Original manual

Absolute Encoder CD_-582
Safety Manual

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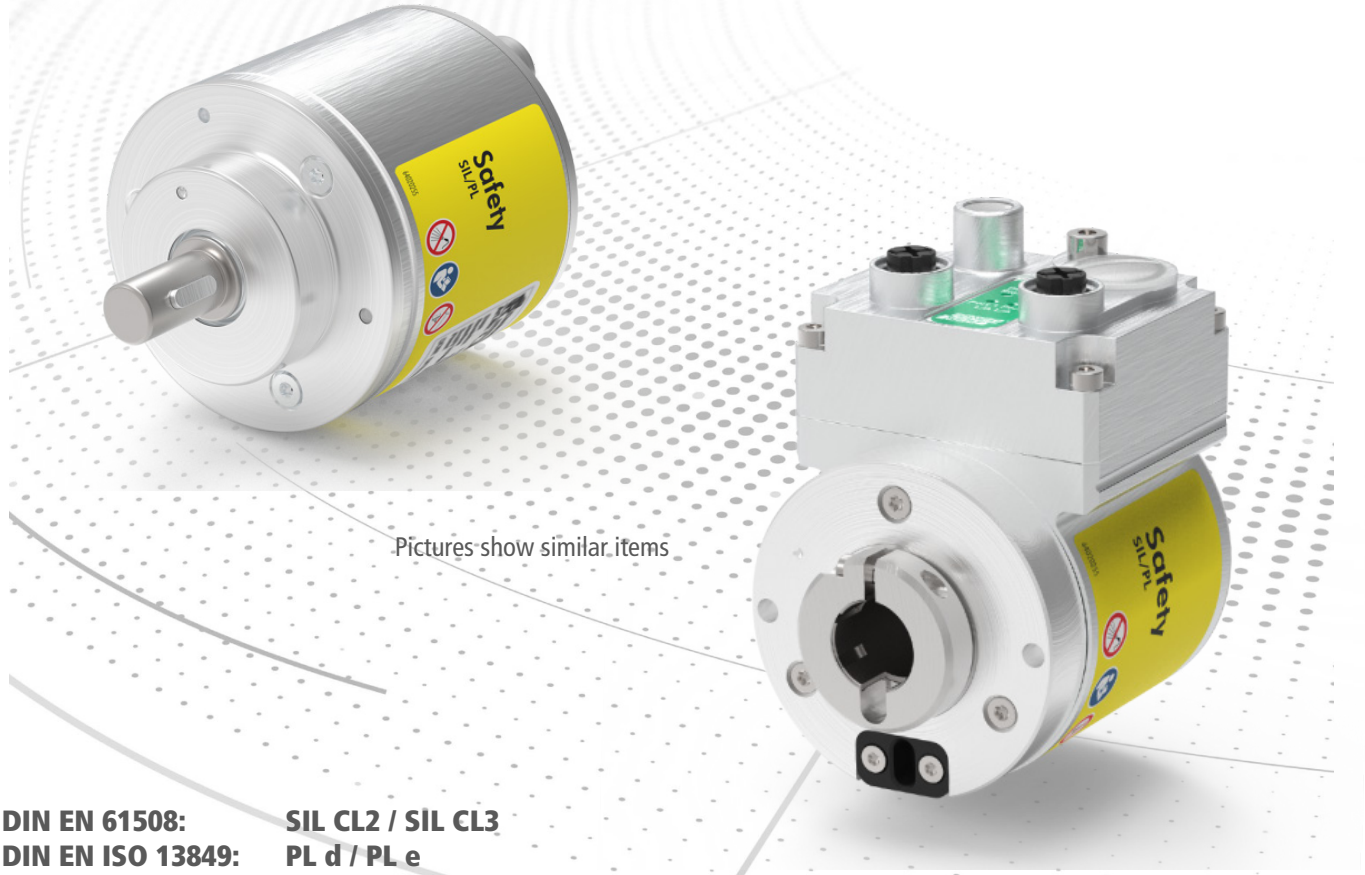

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DIN EN 61508: **SIL CL2 / SIL CL3**
DIN EN ISO 13849: **PL d / PL e**

_Basic safety instructions
_Intended use
_General functional description
_General characteristics
_Assembly

Safety Manual

TR - ECE - BA - GB - 0142 - 05 05/13/2020

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Products, names and logos in this Manual are only mentioned for information purposes and may be brands of their owners without this fact being expressly declared.

Contents

Revision index

Modification	Date	Index
First release	05/28/19	00
Draw-wire box added	06/12/19	01
Specification of the start-up torque of the shaft	09/20/19	02
Parallel key details and generalizations	01/23/20	03
- Option IP67: Specification of the break-away torque (solid shaft) - Specification of the start-up torque with diagram	02/27/20	04
Accessories: threaded rod / joint head M5	05/13/20	05

1 General information

This Manual addresses the following topics:

- General functional description
- Basic safety information with declaration of the intended use
- General specifications
- Assembly

Since it has a modular structure, this Manual is supplementary to other documentations, such as product data sheets, dimensional drawings, brochures, interface-specific user manuals, etc.

