 0 μF, $L_i \approx$ 0 mH</p>
NAMUR sensors	<p>Intrinsically safe sensor circuits "OUT1/IN1" through "OUT18/IN18" Connections "OUT_1" / "IN1" to "OUT18" / "IN18" each Ex ia IIB nominal voltage \approx DC 8.4 V, $U_o \approx$ DC 10 V, $I_o \approx$ 34 mA $P_o \approx$ 85 mW, $R_i \approx$ 300 Ω, $C_o \approx$ 20 μF, $L_o \approx$ 0.01 mH or $C_o \approx$ 11 μF, $L_o \approx$ 0.1 mH or $C_o \approx$ 5.7 μF, $L_o \approx$ 1 mH</p>

Through-wiring electrical circuits	Intrinsically safe through-wiring circuit "+8.4V_2" connections "+8.4V_2" and "0V_2" Ex ia IIB nominal voltage: DC 8.4 V, Ui/Uo DC 10 V, li/Io ≈ 500 mA, Ci ≈ 0 μF, Li ≈ 0 mH
Potential-free shielded connections	Intrinsically safe shielded connection circuits "Sh" Sh each Ex ia IIB Ci ≈ 6 nF, Li ≈ 0 mH
Cable gland	20 x M16 x 1.5 plastic
Connection	Terminals 1,5 mm ² , pluggable
Environmental Conditions	
Ambient temperature	- 20 ... + 50 °C (Ex-approval to +60 °C)
Storage temperature	- 20 ... + 50 °C (+60 °C)
Climatic Class	JWF according to DIN 40040
Protection type	IP65 (IP66)
Ex approval	RL 94/9/EG
Equipment group/category / Ignition protection type	II 2 (1) G Ex ia [ia Ga] IIB T4 Gb
EC-type examination certificate	BVS 10 ATEX E 106 IECEX BVS 14.0059
Standards	EN 60079-0, IEC 60079-0, EN 60079-11, IEC 60079-11
Device-specific Data	
Nominal conditions	23 ± 2 °C
Mechanical Data	
Dimensions	See Dimension Drawing
Weight	16 N (1.6 kg)
Order details	
Designation	Order number
i-Box Namur type 6912-11	292975

36.2 Safety instructions

- The connection cable and wires of the I-Box must be fixed and protected from mechanical damage.
- When selecting and mounting the intrinsically safe connection cables and wires, Paragraphs 12.2 and 12.3 of EN 60079-14 must be followed. Dimensions

36.3 Dimensions

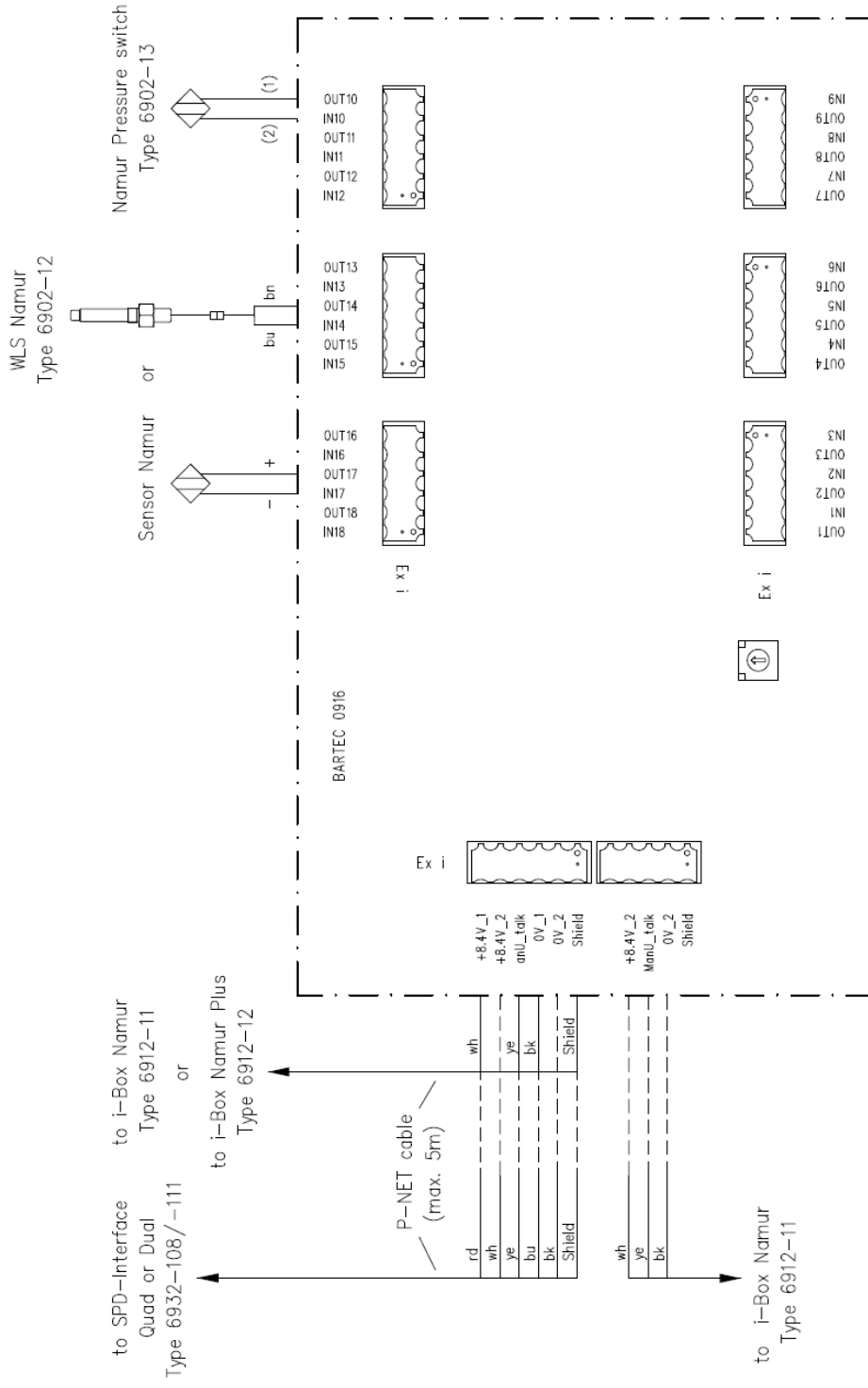


Attention:**Pay attention to switch position:**

Connection to 6932-112 → Switch position 1 (tank identification)

Connection to 6932-108/-111 → Switch position 0 (SPD)

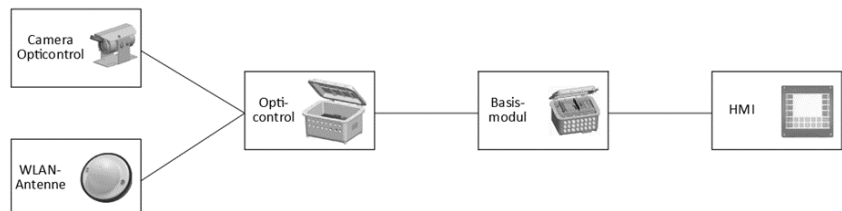
36.4 Wiring



37 Petro 3003 - Opticontrol

37.1 Opticontrol Assistantsystem

37.1.1 Blockdiagram

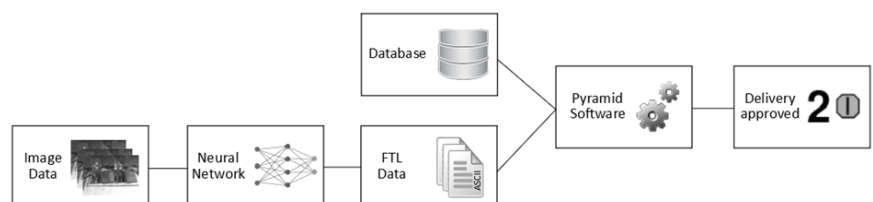


37.1.2 Functionl description

The "Volutank 3003" system in combination with the "Opticontrol" system offers the operator support during the dispensing process at the filling station and helps to reduce product mixing.

The "Opticontrol" system processes the high-resolution images from the camera on the basis of an artificial neural network. The neural network extracts the type, number and position of manholes, nozzles and hoses from the image data. Furthermore, the neural network distinguishes between connected and unconnected filling nozzles. The information determined by the "Opticontrol" system is converted into FTL-compliant data packets and transmitted to the "Volutank 3003" system.

The database of the "Volutank 3003" system contains the layout of the filling station or the arrangement of the shafts, filling nozzles and their assigned product. The corresponding filling station layout is loaded via the GPS position and compared with the data received from the "Opticontrol" system. If the chamber product selected by the operator and the product of the filling nozzle recognized as connected match, the operator is able to start dispensing properly.



37.2 Opticontrol type 6912-100



37.2.1 Technical Data

Technical data	
Device-specific data	
CPU	HMP Dual Denver 2 (Dual-Core) ARM® Cortex® -A57 MPCore (QUAD-Core)
GPU	NVIDIA Pascal™, 256 CUDA cores
LAN	1x Gigabit Ethernet 1x PoE IEEE 802.af PSE Gigabit Ethernet
WLAN	802.11 a/b/g/n
Serial	1x RS232 (Rx, Tx, CTS, RTS) 1x RS232 (Rx, Tx)
Electrical data	
Operating Voltage	DC 24V (DC 9V ... DC 36V)
Power consumption	max. 41W (typ. 24W)
PoE	DC 48V (DC 44V ... DC 57V) max. 15,4W PSE-Class: 1,2,3
Ambient conditions	
Operating temperature	-20°C ... +50°C
Storage temperature	-20°C ... +50°C
Equipment group / category / type of protection	II 2 G Ex db IIA + C ₂ H ₆ O T4 Gb
Certificates	PTB 12 ATEX 1023 X / IECEx PTB 14.0009X
Protection type	IP65
Mechanical data	
Dimensions	See dimensional drawing
Mounting	See dimensional drawing
Weight	Ca. 18kg
Enclosure material	Aluminium cast
Connections	Push-IN <ul style="list-style-type: none"> • Stripping length: 10mm • Wire cross-section: 0,14mm² ... 2,5mm² Screw connection <ul style="list-style-type: none"> • Stripping length: 8mm • Wire cross-section: 0,2mm² ... 2,5mm² RP-SMA – Socket

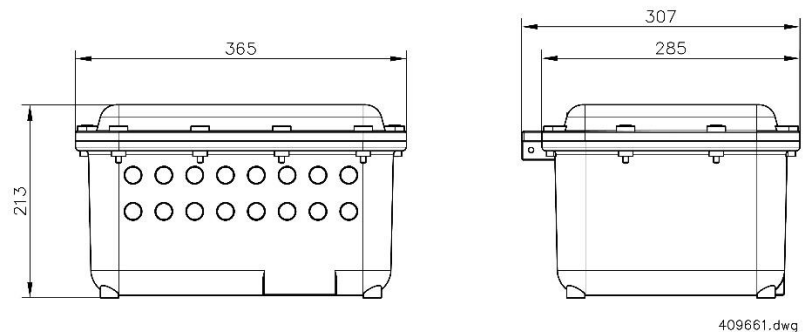
Ordering details	
Designation	Order number
Opticontrol, type 6912-100	409661
Accessory	
A2LBF20SM20x1,5 cable gland Ms 7,2-11,7	287373
A2LF16/M20x1,5 cable gland Ms 4-8,4	216427
Sealing cap MsNi Ex-d M20x1,5	287374

37.2.2 Safety instructions

- The joint surfaces shall be protected against corrosion with a non-hardening grease (see also EN 60079-14:2014, Para. 14.3).
- If parts are mounted that are not specified in the test documents, 20% of each cross-sectional area must remain free (see EN 60079-1:2014, Annex D.3.10).
- Only batteries that correspond with EN 60079-1:2014, Annex E, may be used. The warnings specified in EN 60079-1, clauses 20.2(c) and 20.2(d) shall be affixed on the enclosure:
 - “Warning – do not open when energized!”
 - “Warning – do not open in the presence of an explosive atmosphere!”
- Because cable glands with an elastic sealing ring (EN 60079-1:2014, Annex C.2.1.1) are used, and since the enclosure volume is larger than 2 dm³, no ignition sources may be present inside the enclosure under the intended operating conditions (see EN 60079-14:2009, clause 10.4.2).
- Because cable glands with an elastic sealing ring are used, the cables shall
 - have a minimum length of 3 m, or
 - meet the restricted breathing test for cables according EN 60079-14:2014, Annex E, or
 - are certified as a part of the equipment (enclosures)
- Cables shall be sheathed with thermoplastic, thermosetting, or elastomeric material. They shall be circular and compact. Any bedding or sheath shall be extruded. Fillers, if any, shall be non-hygroscopic (EN 60079-1:2014, clause 9.3.2.a)
- The M8 cover screws for the enclosure types 281xx0, 281xx1, 281xx2 have to be tightened with a torque of 18 Nm.
- After opening, replace grease between the lower part and the cover!

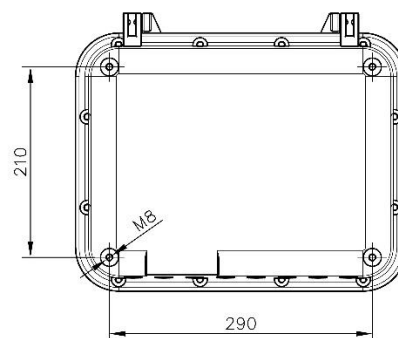
- If neither earthing nor equipotential bonding is required, e.g. in the case of equipment with dual or reinforced insulation, the inner and outer terminal for equipotential bonding will not be necessary.
- The design parameters of the flameproof joints of the equipment partially exceed the requirements of the table values, specified in the EN 60079-1:2014. Any repair at the flameproof joints must be carried out on the base of the design specifications of the manufacturer. Repair according to the values of the table 1 and 2 of the EN 60079-1:2007 is not permissible.
- Installation of certified components (e.g. terminal boxes, bushings, Ex-cable glands, connection facilities) is permitted only, if these comply with the applied standards. The conditions of installation stated in the components' certificates have to be observed unconditionally.
- The electrical connection of the Ex d control unit has to be performed by certified suitable cable glands respective conduits, that comply with the requirements of EN 60079-1:2014, clauses 13.4 and 13.5.
- Cable glands and stopping plugs of standard design are not permitted. If a certified conduit is used, the conduit sealing device has to be located adjacent to the enclosure.
- Unused apertures have to be closed according EN 60079-1:2014, clause 13.8.)
- The cable of the Ex d control unit has to be fixed and effectively protected against damage.
- If the temperature at the feed through parts is more than 70°C, suitable temperature resistant cables have to be used.
- The integrated cable of the Ex d control unit has to be connected in an enclosure that complies with a type of protection according EN 60079-1:2012, clause 1, if the cable connection is located in hazardous area.
- Switch off the main switch during maintenance work, not just the system.

37.2.3 Dimensions and mounting holes



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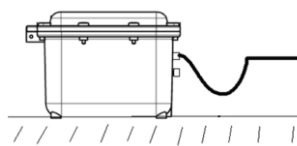
Mounting holes:



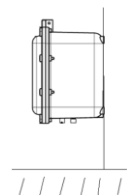
37.2.4 Permissible installation position

- For each set-up a shaded position is recommended.
- For horizontal installation route the cables so that a “water sink” is created upstream of the cable gland.
- For vertical installation the cable glands must point downwards.

