
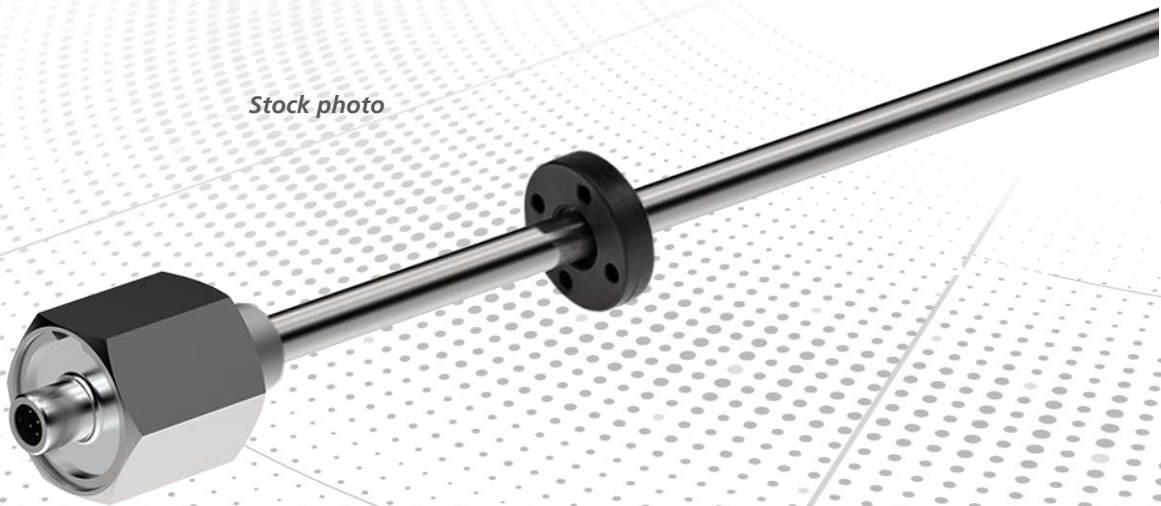


# Explosion Protection Enclosure with integrated measuring system

 Explosion Protection Enclosure - Type  
\_LMRS-34 Ex, Art.-Nr.: 346-xxxxx

*Stock photo*



CE

 II 3 G Ex ec IIC T4 Gc X

 II 3 D Ex tc IIIC T100°C Dc X

**Date of manufacture: DD.MM.YYYY**

- \_ Basic safety instructions
- \_ Intended use
- \_ Product description
- \_ Technical data
- \_ Explosion protection characteristics
- \_ Assembly



**User Manual**

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### Text

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`Courier`-text shows text which is visible on the display or screen as well as software menu-selections.

" < > " refers to keys on your computer keyboard (e.g. <RETURN>).

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<b>Amendment-index</b>
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Amendment	Date	Index
First edition	09/26/2025	03

# 1 General


This -User manual contains all relevant explosion-safety information and includes the following topics:

- Basic safety instructions
- Intended use
- Product description
- Technical data
- Explosion protection characteristics
- Assembly

Since the documentation has a modular structure, this -User manual represents a supplement to the other documentation such as for example product data sheets, dimensional drawings and leaflets etc.

The -User manual is included, but can also be ordered separately.


## 1.1 Scope

This -User manual applies exclusively to the following explosion protection enclosure series with article no.: 346-xxxxx:

LMRS-34 Ex  II 3G Ex ec IIC T4 Gc X  II 3D Ex tc IIIC T100°C Dc X

The products are labelled with affixed nameplates and are components of a system.

## 1.2 Applicable documents

- operator's system-specific operation instructions
- this -User manual
- interface-specific user manual
- pin assignment
- Dimensional drawing
- product data sheet: [www.tr-electronic.de/s/S026520](http://www.tr-electronic.de/s/S026520)
- product documentation from third-party manufacturers (counter plugs, cables)

### 1.3 Relevant directives and standards

The explosion protection enclosure is developed, constructed and finished under compliance with the applicable European- or International standards and directives.