1.1 Applicability

This Manual applies exclusively to measuring system series according to the following keys for article numbers and types:

Article number

* 1	* 2	* 3	* 4	* 5	-	* 6	* 6	* 6	* 6	* 6

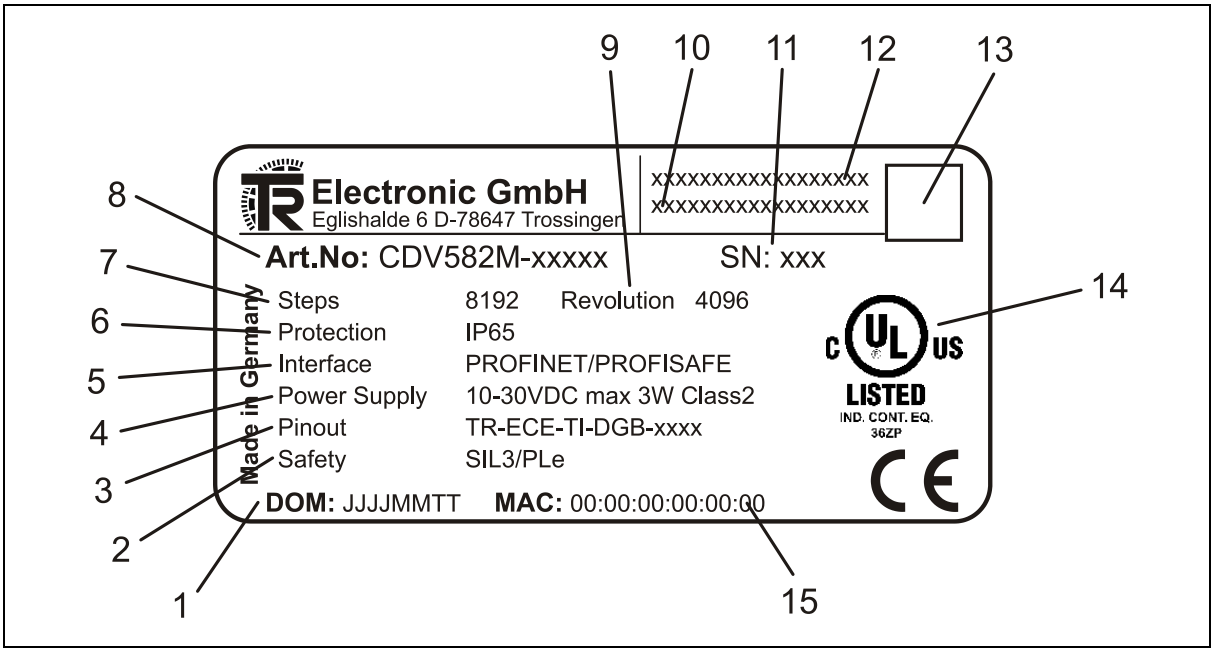
Position	Designation	Description
* 1	A	Explosion protection enclosure (ATEX);
	C	Absolute encoder, programmable
* 2	D	Redundant dual scanning unit
* 3	V	Solid shaft
	H	Hollow shaft
	S	Blind shaft
	W	Rope length transmitter (wire)
* 4	582	Outer diameter ∅ 58 mm, Generation 2
* 5	M	Multi-turn
	S	Singleturn
* 6	-	Consecutive number

* = placeholder

Type key

See Revision Lists:
CD_582M +FS02: www.tr-electronic.de/f/TR-ECE-TI-D-0343
CD_582M +FS03: www.tr-electronic.de/f/TR-ECE-TI-D-0349

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



1:	Date of manufacture in the format YYYY: Year, MM: Month, DD: Tag
2:	Maximum achievable Safety Integrity Level or Performance Level, see Chapter 4.1 on Page 18
3:	Number or identifier of the enclosed pin assignment, see Chapter 10 -> Pin assignments on Page 29
4:	- Supply voltage range, max. power consumption, see Chapter 10 -> Product data sheets on Page 29 - Class 2 power supply unit with UL/CSA approval, see Chapter 2.4 on Page 10.
5:	Measuring system – interface / security log, see Chapter 10 -> -> Interface-specific User Manual on Page 29
6:	IP rating (IP-Code), to DIN EN 60529
7:	Resolution in steps per revolution
8:	Article Number or Order Number
9:	Number of revolutions
10:	Optional customer note
11:	Devices – Serial no.
12:	Optional additional note
13:	Data Matrix Code
14:	UL/CSA approval, see Chapter 2.4 on Page 10
15:	MAC address, for IP-based measuring system interface

1.2 Other Applicable Documents

- The responsible organization's system-specific operating instructions
- This Safety Manual
- Pin assignment
- interface-specific User Manual
- Product data sheet
- optional: Ex User Manual

1.3 Abbreviations and terms used

$B10_d$	Number of operations that a device will operate prior to 10 % of a sample of those devices would fail to danger
CDx	Absolute encoder with redundant dual scanning unit, all designs
EMC	***E***lectro***M***agnetic ***C***ompatibility
ESD	***E***lectro ***S***tatic ***D***ischarge
Fault exclusion	Compromise between technical safety requirements and the theoretical possibility that an error occurs
Functional safety	Part of the overall system safety, which depends on the correct functioning of safety instrumented systems for risk reduction. Functional safety is ensured when each safety function is executed as specified.
IEC	International Electrotechnical Commission
ISO	***I***nternational ***S***tandard ***O***rganisation
$MTTF_d$	***M***ean ***T***ime ***T***o ***F***ailure, ***d***angerous
n_{op}	Number of operations/cycles in one year
PL	***P***erformance ***L***evel according to EN ISO 13849-1
SIL	***S***afety ***I***ntegrity ***L***evel: Four discrete levels (SIL1 to SIL4). The higher the SIL of a safety instrumented system, the lower the probability that the system cannot execute the required safety functions.
Standard measuring-system	Definition: Safety instrumented measuring system, without explosion protection
VDE	***V***erband ***d***er ***E***lektrotechnik, Elektronik und Informationstechnik (Association for Electrical, Electronic and Information Technologies e.V.)