Horizontal installation

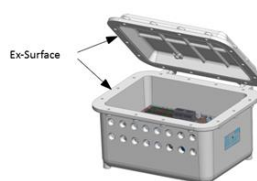


Vertical installation

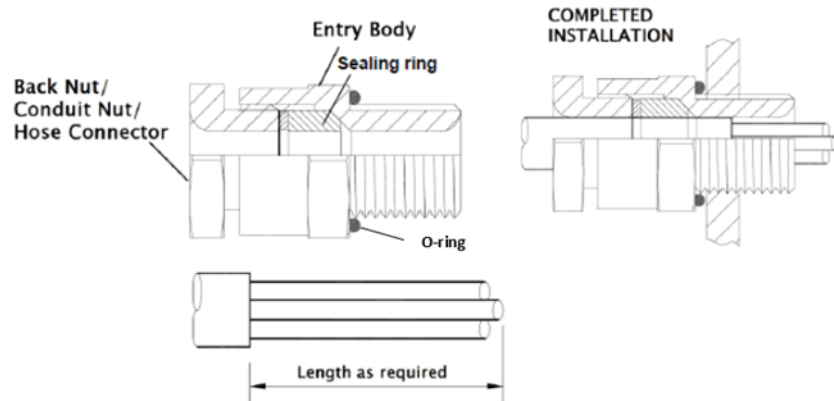


37.2.5 Sealing

- The Ex surface of joint of the flameproof housing must have no scratches or damage and must be coated with the sealing compound provided. (Sealing and corrosion resistance of the Ex surface of joint)



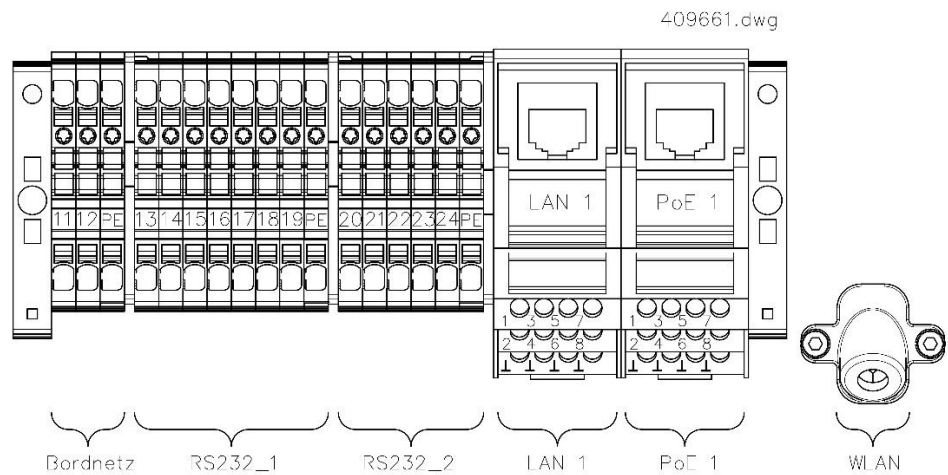
37.2.6 Cable glands



- The cable gland must be specified for the cable diameter.
- The O-ring of the cable gland should not be damaged.
- Check there is no tension in the threads. It is not necessary to dismantle the gland.
- Fit the complete cable gland to the enclosure. Hand -tighten, then suitably secure with a wrench.
- Prepare cable as required for the installation. If required, fit the shroud over the cable.
- Insert cable through the cable gland. Position the cable correctly. The seal must grip the outer jacket of the cable when the cable gland is tightened.
- Tighten Back Nut/Conduit Nut to the Entry Body. Ensure the seal makes full contact with cable sheath and then tighten the Back Nut/Conduit Nut by the additional turns detailed in the table below. Support the cable to prevent it from twisting during tightening. If fitted, pull shroud over gland assembly.

Gland Size	Back Nut Turns	Outer Sheath / mm	
		Min	Max
16	2	4,0	8,4
20S	1	7,2	11,7
20	2	9,4	14,0

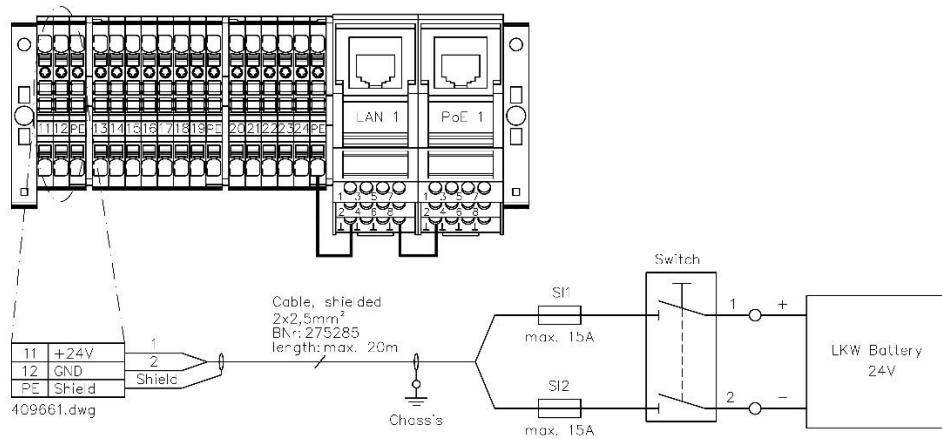
37.2.7 Terminal assignment



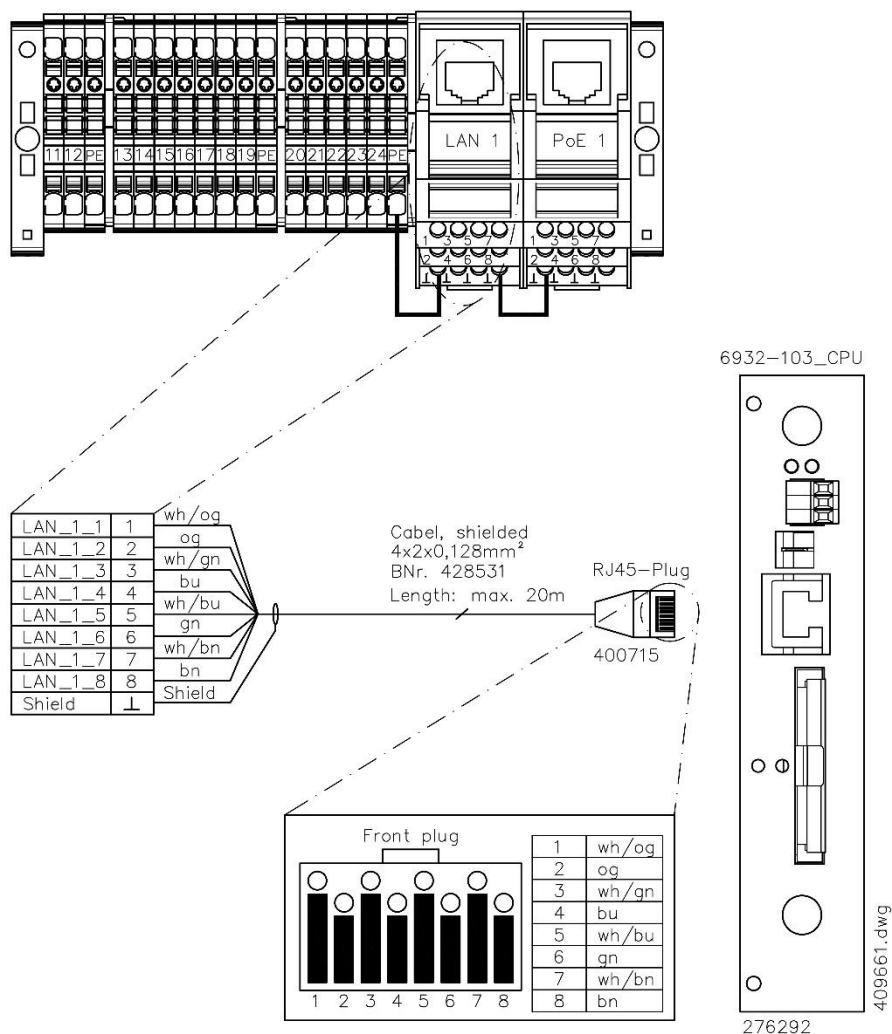
Function	Terminal/Connection	Designations
Power supply	11	+24V
	12	GND
	PE	Shield
RS232_1	13	+12V_O
	14	GND_O
	15	RS232_1_CTS
	16	RS232_1_RTS
	17	RS232_1_GND
	18	RS232_1_TX
	19	RS232_1_RX
	PE	Shield
RS232_2	20	+12V_O
	21	GND_O
	22	RS232_2_TX
	23	RS232_2_RX
	24	RS232_2_GND
	PE	Shield
LAN 1	1	LAN_1_1
	2	LAN_1_2
	3	LAN_1_3
	4	LAN_1_4
	5	LAN_1_5
	6	LAN_1_6
	7	LAN_1_7
	8	LAN_1_8
	1	LAN_Shield
PoE 1	1	PoE_1_1
	2	PoE_1_2
	3	PoE_1_3
	4	PoE_1_4
	5	PoE_1_5
	6	PoE_1_6
	7	PoE_1_7
	8	PoE_1_8
	1	PoE_1_Shield
WLAN	RP-SMA	WLAN-Ant.

37.2.8 Wiring

37.2.8.1 Power-supply



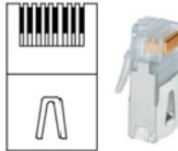
37.2.8.2 Basic module



37.2.8.3 Assembly RJ45 Plug (BNr. 400715)

37.2.8.3.1 Components

Plug



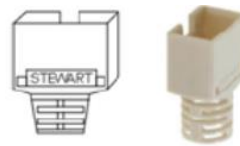
Ring



Management bar



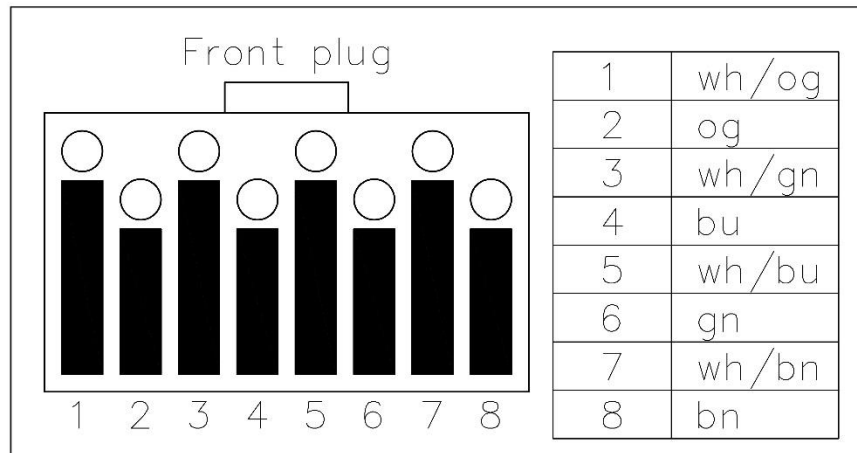
Cable bend relief



37.2.8.3.2 Crimp instruction

- Slide the cable bend relief onto the patch cable.
- Strip the insulation of the patch cable for 25mm.
- Lay the shield backwards over the sheath and shorten it by 5mm (as long, as the ring is high).
- Slide the ring over the shield/ sheath, so that the narrowed side directly abuts the sheath.
- Insert the wires according to the pin assignment (see pin assignment plug RJ45 (BNr 400715)) into the management bar. Wires should be as smooth as possible next to each other.
- Press the ring with a crimping tool (BNr 401906).
- Shorten the wires so that they touch the connector casing when the ring has completely disappeared into the plug. (Wires length ca. 15mm)
- Slide the management bar to the beginning of the wire.
- Overlay the plug so far that the wires slide into the provided notch of the plug.
- Check that all wires are in their intended position and then press the plugs with the crimping tool (BNr 401906).
- Overlay the bend relief. The recess of the bend relief, have to be on the same side where the clip of the plug is. The sheet metal of the plug must not move when the cable blend relief pushed on. Blend relief click into place.

37.2.8.3.3 Pin assignment plug RJ45



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37.2.8.4 Web-Interface

- The Opticontrol supports a web interface for outputting the camera image. The interface can be used, for example, for camera alignment or for checking the glass pane for contamination. To use the web interface, the WLAN interface of the Opticontrol must be activated on the System 3003. With a terminal device, e.g. notebook, you can then connect to the WLAN network of the Opticontrol. Using a web browser, e.g. Firefox, the camera image is output via the following URLs.

10.42.0.1:8001/img.jpg	Get current image once
10.42.0.1:8001/img_refresh.jpg	Get current image periodically

37.3 Camera Opticontrol type 6912-101



37.3.1 Technical data

Technical data																			
Device-specific data																			
Sensor	1,1" CMOS / 12MP / global shutter / monochrom																		
Lens	Fixed lens / 60,5° (H) x 46,2 (V)																		
Interface standard	GigE Vision 1.2																		
Electrical data																			
Power supply	48V DC (44V ... 57V) PoE Class 2 according to IEEE 802.3af																		
Power	4W ... 4,9W																		
Interface	Gigabit Ethernet (1000MBit/s) 10/100 MBit/s are not supported																		
Connection type	Open cable / Cat. 5e / 2x4x0,128mm ² / Length 20m / cladding diameter 5,7mm																		
Assignment	<table border="1"> <thead> <tr> <th>Pin</th> <th>Wire</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>wh/og</td> </tr> <tr> <td>2</td> <td>Og</td> </tr> <tr> <td>3</td> <td>wh/gn</td> </tr> <tr> <td>4</td> <td>bu</td> </tr> <tr> <td>5</td> <td>wh/bu</td> </tr> <tr> <td>6</td> <td>gn</td> </tr> <tr> <td>7</td> <td>wh/bn</td> </tr> <tr> <td>8</td> <td>bn</td> </tr> </tbody> </table>	Pin	Wire	1	wh/og	2	Og	3	wh/gn	4	bu	5	wh/bu	6	gn	7	wh/bn	8	bn
Pin	Wire																		
1	wh/og																		
2	Og																		
3	wh/gn																		
4	bu																		
5	wh/bu																		
6	gn																		
7	wh/bn																		
8	bn																		
Pneumatical data																			
Operating mode cylinder	Double acting																		
Connection type	2 plug connections for hose outside diameter 4mm																		
Maximum pressure	10bar																		
Minimum pressure	1,5bar																		
Ambient conditions																			
Operating temperature	-20°C ... +50°C																		
Storage temperature	-20°C ... +50°C																		
ATEX / IECEx	KIWA 19 ATEX 0055 X / IECEx KIWA 19.0030X																		
Protection class	IP65																		
Mechanical data																			