EU-Directive 2014/30/EU	Electromagnetic compatibility
EU-Directive 2014/34/EU	Equipment and protective systems intended for use in potentially explosive atmospheres
EN 61000-6-2	EMC: Interference immunity
EN 61000-6-3	EMC: Interference emission
EN 60079-0	Explosive atmospheres: General requirements
EN IEC 60079-7	Explosive atmospheres: Equipment protection by increased safety "e"
DIN EN 60079-14	Explosive atmospheres: Electrical installations design, selection and erection
EN 60079-31	Explosive atmospheres: Equipment dust ignition protection by enclosure "t"
DIN EN 60529	Degrees of protection provided by enclosures (IP code)

## 1.4 Used abbreviations / Terms

LMRS-34 Ex	Explosion protection enclosure with integrated measuring system of the LMRS-34 series, type with tube-housing (Standard version).
EU	<b>E</b> uropean <b>U</b> nion
EMC	<b>E</b> lectro <b>m</b> agnetic <b>c</b> ompatibility
ESD	<b>E</b> lectro <b>S</b> tatic <b>D</b> ischarge
IEC	<b>I</b> nternational <b>E</b> lectro-technical <b>C</b> ommission
VDE	Association for Electrical, Electronic & Information Technologies

## 1.5 Product description

The aluminum explosion protection enclosure with built-in systems and integrated evaluation electronics serves the detection of linear movements for fixed installations.

The explosion protection enclosure has the ignition protection type

- "e": increased safety (potential gas-explosive atmosphere) and
- "t": protection by the enclosure (potential dust-explosive atmosphere)

Through its manner of construction, the types of ignition protection and additional measures, the enclosure is suitable for the incorporation of non-explosion protected installation devices such as the measuring system of the series LMRS-34.

The construction, as well as the interaction of the individual components and the housing with regards to their possibilities for use in potentially explosive areas, are tested by the company TR Electronic GmbH and confirmed by identification with the nameplate.



- The explosion protection enclosure is supplied without a mating connector or cable. Refer to the chapter "Intended use" on page 11.
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## 2 Basic safety instructions

### 2.1 Symbol- and note definition



means that death or serious injury can occur if the required precautions are not met.

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means that minor injuries can occur if the required precautions are not met.

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**NOTICE**

means that damage to property can occur if the required precautions are not met.

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indicates important information or features and application tips for the product used.

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signifies that respective ESD-safety measures according to DIN EN 61340-5-1 supplement 1 are to be observed.

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### 2.2 Obligation of the operator prior to commissioning

As an electronic device and for use in potentially explosive areas, the explosion protection enclosure with integrated measuring system is subject to the provisions of the EU-directives EMC and ATEX.

Therefore commissioning of the device is only allowed once it has been established that the system/machine in which the device is to be installed, complies with the provisions of the EU-directives EMC and ATEX, the harmonized standards, European standards or the respective national standards.

### 2.3 General dangers with the use of this product

The product, hereafter referred to as **equipment** is manufactured using the latest technology and according to recognized safety regulations. **Nevertheless, non-intended use can cause danger to life and limb of the user or third parties or cause damage to the equipment and other property!**

Only use the equipment for its intended use, with safety- and danger awareness and in compliance with the Use operating materials only as intended, in a safe and hazard-conscious manner, observing the **Applicable documents!**

The operator of an electrical system in a potentially explosive environment should keep the equipment in a proper condition, it should be properly operated and monitored and maintenance- as well as repairs are to be performed. This also includes inspection of the equipment for possible transport damage prior to commissioning.

Power connections may not be connected or disconnected with the power engaged. Generally, wiring work as well as opening and closing of electrical connections may only be performed with the power switched off.

The equipment may not be used in case of defects, as a basic principle it may not be opened and dust deposits > 2 mm must be removed.

## 2.4 Intended use


The equipment is used to record linear movements and process measurement data for downstream control in industrial process and control sequences.


The equipment is a stationary device for use in Ex Zone 2 (gas explosion hazardous areas, II 3 G, device protection level Gc) or 22 (areas with combustible dust, II 3 D, device protection level Dc).

Installation is carried out using the specified mounting options. The electrical data indicated on the type plate, as well as the device category, temperature class, etc. for the place of use must be observed. The operating temperature range of the equipment is -20°C to +70°C.

The equipment is delivered without a mating connector. The connectors selected by the operator must have an EU declaration of conformity in accordance with the ATEX Directive 2014/34/EU.

The selected cable must generally be suitable for the hazardous area in which it is used and the ambient conditions. The information in EN 60079-14 must be observed in this regard.

The selected components must be selected and operated in accordance with the requirements specified in this -User manual or the manufacturer's specifications. No new ignition sources may be created in the process.

In accordance with the ATEX directive, the equipment with the mating connector/cable forms an ATEX-compliant assembly. The conformity of the complete assembly must therefore be verified separately after installation. This is ensured if the operator follows the specifications in this -User manual and the component manufacturer's instructions.

See the chapter "Special conditions for safe use, marking "X"" on page 17.

### **Intended use also includes:**

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- Observe all information in the **Applicable documents**.
- Observe the type plate and any prohibition or information signs affixed to the equipment.
- Observe the accompanying documents.
- Operate the equipment within the limits specified in the technical data.