1.4 General functional description

The rotary measuring system is a safe and absolute multi-turn position measuring system with a safety protocol and a standardized interface that is, however, NOT safety instrumented.

The safety measuring system consists of a **redundant, dual-channel system** in which

- variant 1: optical and magnetic scanning units, or
- variant 2: two magnetic scanning units

are arranged on a drive shaft that is designed either as a hollow shaft, a blind-hole shaft, or as a solid shaft.

The measuring system has primarily been designed for use in systems that require safe position detection.
The additional safe velocity measurements allow the following safety functions to be implemented according to DIN EN 61800-5-2:

- Safe Direction (SDI)
- Safe Stop 1 (SS1)
- Safe Stop 2 (SS2)
- Safe Operating Stop (SOS)
- Safely Limited Velocity (SLS)
- Safe Velocity Range (SSR)
- Safe Velocity Monitor (SSM)
- Safely-Limited Position (SLP)
- Safe Cam (SCA)

As a sensor, the measuring system is always part of a safety chain.

2 Basic safety instructions

2.1 Definition of symbols and notes

⚠ DANGER	means that death or serious injury will occur if the user fails to take the respective precautionary measures.
⚠ WARNING	means that death or serious injury can occur if the required precautions are not met.
⚠ CAUTION	means that minor injuries can occur if the required precautions are not met.
NOTICE	means that damage to property can occur if the required precautions are not met.
	indicates important information or features and application tips for the product used.
	means that appropriate ESD protective measures according to DIN EN 61340-5-1 supplementary sheet 1 must be taken.

2.2 General risks when using the product

The product, hereinafter referred to as ***measuring system***, is manufactured according to state-of-the-art technology and accepted safety rules.

Nevertheless, non-intended use can pose a danger to life and limb of the user or third parties, or lead to impairment of the measuring system, or other property values!

The measuring system may only be used in technically perfect condition in accordance with its intended use and the instructions set out in the **Other Applicable Documents** and only by safety-conscious persons who are fully aware of the risks involved in operating the measuring system. Faults which could threaten safety should be eliminated without delay!

2.3 Residual risk

According to EN ISO 12100-1 “Safety of machinery – Basic concepts, general principles for design”, residual risk is defined as the risk remaining after application of all protective measures.
Risk itself is defined as the “combination of the likelihood of a hazard and the severity of the potential damage”.

During the entire safety lifecycle, TR-Electronic has applied risk minimizing measures and methods according to the state of the art and technology – however, residual risks still remain even when properly using the measuring system!

Residual risks are not only indicated in this chapter, but also in all relevant parts of the entire document, in some cases also by referencing the corresponding interface-specific user manual.

The risk assessment of the entire system required by the EU Machinery Directive requires knowledge of all **Other Applicable Documents**, including any documented general conditions, safety instructions and residual risks, and to incorporate such into the company’s own risk assessment.

2.4 UL / CSA approval

The nameplate of measuring systems with this approval carry the UL symbol:

c UL US
LISTED
IND. CONT. EQ.
36ZP
Class 2
File No.: E300802

Measuring system running UL applications may therefore only be operated on NEC Class 2 approved power supply units. For further information, please refer to this document: TR-ECE-TI-DGB-0152

2.5 Intended use

The safety measuring system can be used for the detection of angular movement and processing of measured data for a downstream safety host in systems in which the **safety-related requirements of "Safeguarding travel", "Safeguarding velocity" or "Safeguarding direction of travel"** must be reliably achieved. In this case, the complete processing chain of the safety function must satisfy the requirements of the applied safety standard.
The safety measuring system may only be used in safety applications in conjunction with a control certified according to the applied safety standard.
The system manufacturer must verify that the properties of the measuring system satisfy his application-specific safety requirements. The responsibility or decision regarding the use of the measuring system lies with the system manufacturer.

Intended use also includes:

- following all instructions provided in the other applicable documents,
- observing the nameplate and any prohibition or instruction symbols on the measuring system;
- observing enclosed documents,
- operating the measuring system within the limit values specified in the technical data;
- ensuring that the fail-safe processing unit fulfills all required safety functions;
- ensuring that the checklist – part 1 in the present document and part 2 in the interface-specific User Manual – is used and went through completely;
- safely attaching (form-locking) the measuring system to the driving axis.

2.6 Non-intended use

Any non-intended use of the measuring system results in the risk of death, physical injury and damage to property.

⚠ **WARNING**

NOTICE

- The following areas of use are especially forbidden:
  - standard measuring-system:
    in environments with an explosive atmosphere according to the ATEX Directive
  - for medical purposes in accordance with the Medical Devices Directive
  - as a step or climbing aid
  - for wiring as antitwist protection (torque arm)
  - as an abutment for tension chains and belts

2.7 Usage in explosive atmospheres

The standard measuring system must be installed in an appropriate explosion protection enclosure as required when used in explosive atmospheres.

The products are labeled with an additional Ex marking on the nameplate.

The “intended use” as well as any information on the safe usage of the ATEX-compliant measuring system in explosive atmospheres are contained in the Ex User Manual.