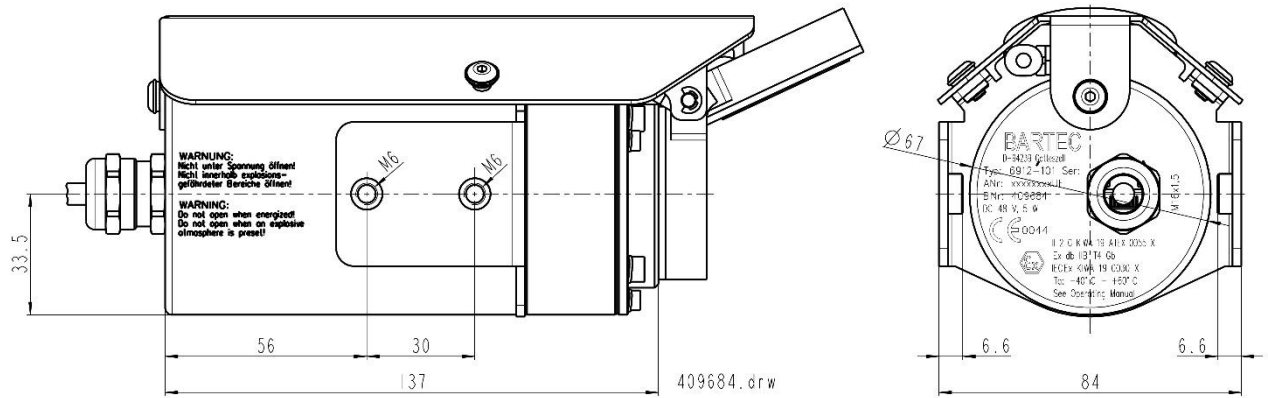
Dimensions	See drawing
Mounting	See drawing
Weight	Approx. 3kg
Material	Aluminium
Ordering details	
Designation	Order number
Camera Opticontrol, type 6912-101	409684

37.3.2 Safety instructions

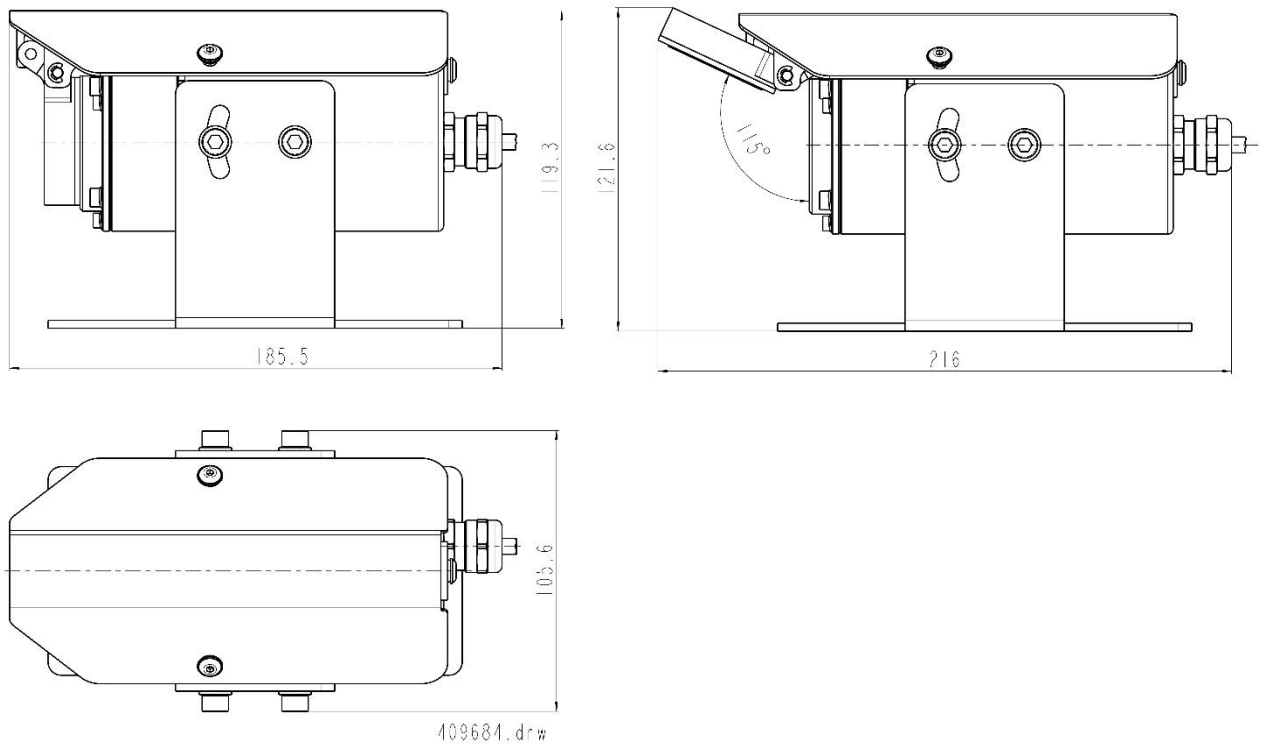
- The joint surfaces shall be protected against corrosion with a non-hardening grease (e.g. Molykote Longterm W2, BARTEC p/n 236218 (see also EN 60019-14:2014, clause 14.3).
- Cables shall be sheathed with thermoplastic, thermosetting, or elastomeric material. They shall be circular and compact. Any bedding or sheath shall be extruded. Fillers, if any, shall be non-hygroscopic (EN 60079-1:2014, clause 9.3.2.a).
- The M4 screws between the lower and upper enclosure part have to be tightened with a torque of 3.5 Nm.
- Repairs to the flame paths are not permitted.
- Installation of Ex-cable glands is permitted only, if these comply with the applied standards. The conditions of installation stated in the component's certificates have to be observed unconditionally.
- The cable has to be fixed and effectively protected against damage.
- The integrated cable unit has to be connected in an enclosure that complies with a type of protection according EN 60079-0, clause 1, if the cable connection is located in hazardous area.
- The cable glands Series HSK-M-Ex-d, HSK-INOX-Ex-d, HSK-M-PVDF-Ex-d and HSK-INOX-PVDF-Ex-d are tested with a reduced tensile force (25 %) in accordance with clause A.3.1 of EN 60079-0 and may only be used for fixed installation of Group II apparatus. The user shall ensure adequate clamping of the cable.
- The cable glands are provided with a sealing ring with a minimum axial sealing height of 5 mm.

37.3.3 Dimensions

37.3.3.1 Without camera holder

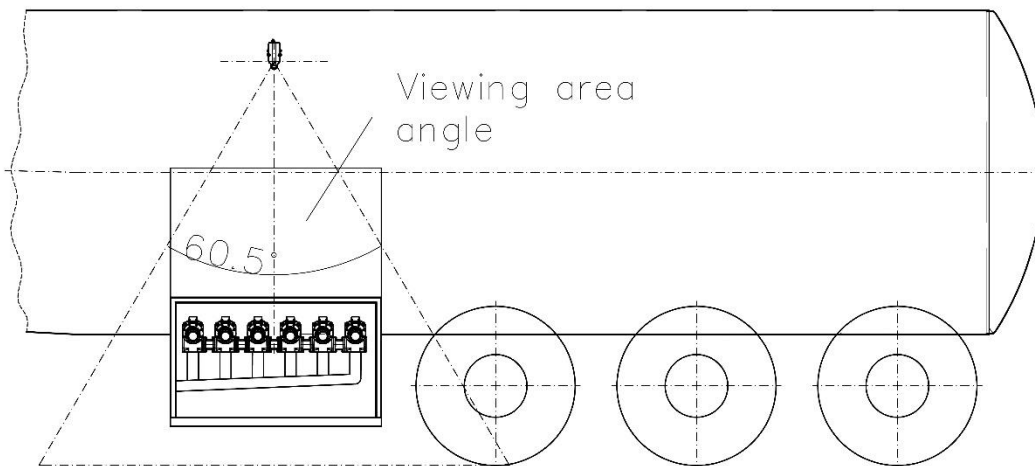


37.3.3.2 With camera holder

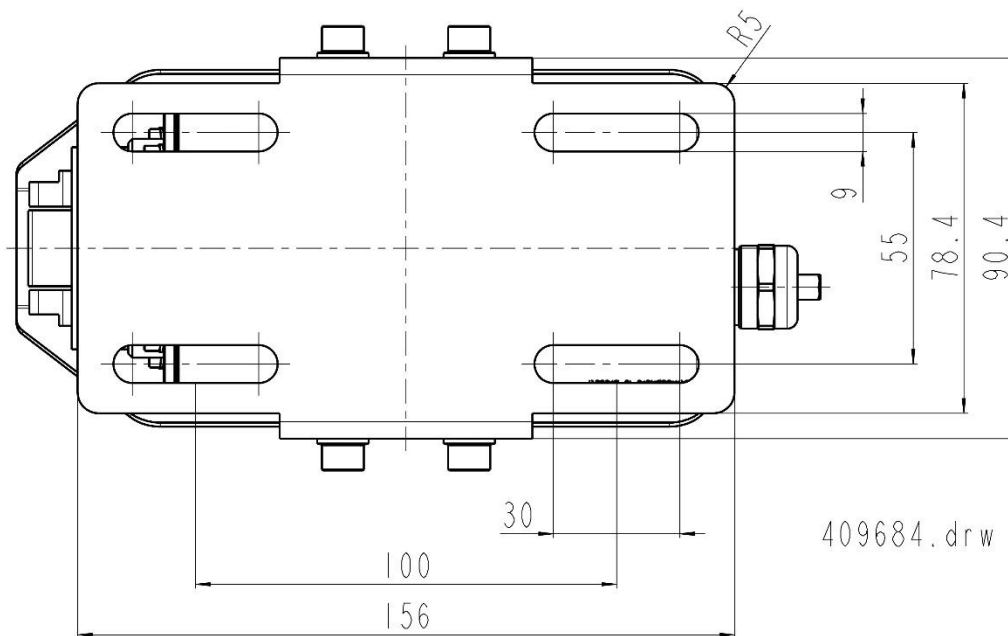


37.3.4 Mounting

- The metal camera holder / mouting bracket 6912-00-022 must be included in the equipotential bonding. This can be done either by the direct electrically connecting assembly on the vehicle chassis or by a separate equipotential bonding conductor, which is connected to a cable lug (e.g. BNr. 246665) on the mounting bracket
- The camera must be mounted in the center of the hose connections.

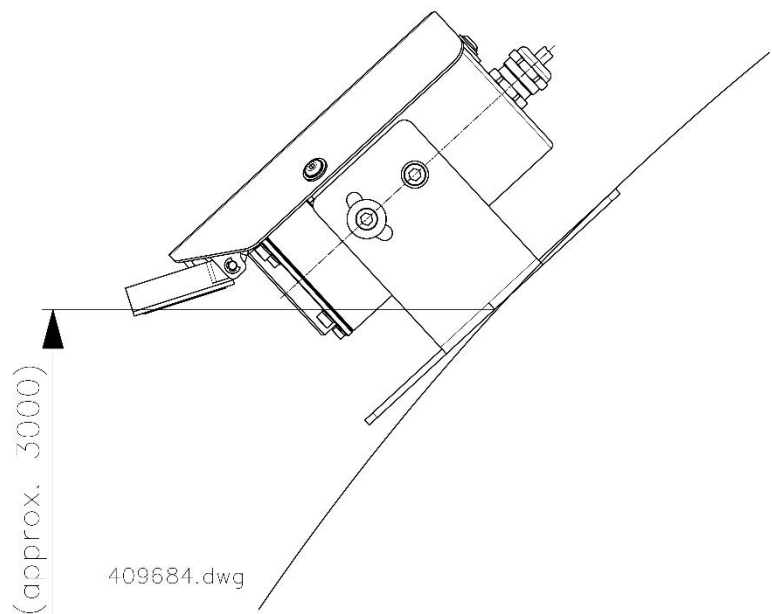
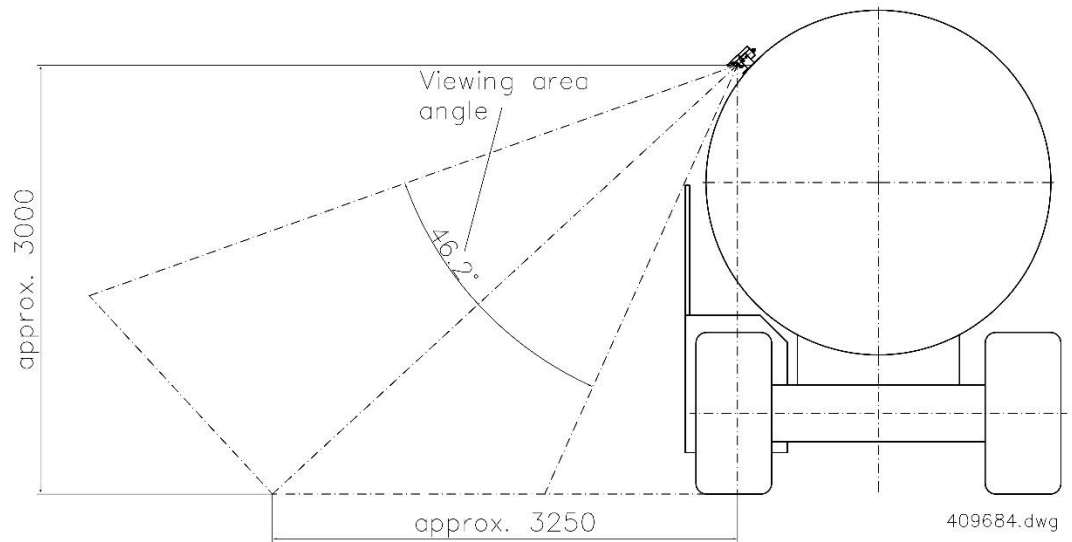


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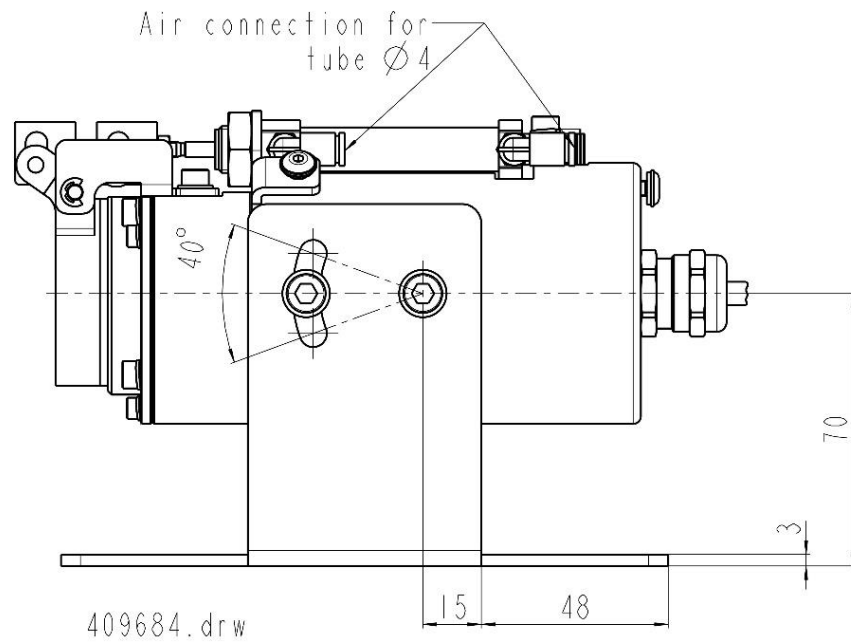


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- The camera must be mounted at a height of at least 2700-3000mm.
- The camera angle must be set that the center is focused on a point in 3m distance from the vehicle.