### 2.5 Non-intended use

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***Risk of death, bodily injury or damage resulting from non-intended use of the equipment!***

**⚠ WARNING**

- Since the equipment is **not a safety component** according to the EU-machine directive, a plausibility test of the measuring-system-values has to be performed through the downstream control.
- It is compulsory for the operator to incorporate the equipment into their own safety system.

**NOTICE**


- The following uses are especially prohibited:
  - in environments with an explosive atmosphere of the Zones 0, 1, 20 and 21
  - for medical aims
  - commissioning of the equipment if the nameplate is no longer readable or is completely missing.

## 2.6 Warranty and liability

The "General terms and conditions" ("Allgemeine Geschäftsbedingungen") of the company TR Electronic GmbH apply in general. This will be available to the operator with the contract confirmation or –conclusion at the latest. Warranty- or liability claims with regards to personal- and property damage are excluded, if they are the result of one or more of the following causes:

- Non-intended use of the equipment.
- Improper assembly, installation, commissioning, programming, maintenance or dismantling of the equipment.
- Improperly executed work on the equipment by unqualified personnel.
- Operating of the equipment in the presence of technical defects.
- The performance of unauthorized mechanical or electrical modifications of the equipment.
- The performance of unauthorized repairs
- Catastrophic incidents caused by external forces or acts of God.

## 2.7 Organizational measures

- The applicable documents must always be kept within reach in the equipment's operating location.
- In addition to the applicable documents, the generally applicable legal regulations and other mandatory directives for work safety, accident prevention and environmental conservation are to be observed and conveyed.
- The applicable national-, site- and system-specific provisions and requirements are to be observed and conveyed.
- The operator has the obligation to point out any special operational features and requirements to the personnel.
- Before starting work, the personnel responsible for work on or with the equipment must have read and understood the -User manual, in particular the chapter on "Basic safety instructions".
- The nameplate and possible affixed prohibition- or instruction labels on the equipment must be kept in a readable condition.
- Do not perform any mechanical or electrical modifications to the equipment, except those which are specifically described in the applicable documents.
- Repairs may only be performed by the manufacturer, or by a person or body who carries the manufacturer's authorization.

### 2.8 Personnel selection and -qualification; basic obligations

#### 2.8.1 Electrical installations design, device selection and erection

The project development of electrical systems, the selection of the devices and the installation in potentially explosive atmospheres may only be performed by persons whose training includes instruction in various types of ignition and installation techniques, applicable regulations and prescriptions as well as general principles of the Zone-classification. The persons must have the relevant competence for the type of work to be performed.

The personnel must regularly undergo corresponding further training or courses.

For definitions on the knowledge, expertise and competence of the "responsible persons", "manual workers" and "planners", the IEC 60079-14 or DIN EN 60079-14 standards are to be additionally consulted [suppliers e.g. Beuth Verlag GmbH, VDE-Verlag GmbH].

#### 2.8.2 Inspection, maintenance and repair

The inspection, maintenance and repair of electrical systems in potentially explosive environments may only be performed by experienced personnel who have also gained knowledge on the various types of ignition and installation procedures, the requirements of the IEC / DIN EN 60079-17 standard, relevant national provisions and company regulations for the system as well as on the general principles of the Zone-classification during their training.

Personnel are to undergo appropriate further training or instruction regularly. Proof of the relevant experience and completed training must be available.

For definitions on the knowledge, expertise and competence of the "responsible persons", "expert person with leadership functions" and the "performing personnel", the IEC 60079-17 or DIN EN 60079-17 standards are to be additionally consulted [suppliers e.g. Beuth Verlag GmbH, VDE-Verlag GmbH].

## 2.9 First commissioning / Commissioning

Prior to the first commissioning the equipment is to be checked regarding its suitability in the respective zone according to its labeling. The values indicated on the nameplate are not to be exceeded. With use of the equipment in areas which are potentially explosive because of dust, a deposit of dust on the top-side which is more than 2 mm thick is not permissible. Here the installation of an additional covering may be required in circumstances where the deposit of dust cannot be reliably avoided.

The operational safety of the equipment and the correct functional arrangement of the equipment inside the plant must be checked before commissioning. It may only be used in a clean and undamaged condition.

## 2.10 Assembly, installation and dismantling

With installation and operation of the explosion protective equipment, one should consider protection against hazardous environmental influences which limit the intended use of the equipment. This could be protection against aggressive fluids or weather protection for example. During installation, the IEC 60079-14 and DIN EN 60079-14 as well as other national standards and regulations applicable at the installation site are to be adhered to.

The information on the nameplate must be complied with.

The assembly of the equipment takes place according to the enclosure's established mounting possibilities, but impacts on the equipment such as from hammer blows are to be avoided. Do not bend the sensor rod and do not install the equipment next to magnetic fields.