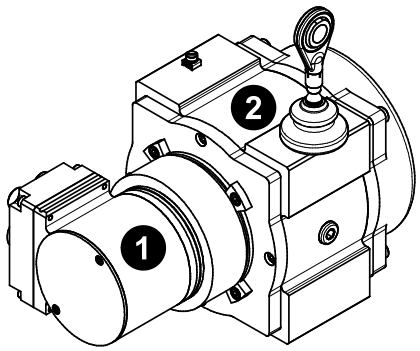
Standard measuring systems that are installed in the explosion protection enclosure and are intended for use with safety instrumented applications can therefore be used in explosive atmospheres.

When the measuring system is installed in the explosion protection enclosure, which means that it meets explosion protection requirements, the properties of the measuring system will no longer be as they were originally.

Following the specifications in the Ex User Manual, please check whether the properties defined in that manual meet the application-specific requirements.

Fail-safe usage requires additional measures and requirements. Such measures and requirements must be determined prior to initial commissioning and must be taken and met accordingly.

2.8 Combination measuring system and draw-wire box (CDW582)



❶: Measuring system

Device type 1 with SIL value or PL value

❷: Draw-wire box

Device type 3 with B10d value

Figure 1: Combination measuring system and draw-wire box

From a safety viewpoint the combination of measuring system and draw-wire box is a series connection with a device type 1 (measuring system) and a device type 3 with a category 1 structure in accordance with EN ISO 13849-1 (draw-wire box).

Device type 1 is characterized by the fact that the device can already be used as the safety-relevant part of a control system.

Device type 3 refers to devices with a failure behavior which is dependent on the switching frequency (cycle) and in terms of the draw-wire corresponds to complete extension and retraction of the wire. This fact is expressed by the **B10d-value** and represents the average number of cycles by which 10 % of the components have failed dangerously. The draw-wire box has not been developed in accordance with any specific safety standard, but this does not in principle exclude its use in accordance with DIN EN 61508, EN ISO 13849-1 or IEC 62061.

Generally, however, the use of such devices, if they are used as a safety-relevant part of a control system, must be independently assessed by the user in relation to safety.

As the combination of measuring system and draw-wire box is a series connection, this "unified structure" must be reassessed in relation to safety. The component with the lowest reliability in the series connection is determining for the highest possible level of safety that can be achieved. For mechanical reasons draw-wires only have a limited number of cycles, which in turn is strongly dependent on the type used.

In practice this means that the draw-wire is the limiting component in the series connection and the safety requirement level of the measuring system can never be achieved for the unified structure. For this reason there is also no TÜV certification for the combination of measuring system and draw-wire box!

This fact means that the unified structure may only be used as the subsystem of a safety function if the safety requirement level of the unified structure corresponds to the required safety requirement level for the subsystem.

To enable the user to assess the safety function, TR-Electronic provides the relevant safety indicators in the product data sheets valid for the respective measuring system,
see www.tr-electronic.com/s/S020955.

TR-Electronic can provide the relevant B10d value for the draw-wire box on request.

1) The $MTTF_d$ value for the draw-wire box can be calculated as follows:

$$MTTF_d = \frac{B10_d}{0.1 * n_{op}}$$

The total $MTTF_d$ value for the draw-wire box + measuring system can be calculated from this:

$$MTTF_{d\ (total)} = \frac{(\ MTTF_{d\ (draw\text{-}wire\ box)}\ *\ MTTF_{d\ (measuring\ system)}\ )}{(\ MTTF_{d\ (draw\text{-}wire\ box)}\ +\ MTTF_{d\ (Mess\text{-}System)}\ )} = \text{value in years [a]}$$

1) Abbreviations, also see page 8

2.9 Safety functions of the fail-safe processing unit

It is mandatory that the **safety control**, which the measuring system is connected to, executes the safety checks required by the interface-specific User Manual.

2.10 Warranty and liability

The “General Terms and Conditions” of TR-Electronic GmbH are generally applicable. They will be submitted to the responsible organization along with the order confirmation or on conclusion of the contract at the latest. Warranty and liability claims are excluded in the event of personal injury or damage to property if they result from one or more of the following causes:

- Non-intended use of the measuring system.
- Improper assembly, installation, commissioning and programming of the measuring system.
- Work on the measuring system that is carried out improperly.
- Operation of the measuring system with technical defects.
- Unauthorized mechanical or electrical modifications to the measuring systems.
- Unauthorized repairs.
- Catastrophic events beyond human control and acts of God.

2.11 Organizational measures

- The other applicable documents must always be within reach where the measuring system is used.
- In addition to the other applicable documents, generally valid legal and other binding regulations on accident prevention and environmental protection must be observed and communicated.
- The respective applicable national, local and system-specific provisions and requirements must be observed and communicated.
- The responsible organization is obliged to inform personnel on special operating features and requirements.
- Personnel handling the measuring system must have read and understood the Safety Manual, in particular Chapter “Basic safety instructions” prior to commencing work.
- It must be ensured that the nameplate and any prohibition or instruction symbols provided on the measuring system are always legible.
- Do not modify the measuring system in any mechanical or electrical way; the only modifications allowed are those expressly described in the other applicable documents.
- Repairs may only be made by the manufacturer or a center or person authorized by the manufacturer.

