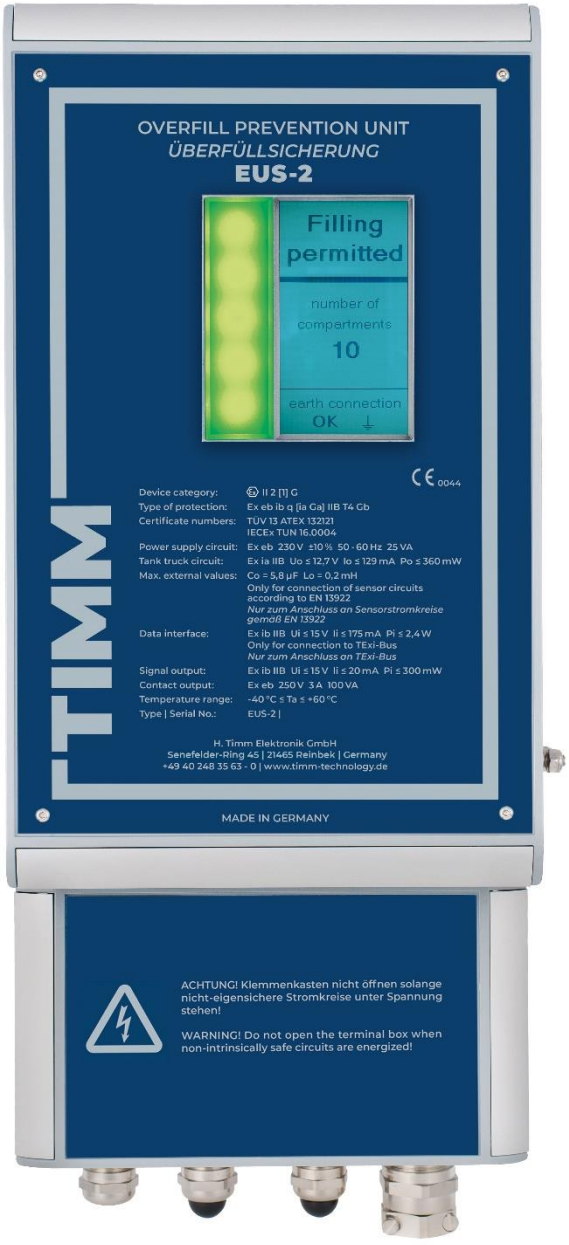
Overfill Prevention Controller Type EUS-2

Operating Instructions | English



Overfill Prevention Controller Type EUS-2

Operating Instructions and Technical Data

Manufacturer: Timm Technology GmbH

Address: Senefelder-Ring 45
21465 Reinbek
GERMANY

Phone: +49 40 248 35 63 – 0
Fax: +49 40 248 35 63 – 39

Mail: info@timm-technology.de
Web: www.timm-technology.com

Saftety Note: This explosion-proof device complies with the requirements of the European standard series EN 60079 (for details see EU Declaration of Conformity on page 23) as well as with the similar IEC 60079 standards (for details see IECEx Certificate of Conformity on page 27). As an electrical apparatus of equipment category **II 2 (1) G** according to ATEX directive 2014/34/EU it is approved for use in potentially explosive areas of **zone 1** and intrinsically safe supply of level sensors that are installed in **zone 0**.

The explosion protection type designation is:

Ex eb ib q [ia Ga] IIB T4 Gb

The intrinsically safe circuit of the level sensors is grounded.

For the Overfill Prevention Controller type EUS-2 the TÜV NORD CERT GmbH in Hannover / Germany has issued as well the IECEx Certificate of Conformity No. IECEx TUN 16.0004. The related IECEx Quality Assessment Report is DE/TUN/QAR15.0008/01. This explosion-proof device complies with the Equipment Protection Level (EPL) Gb and as an electrical apparatus it is intended for use in potentially gas explosive areas of zone 1.

The installation and commissioning must be performed by authorized and qualified personnel only.

Ordinances on industrial safety, applicable guidelines and regulations for setting up explosion protected operating equipment have to be followed at any time, e.g. IEC / EN 60079-14 / VDE 165 Part 1 and DGUV Regulation 113-001 (EX-RL).

The safety information and technical data of this instruction as well as the national safety and accident prevention regulations must be observed during all work on the overfill prevention control unit.

Use this unit only for its intended purpose in an undamaged and proper condition.

If the cable glands are not properly fitted**, IP 66** as minimum degree of protection will not be ensured.

The EUS-2 control unit is SIL 2 certified according to EN 61508:2010 for use in safety-related systems. The characteristic safety values for functional safety can be found in chapter 8.2.

Table of Contents

1. Functional Principle of Overfill Prevention

The EUS-2 control unit is the loading terminal's part of the overfill prevention system according to EN 13922. A compliance to API RP 1004 is given.

The overfill prevention system is used during filling processes of bottom loading tank trucks with gasoline or diesel fuel at fuel depots and refineries, Figure 1. The EUS-2 controller connects to the tank truck by a multi-conductor plug and cable set. It monitors permanently the level sensors of the tank compartments, the vapor recovery interlock switch as well as the simultaneously established ground connection. If all necessary preconditions are met, the 'filling permission' will be given by the control unit. The filling permission is indicated at the display located at the unit's front and by electric output signals. The output signals are designed for automated control of the filling process.

The sensor interface is designed to connect to EN 13922 compliant tank compartment level sensors (5-wire or 2-wire sensor installations, thermistor or optoelectronic sensors), **Figure 1**.

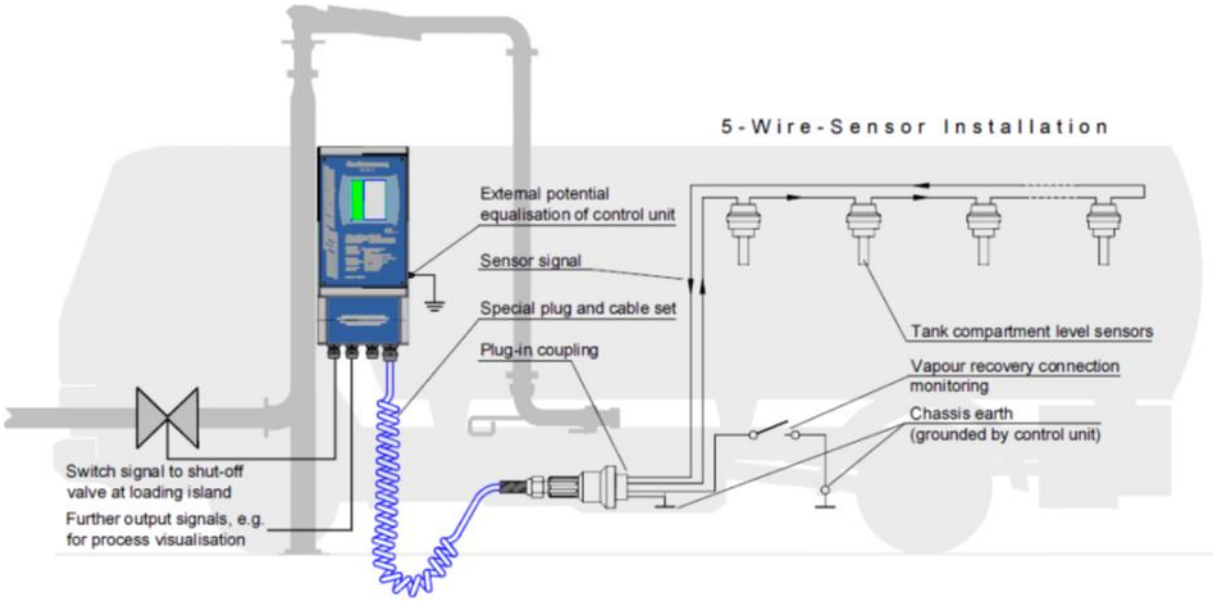


Figure 1: Scheme of overfill prevention system with five-wire sensor installation

The **safety function** of the overfill prevention controller EUS-2 is the switching off of the safety relay contacts and the deactivation of the electronic filling release output (no release) in case the release signal of the truck level sensors is not correctly detected with regard to the voltage level as well as the timing or there is insufficient conductivity of the grounding connection to the vehicle chassis.