In potentially explosive areas, the equipment's power supply line with mating connector respectively the connection cable is to be routed in such a way that it is protected from damage and mechanical failure. In case of connection cables without mating connectors the single wires mustn't be damaged. The maximum connection information on the nameplate must be complied with.

Observe the information in chapter "Special conditions for safe use, marking "X" " on page 17.

Metal enclosures in potentially explosive areas must be connected to the equipotential bonding system; see chapter "Equipotential bonding conductor - Connection" on page 24.

Wiring work, opening and closing of electrical connections may only be performed with the power switched off.

Do not perform any welding work once the equipment has already been wired and switched on.




Touching the equipment-connection contacts with bare hands is to be avoided, or the respective ESD-protective measures are to be implemented.

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### 2.11 Inspection, maintenance and repair

The operator of an electrical system in a potentially explosive environment must keep the equipment in an good condition, operate it properly, monitor it and maintenance and repair work must be performed, also see IEC 60079-17 and DIN EN 60079-17 in this respect.

Maintenance work and defect repairs may only be performed by trained professionals. Before the maintenance or repair, the specified safety precautions are to be observed. The warning notes on the equipment and in the -User manual and the interface-specific user manual are to be adhered to!  
The applicable laws and directives are complied with before recommissioning.



- The equipment does not require any maintenance by the operator. Nevertheless, inspections must be performed at regular intervals:
  - Visual inspection
    - of the enclosure for damages
    - of the connection cable as well as the supply line for external damages
    - for dust deposits
  - Checking of the connection plug for a tight fit
- In case of damages, the equipment is to be taken out of service immediately and to be repaired by the manufacturer!

## 2.12 Special conditions for safe use, marking "X"

The "X" symbol in the equipment labeling is used to indicate special conditions for use:

The installation location and type of installation of the equipment must generally be selected so that it is protected from external mechanical influences and no functional impairments can result from them. To ensure this, additional design measures may have to be taken.

To prevent electrostatic charges on plastic parts such as the type label and plastic housing, high dust flow velocities must be excluded when using the equipment in areas at risk of dust explosions, and cleaning is only permitted with a damp cloth.

Misuse of the equipment as a support, footboard, stirrup, etc. is prohibited.

The power supply unit used must meet the requirements of SELV/PELV (IEC 60364-4-41:2005).

### Requirements – mating connector

- The selected mating connector must meet the minimum requirements for gas and dust as specified in the "Explosion protection data" section starting on page 20. The corresponding EU declaration of conformity must meet the requirements of the ATEX Directive 2014/34/EU and contain the corresponding ATEX marking.
- Protection class, according to DIN EN 60529: IP66 / IP67
- The temperature resistance must be 10 °C higher than the specified operating temperature of the equipment: -20 °C...+80 °C
- Impact resistance, in accordance with DIN EN 60079-0 (Group II, low): 0.4 m. If the connector has a lower impact resistance, additional mechanical impact protection must be provided.
- EMC shield connection
- Connection thread: M12x1
- Number of poles: in accordance with the enclosed connector assignment
- The mating connector must be secured against accidental loosening by using a screw lock.

### Requirements - Cable

- As a general rule, the specifications of EN 60079-14 must be observed for the design, selection, and installation of electrical systems.
- The cables used must be suitable for fixed installation and the cable material must be selected so that local requirements regarding resistance are met.
- The cable must be sheathed with a thermoplastic, thermosetting or elastomeric material. It must be circular and compact. Any embeddings or sheaths must be extruded. Fillers, if present, must not be hygroscopic; or
- Mineral-insulated, metal-sheathed with sealing
- The temperature resistance must be 10 °C higher than the specified operating temperature of the equipment: -20 °C...+80 °C

### 3 Transport / Storage

#### Transport – instructions

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***Do not drop the device or allow hard impacts!***

The equipment consists of a magneto-resistive sensor.

***Only use the original packaging!***

Inappropriate packaging material may cause damage to the device during transport.