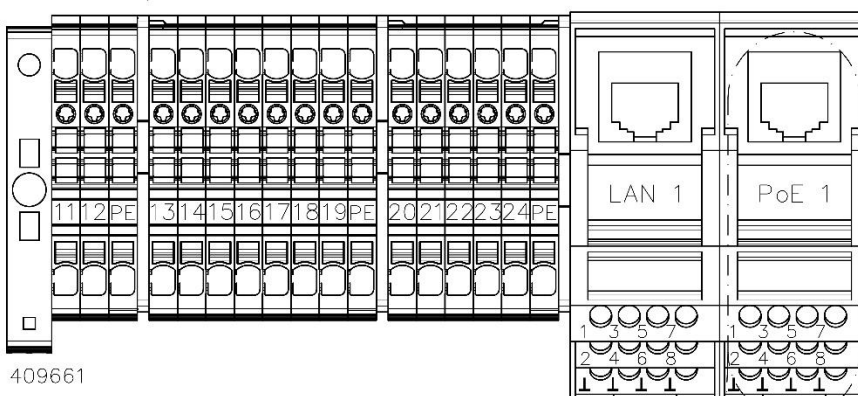
- The web interface of the Opticontrol can be used for camera alignment.
- The compressed air connections for the flap control are located under the camera roof.



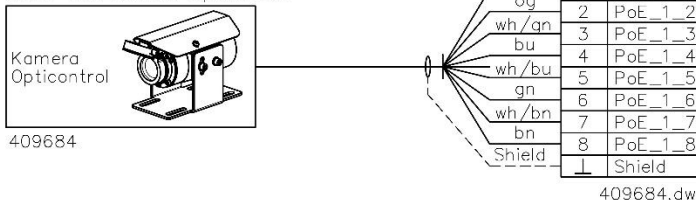
37.3.5 Wiring

- The camera must be shielded on one side. The camera housing is already contacted with the cable shield.
- The metal camera holder / mounting bracket 6912-00-022 must be included in the equipotential bonding. This can be done either by the direct electrically connecting assembly on the vehicle chassis or by a separate equipotential bonding conductor, which is connected to a cable lug (e.g. BNr. 246665) on the mounting bracket

6912-100_Opticontrol



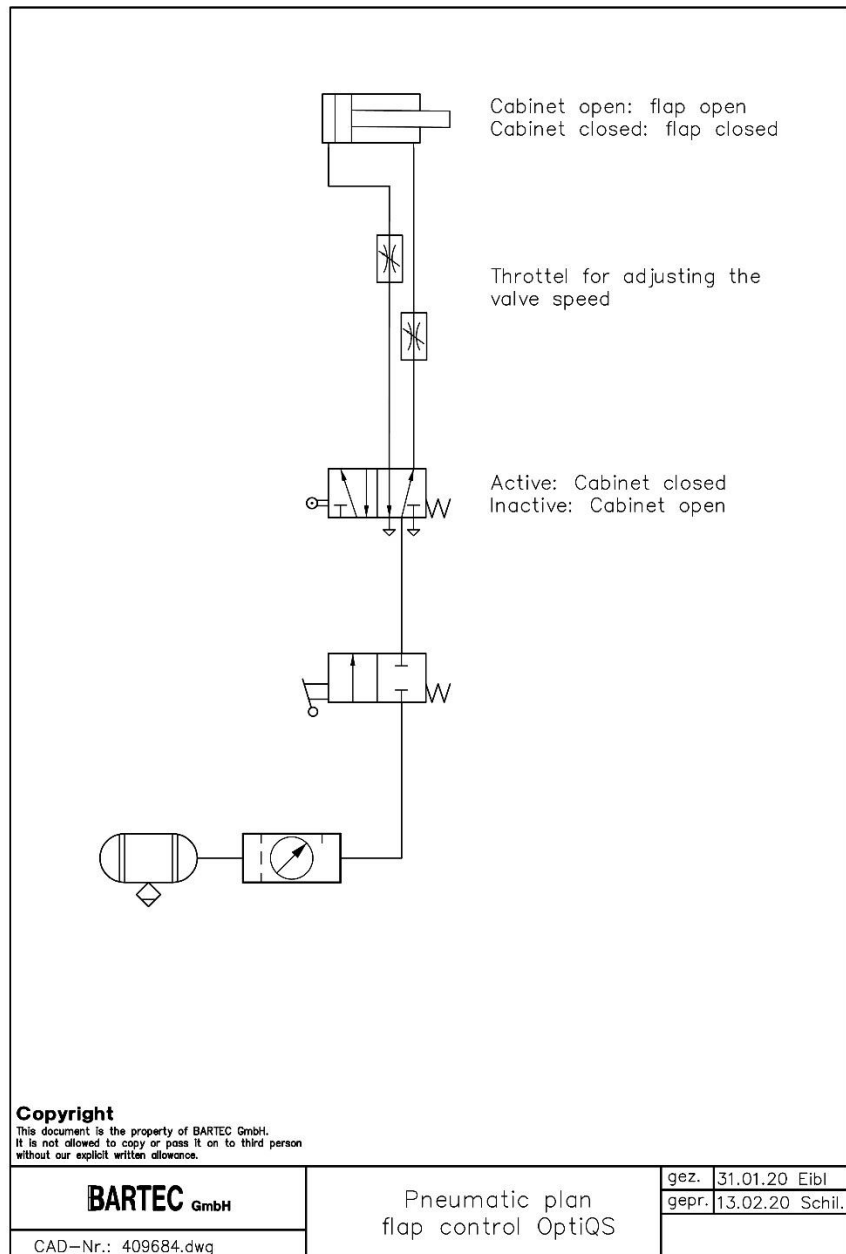
6912-101_Kamera Opticontrol



Opticontrol type 6912-100 PoE 1, Pin	Opticontrol camera type 6912-101 cable, wire
1	ws/or
2	or
3	ws/gn
4	bl
5	ws/bl
6	gn
7	ws/br
8	br

37.3.6 Flap control

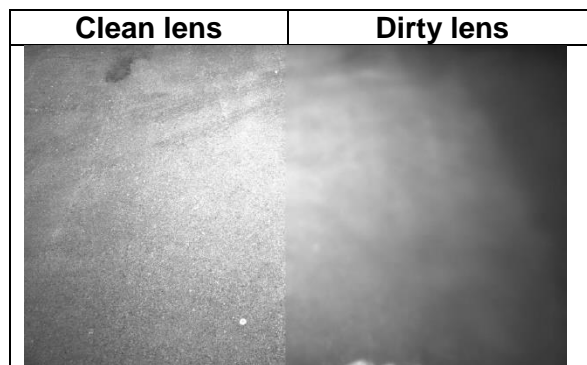
- The camera flap is controlled by a double-acting compressed air cylinder.
- The camera flap must be combined with the cabinet flap that the camera flap opens and closes with the cabinet flap.
- The speeds for opening and closing the flap must be set via appropriate throttles.



37.3.7 Maintenance

37.3.7.1 Cleaning the camera lens

- The camera lens must be checked for contamination at 4-week intervals and cleaned if necessary.
- In addition to the simple visual inspection, the camera image can be checked using the WLAN interface of the Opticontrol. For the output of the camera image, see Opticontrol description.
- The following is an example of a dirty camera lens



- The camera lens must be cleaned with a clean cloth, e.g. microfiber cloth, and with a glass cleaner, e.g. Bioethanol 96.6% Premium.
- The entire surface of the camera lens, including the frame, must be cleaned. Streaks must be avoided.

37.4 WLAN roof antenna set, type 6982-100



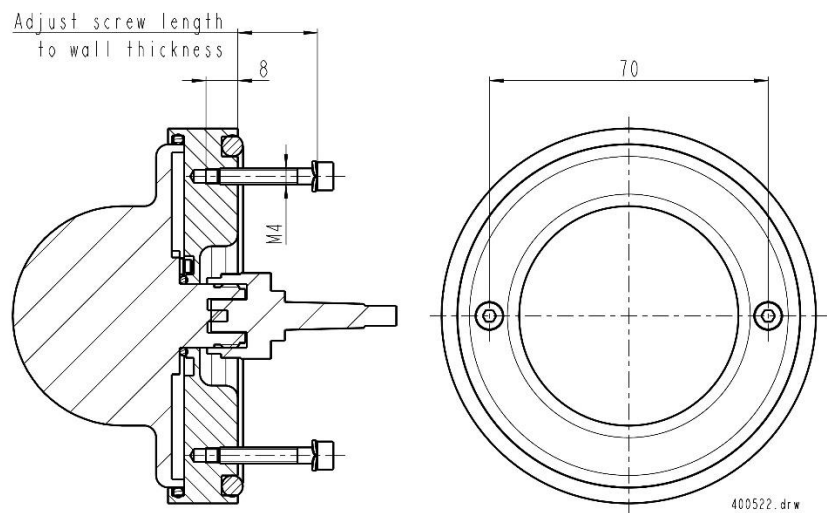
- The omnidirectional antenna ensures the wireless connection (wifi).
- The antenna may only be installed and operated in the non-hazardous area

37.4.1 Technical data

Technical data	
Specific data	
Frequency	2400-4900MHz 4900-6000MHz
VSWR 2400-4900MHz 4900-6000MHz	1.7 1.7
Gain 2400-4900MHz 4900-6000MHz	4dBi 6.5dBi
Dispersion angle	360°
Polarisation	vertical
DC grounding	no
Power max.	10W @ 25°C (ambient temperature)
Connection	
Antenna	N, jack (female)
Ambient conditions	
Operation temperature	-40 ... 80°C
Storage temperature	-40 ... 80°C
Mechanical data	
Weight	300g
Dimensions	
Data for purchase order	
Designation	Order number
WLAN-Roof antenna set, type 6982-100, incl. 5m antenna connection cable	400522

37.4.2 Mounting

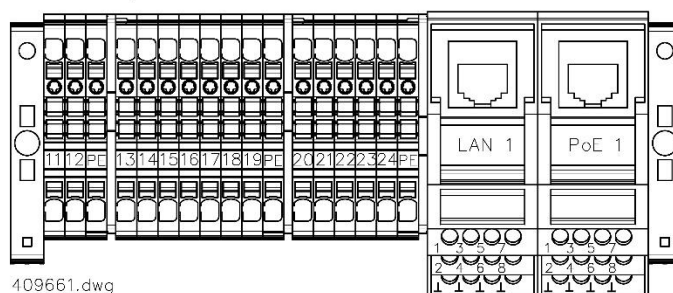
- The antenna may only be installed and operated in the non-hazardous area
- The antenna has to be installed on top of the vehicle as horizontally as possible. The device must not be covered by metal parts and must have a "free view" towards every direction as far as possible
- Distance to another aerial must at least 30cm.



37.4.3 Connection

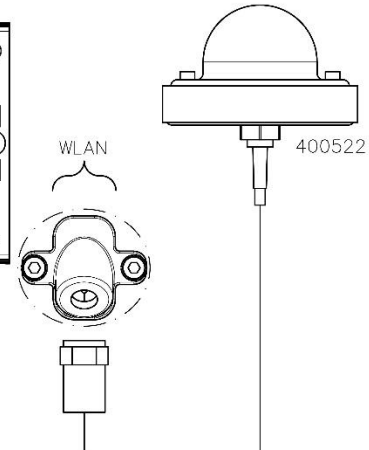
- Connect the antenna cable to the antenna (N-jack) and to the RP-SMA jack inside Opticontrol.
- The antenna cable must not be extended