2.12 Personnel selection and qualification; basic duties

- Only qualified personnel may work with the measuring system.
  Qualified personnel are persons, who, through their training, experience and instruction, as well as their knowledge of the relevant standards, provisions, accident prevention regulations and operating conditions, have been authorized by the persons responsible for the system to carry out the required work and are able to recognize and avoid potential hazards. Such personnel is capable of identifying and avoiding potential hazards.
- The additional definitions of “qualified personnel” given in the VDE 0105-100 and IEC 364 standards must also be understood (source: e.g. Beuth Verlag GmbH, VDE-Verlag GmbH).
- The responsibilities for assembly, installation, commissioning and operation must be clearly defined. Personnel to be trained or educated must be supervised.

2.13 Safety-related instructions

- **The instructions listed below must be followed to prevent destruction, damage and malfunction of the measuring system and downstream electronic devices.**
  - Wiring work may only be carried out and electrical connections only be opened and closed while the system is de-energized.
  - Voltages equal to the supply voltage at the additional incremental interface output. Ensure the ground reference point is present at all times, respectively the organization responsible for the system must provide appropriate protective measures for downstream electronic devices.
  - Cable outlets of mating connectors must always be secured with a cable grip against pulling out.
  - Do not carry out any welding work after the measuring system has already been wired or switched on.
  - Ambient temperature values may never fall below or exceed the permissible limit values; this must be ensured by taking the appropriate heating/cooling measures at the place of installation.
  - The measuring system must be installed such that it is not exposed to any direct moisture.
  - Suitable aeration/ventilation and heating/cooling measures must be taken at the place of installation to prevent the temperature falling below the dew point (condensation).

⚠ WARNING

NOTICE

  - Potential hazards resulting from interactions with other systems and equipment which are or will be installed in the vicinity must be determined. The user is responsible for taking appropriate measures.
  - Voltage supply must be protected with a fuse suitable for the supply lead cross-section.
  - Cables used must be suitable for the temperature range.
  - If defective, the measuring system may not be operated.
  - Make sure that the installation environment is protected from aggressive media (acids, etc.).
  - Avoid shocks (e.g., hammer blows) to the shaft during installation.
  - It is prohibited to open the measuring system.
  - After having set the address switches and LEDs, ensure that they are no longer accessible by firmly closing the access with the screw plug.
  - Connector plugs of the measuring system that are unused during storage and/or operation of the system have to be provided either with a mating connector or a protective cap. The IP degree of protection is to be selected according to requirements.
  - The nameplate specifies the technical properties of the measuring system. If the nameplate is no longer legible or is completely missing, the measuring system may no longer be put into operation.
  - The measuring system cannot detect a break in the coupling or the torque arm. The operator must include this circumstance in the safety concept of the system.

- **The measuring system contains components and assemblies susceptible to electrical discharge, which can be destroyed if incorrectly handled.**
  – Do not touch the connection contacts of the measuring system with your fingers or apply the relevant ESD protective measures.

- **Disposal**
  – Electronic waste is hazardous waste.
  The disposal must observe the local regulations.

3 Transport / Storage

- Shipping information
  - Do not drop the device or subject it to heavy impacts!
    The device contains an optical system.
  - Only use the original packaging.
    Inappropriate packaging material may cause damage to the unit in transit.

- Storage
  - Storage temperature: see product data sheet
  - Store at a dry place

4 Technical Data – general

4.1 Functional safety

The achievable Safety Integrity Level or Performance Level depends on the device and is noted on the nameplate.

DIN EN 61508 Part 1-7, Safety Integrity Level (SIL).....	CL2 or CL3
EN ISO 13849-1, Performance Level.....	PLd / Cat. 3 or PLe / Cat. 4

4.2 Safety functions

DIN EN 61800-5-2, Electric power drive systems	SDI, SS1, SS2, SOS, SLS, SSR, SSM, SLP, SCA
Operating mode or requirement rate, DIN EN 61508.....	high or continuous

The measuring system, functioning as a sensor, is always part of a safety chain.

4.3 Supply

The measuring system may only be operated on SELV/PELV (IEC 60364-4-41:2005) compliant power supply units.

Measuring system running UL applications may only be operated on NEC Class 2 approved power supply units.

Nominal voltage.....	24 V DC
Power consumption	≤ 6 Watt

5 Assembly

DANGER

NOTICE

- **If the safety functions are deactivated because of an unstable shaft drive, there will be the danger of death, serious physical injury and/or damage to property!**

  - The system manufacturer must take suitable design measures to ensure that the measuring system is reliably driven by the shaft and firmly attached at any time (fault exclusion). The specifications of DIN EN 61800-5-2:2017 “Electrical power drive systems with speed control, Safety requirements – Functional, Table D.8 – Motion and position feedback sensors“ must be observed.
  - The requirements and acceptance conditions for the overall system must always be taken into account when assembling the measuring system.
  - All fastening screws must be secured such that they cannot be loosened accidentally.
  - In case of applications with low ambient temperatures, the start-up torque will be increased. This fact must be taken into account during assembly and when providing the shaft drive.

Due to the variety of measurement system series and the variety of types within a measurement system series, the following text and dimensions information must be considered as exemplary and have to be adapted to the specific product.

5.1 Solid shaft

5.1.1 Requirements

The following instructions are not exhaustive as the assembly situation may be different for each application.