#### Storage

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Storage temperature: -40 to +85°C

Store in a dry place

## 4 Technical data

### 4.1 Allgemeine

Rated Voltage.....	24 V DC
SELV/PELV .....	IEC 60364-4-41
Power consumption .....	≤ 3,5 W
Impact resistance, DIN EN 60079-0.....	Group II, low: 0,4 m
Working temperature .....	-20 °C...+70 °C
Relative humidity, DIN EN 60068-3-4 .....	98 %, non-condensing
<sup>1</sup> Protection class .....	<b>IP66 / IP67:</b> Protection classes according to DIN EN 60529

### 4.2 Enclosure materials


#### Aluminum design


Enclosure material.....	Al Mg Si 0.5 F22
Flange material.....	EN AW-AlCuMg1

<sup>1</sup> Observe the instructions for safe use, see chapter 2.12 on Page 16

### 4.3 Explosion protection characteristics

#### 4.3.1 Ex-labeling, gas

 II 3G Ex ec IIC T4 Gc X

	II	3G	Ex	ec	II	C	T4	Gc	X
									special conditions
									Device protection level (IEC/CENELEC)
									Temperature (IEC/CENELEC)
									Explosion group (IEC/CENELEC)
									Group (IEC/CENELEC)
									Ignition protection type (IEC/CENELEC)
									Labeling (IEC/CENELEC)
									Device category (ATEX)
									Device group (ATEX)
									Ex-labeling (ATEX)

**Device group**..... **II**: potentially gas-explosive areas

**Device category**..... **3G**: Zone 2  
adequate safety with normal operation

**Ignition protection type** ..... **ec**: increased safety  
additional measures to prevent ignition of the  
Ex-Atmosphere

**Group**..... **II**: potentially gas-explosive areas

**Explosion group**  
**C**:..... typical gas: Hydrogen


**Temperature**..... **T4**: max. enclosure surface-temperature ≤ 135 °C

**Device protection level** ..... **Gc**: Zone 2  
sufficient safety during normal operation

**Special conditions**..... **X**: see chapter 2.12 on page 17

### 4.3.2 Ex-labeling, dust

 II 3D Ex tc IIIC T100°C Dc X

	II	3D	Ex	tc	III	C	T100°C	Dc	X
									special conditions
									Device protection level (IEC/CENELEC)
									Temperature
									Explosion group (IEC/CENELEC)
									Group (IEC/CENELEC)
									Ignition protection type (IEC/CENELEC)
									Labeling (IEC/CENELEC)
									Device category (ATEX)
									Device group (ATEX)
									Ex-labeling (ATEX)

**Device group**..... **II**: potentially dust-explosive areas

**Device category**..... **3D**: Zone 22  
adequate safety with normal operation

**Ignition protection type** ..... **tc**: Protection by enclosure  
with adherence to the type of protection and within the  
surface temperature limits, Ex-atmosphere cannot be  
ignited

**Group**..... **III**: potentially dust-explosive areas

**Explosion group**

**C**: ..... Type of dust: nonconductive dust

**Temperature**..... **T100°C**: max. enclosure surface-temperature ≤ 100 °C

**Device protection level** ..... **Dc**: Zone 22  
sufficient safety during normal operation

**Special conditions**..... **X**: see chapter 2.12 on page 17

## 5 Assembly



- Dimensions must be taken from the customer-specific drawing

When installing the operating equipment, ensure that there are no strong magnetic or electrical interference fields in the vicinity of the sensor.

Unacceptable interference fields can affect the measurement accuracy. The field strength in the vicinity of the measuring rod must not exceed 3 mT.

### 5.1 Mechanics tube-housing design

The measured value is coupled to the sensor rod without contact via the magnetic field of the position sensor. The precision of the measured values depends, among other things, on the symmetry of the magnetic field geometry. In terms of mechanics, this means that the position sensor must be mounted centrally to the pipe and guided axially in parallel with precision.