6912-100_Opticontrol

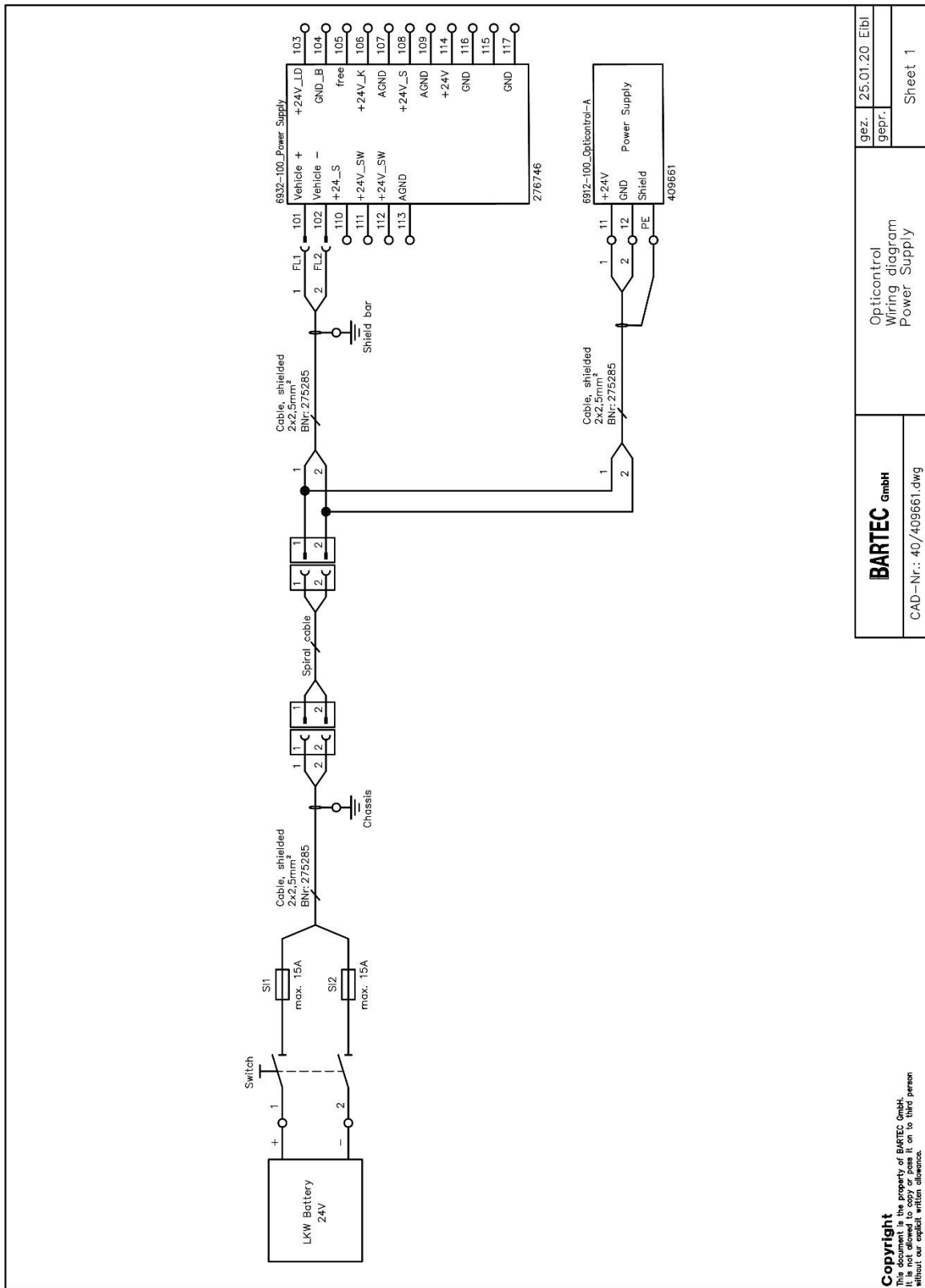


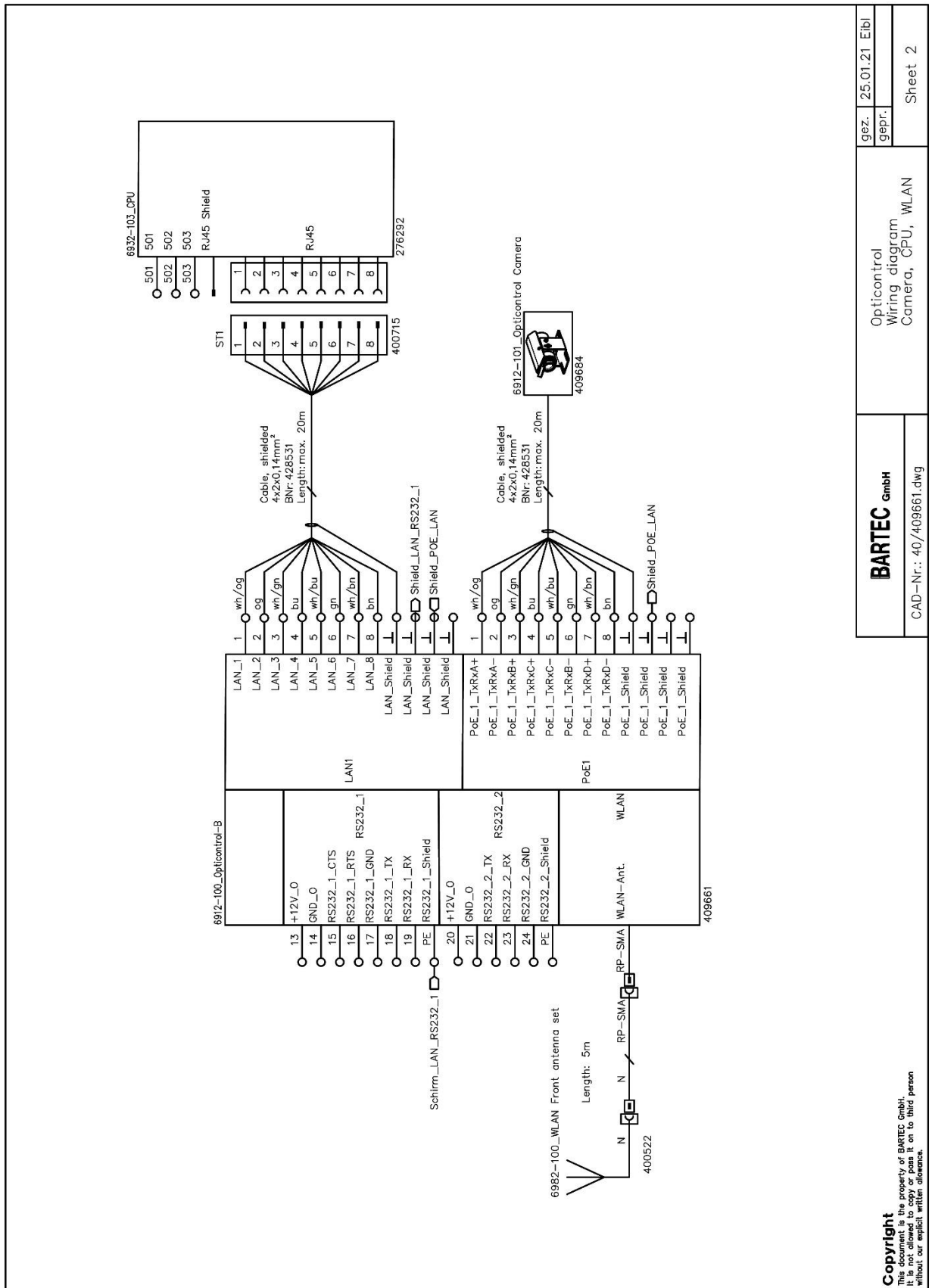
409661.dwg

6982-100_WLAN-Front antenna set



37.5 Wiring diagram

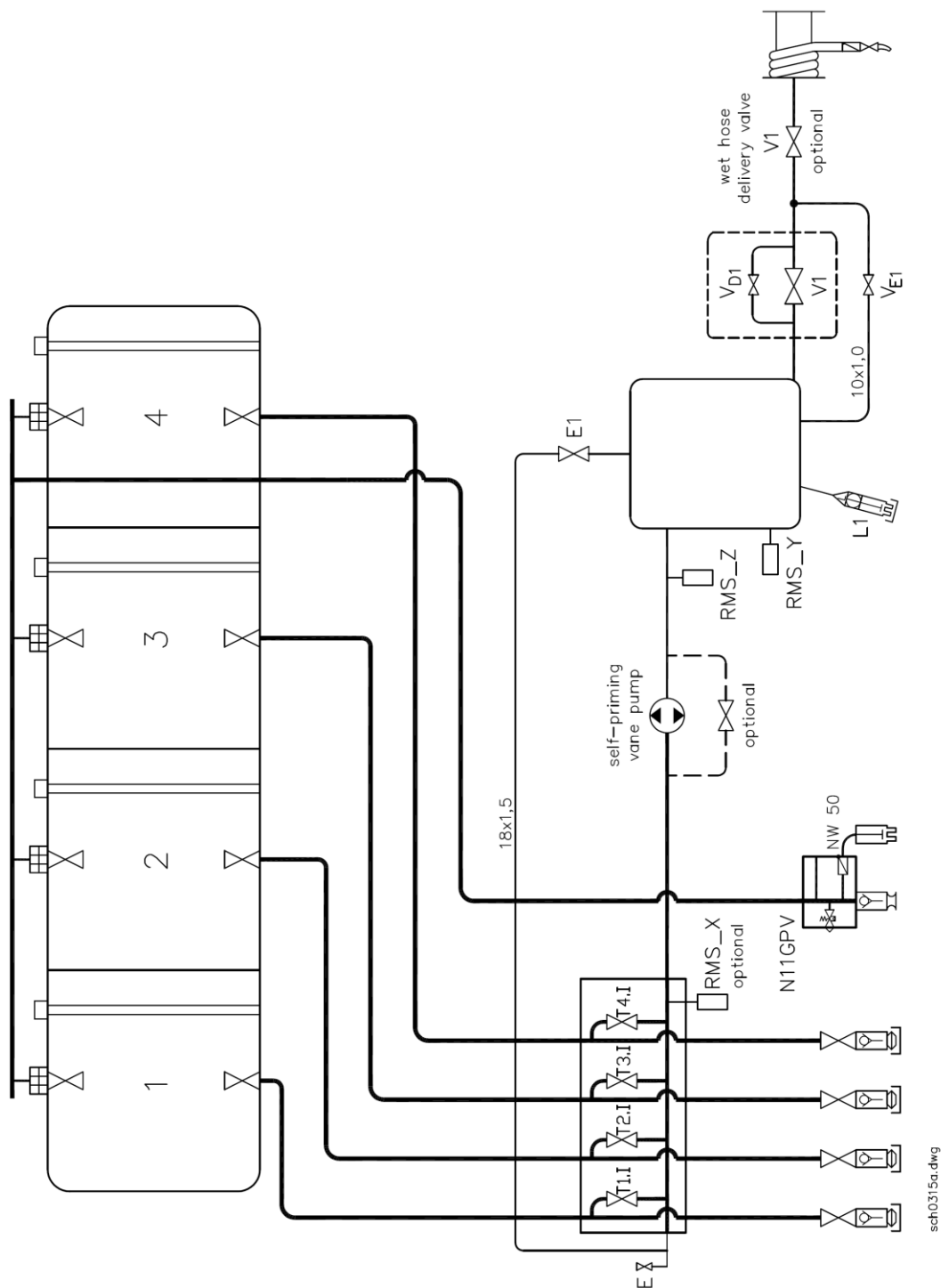




BARTEC GmbH	gez.	25.01.21 Eibl
	gepr.	
Opticontrol Wiring diagram Camera, CPU, WLAN		Sheet 2
CAD-Nr.: 40/409661.dwg		

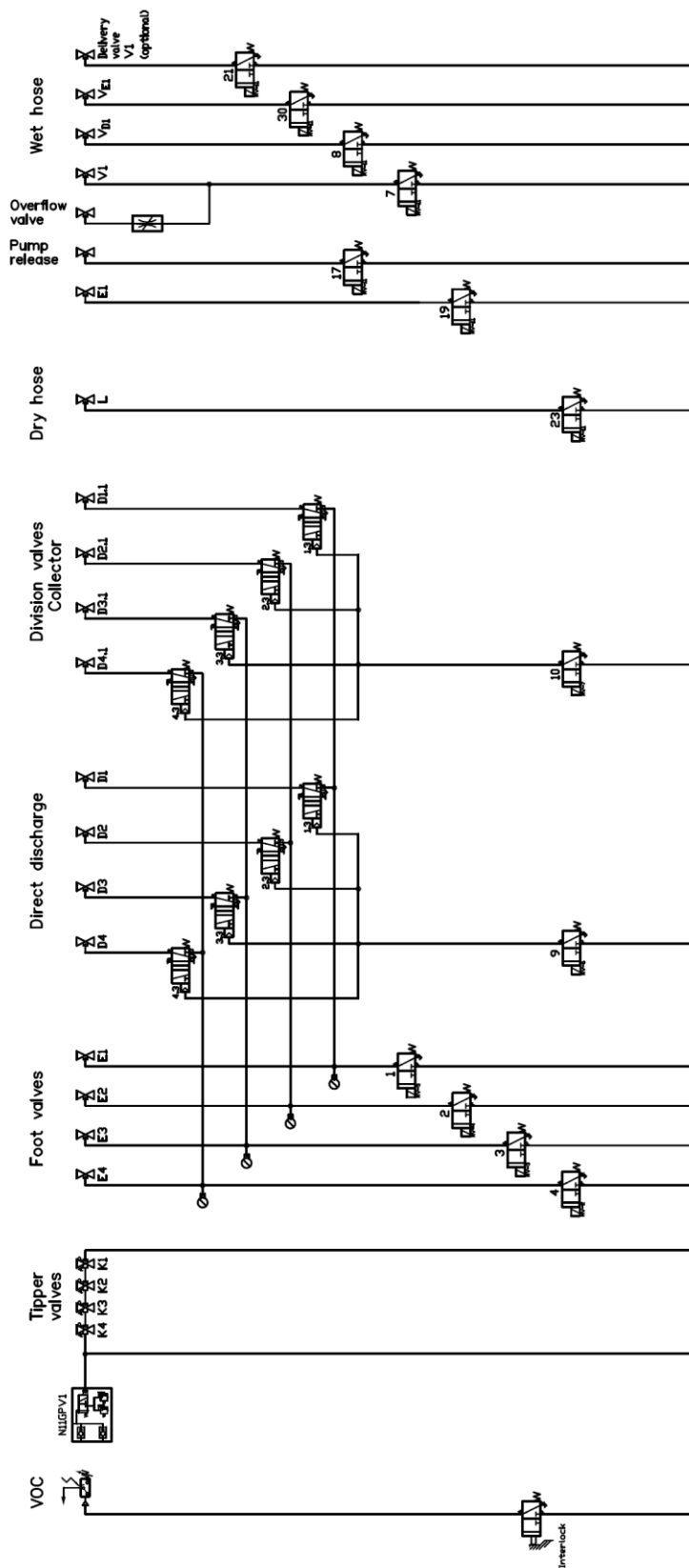
38 Full Hose Option for Bulk Delivery

38.1 Piping diagram



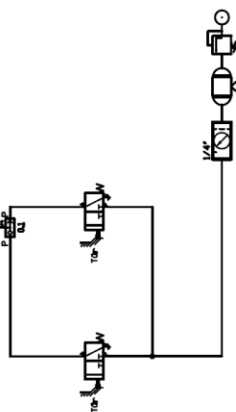
sch0315a.dwg

38.2 Pneumatic plan



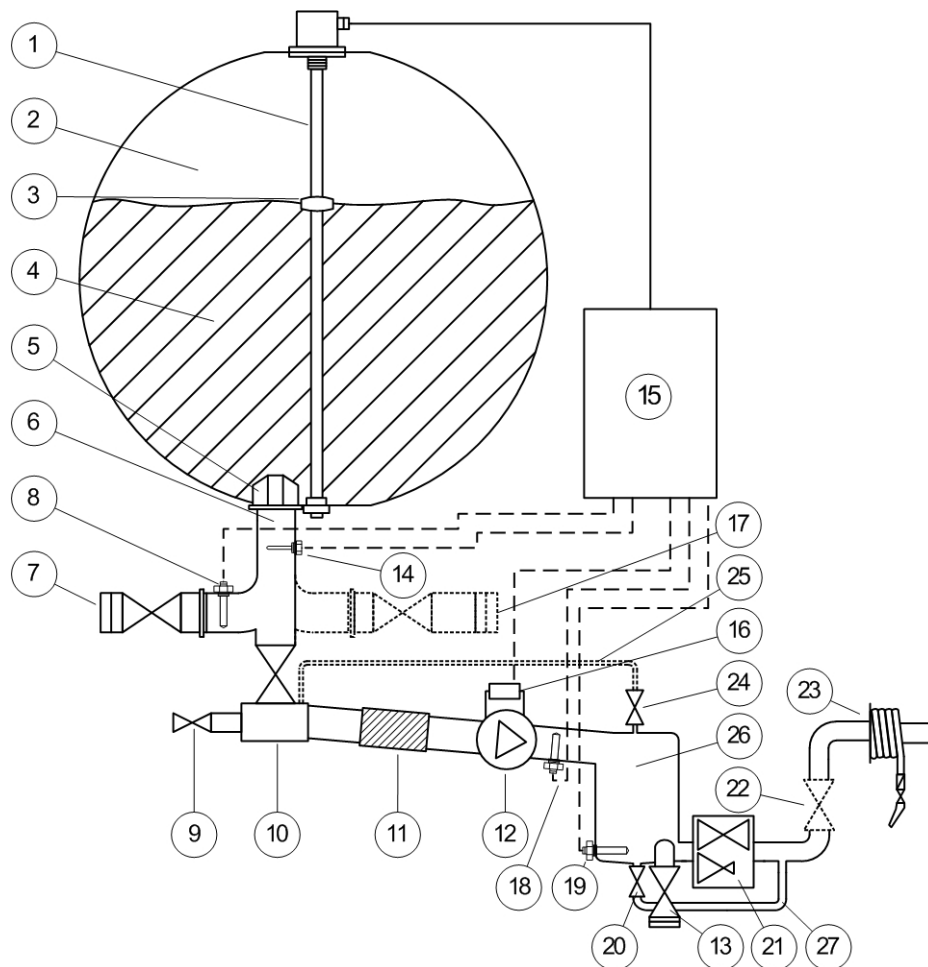
pneumat\3003\Bild3

Output	Log. Nr.
Bottom valve compartment 1 ... 6	1 ... 6
D-valve fully open	7
D-valve reduced (Bypass)	8
Collecting valve discharge	9
Collecting valve collector	10
Pump	17
Venting when filling the collector	19
Full hose 1	21
Empty hose 1	23
Vent valve	26
Thin residue removal pipe with full hose delivery	30



The superstructure manufacturer bears responsibility for pneumatic layout and functionality

Overview



<ul style="list-style-type: none"> 1. Level sensor 2. Measuring compartment 3. Float 4. Product 5. Bottom valve 6. Delivery pipe 7. API 8. Wet leg sensor 9. Collector venting valve 10. Collector 11. Filter assembly 12. Pump 13. Connection to empty hose valve 14. Temperature sensor 15. Measurement and control unit 16. Pump control (fast/slow), if needed 17. Gravity delivery pipe, if needed 	<p><i>and with optional full hose delivery:</i></p> <ul style="list-style-type: none"> 18. Wet leg sensor for collector 19. Wet leg sensor - threshold level 20. Valve full hose delivery pipe - draining 21. Valve for full hose delivery (two-stage) 22. Full hose valve 23. Full hose reel 24. Vacuum valve 25. Vacuum pipe 26. Niveau bottle 27. Draining pipe
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

38.3 Mounting instructions

- Full hose system for bulk deliveries with more than 1500 liters of self-contained delivery amount and delivery amount greater than segment content/5
- The pipework system, tank geometry, pneumatic and electrical installation lie in the superstructure manufacturer's area of responsibility and have to be designed and dimensioned in such a manner that a safe and calibrated operation of both Volutank system and full hose delivery can be guaranteed. The applicable regulations for tank trucks are to be complied with.
- Starting from the bottom valves, the whole pipework system has to be designed with a steady incline so that a complete delivery without any residual quantities can be guaranteed under all working conditions.
- As a basic principle, the pipework system must not contain any spots that don't drain automatically - even with all permitted angles of slope.
- Pumps, filters etc. have to be arranged in such a way that they drain completely.
- The vacuum pipe has to be connected to the niveau bottle (26) at its lowest point. The vacuum pipe has to be pressure balanced.
- The two-stage valve for full hose delivery (21) has to be connected to the niveau bottle (26) directly with a connecting pipe that is as short as possible (max. 6 cm length). Starting from the niveau bottle, both valve and connecting pipe have to be installed horizontally or, preferably, with an incline.