- The coupling used must be suitable for the application and allow form-locking connection.
- The coupling manufacturer's information and installation requirements must be observed.
- In particular, you must ensure that
  - the coupling is suitable for the specified speed and the potential axial offset,
  - installation is on a grease-free shaft,
  - there is no axial load on the coupling and the measuring system,
  - the clamping screws are tightened with the torque defined by the coupling manufacturer,
  - the coupling screws are secured such that they cannot be loosened accidentally.
- Axial slipping of the measuring system on the drive shaft must be prevented by fixing the coupling in position, see Figure 2, (1).
- Radial slipping of the measuring system on the drive shaft must be prevented by a form-locking connection, using a parallel key / groove combination (Figure 2, (2)); a coupling with groove must be used for this purpose.

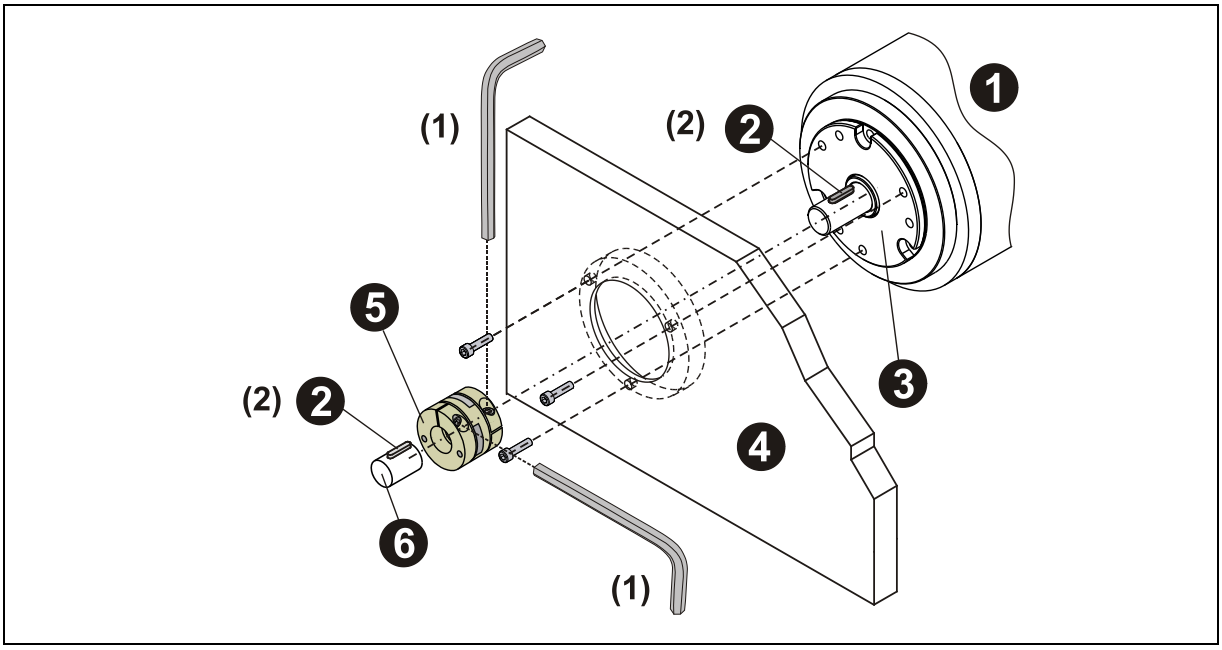


Figure 2: Installing the flange, illustration showing the principle

Components:

1: Measuring system
2: Parallel key
3: Centering collar
4: Machine
5: Coupling with groove
6: Drive shaft

5.2 Blind-hole shaft / hollow shaft

5.2.1 Requirements

The following instructions are not exhaustive as the assembly situation may be different for each application.

- Tolerances and mounting capabilities have to be gathered from the customized dimensional drawing
- The measuring system must be installed on a grease-free shaft.
- Axial slipping of the measuring system on the drive shaft must be prevented by fixing the clamping ring in position, see Figure 3.
- Further measures may be required to prevent axial slipping of the measuring system.
- There may be no axial load on the clamping mechanism of the measuring system.
- The screw of the clamping ring must be tightened with 3 Nm using a torque wrench.
- The screw of the clamping ring must be secured such that it cannot be loosened accidentally.
- Radial slipping of the measuring system on the drive shaft must be prevented by a form-locking connection, using a parallel key / groove combination; the measuring system must be fixed in position on the drive end using a dowel pin, see Figure 3.
- The dowel pin must extend at least 4 mm into the groove insert, max.5.5 nm. The distance from the measuring system flange **Y** to the customer-provided device plane **X** must be > 1.5 mm, see Figure 3.