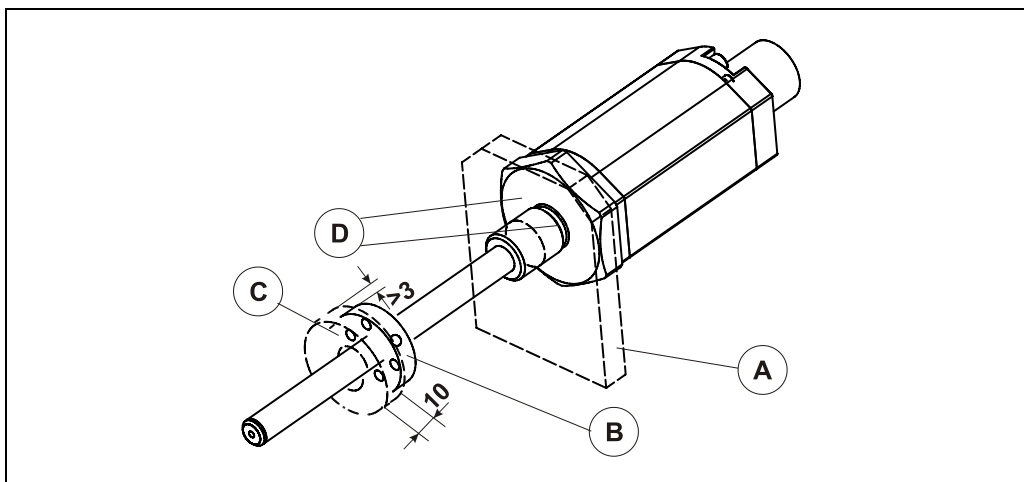
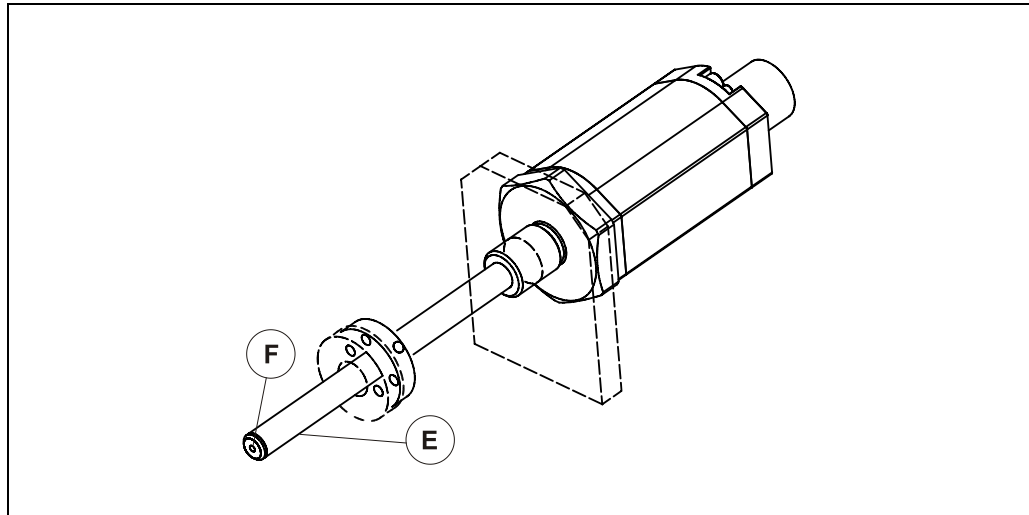


Figure 1: Assembly diagram 1

**A:** The displacement sensor is fixed directly to the bracket using the thread or a nut, with a tightening torque of < 50 Nm. The fastening material for the displacement sensor and position sensor B must be made of non-magnetizable material.

**C:** If magnetizable fastening material is used, a spacer made of non-magnetizable material with a thickness of 10 mm and a minimum distance of 3 mm greater than the circumference of the position sensor must be provided. The spacer must be mounted between the position sensor and its fastening. The fastening screws must be made of non-magnetizable material.

**D:** We recommend sealing the hydraulic connection at the flange contact surface using an O-ring in a groove at the bottom of the cylinder. The seal can also be made using an O-ring in the threaded outlet groove.



**Figure 2: Assembly diagram 2**

**E:** Horizontally installed measuring rods longer than 1.5 m should be supported and a position sensor with an open circumference should be used.

**F:** Optionally, the displacement sensor can be supplied with an M4x5 blind hole thread at the tip of the tube. This can be used for tip mounting.

## 6 Equipotential bonding conductor - Connection

- All **metal housings** of electrical equipment and **external conductive parts** must be connected to the **equipotential bonding system**.
- The discharge can be carried out via
  - **external grounding terminal**
  - secured, **metallic contact** with **structural parts** that are connected to the **equipotential bonding**
- The cross-section of the bonding conductor must be at least 4 mm<sup>2</sup>
- The connecting parts must be effectively protected against **corrosion** (e.g., steel spacer for light metal contacts)
- The **contact pressure** must be maintained permanently (no loosening or twisting!)