The **safe condition** of the control unit is the switching off of the control outputs (safety relay contacts) in order to interrupt a filling or discharging process (no release).

2. Installation

The control unit has to be installed vertically with the cable glands of the terminal box pointing downwards. An appropriate mounting must be provided by the executor of construction work for this purpose. For hole distances see dimensional drawing (**section 8.2, drawing 2**).

The installation has to be made with four M5 cylinder head or hexagon socket screws. This does not require the housing to be opened. Only the snap-on covers at the upper and lower front panel have to be removed. The device must be fix installed and the installation location should be free from oscillations and vibrations.

The electrical installation must be realized in accordance with IEC / EN 60079-14 and the relevant national and local regulations applicable for the installation of electrical equipment in hazardous areas, e.g. DGUV Regulation 113-001 (EX-RL) in Germany.

Switch off power before making any connections to not intrinsically safe circuits.

To connect the power supply and the control cables to the control unit, the terminal box has to be opened. The four screws to open the terminal box are below its sidewise snap-on covers.

The conductors have to be connected according to the connecting diagram (**section 8.2, drawing 1**). The permissible diameter of the connecting cables must be observed. The permissible terminal area (cable cross section) for the cable gland connection M20 x 1.5 is 6 – 12 mm. All supply and control cables have to be installed firm. The cables have to be pull relieved.

According to the permissible terminal area of the installed terminal block, cables with a wire diameter of 0.5 - 4 mm² must be used only. To connect the individual wires, the connector ends must be stripped of insulation by 10 mm. We recommend the use of solid copper lines. When using wire end ferrules, they must have the shape of a non-insulated conductor.

For filling release, only the closing contacts K1 and K2 (connecting terminals 1-2 or 3-4) or the electronic signal output E1 (connecting terminals 15-16) must be used.

In order to integrate the overfill prevention controller EUS-2 into a **safety-related system**, the following safety-relevant interfaces are provided:

Connection terminals 1-2 (control output K1) and 3-4 (control output K2) or the electronic signal output E1 (connection terminals 15-16)

The relay contacts (K1, K2) are duplicated, mechanically linked, redundant by series relays each and continuously monitored by return signal. The signal output E1 generates a failsafe, dynamic release signal (oscillating signal). In connection with an adapted signal evaluation at the filling station control, a reliable supervision of the signal transmission is possible.

The outer earth terminal must be connected to the closest equipotential bonding.

To achieve external potential equalization, lines with a diameter of 4 to 16 mm2 can be used. With flexible stranded wires it is absolutely necessary to use wire end ferrules.

As truck connecting cable, only a special ten-wire cable with diameter of 14 to 18 mm and single wire shielding according to EN 13922 has to be used. Maximum cable length is 20 m (loading rack installation + truck connecting cable).

When replacing the cable, the proper mounting of the strain relief of the cable glands has to be ensured.

3. Commissioning

Check all electrical connections carefully before first switching-on power supply. For the electronic control outputs E1 and E2 and the data interface, only connections to intrinsically safe circuits with allowed limit values are permitted.

Other control signals besides 'filling release' have to be activated at the EUS-2 using the configuration menu, see section 4.

We recommend performing a functional test according EN 13922:2020, chapter 7.3, after commissioning and after all maintenance procedures with re-connections of the EUS-2 control unit.

The EUS-TST3 testing equipment, available as an accessory, enables a complete system check, including the simulation of an overfilling. During commissioning, it is recommended to check the safety function in order to ensure the expected behavior of the control outputs. The procedure described for the recurring function test can be used for this purpose.

4. System Functions and Configuration

Note: The control unit is fully operational with the factory setting (delivered state from manufacturer). All configuration is optional

4.1. Configuration Controls

The EUS-2 unit features a menu-driven system configuration. The configuration is done by a joystick control and indicated at the graphic display.

4.2. Joystick

System configuration must be performed by qualified and authorized personnel only. For restricted access to the joystick control, it is situated inside the unit. To open the unit, the two snap-on covers at the upper and lower front panel rim must be removed. After loosening the four housing screws, the front panel can be opened to the left. The joystick control is located at the rear side of the front panel, Figure 2. It can be used as a four-way steering stick with a push button functionality.

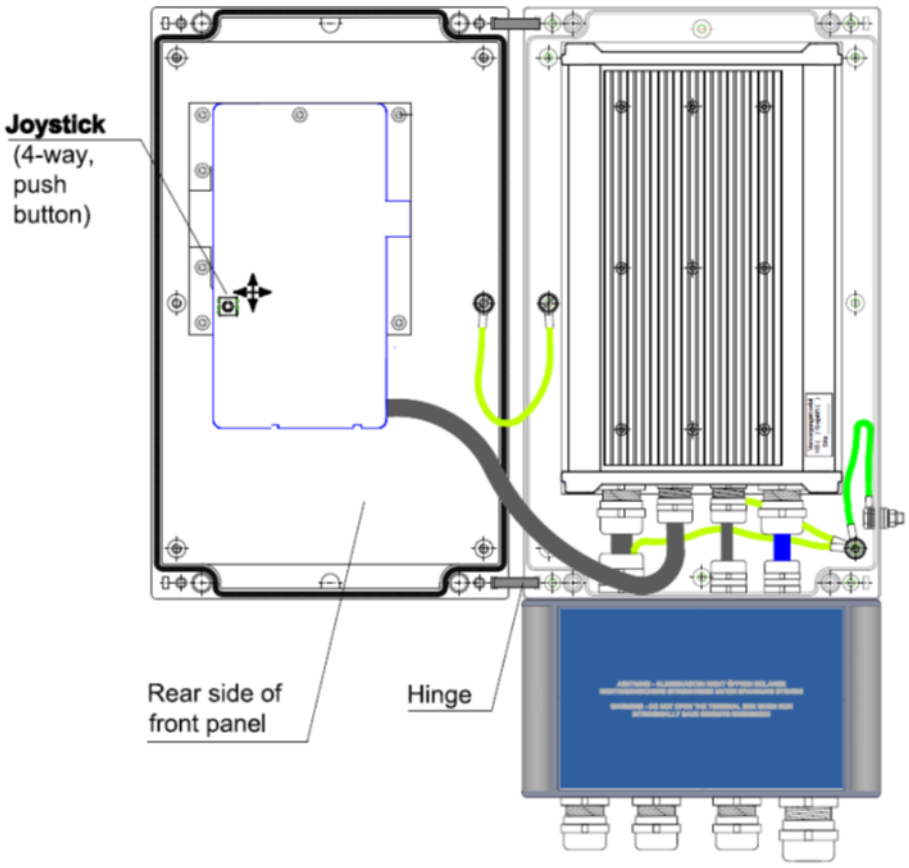


Figure 2: Unclosed overfill control unit EUS-2

4.2.1. Menu Structure

Entering the menu and menu navigation are done by joystick control. While looking at the display, the joystick is well accessible with the fingers of the right hand. A slightly push to the joystick opens the main menu with the following items:

Main Menu	**Description / Submenu**
Language	Change display language, Please contact supplier for available language sets
Settings	Access to the submenu as below to change device setting: ▪ Grounding ▪ Relay output K3 ▪ Relay output K4 ▪ NAMUR E2 ▪ Interface ▪ Default settings ▪ Reset (Re-initialization)
System Info	Access to internal system data and measured values, mainly to assist service and maintenance
Display	Change display contrast