38.3.1 Vacuum pipe/Venting valve/ Collector Draining pipe

Vent pipe

The vent pipe (25) must be attached in such a way that it is opposite the collector draining pipe. An axial valve (type 4202) supplied by Legris can be used as a venting valve (24).

Ventilation valve

The following valves can be used as a ventilation valve (9):

- Vacuum valve with an opening pressure of 0.2 bar
- Axial valve (e.g. Legris type 4202)

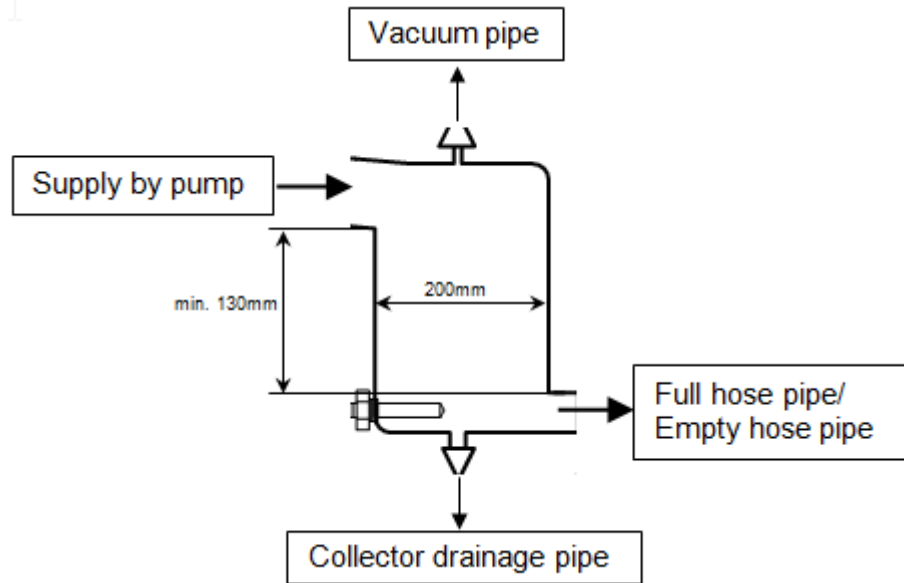
The ventilation valve must be attached in such a way that it is opposite the collector draining pipe.

Residue removal line

The residue removal line (27) must be constructed in such a way that a volume flow rate of 36 l/min is reached with restricted pump output.

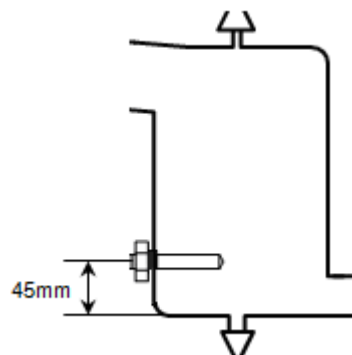
An axial valve (type 4202) supplied by Legris can be used as a stop valve for full hose residue removal (20).

38.3.2 Niveau bottle



- The niveau bottle's diameter has to be 200 mm.
- The bottom line of the supply pipe and the upper edge of the drainage pipe have to be at least 130 mm apart.
- The full/empty hose pipe's connection to the niveau bottle has to be flush with the bottle's bottom.
- The collector drainage pipe has to be installed at the lowest point of the full/empty hose pipe.

The wet leg sensor inside the niveau bottle has to be installed at a distance of 45 mm to the bottle bottom.



38.3.3 Valves

38.3.3.1 Full hose delivery valve

- The full hose delivery valve has to be designed in such a way that the highest possible delivery rate can be achieved with full pumping power.
- Additionally, this valve must be capable of the option to limit the flow to 150-200 l/min when the pumping power is throttled.
- Furthermore, the valve has to have a block function.
- Therefore the Bartec Valve D DN 65 is recommended.

38.3.3.2 Full Hose Valve 1

The full hose delivery valve has to be designed in such a way that the maximum delivery rate can be achieved with full pumping power. Furthermore, this valve needs to have a blocking function.

38.3.3.3 Vacuum valve/ Full hose residue removal

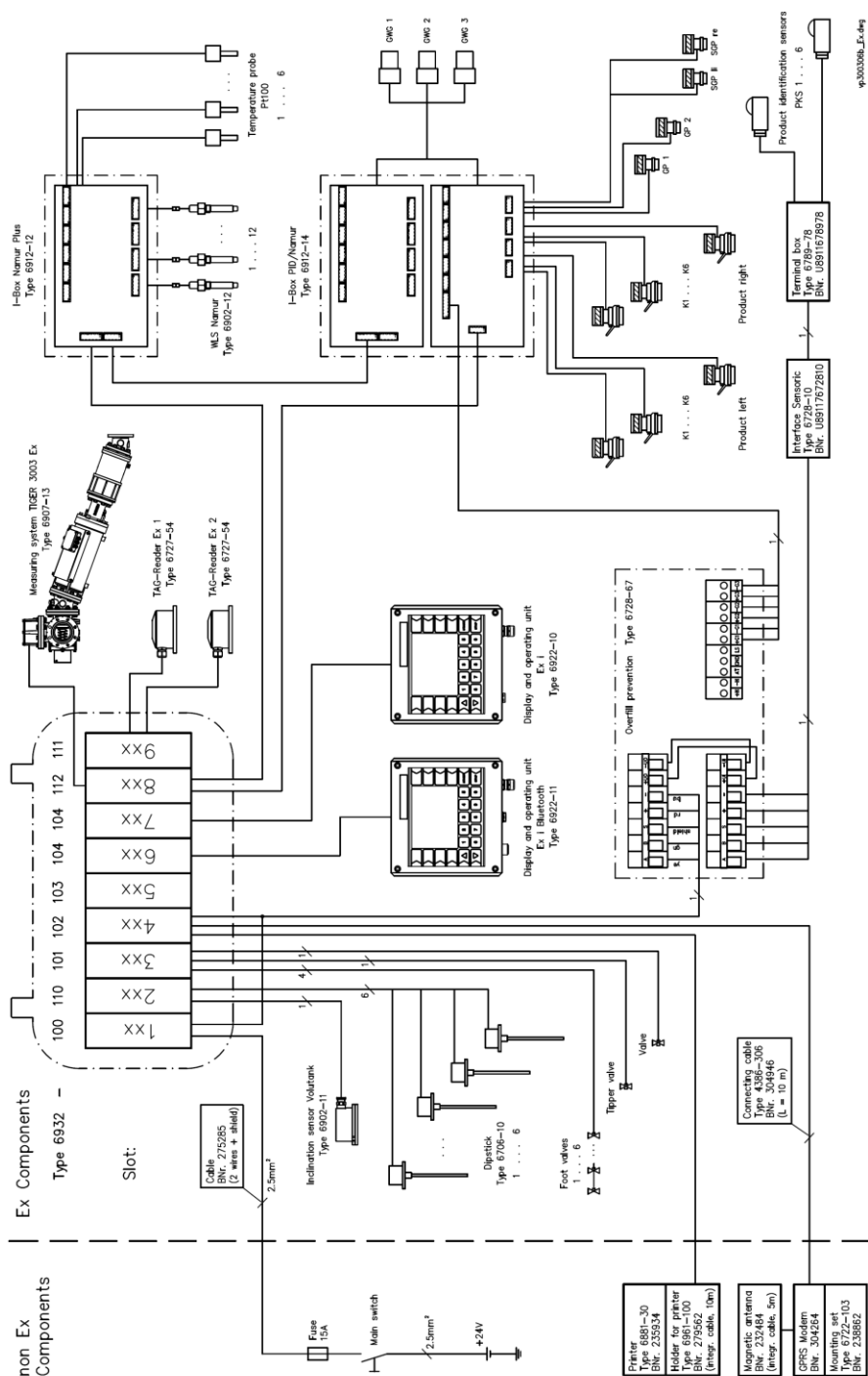
An axial valve (type 4202) supplied by Legris can be used for this valve.

38.3.4 Pump

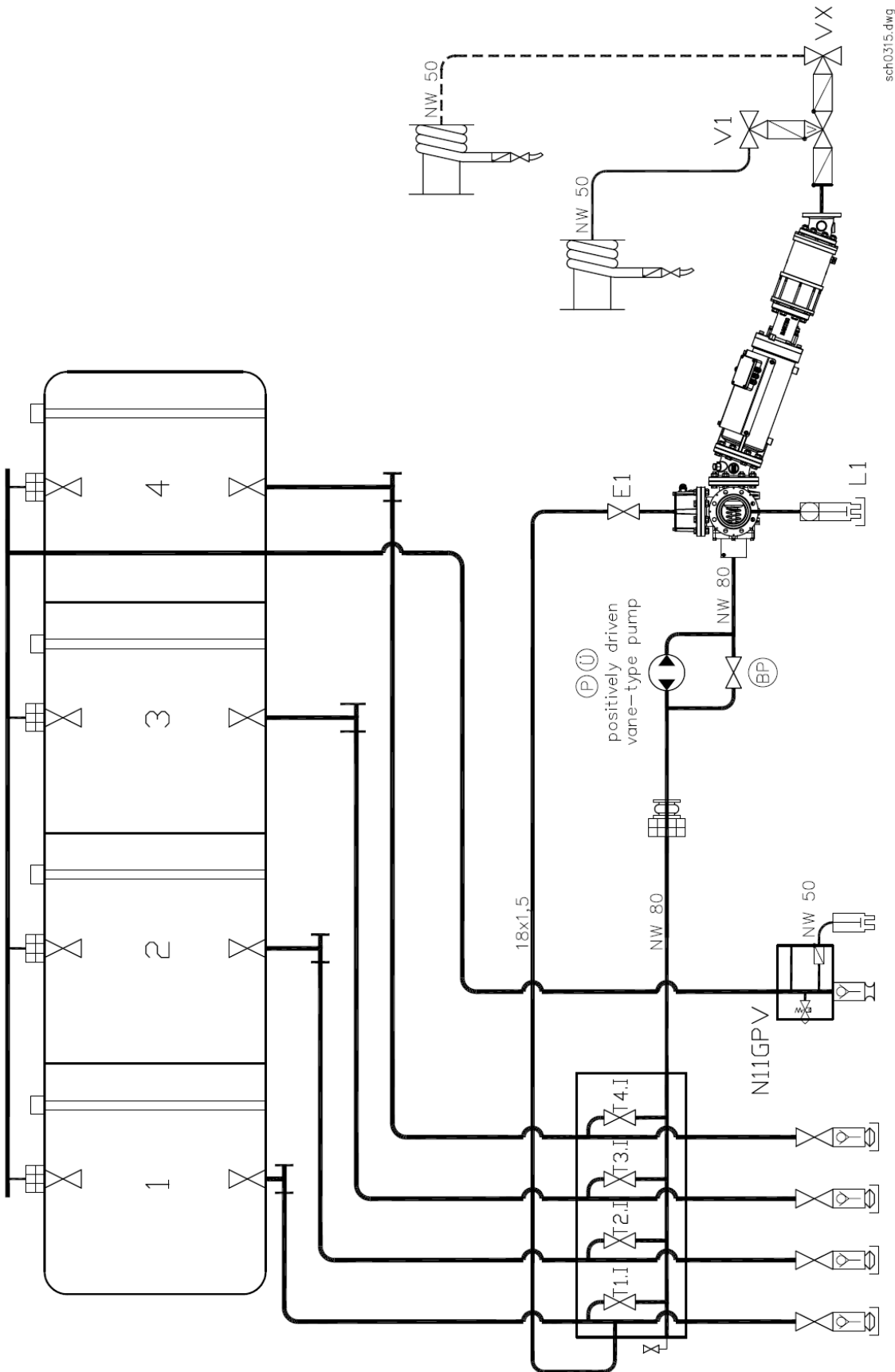
A forcibly guided vane pump must be used. This pump must be a two-stage output version. The FP05 80-700 RV/PA 1.8 vane pump supplied by Haar has been tested and approved. Proper operation cannot be guaranteed if pumps from other manufacturers are used.