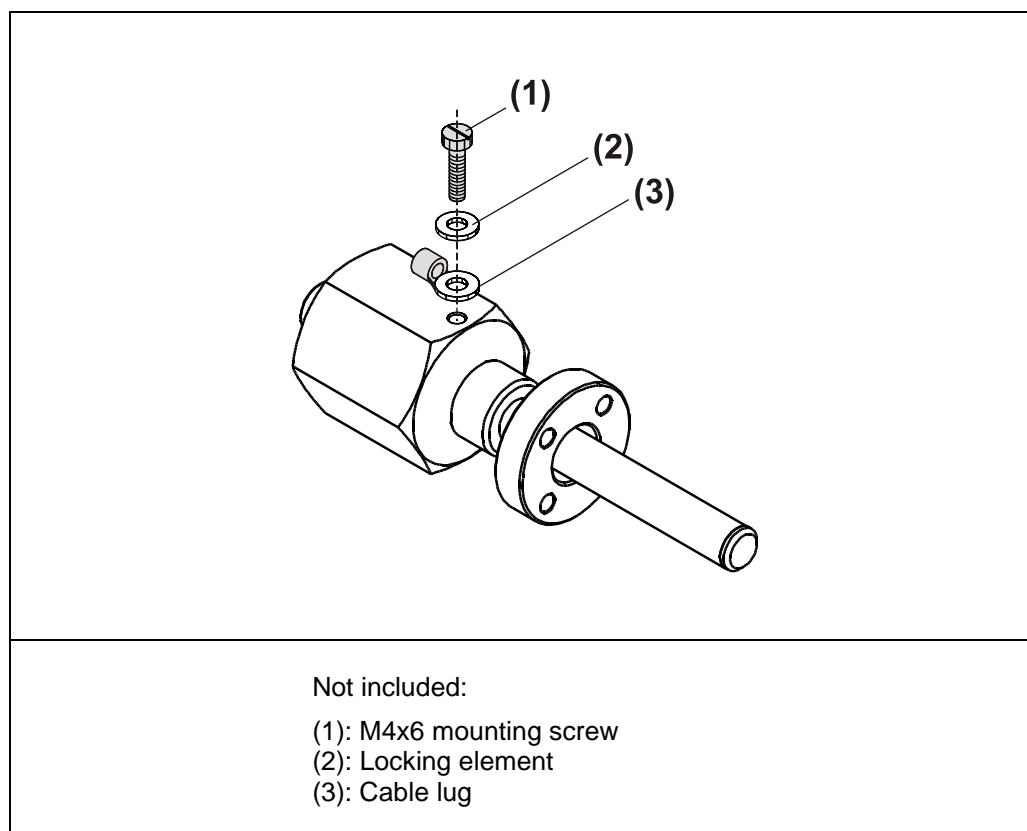


Figure 3: Equipotential bonding conductor – connection

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## 7 Disposal

Electronic waste is hazardous waste. The applicable country-specific regulations are to be adhered to for disposal.

## 8 EU declaration of conformity



### EU Declaration of Conformity

#### The Linear Measuring System Series in Explosion Proof Design

Types: LMRS-34 Ex, LP-46K  
 Order-No.: 346-xxxxx, 334-xxxxx

were developed, designed and manufactured to comply with the EU-Directives

Electromagnetic Compatibility (EMC)	2014/30/EU	(L 96/79)
Equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)	2014/34/EU	(L 96/309)
Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)	2011/65/EU	(L 174/88)

under the sole responsibility of

TR-Electronic GmbH  
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 Fax: +49 7425/228-33  
 Germany

#### The following harmonized standards were applied :

EN 61000-6-2:2005/AC:2005	Generic standards - Electromagnetic compatibility, Immunity (Industrial environments)
EN 61000-6-3:2007/A1:2011	Generic standards - Electromagnetic compatibility, Emissions (Commercial environments)
EN IEC 60079-0:2018	Explosive atmospheres Part 0: Equipment - General requirements
EN IEC 60079-7:2015/A1:2018	Explosive atmospheres Part 7: Equipment protection by increased safety "e"
EN 60079-15:2010	Explosive atmospheres Part 15: Equipment protection by type of protection "n"
EN 60079-31:2014	Explosive atmospheres Part 31: Equipment - Dust ignition protection by enclosure "t"
EN IEC 63000:2018	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

#### Other applied standards:

DIN EN IEC 60079-14:2021	Explosive atmospheres Part 14: Electrical installations design, selection and erection
EN 60529:2014	Degrees of protection provided by enclosures (IP code)

The products are marked additionally with the following characteristics on the name plate:

II 3G Ex X     II 3D Ex X
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For adherence of the conformity the references in the Ex User Manual must be observed, especially in the chapters "Intended use" and "Special conditions for safe use, marking "X"."