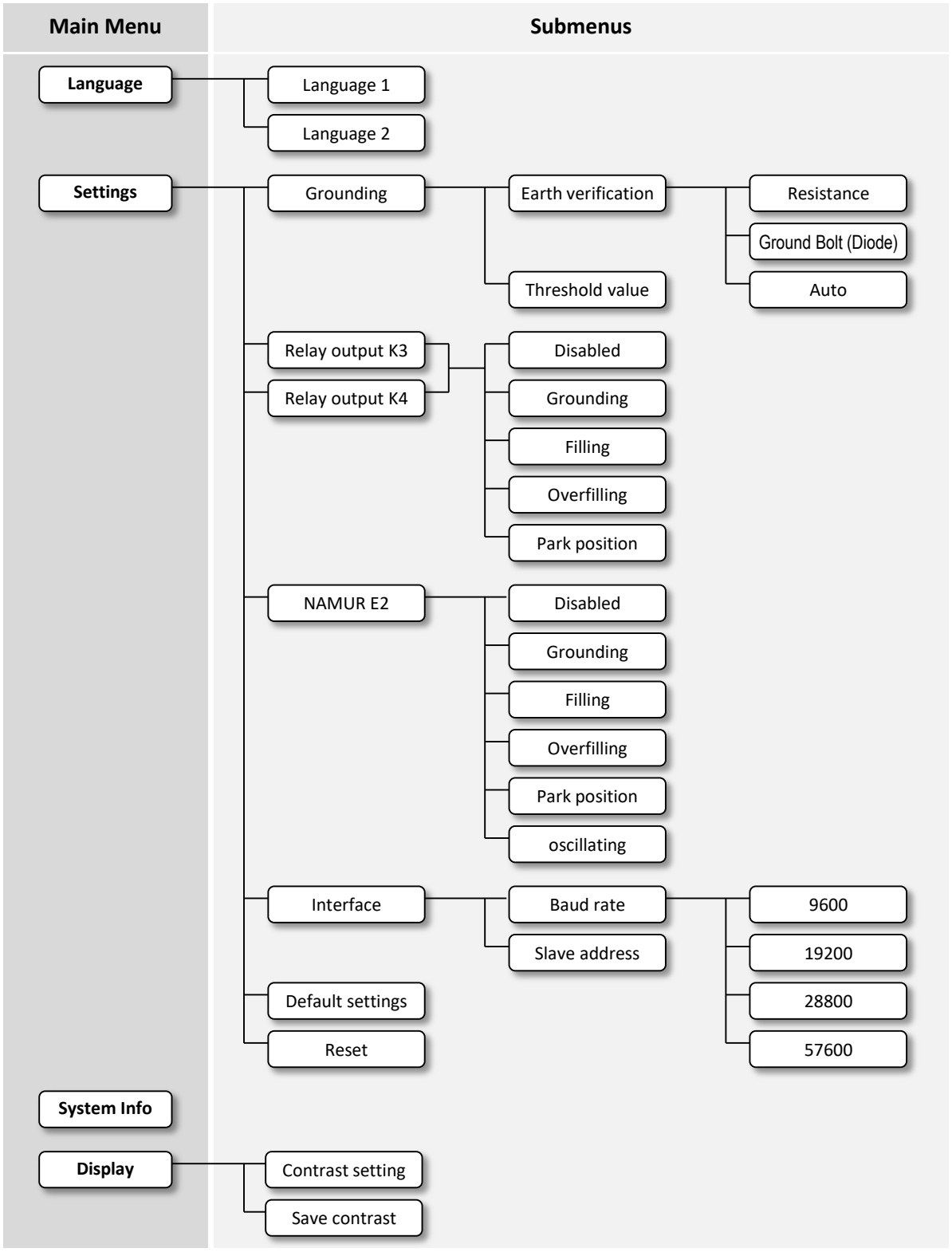


Figure 3: Menu structure

4.3. Level Sensor Circuits

The sensor interface is realized in type of protection 'intrinsic safety' according category 'ia'. It is designed to connect to EN 13922 compliant tank compartment level sensors. The EUS-2 control unit detects the present type of level sensors at the tank truck: serial five-wire or parallel two-wire installation. The mode of operation of the sensor interface will be adapted by the controller accordingly.

Five-wire mode (serial level sensor arrangement, see **Section 1. Figure 1**)
The number of level sensors at the tank truck can be 1 to 12. Only optoelectronic sensors are used at this installation. Thus, the sensor status will be cognizable instantly after connecting to the tank truck. By reason of the serial arrangement, solely the first wet or faulty sensor within the signal chain is cognizable. The indication of the wet or faulty sensor at the unit's display has to be understood under this premise.

Two-wire mode (parallel level sensor arrangement)
The control unit always evaluates eight release signals from the tank truck. The filling permission is given only in case all sensor channels provide a proper release signal. If a tank truck has less than eight tank compartments, the remaining sensor circuits have to be connected to an adequate sensor dummy unit at the tank truck side. This dummy unit must not endanger the intrinsic safety and the channel separation of the sensor circuits.

Thermistor or optoelectronic sensors are used at two-wire installations. Thermal two-wire sensors have a negative temperature coefficient (NTC) behavior and need a temperature-dependent 'heating time' after the connection of the tank truck. In cold environments, a delay of up to 75 seconds is possible until the filling permission will be given. Optoelectronic two-wire sensors react without any time lag.

In case that a wet, faulty or not-ready-to-operate sensor status prohibits filling release, the state of all sensors will be indicated at the display by symbols, Figure 4. This eases determining the overfilled tank compartment or the fault cause.

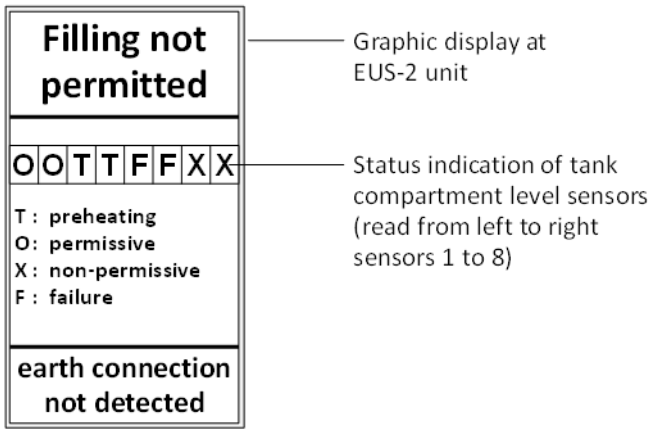


Figure 4: Status indication of tank compartment level sensors at two-wire mode

Regardless of the operational mode of the sensor interface, the control unit monitors continuously all relevant parameters of the sensor signals. Both, internal device failures and failures at the tank truck installation will be detected reliably. In case of a fault, the unit status switches to 'Filling not permitted' and further information concerning the fault cause will be shown at the display in plaintext.

4.4. Ground Verification

The electrostatic grounding of the tank truck is verified by measuring the connection between the grounded earth line 10 (white) and the measuring line 9 (black). Depending on the tank truck installation, this connection is either a direct wiring to the vehicle chassis or with a mounted 'Ground Bolt'. The 'Ground Bolt' is looped in between the measuring line and the vehicle chassis.

The mode of ground detection can be set under the menu items:

Settings > Grounding > Earth verification

Setting to 'AUTO' means automatic detection of the tank truck installation and automatic adaption of the ground detection. Both kinds of installations ('Resistance' / 'Ground Bolt') will be accepted with this setting. By setting to 'Resistance' or 'Ground Bolt' filling permission will only be given for vehicles compliant to the chosen specification. Thus, only vehicles equipped with an installation accepted by the operator of the filling station will be permitted to load.

The EN 13922 standard limit value for the electrostatic grounding via the earth line of the overfill prevention system is 10 kOhm. This conductance is definitely sufficient for discharging static electricity. But by reason of this connection providing the joint ground for the sensor circuitry as well, we recommend to ensure the resistance does not exceed 1000 Ohm. By selecting the mode of ground detection 'Resistance' or 'AUTO', the allowed limit value can be set accordingly. At the mode 'Ground Bolt (Diode)', this setting will be ignored.

Setting a strict limit value enables besides just reliable electrostatic grounding, to monitor the ground connection in regards of its quality.

4.5. Vapor Recovery Monitoring

Filling of tank trucks is only allowed with connected vapor recovery hose. The vapor coupling at the tank truck is equipped with an electro-pneumatic switch. This switch goes to release position only if the vapor recovery hose is connected properly and the pneumatic control air is activated.

As a matter of principle, the switch contact cannot be detected separately by the control unit. It is part of the measuring loop for ground detection (see Figure 1). Does an interruption by the open switch prevent filling release, the control unit indicates at its display 'vapor recovery hose and/or earth connection not detected' consequentially.

4.6. Detecting Parking Position

The control unit can detect the defined parking position of the plug and cable set in conjunction with a code-generating parking position socket at the loading rack. As long as the plug is attached to this so-called parking socket, the control unit switches off the LED light and indicates the corresponding text message at the display. Furthermore, a signal at the contact output or the transistor output can be generated, see **section 4.7**. This signal provides an unambiguous criterion for the tank truck not being connected to the control unit anymore, e.g. for controlling a barrier to prevent unplugged driveaways.