39 Full hose delivery for small quantities (TIGER 3003 Ex)

39.1 Execution example Volutank with Tiger 3003 Ex Type 6907-14 (VOLUTIGER)

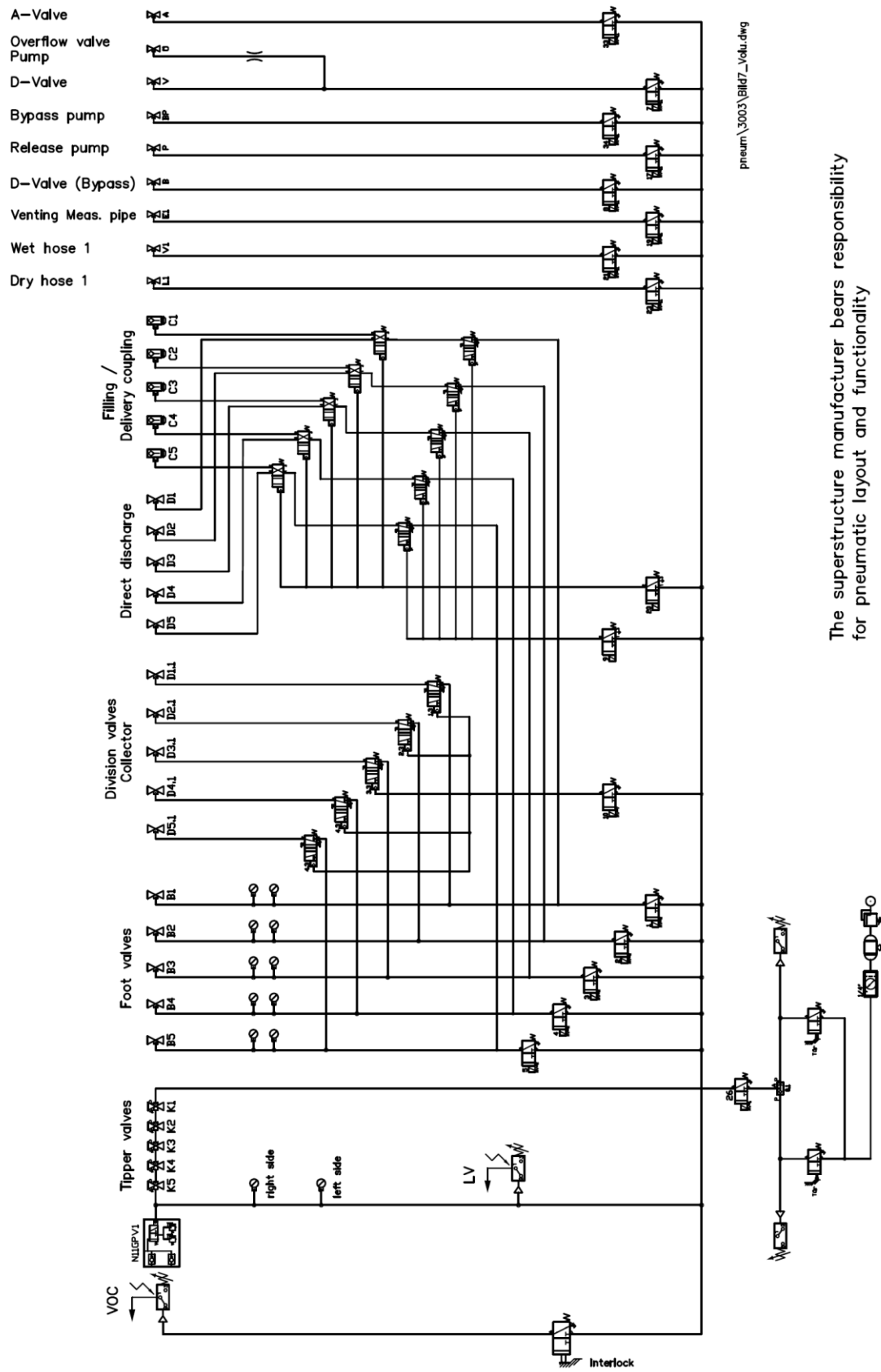


39.1.1 Piping diagram



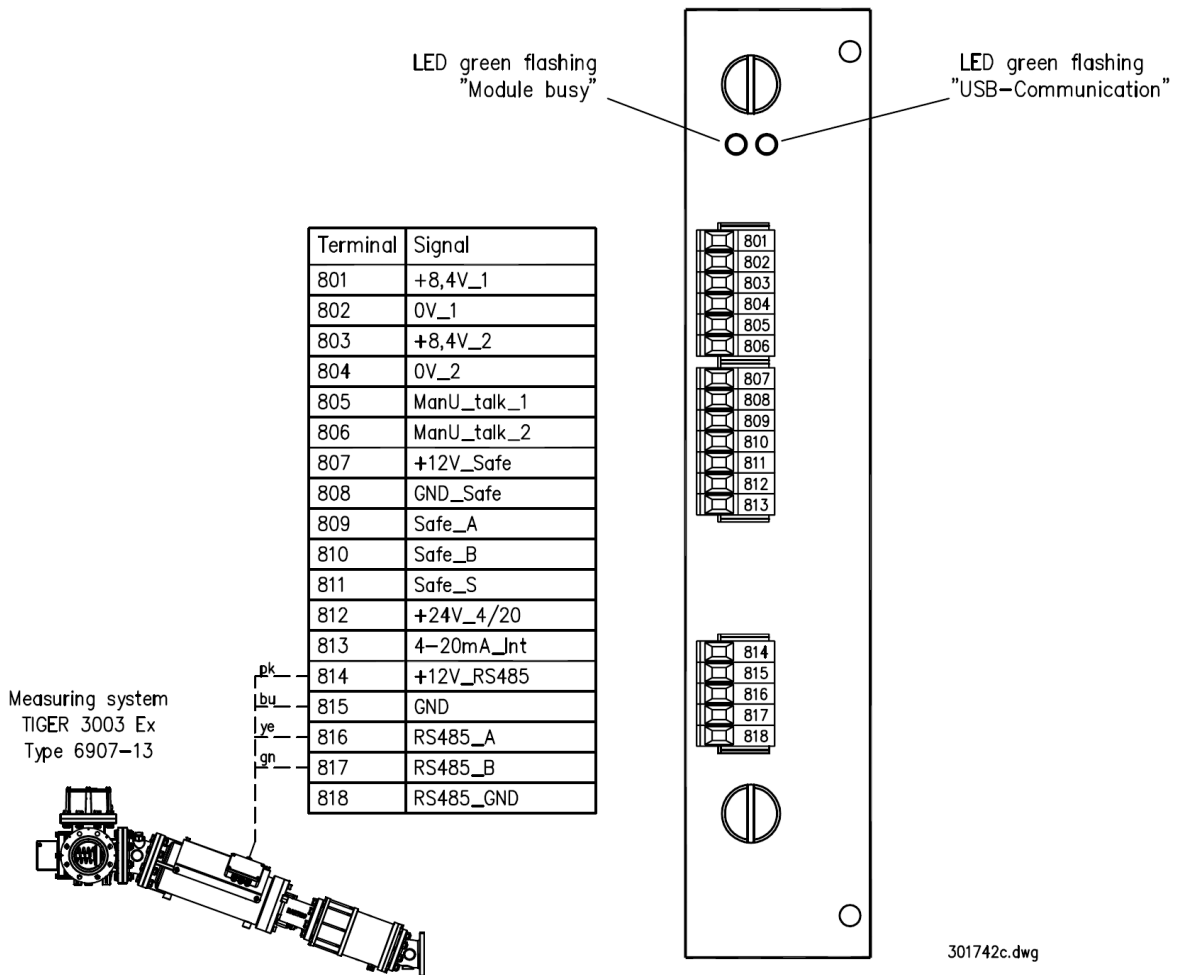
sch0315.dwg

39.1.2 Pneumatic plan



39.1.3 Wiring

39.1.3.1 Wiring TIGER 3003 Ex



The Tiger Ex measuring system is connected to the iBox interface type 6932-112 (see drawing).

The data line is wired to the measuring tube at the factory. This line can be shortened if required. Wire end ferrules must be used when connecting the A1 Tiger.

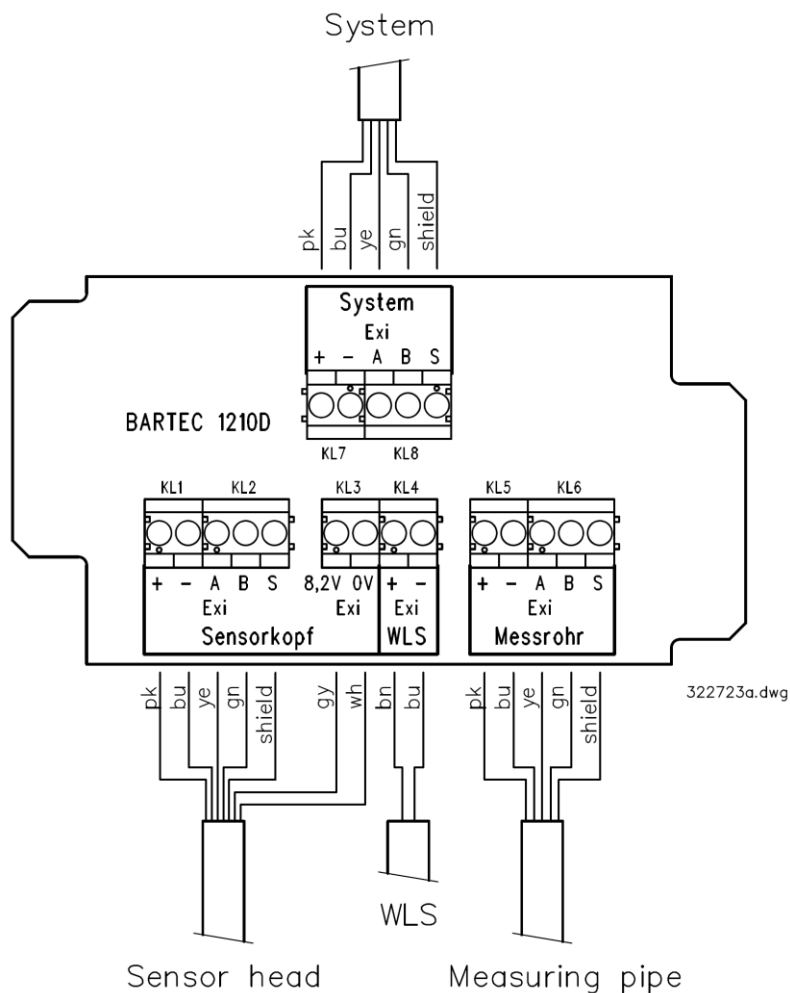


Attention:

The shielding braid must be connected to the shield bar in the basic module.

39.1.3.2 Wiring Tiger 3003 Ex terminal box

The terminal box on the Tiger measuring tube is wired at the factory. The wetleg sensor in the lower elbow must be wired on site, as shown in the drawing (WLS).



Attention:

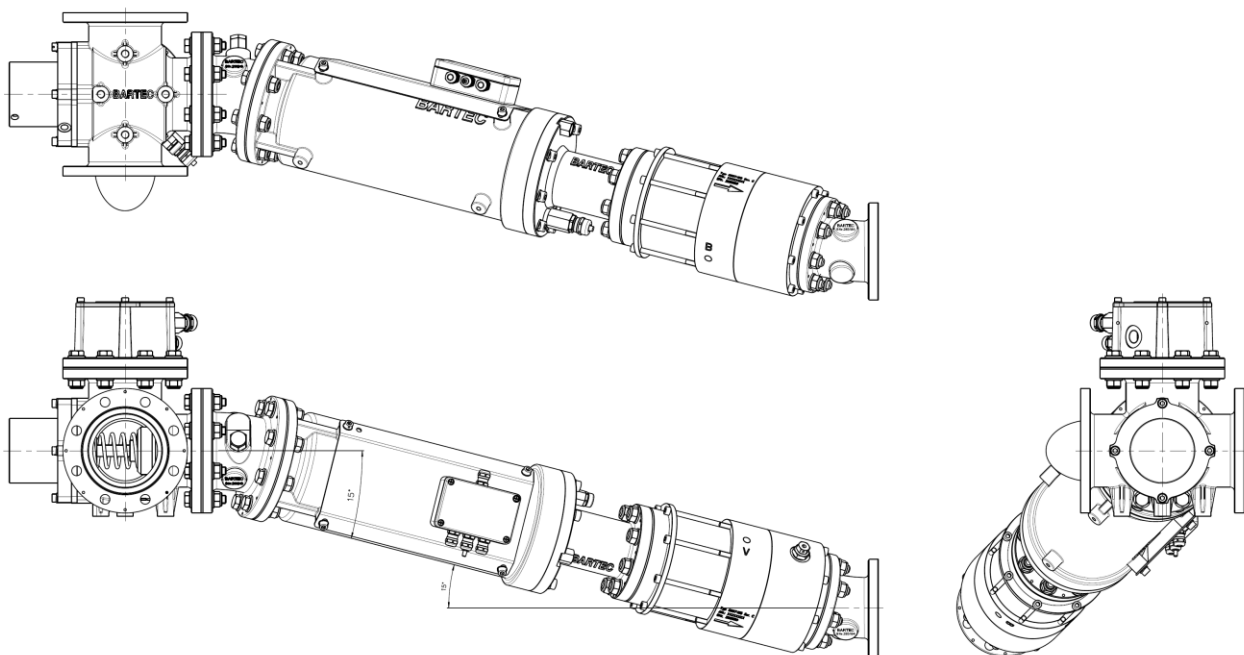
The lines to the sensor head and to the measuring tube must not be shortened or replaced. The line to the system must not be lengthened.

Mounting instructions

- Full hose delivery system for small quantities with more than 200 liters closed delivery amount.
- The pipe system, the tank geometry, and the pneumatic and electrical installations are the responsibility of the assembly manufacturer and must be designed/dimensioned in such a way as to ensure the safe and accurately calibrated operation of the Volutank system, incl. full hose discharge. The corresponding regulations for tankers must be adhered to.
- The entire pipeline system must be at an incline all the way from the foot valves so that the entire quantity can be unloaded in all operating conditions without leaving any residues.
- As a general principle, the pipeline system must not have any sections which cannot drain completely even given all the permissible tilt angles.
- Pumps and filters, etc. must be arranged in such a way as to be able to drain completely.
- The vent pipe must be fitted so that it is opposite the collector outlet.
- Due to the risk of impact and friction sparks, there must be no metallic particles larger than 1.5 mm (maximum diameter or edge length) in the product stream. A filter of the relevant type with a maximum mesh width of 1.5 mm must be installed.
- The integrated connection cable must either be fitted with light blue shrink sleeving or be marked with the inscription "Ex i" (cf. EN 60079-14:2009 Section 12.2.2.6 and EN 60079-11:2012 Section 12.2. The integrated connection cable must be fixed in position and protected from mechanical damage (cf. EN 60079-14:2009 Section 12.2.2.7).
- The original gaskets must be used for the sealing. The seal must be subjected to a 20 bar pressure test to check for leaks after installation.
- Explosive gas mixtures can escape from the air vent of the sensor head Ex type 6907-309 B no.: 322711 and from the float air vent B no.: 303798. In order to avoid an explosive atmosphere, therefore, the breather hole must be situated outdoors or routed outdoors via a line.

General instructions

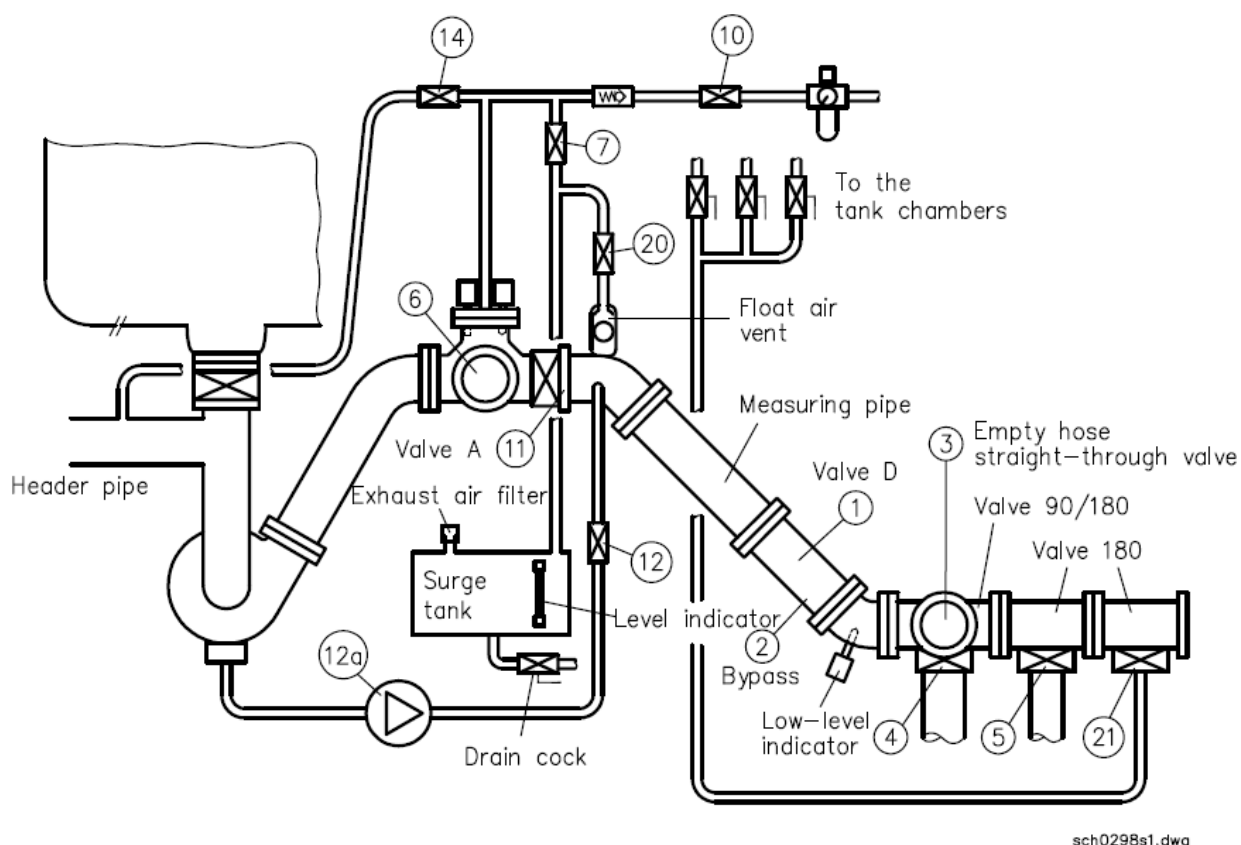
- The dry hose must be connected using a pressure-equalising valve.
- The dry hose output quantity (pump operation or gravity) is calculated using the dipstick for the relevant compartment when the dry hose is connected to valve A (minimum tank output quantity/5).
- A valve must be fitted on the opposite side to the collector outlet for the collector ventilation system. This may be a vacuum valve (0.2 bar, e.g. additive injection valve U495556) without pneumatic control.
- The residues are not emptied via an external pump in full hose mode if an A1-Tiger is being used in a Volutank system. In this case the drainage of the collector strand and of the pipes to the measuring section is stopped at a specified point in the measuring pipe.
- When the A1-Tiger is used in conjunction with a Volutank system, it is not necessary to fit a float air vent in the upper elbow (downstream of A valve). In this case the connection needs to be sealed with a blind screw of the right size.
- The operation of the TIGER 3003 Ex in a Volutank system has been tested in conjunction with the Haar FPOS 80-700 RV/PA1.8/ pump and approved for use. Smooth-running processes cannot be guaranteed if other makes of pump are used.
- The upper and lower elbow joints may be turned 45° to fit in the cabinet, resulting in a measuring pipe angle of approximately 15°. Lower angles of installation are not permitted.