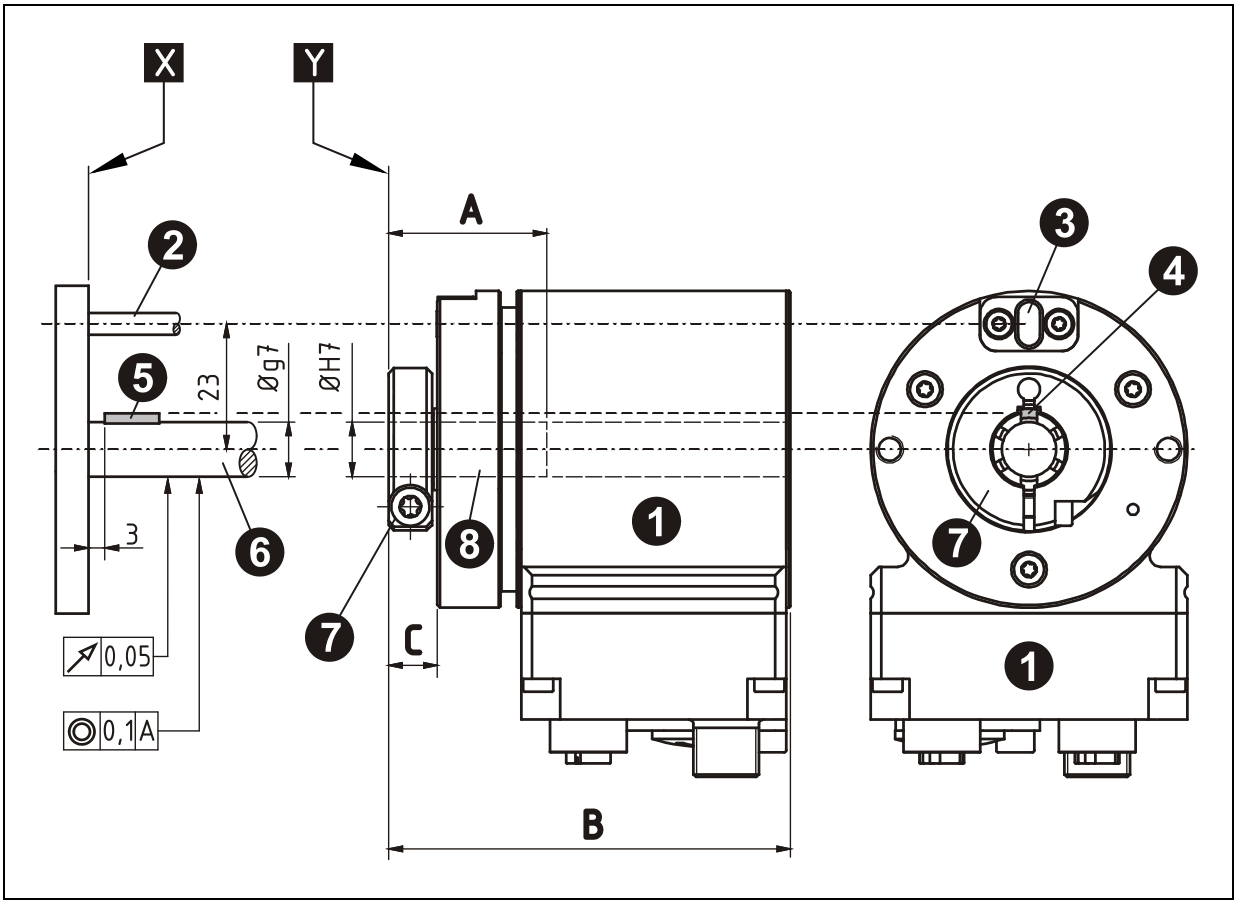


Figure 3: Customer-provided shaft, illustration showing the principle

Components:

1: Measuring system with blind-hole shaft or hollow shaft

2: Alignment pin, provided by customer: Diameter 4 mm with m6 fit
Length = distance between reference planes X and Y + deviation C +
an immersion depth of 4 ... 5.5 mm

3: Groove insert 4K7, 6 mm deep

4: Groove, according to the article number in the referenced drawing

5: Parallel key, according to the article number in the referenced drawing

6: Drive shaft with g7 fit, provided by customer

7: Clamping ring with screw, tightening torque = 3 Nm, secured against loosening

8: Measuring system – shaft with H7 fit, according to article number in referenced drawing

Dimensions:

A: Immersion depth for model with blind-hole shaft, according to article number in referenced drawing

B: Immersion depth for model with hollow shaft, according to article number in referenced drawing

C: Clamping ring width, according to the article number in the referenced drawing

Reference planes, minimum clearance:

X: customer-provided device plane

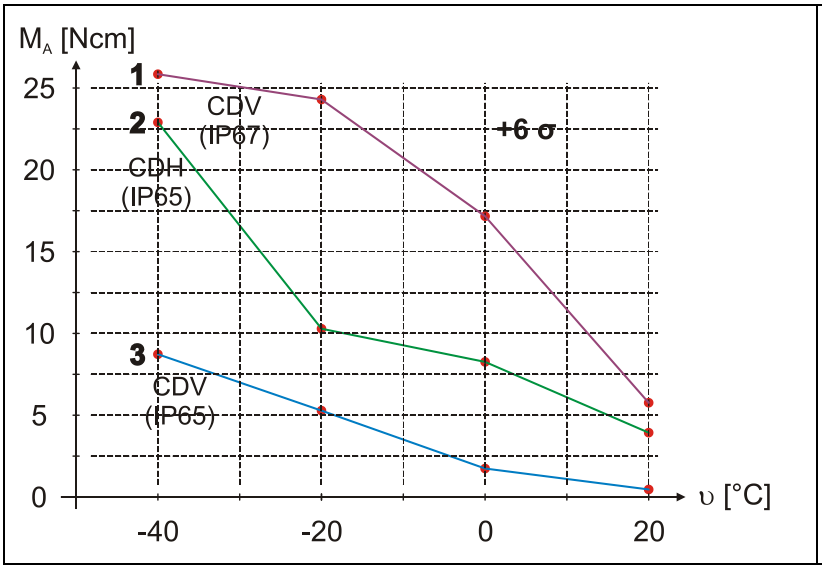
Y: front surface of clamping ring

Minimum clearance: > 1.5 mm

5.3 Shaft turning moments (worst-case)

Temperature [°C]	Break-away torques / Start-up torques in [Ncm] at +6 σ		
	1 (IP67, CDV)	**2** (IP65, CDH)	**3** (IP65, CDV)
20	5.76 / 4.67	3.93 / 3.76	0.46 / 0.34
0	17.16 / 10.13	8.26 / 5.75	1.74 / 1.43
-20	24.30 / 9.86	10.29 / 8.04	5.41 / 3.59
-40	25.85 / 11.67	22.90 / 16.60	8.73 / 7.30