Trossingen, 02/17/2022

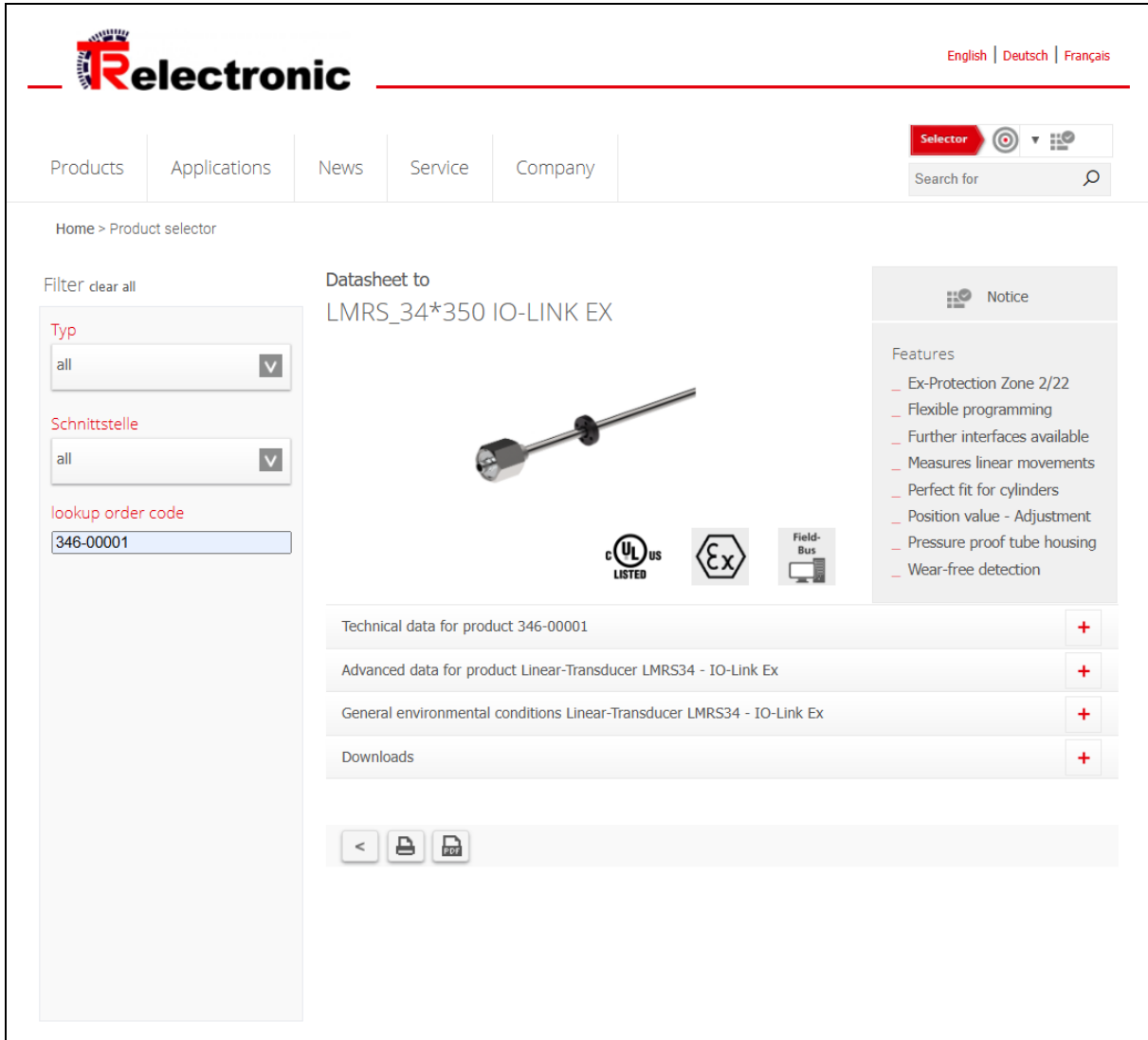
Mr. Klaus Tessari, CEO

TR-ELA-KE-DG B-0071-02.docx

## 9 Download

### 9.1 Technical documentation for item number

- <https://www.tr-electronic.com/product-selector.html>
- Enter the desired item number, e.g., 346-00001, in the search window and press <RETURN>:



The screenshot shows the TR-electronic website's product selector interface. At the top, there is a navigation bar with the TR-electronic logo, language options (English, Deutsch, Français), and a search bar. Below the navigation bar, there are tabs for Products, Applications, News, Service, and Company. The main content area is titled "Home > Product selector" and displays the product "LMRS\_34\*350 IO-LINK EX". On the left, there is a filter section with dropdown menus for "Typ" (set to "all") and "Schnittstelle" (set to "all"), and a "lookup order code" field containing "346-00001". The product image is a cylindrical metal component with a long shaft. Below the image are certification logos for UL LISTED, Ex, and Field-Bus. To the right of the image is a "Notice" section with a list of features: Ex-Protection Zone 2/22, Flexible programming, Further interfaces available, Measures linear movements, Perfect fit for cylinders, Position value - Adjustment, Pressure proof tube housing, and Wear-free detection. Below the features are expandable sections for "Technical data for product 346-00001", "Advanced data for product Linear-Transducer LMRS34 - IO-Link Ex", "General environmental conditions Linear-Transducer LMRS34 - IO-Link Ex", and "Downloads". At the bottom of the page, there are navigation icons for back, print, and PDF.

## 10 Accessories

<http://www.tr-electronic.com/products/linear-encoders/accessories.html>