- The output is reduced from a dipstick reading of 150 mm, configurable via Min Level.

39.2 Execution example Tiger 3003 Ex Type 6907-14 (Stand-alone, software pair)

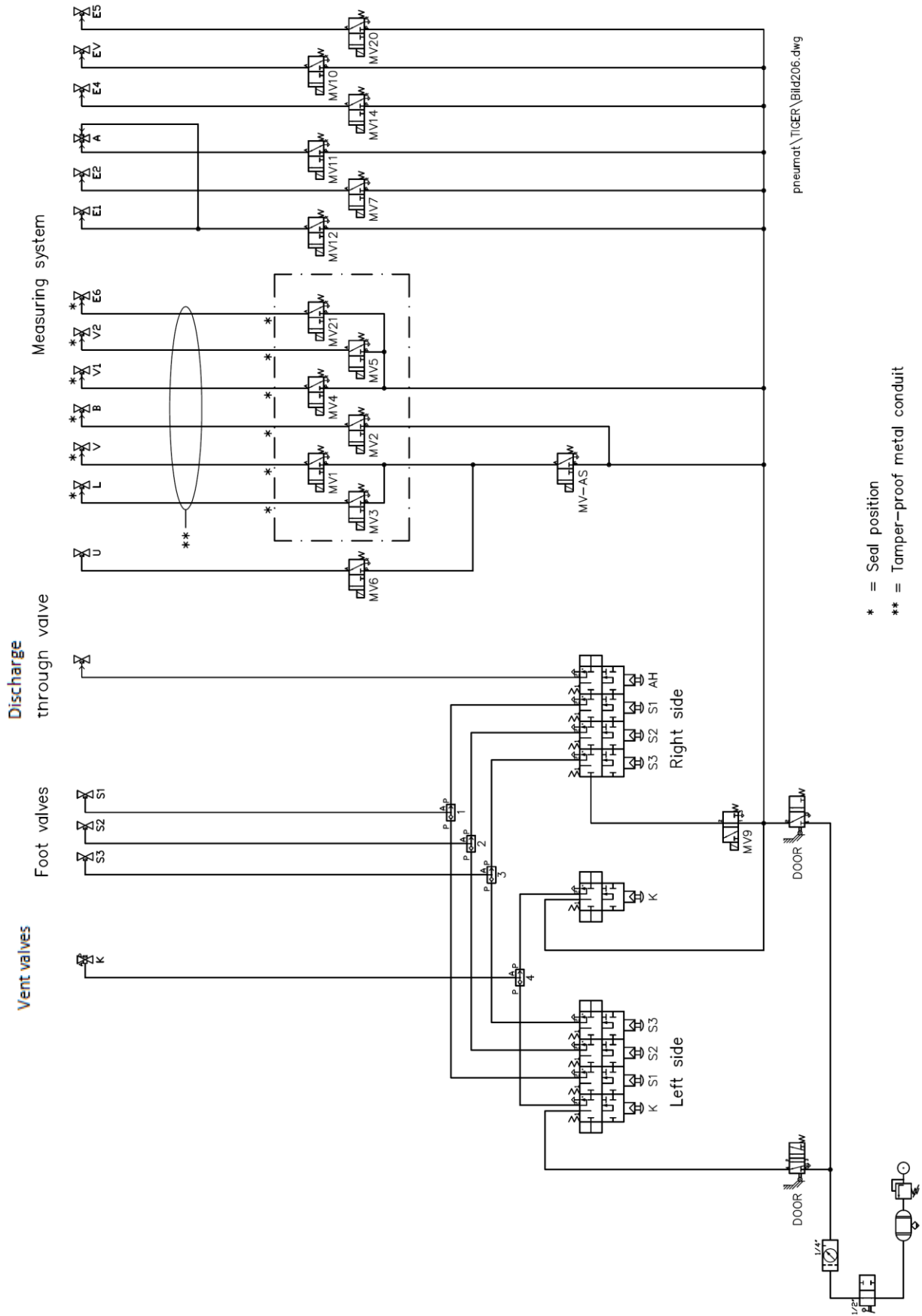
39.2.1 Piping diagram



Logical outputs software pair

Output	Log. Nr.
D-valve fully open	1
D-valve reduced (Bypass)	2
Empty hose	3
Full hose 1	4
Full hose 2	5
Unmeasured	6
Bleeding – fill up	7
Bleeding the control block	9
Residue removal by compressed air	10
Inlet measuring section (A-valve)	11
Shut-off valve residue removal	12
Relay residue removal pump	12a
Compressed air collector pipe	14
Bleeding measuring pipe	20
Residue removal back to the compartment	21

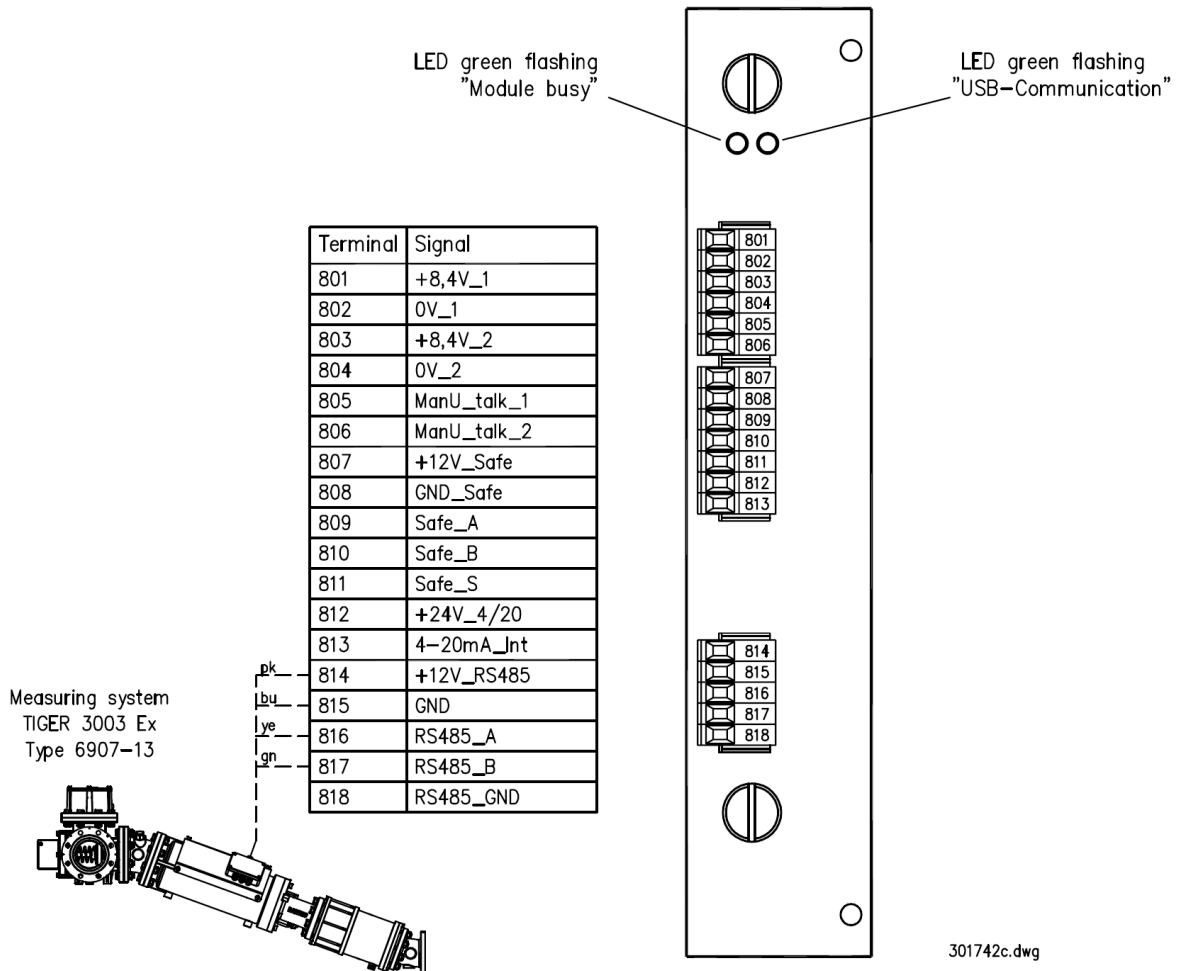
39.2.2 Pneumatic plan



* = Seal position
 ** = Tamper-proof metal conduit

39.2.3 Wiring

39.2.3.1 Wiring TIGER 3003 Ex



The Tiger Ex measuring system is connected to the iBox interface type 6932-112 (see drawing).

The data line is wired to the measuring tube at the factory. This line can be shortened if required. Wire end ferrules must be used when connecting the A1 Tiger.

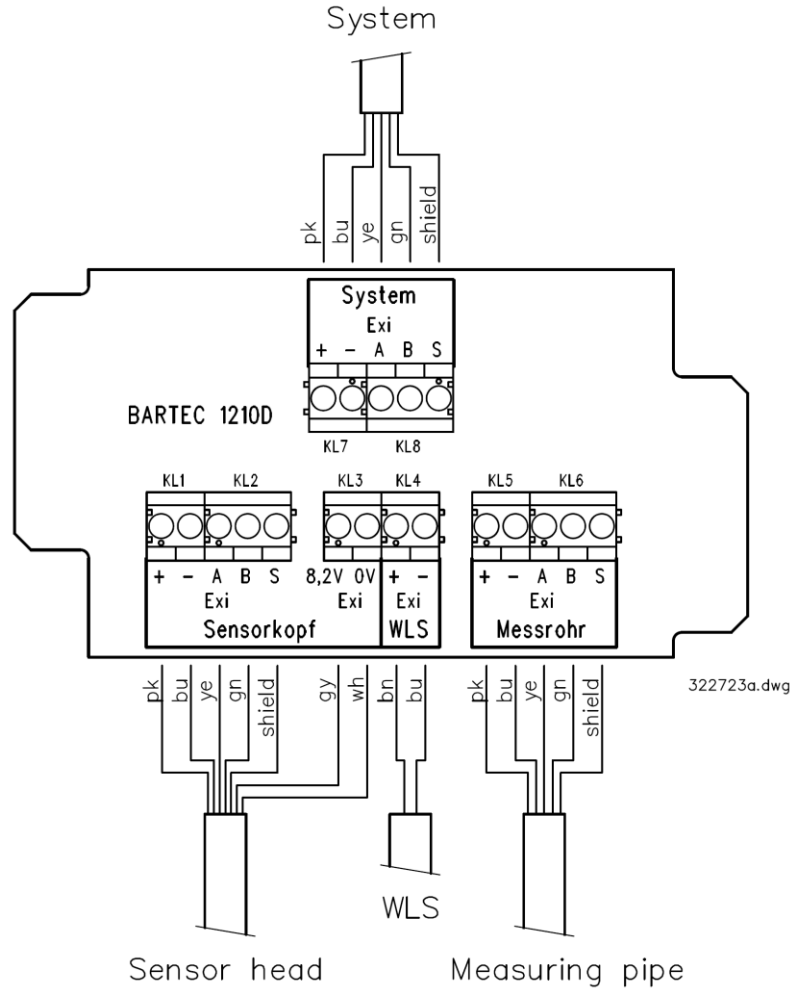


Attention:

The shielding braid must be connected to the shield bar in the basic module.

39.2.3.2 Wiring Tiger 3003 Ex terminal box

The terminal box on the Tiger measuring tube is wired at the factory. The wetleg sensor in the lower elbow must be wired on site, as shown in the drawing (WLS).



Attention:

The lines to the sensor head and to the measuring tube must not be shortened or replaced. The line to the system must not be lengthened.

Mounting instructions

- The pipe system, the tank geometry, and the pneumatic and electrical installations are the responsibility of the assembly manufacturer and must be designed/dimensioned in such a way as to ensure the safe and accurately calibrated operation of the Volutank system, incl. full hose discharge. The corresponding regulations for tankers must be adhered to.
- Due to the risk of impact and friction sparks, there must be no metallic particles larger than 1.5 mm (maximum diameter or edge length) in the product stream. A filter of the relevant type with a maximum mesh width of 1.5 mm must be installed.
- The integrated connection cable must either be fitted with light blue shrink sleeving or be marked with the inscription "Ex i" (cf. EN 60079-14:2009 Section 12.2.2.6 and EN 60079-11:2012 Section 12.2. The integrated connection cable must be fixed in position and protected from mechanical damage (cf. EN 60079-14:2009 Section 12.2.2.7).
- The original gaskets must be used for the sealing. The seal must be subjected to a 20 bar pressure test to check for leaks after installation.
- Explosive gas mixtures can escape from the air vent of the sensor head Ex type 6907-309 B no.: 322711 and from the float air vent B no.: 303798. In order to avoid an explosive atmosphere, therefore, the breather hole must be situated outdoors or routed outdoors via a line.
- The dry hose connection must be attached at the lowest point of the measuring system. A pressure-equalizing model must be used for the dry hose valve.
- An Ex-compatible pump must be installed to remove residues from the measuring pipe; pipe assembly here as with A3 Tiger (pump is not supplied by BARTEC!)
- If using a pneumatic pump, the air supply must be sufficient to ensure that the measuring section and the feed lines can be emptied of all residues.
- The "residue removal back into the chamber" model is the only one that can be used with TIGER Ex.
- For further installation instructions see the service manual for the TIGER 3003 measuring system.