4.7. Display

The dichromatic LED light at the front panel indicates the main status of the control unit with green light for 'Release' and red light for 'Prohibited'. At the same time the relevant status and system information are shown at the status display alongside the LED light. For further information about the display function see **section 5.1.**

4.8. Control Outputs

The EUS-2 unit provides various control signals for its integration into the control of the filling station.

For filling release, only the closing contacts K1 and K2 or the electronic signal output E1 must be used (see section 2).

Configuration control outputs

The following functions can be assigned to the configurable control outputs K3, K4 and E2 (see connecting diagram, **section 8.2 drawing 1**):

Control Signal	Description
Grounding	This signal is always generated if the proper ground connection of the tank truck was detected. It is independent from other release criteria.
Filling Process	The filling process starts with filling release and ends either by disconnecting the tank truck or a wet/submerged level sensor. The filling process does not end as a result of evaluation of other release criteria, e.g. grounding, vapor recovery.
Overfilling	Interruption of sensor release signal during 'filling permission'.
Parking Position of Plug	Truck plug detected at active parking position socket arranged at the loading rack.

The configuration is done at the menu 'Settings'. By pushing the joystick, the selected function of the control output gets activated. This is highlighted by a frame line around the menu item. In addition, the electronic output E2 can get configured to a static signal (conducting transistor, e.g. if proper grounding is detected) or an oscillating signal.

4.9. Serial Data Interface

Another possibility to embed the control unit into the control system or the visual display system of the filling station is given by use of the data interface. The data interface is realized in protection type 'intrinsic safety' and intended for connection to the serial, intrinsically safe TExi data bus.

The following data can be transmitted:

- Operational mode of the control unit
- Type of level sensor at the connected tank truck
- Total number of tank compartments (only with five-wire installation)
- Number of the overfilled tank compartment
- Error messages

For further information see description of the data interface (separate document).

5. Operation

5.1. Status Display

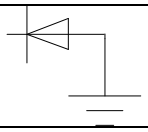
The status display is located at the front besides the LED light. It is divided into three sections. The top section of the display indicates the main status of the control unit:

Message	Meaning
Start	Initialization after switch-on of supply voltage or device reset
Ready for Use	Device is ready for connection to tank truck
Filling permitted	All necessary release preconditions have been met
Filling not permitted	One or more release preconditions have not been met
Overfilling	Interruption of the sensor signal during 'filling permitted'
Park position	Tank truck plug detected at parking position socket
Fault	The internal self-monitoring system indicates a device error

The middle section of the display indicates state dependent system information in plaintext:

- Step of initialization procedure
- Total number of level sensors during 'filling permitted'
- Number of the wet/submerged sensor in case of an 'overfilling'
- Cause for 'filling not permitted' state, e.g. 'vapor recovery hose and/or earth connection not detected', ...

The lower section of the display indicates status and mode of ground detection:

Symbol	Meaning
	Resistive ground detection
	Ground detection by 'Ground Bolt (Diode)' mounted to vehicle chassis

5.2. Operational Use

The plug and cable connection of the overfill prevention systems grounds the tank truck. Thus, the connection of the controller to the tank truck must be made prior to coupling of filling hoses and vapor recovery hose.

The control unit monitors the electrical conductivity of the ground connection and indicates its status at the display, regardless of the ground detection being resistive or by a mounted 'Ground Bolt'. In case of a 'Ground Bolt', besides the grounding symbol a diode symbol is indicated at the display.

Note: The proper grounding of the tank truck will be indicated not until the correct coupling of the vapor recovery hose.

By connecting the vapor recovery hose, the detection circuit gets closed. Until this happens, the display indicates the status information: 'vapor recovery hose and/or earth connection not detected'.

Only in case a proper grounding is detected and all level sensors at the tank truck give a release signal, the controller changes its operational mode to 'filling permitted'. This is indicated by green color of the LED light. At the same time, the controller generates a failsafe signal for controlling the filling process at the loading rack.

At truck installations with five-wire level sensors the number of tank compartments is indicated at the display. At two-wire installations the number of sensor channels is always eight and independent from the actual number of tank compartments. The display indicates the message 'all sensor signals OK'.

If within a filling process the liquid level in the tank compartment reaches the level sensor, e.g. by incorrect quantity pre-selection, the filling process will be interrupted immediately. The red color of the LED light indicates this state. The number of the overfilled compartment is shown at the display. It is not possible to continue filling at this state. Before restart filling, the overfilled compartment has to be emptied until the level sensor is not wet/submerged anymore and provides a release signal.

6. Maintenance

Repairs of the function modules of the control unit must be performed by the manufacturer only. The supply module in the aluminum profile housing is continuously closed and must not be opened.

Within regular device testing according to Health and Safety at Work Regulations, we recommend verifying the intactness of the housing as well as of the plug and cable set. In particular, check:

- contact pins at the plug regarding free movement capabilities,
- proper condition of cover gasket seal,
- tightening condition of cable glands (necessary for type of housing protection IP66).

Additionally we recommend a functional test by using the separate available testing equipment EUS-TST3.

Soiled contact pins of the plug have to get cleaned. To maintain free movement capabilities of the contact pins, treat them with contact spray regularly.

Do not use aggressive cleaning agents, mineral spirits or other petroleum-like substances for cleaning the housing. These substances can affect the characteristics of the housing gasket. If heavily soiled, we recommend using denatured alcohol as cleaning agent.

6.1. Recurring functional test (proof test)

The recurring functional test is used to check the safety function of the device. The functionality must be checked at appropriate intervals and must not exceed an interval of 5 years. For the choice of the type of check the operator is responsible.

Required equipment: Testing equipment EUS-TST3 (5-wire) or EUS-TST3-2W (2-wire)

The recurring test (functional test) must be carried out in accordance with the procedure for performing the test described in the operating instructions for the respective testing equipment.

If the function test is negative, the device must be taken out of operation and, if necessary, other measures taken to maintain the safe state of the safety-related system.

7. Return and Disposal

Only for customers located within the European Community:

According to the Waste Electrical and Electronic Equipment Directive 2002/96/EC (WEEE) and the national acts governing the 'Sale, Return and Environmentally Sound Disposal of Electrical and Electronic Equipment' basing on it, used electrical equipment must be collected separately and disposed of in an environmentally-friendly manner. This measure is intended to protect the environment and contributes to reducing the amount of waste and preventing pollution by recycling the devices and the associated components and raw materials.

Waste electronic and electrical equipment used in private households (known as B2C equipment) must therefore be submitted at the designated collection centers of the municipal public waste management authorities (e.g. recycling centers). B2C devices are characterized by the crossed-out waste bin.

In contrast to this, the devices and equipment manufactured by Timm Elektronik are, however, professional control and measurement devices which are intended exclusively for commercial and industrial use (so-called B2B devices).

For these devices, identified by a type plate with the brand name TIMM ELEKTRONIK, a serial number and date of delivery, H. Timm Elektronik GmbH handles the proper disposal of waste as long as such devices were introduced to the market after August 12th 2005. This is the reason our devices are not labelled with the symbol of a crossed-out rubbish bin. All devices manufactured by Timm Elektronik must therefore **not** be submitted to the collection centers of the public disposal companies, but must be sent back to us for disposal.

Your waste electrical and electronic equipment of Timm Elektronik must be marked with the note **„waste equipment for disposal"** and send to the following address:

Timm Technology GmbH
Senefelder-Ring 45
21465 Reinbek
GERMANY

Please note that we do not accept shipments without proper postage. Also, no waste electrical and electronic equipment (WEEE) delivered prior to August 13th 2005 will be accepted for disposal. The user himself is responsible for the proper disposal of old electrical equipment supplied prior to that date.

8. Technical Annex

8.1. Technical Specifications

Device category (ATEX):	Ⓔx II 2 [1] G
Type of Protection:	Ex eb ib q [ia Ga] IIB T4 Gb
EC-Type Examination certificate:	TÜV 13 ATEX 132121
IECEx Certificate No.:	IECEx TUN 16.0004

Power Supply:

Type of protection:	Ex eb
Supply Voltage:	230 V ±10 % 50-60 Hz about. 25 VA

Contact outputs: 2 potential-free closing contacts and 2 potential free changeover contacts

Type of protection:	Ex eb
Switching power:	250 VAC 3 A 100 VA

Tank truck circuits: **Only for connection to sensor circuits according to EN 13922**

Type of protection:	Ex ia
Maximum ratings:	Uo = 12,7 V Io = 129 mA Po = 360 mW
Characteristic curve:	Linear
	Internal capacitance Co insignificant small
	Internal inductance Lo insignificant small
Maximum cable length:	50 m (Ex related specification, please observe functional limitations)

Signal Outputs: 2 NAMUR-compatible transistor outputs

Type of protection:	Ex ib
Maximum ratings:	Ui ≤ 15 V Ii = 20 mA Pi = 300 mW
	Internal capacitance Ci insignificant small
	Internal inductance Li insignificant small

Data interface: Only for connection to TExi - Bus

Type of protection:	Ex ib
Maximum ratings:	Ui ≤ 15 V Ii ≤ 175 mA Pi ≤ 2.4 W

Cable glands:

Cable gland M20 x 1.5: (KLE 1 – 3)	permissible cable diameter = 6 - 12 mm, Tightening torque = 10 Nm
Cable gland MZ 25 x 1.5: (KLE 4)	permissible cable diameter = 14 - 18 mm, Tightening torque = 12 Nm

Ambient Operating Temperature: - 40 to +60 °C

Housing protection type: IP66

Dimensions: (W x L x H): 215 mm x 475 mm x 120 mm

Weight: 10 kg

8.2. Characteristic safety values for functional safety

The following table shows the relevant parameters and values for evaluating the functional safety of the device:

System	Relevant parameters and values according to IEC 61508					
	λ_{SD} [1/h]	λ_{SU} [1/h]	λ_{DD} [1/h]	λ_{DU} [1/h]	PFD	SFF [%]
EUS-2 in 2-wire-mode	2,40E-08	3,44E-07	5,16E-07	8,67E-08	1,09E-04	91,07
EUS-2 in 5-wire-mode	1,72E-08	3,42E-07	4,79E-07	7,94E-08	9,86E-05	91,34

Lambda λ (Failure rate)

- λ_{SD}: Failure rate for safe, detectable failures
- λ_{SU}: Failure rate for safe, unrecognisable failures
- λ_{DD}: Failure rate for dangerous, detectable failures
- λ_{DU}: Failure rate for dangerous, unrecognisable failures

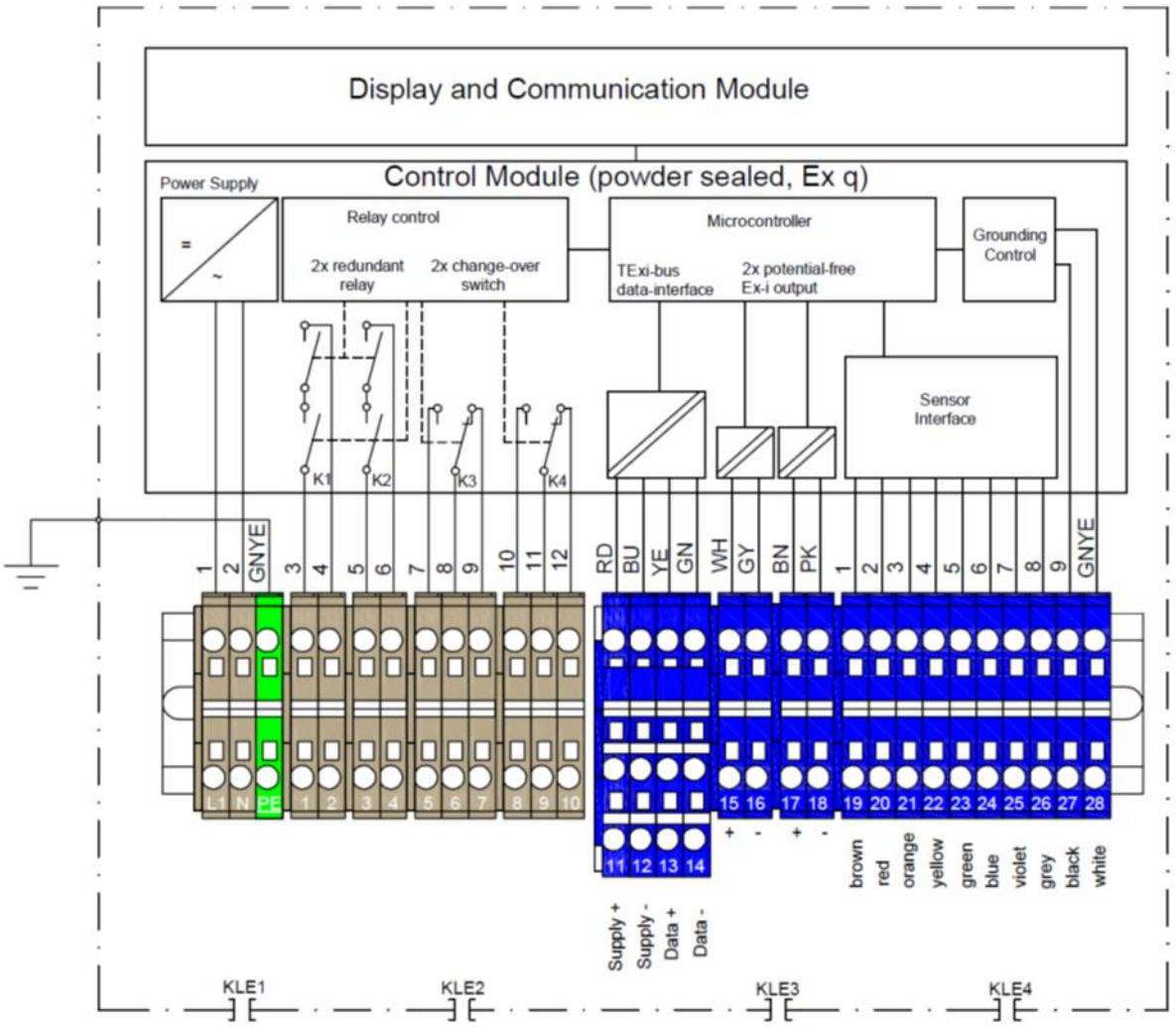
PFD (Probability of Failure on Demand)

Probability of failure of a safety function at a low request rate

SFF (Safe Failure Fraction)

Proportion of safe failures in the total number of failures

8.3. Drawings

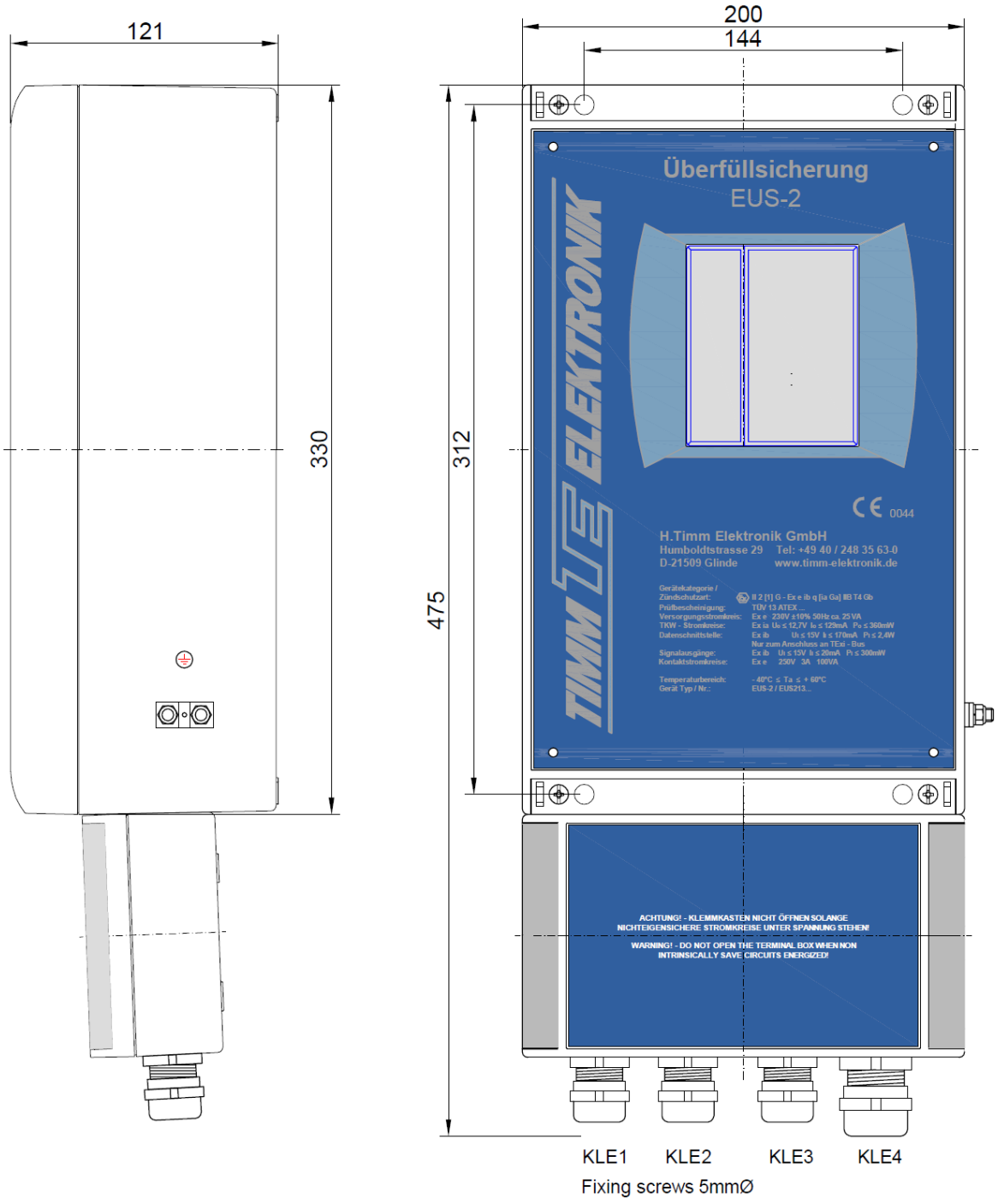


L, N, PE:	Power supply 230V (±10%) 50Hz, ca. 25VA
1 - 2:	Potential-free relay-contact 1: N/O (Internally monitored output)
3 - 4:	Potential-free relay-contact 2: N/O (Internally monitored output)
5 - 7:	Potential-free relay-contact 3 (configurable auxiliary relay)
8-10:	Potential-free relay-contact 4 (configurable auxiliary relay)
	Contact rating (terminal 1-7): max. 250VAC, 3A, 100VA
15 - 16:	Potential-free Ex-i transistor output 1 NAMUR-compatibel
17 - 18:	Potential-free Ex-i transistor output 2 NAMUR-compatibel
	Maximum values: (terminal 15-18): Ui=16V, Ii=20mA, Pi=400mW
11 - 14:	TExi-bus data-interface: Ui = 15 V, Ii = 175 mA, Pi = 2,6 W
19 - 28:	Tank truck cable connection
	Use only cables with a wire diameter of 0,5 – 4 mm² (AWG 20 bis 12)

Cable and cable glands:

KLE1	(M20) Power supply cable diameter 6-12mm
KLE2	(M20) Contakt output cable diameter 6-12mm
KLE3	(M20) Namur transistor output cable diameter 6-12mm
KLE4	(M25) Tank truck cable cable diameter 14-18mm

Drawing 1: Connecting Diagram



Drawing 2: Dimensional Drawing

8.4. EC-Type-Examination Certificate

Translation

(1) **EC-Type-Examination Certificate**

(2) Equipment and protective systems intended for use in potentially explosive atmospheres, **Directive 94/9/EC**

(3)	**Certificate Number**	**TÜV 13 ATEX 132121**
(4)	for the equipment:	Overfill Prevention Controller type EUS-2
(5)	of the manufacturer:	H. Timm Elektronik GmbH
(6)	Address:	Humboldtstr. 29 21509 Glinde Germany
	Order number:	8000427833
	Date of issue:	2014-02-26

(7) The design of this equipment or protective system and any acceptable variation thereto are specified in the schedule to this EC-Type-Examination Certificate and the documents therein referred to.

(8) The TÜV NORD CERT GmbH, notified body No. 0044 in accordance with Article 9 of the Council Directive of the EC of March 23, 1994 (94/9/EC), certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive. The examination and test results are recorded in the confidential report No. 13 203 132121.

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

EN 60079-0:2012
EN 60079-5:2007
EN 60079-7:2007
EN 60079-11:2012

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

(11) This EC-type-examination certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment or protective system must include the following:

II 2 [1] G Ex e ib q [ia Ga] IIB T4 Gb

TÜV NORD CERT GmbH, Langemarckstraße 20, 45141 Essen, notified by the central office of the countries for safety engineering (ZLS), Ident. Nr. 0044, legal successor of the TÜV NORD CERT GmbH & Co. KG Ident. Nr. 0032

The head of the notified body

Meyer

Hanover office, Am TÜV 1, 30519 Hannover, Fon +49 (0)511 986 1455, Fax +49 (0)511 986 1590

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TÜV NORD

(13) **SCHEDULE**

(14) **EC-Type-Examination Certificate No. TÜV 13 ATEX 132121**

(15) Description of equipment

The EUS-2 Controller builds up the loading terminal's part of the overfill prevention system according to EN13922. It's used during filling process of tank trucks with otto engine fuel resp. diesel fuel at fuel depots or refinery. The controller connects using a multi-pole cable with the tank truck and permanently monitors the level sensors of tank compartment as well as the status of simultaneously established grounding connection. The release of filling process will be established if all preconditions have been reached. It will be optically indicated of the device's front panel and by electric outputs signal used for automated control of the filling process.

Specification:

Power supply	
Type of protection:	Ex e
Supply voltage:	230V±10% 50-60Hz ca. 25VA
Control outputs:	2 potential-free closing contacts and 2 potential-free change over contacts
Type of protection:	Ex e
Switching power:	250 VAC, 3A, 100VA
Tank trucks circuits:	
Type of protection:	Ex ia
Maximum ratings:	$U_o \leq 12.7V$, $I_o \leq 129mA$, $P_o \leq 360mW$
Characteristic curve:	linear C_o negligible small L_o negligible small
Maximum cable length:	50m
Signal outputs:	2 NAMUR-transistor outputs
Type of protection:	Ex ib
Maximum ratings:	$U_i \leq 15V$, $I_i \leq 20mA$, $P_i \leq 300mW$ C_i negligible small L_i negligible small
Data interface:	
Type of protection:	Ex ib
Maximum ratings:	$U_i \leq 15V$, $I_i \leq 175mA$, $P_i \leq 2.4W$ Only allowed to connect to TExi-Bus
Size (w x l x h):	215mm x 475mm x 120mm
Weight:	ca. 10kg
Ingress protection:	IP66

Allowed ambient temperature range: -40°C to +60°C

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TÜV NORD

Schedule EC-Type Examination Certificate No. TÜV 13 ATEX 132121

(16) Test documents are listed in the test report No. 13 203 132121

(17) Special conditions for safe use

none

(18) Essential Health and Safety Requirements

no additional ones

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8.5. Functional Safety Certificate

TÜV NORD

ZERTIFIKAT
CERTIFICATE

Hiermit wird bescheinigt, dass das unten beschriebene Produkt der Firma
This certifies that the product mentioned below from company

H. Timm Elektronik GmbH
Senefelder-Ring 45
21465 Reinbek
Deutschland

die Anforderungen der folgenden Prüfunterlage(n) erfüllt.
fulfills the requirements of the following test regulations.

Geprüft nach: *Tested in accordance with:*	**EN 61508:2010 (SIL 2)**
Beschreibung des Produktes: (Details s. Anlage 1) *Description of product:* *(Details see Annex 1)*	**Überfüllsicherung** *Overfill protection*
Typenbezeichnung: *Type designation:*	**EUS-2**
Bemerkungen: *Remarks:*	**Siehe Anlage 1** *See Annex 1*

Dieses Zertifikat bescheinigt das Ergebnis der Prüfung an dem vorgestellten Prüfgegenstand. Eine allgemein gültige Aussage über die Qualität der Produkte aus der laufenden Fertigung kann hieraus nicht abgeleitet werden.
This certifies the result of the examination of the product sample submitted by the manufacturer. A general statement concerning the quality of the products from the series manufacture cannot be derived there from.

Registrier-Nr. / *Registered No.* 44 799 16129103
Prüfbericht Nr. / *Test Report No.* 3526 8700
Aktenzeichen / *File reference* 80030018262

Gültigkeit / *Validity*
von / *from* 2020-10-09
bis / *until* 2025-10-08

Zertifizierungsstelle der
TÜV NORD CERT GmbH

Essen, 2020-10-09

TÜV NORD CERT GmbH Langemarckstraße 20 45141 Essen www.tuev-nord-cert.de technology@tuev-nord.de

Bitte beachten Sie auch die umseitigen Hinweise
Please also pay attention to the information stated overleaf

TÜV NORD

ANLAGE
ANNEX

Anlage 1, Seite 1 von 2
Annex 1, page 1 of 2

zum Zertifikat Registrier-Nr. / *to Certificate Registration No.* 44 799 16129103

Produktbeschreibung: *Product description:*	**Die Überfüllsicherung EUS-2 überwacht permanent den Zustand der Tankkammer Niveausensoren sowie die Wirksamkeit der gleichzeitig hergestellten Erdverbindung. Die Freigabe für eine Befüllung wird nur erteilt, wenn ein korrektes Sensor-Freigabesignal detektiert wird und eine ausreichende Leitfähigkeit der Erdverbindung mit dem Fahrzeugchassis besteht. Ist dies nicht der Fall geht das System in den sicheren Zustand und schaltet die Steuerausgänge ab und deaktiviert den elektronischen Freigabeausgang, um so den Befüllvorgang zu unterbrechen.** *The overfill protection EUS-2 is used to supervise the status of the tank compartment level sensors as well as the efficiency of the ground connection. A filling is exclusively enabled, if a correct sensor-enable-signal and a sufficient ground connection to the vehicle chassis is given. Otherwise the system enters the safe state and switches off the control outputs and deactivate the enable-outputs to stop the filling process.*	
Technische Daten: *Technical data:*	**Versorgungsspannung:** *Supply Voltage:*	*230 V ±10 % 50 - 60 Hz, ca. 25 VA* *230 V ±10 % 50 - 60 Hz, ca. 25 VA*
	Sicherheits-Relaiskontakte: *Safety related relay contacts:*	**2 Schließer** **(potentialfrei 250 VAC, 3A, 100VA)** **2 NO contacts** **(isolated 250 VAC, 3 A, 100VA)**
	Umgebungstemperatur im Betrieb: *Operational ambient temperature range:*	**-40 °C ... 60 °C** *-40 °C ... 60 °C*
	Gehäuseschutzart: *Ingress Protection Level:*	**IP66**

Zertifizierungsstelle der
TÜV NORD CERT GmbH

Essen, 2020-10-09

TÜV NORD CERT GmbH Langemarckstraße 20 45141 Essen www.tuev-nord-cert.de technology@tuev-nord.de

ANLAGE
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Anlage 1, Seite 2 von 2
Annex 1, page 2 of 2

zum Zertifikat Registrier-Nr. / *to Certificate Registration No.* 44 799 16129103

Hinweise zur sicheren Verwendung:
Notes for safe use:

1. **Die Originalbetriebsanleitung ist zu beachten.**
   Original instruction manual must be considered.

2. **Für die vollständige Beurteilung der funktionalen Sicherheit einer Sicherheitsfunktion müssen alle Anforderungen der EN 61508 auf die gesamte Sicherheitsfunktion angewendet werden, in der die Überfüllsicherung EUS-2 zur Anwendung kommt.**
   For a complete functional safety assessment of a safety function, all requirements of EN 61508 have to be applied to the complete safety function in which the Overfill Protection EUS-2 is used.

3. **Die Gültigkeit der Prüfergebnisse ist nur für die folgenden Versionen gegeben:**
   The validity of the assessment is only given for the following versions:

   Hardware:

Netzteilplatine	TE12-823 V1.4
TWI Platine	TE12-821 V1.3
Anzeigeplatine	TE12-825 V1.3

   Software:

   EUS-2 STM V1.60G (Md5: 9bed241466fedfc2a7d6f4da0612520a)

   EUS-2 STM V1.60N (Md5: c0337fc533c508a94aa52560a11e4130)

Zertifizierungsstelle der
TÜV NORD CERT GmbH

Essen, 2020-10-09

TÜV NORD CERT GmbH Langemarckstraße 20 45141 Essen www.tuev-nord-cert.de technology@tuev-nord.de

8.6. EU Declaration of Conformity

EU-Konformitätserklärung

EU Declaration of Conformity

Timm Technology GmbH | Senefelder-Ring 45 | 21465 Reinbek | Germany

Erklärt als Hersteller in alleiniger Verantwortung, dass das Produkt |
declares in its sole responsibility as manufacturer that the product

Überfüllsicherung Typ EUS-2

Overfill Prevention Controller type EUS-2

mit den Anforderungen der folgenden EU-Richtlinien und harmonisierten Normen übereinstimmt | *is in conformity with the requirements of the following EU directives and harmonised standards:*

**EU Richtlinien	*EU Directives***	**Normen	*Standards***
EMV-Richtlinie 2014/30/EU *EMC Directive 2014/30/EU*	EN 55011:2016 + A1:2017 + A11:2020 + A2:2021 EN 61326-1:2013
ATEX-Richtlinie 2014/34/EU *ATEX Directive 2014/34/EU*	EN IEC 60079-0:2018 EN 60079-5:2015 EN IEC 60079-7:2015/A1:2018 EN 60079-11:2012
RoHS-Richtlinie 2011/65/EU *RoHS Directive 2011/65/EU*	EN IEC 63000:2018

ATEX-Kennzeichnung | *ATEX-Marking:* Ex II 2 [1] G Ex eb ib q [ia Ga] IIB T4 Gb

EG-Baumusterprüfbescheinigung | *EC Type Examination Certificate:* TÜV 13 ATEX 132121 CE 0044
(TÜV NORD CERT GmbH, Geschäftsstelle Hannover, Am TÜV 1, 30519 Hannover)

Weiterhin erklären wir, dass das vorstehend genanntes Produkt den technischen Spezifikationen für Überfüllsicherungssysteme zur Befüllung Europäischer Straßentankfahrzeuge mit Untenbefüllung und Gaspendelung gemäß Anhang IV der Richtlinie 94/63/EG und der Norm EN 13922:2020 entspricht. / In addition we declare that the above-mentioned product is in compliance with the technical specifications of the directive 94/63/EC Annex IV and standard EN 13922:2020, relating to the conception and construction of Overfill Prevention Systems for European bottom-loading tank trucks with vapour recovery.

(Fortsetzung Seite 2 | *continue page 2)*

info@timm-technology.de
www.timm-technology.de

Seite 2 der EU-Konformitätserklärung zur Überfüllsicherung Typ EUS-2

Page 2 of EU Declaration of Conformity for the Overfill Prevention Controller type EUS-2

Reinbek 12.10.2022

Ort und Datum |
Place and date

Dr. Thomas Overbeck
Geschäftsführer | *General Manager*

Anlagen: |
Enclosures:

EG-Baumusterprüfbescheinigung TÜV 13 ATEX 132121 |
EC-Type-Examination Certificate TÜV 13 ATEX 132121

Herstellererklärung zur Übereinstimmung der genannten Normenstände vom 12.10.2022 |
Manufacturer's Declaration on the compliance of the stated standards, dated 12/10/2022

Anerkennung des Qualitätssicherungssystems TÜV 98 ATEX 1362Q |
Production quality assessment notification TÜV 98 ATEX 1362Q

Herstellererklärung zur Übereinstimmung der genannten Normenstände als Anlage zur EU-Konformitätserklärung vom 12.10.2022

Manufacturer's Declaration on the compliance of the stated standards as enclosure to EU Declaration of Conformity dated 12/10/2022

Timm Technology GmbH | Senefelder-Ring 45 | 21465 Reinbek | Germany

bestätigt auf der Grundlage eigenverantwortlich durchgeführter Bewertungen die Übereinstimmung der in den folgenden, in der EG-Baumusterprüfbescheinigung TÜV 13 ATEX 132121 aufgeführten Europäischen Normen | *confirms on basis of assessments under our manufacturer's responsibility the compliance of the following standards listed in the EC-Type-Examination Certificate TÜV 13 ATEX 132121*

EN 60079-0:2012	Explosionsgefährdete Bereiche - Teil 0: Betriebsmittel - Allgemeine Anforderungen | *Explosive atmospheres - Part 0: Equipment - General requirements*
EN 60079-5:2007	Explosionsfähige Atmosphäre - Teil 5: Geräteschutz durch Sandkapselung "q" | *Explosive atmospheres - Part 5: Equipment protection by powder filling "q"*
EN 60079-7:2007	Explosionsfähige Atmosphäre - Teil 7: Geräteschutz durch erhöhte Sicherheit "e" | *Explosive atmospheres - Part 7: Equipment protection by increased safety "e"*

festgelegten Anforderungen an die Konzeption und die Bauart der / *referring the requirements related to the design and construction of the*

Überfüllsicherung Typ EUS-2

Overfill Prevention Controller type EUS-2

mit den Anforderungen, der zum Zeitpunkt der Ausstellung dieser EU-Konformitätserklärung im Amtsblatt der Europäischen Union genannten Normausgaben: | *with the requirements of the EN standards stated in the Journal of the European Union at the date of the issue of this EU Declaration of Conformity:*

EN IEC 60079-0: 2018	Explosionsgefährdete Bereiche - Teil 0: Betriebsmittel - Allgemeine Anforderungen | *Explosive atmospheres - Part 0: Equipment - General requirements*
EN 60079-5:2015	Explosionsgefährdete Bereiche - Teil 5: Geräteschutz durch Sandkapselung "q" | *Explosive atmospheres - Part 5: Equipment protection by powder filling "q"*
EN IEC 60079-7: 2015/A1:2018	Explosionsgefährdete Bereiche - Teil 7: Geräteschutz durch erhöhte Sicherheit "e" | *Explosive atmospheres - Part 7: Equipment protection by increased safety "e"*

(Fortsetzung Seite 2 | continue page 2)

info@timm-technology.de
www.timm-technology.de

Seite 2 der Herstellererklärung zur Übereinstimmung der genannten Normenstände als Anlage zur EU-Konformitätserklärung vom 12.10.2022

Page 2 of the Manufacturer's Declaration on the compliance of the stated standards as enclosure to EU Declaration of Conformity dated 12/10/2022

Diese Erklärung wird verantwortlich für den Hersteller abgegeben durch: |
This declaration is given under the sole responsibility of the manufacturer by:

Reinbek, 12.10.2022

Ort und Datum |
Place and date

Dr. Thomas Overbeck
Geschäftsführer | *General Manager*

8.7. IECEx Certificate of Conformity

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

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

Certificate No.:	IECEx TUN 16.0004	Issue No: 0	Certificate history: Issue No. 0 (2016-02-22)
Status:	**Current**	Page 1 of 3	
Date of Issue:	**2016-02-22**		
Applicant:	**H. Timm Elektronik GmbH** Humboldtstraße 29 21509 Glinde **Germany**		
Equipment:	**Overfill Prevention Controller EUS-2**		
Optional accessory:			
Type of Protection:	**Protection by increased safety "e", Protection by intrinsic safety "i", Protection by powder filling "q"**		
Marking:	Ex eb ib q [ia Ga] IIB T4 Gb		

Approved for issue on behalf of the IECEx Certification Body: Andreas Meyer

Position: Head of IECEx Certification Body

Signature:
(for printed version)

Date:

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

Certificate issued by:

TÜV NORD CERT GmbH
Hanover Office
Am TÜV 1
30519 Hannover
Germany

IECEx Certificate of Conformity

Certificate No:	IECEx TUN 16.0004	Issue No: 0
Date of Issue:	**2016-02-22**	Page 2 of 3
Manufacturer:	**H. Timm Elektronik GmbH** Humboldtstraße 29 21509 Glinde **Germany**	

Additional Manufacturing location(s):

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

STANDARDS:

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

IEC 60079-0 : 2011 Edition:6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-11 : 2011 Edition:6.0	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
IEC 60079-5 : 2015 Edition:4.0	Explosive atmospheres –Part 5: Equipment protection by powder filling "q"
IEC 60079-7 : 2015 Edition:5.0	Explosive atmospheres – Part 7: Equipment protection by increased safety "e"

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

TEST & ASSESSMENT REPORTS:

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

Test Report:

DE/TUN/ExTR16.0001/00

Quality Assessment Report:

DE/TUN/QAR15.0008/00

IECEx Certificate of Conformity

Certificate No: IECEx TUN 16.0004 Issue No: 0

Date of Issue: **2016-02-22** Page 3 of 3

Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

Overfill Prevention Controller type EUS-2

The data can be found in the "Attachment to IECEx TUN 16.0004 Issue 0".

CONDITIONS OF CERTIFICATION: NO

Annex:

Attachment to IECEx TUN 16.0004 Issue 0.pdf

TÜV NORD CERT GmbH
Hanover Office
Am TÜV 1
30519 Hannover
Germany

Attachment to IECEx TUN 16.0004 Issue 0

Parameters:

Power supply	
Type of protection:	Ex eb
Supply voltage:	230V±10% 50-60Hz ca. 25VA
Control outputs:	2 potential-free closing contacts and 2 potential-free change over contacts
Type of protection:	Ex eb
Switching power:	250 VAC, 3A, 100VA
Tank trucks circuits:	Only for connection to sensor circuits
Type of protection:	Ex ia IIB
Maximum ratings:	$U_o \leq 12.7V$, $I_o \leq 129mA$, $P_o \leq 360mW$
Characteristic curve:	linear

The Maximum permissible values for the external inductance L_o = 0.2 mH and the external capacitance C_o = 5.8 µF

Maximum cable length: 50m

Signal outputs:	2 NAMUR-compatible transistor outputs
Type of protection:	Ex ib IIB
Maximum ratings:	$U_i \leq 15V$, $I_i \leq 20mA$, $P_i \leq 300mW$

The effective internal capacitance and inductance are negligibly small.

Data interface:	Only for connection to TExi - Bus
Type of protection:	Ex ib IIB
Maximum ratings:	$U_i \leq 15V$, $I_i \leq 175mA$, $P_i \leq 2.4W$

The effective internal capacitance and inductance are negligibly small.

Size (w x l x h):	215mm x 475mm x 120mm
Weight:	ca. 10kg
Ingress protection:	IP66

Allowed ambient temperature range: -40°C to +60°C

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8.8. IECEx Quality Assessment Report

IECEx Quality Assessment Report Summary

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification System for Explosive Atmospheres
for rules and details of the IECEx Scheme visit www.iecex.com

QAR Ref. No.: **DE/TUN/QAR15.0008/04**

Page 1 of 1

QAR Free Ref. No.: **19 216 239624**

Status: **Issued**

Details of change: re-certification, no other changes
Change in product Information (only editorial)

Date of issue: **2019-06-06**

Valid until: **2022-06-09**

Site(s) audited: **H. Timm Elektronik GmbH**
Humboldtstr. 29
Glinde 21509
Germany

Audit date: **2019-05-22**

Issuing ExCB: **TUN - TÜV NORD CERT GmbH**

Manufacturer: **H. Timm Elektronik GmbH**
Humboldtstr. 29
Glinde 21509

Location of Manufacturer: **Germany**

Product information: Electronic monitoring, measurement and control equipment, as well as data communication systems

Protection concept: **Powder filling "q" Intrinsic safety "i" Increased safety "e" Protection by enclosures "t"**

Related QARs:

DE/TUN/QAR15.0008/00 DE/TUN/QAR15.0008/01 DE/TUN/QAR15.0008/02
DE/TUN/QAR15.0008/03

Related Certificates (manual insertion):

Related Certificates (automatic linking):

Related Certificates for previous versions:

IECEx PTB 17.0036 issue: 0 IECEx TUN 16.0004 issue: 0

Comments: QM-System is also certified acc. to ISO 9001:2015 (certificate no. 08100992238) and Directive 2014/34/EU-Annex IV,
DIN EN ISO/IEC 80079-34 (certificate no. 98ATEX1362Q)