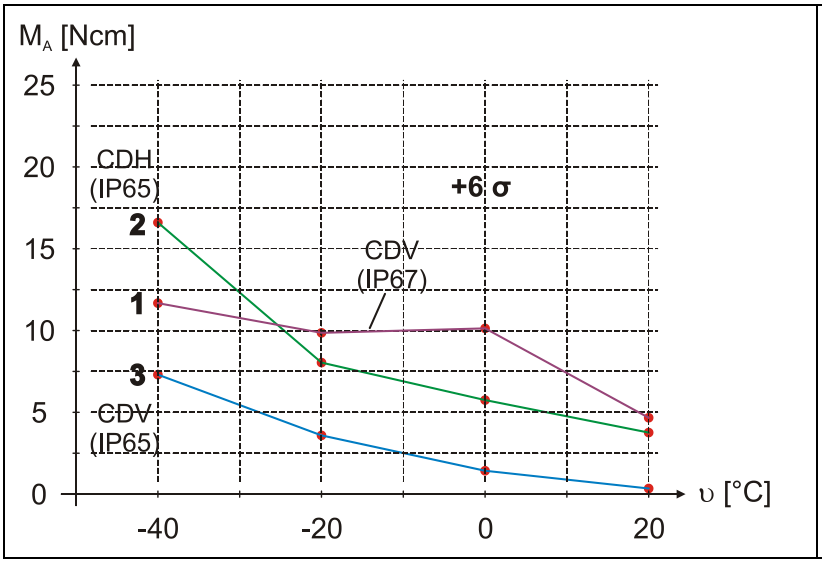
The break-away torque is the maximum torque that occurs after the temperature load (0, -20 and -40 °C) to set the shaft in motion. The start-up torque must be applied after breaking to set the shaft in motion. The difference between break-away torque and start-up torque arises, e.g. through ice formation at low temperatures.



M_A: Break-away torque
ϑ: Temperature

At +6 Sigma

Figure 4: Break-away torques



M_A: Start-up torque
ϑ: Temperature

At +6 Sigma

Figure 5: Start-up torques

5.4 Potential equalization – connection

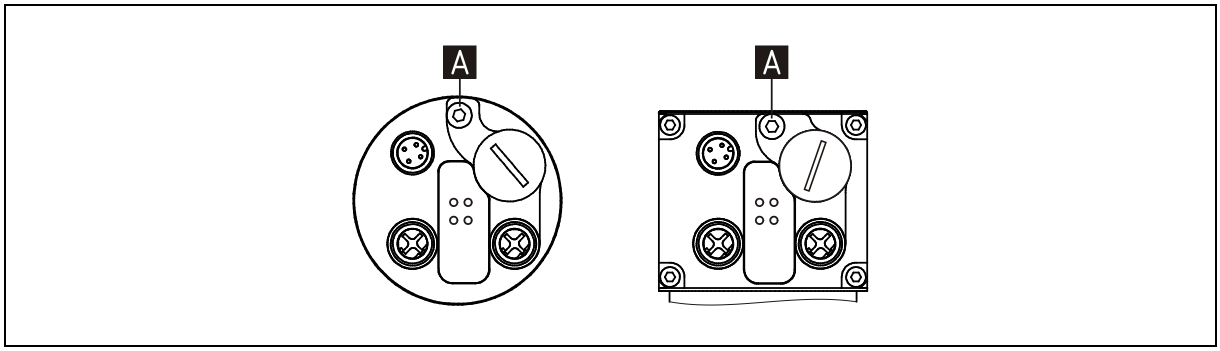


Figure 6: Grounding point

A: M4 thread for equipotential bonding

6 Replacing the measuring system

Ensure that you meet the following requirements while replacing the measuring system:

- The new measuring system must have the same article number as the measuring system being replaced; any deviations must be expressly clarified with TR-Electronic.
- When the new measuring system is used, it must be ensured that the hardware switch settings comply with the previous settings.
- The new measuring system must be installed in accordance with the specifications and requirements in Chapter “Assembly” on Page 19.
- The new measuring system must be connected in accordance with the specifications in the interface-specific User Manual.
- Since the parameters of the measuring system are usually stored in the control, the new measuring system is parameterized with the projected settings in the start-up phase. If this mechanism fails, it must be ensured that the settings for the new measuring system are the same as those for the old one.
- Depending on the application, the output position value must possibly be adjusted to the reference position of the machine. The position value must be adjusted as specified in the interface-specific User Manual.
- Before the replaced measuring system is recommissioned, its proper functioning must be verified in a protected test run.

7 Checklist, Part 1 of 2

We recommend that you print out and work through the checklist for commissioning, replacing the measuring system and when changing the parameterization of a previously accepted system and store it as part of the overall system documentation.

Documentation reason	Date	edited	checked

Sub-item	Note	Reference	yes
This Safety Manual was read and understood	–	Document no.: TR-ECE-BA-GB-0142	☐
Interface-specific User Manual	• Go through and use the checklist part 2 of 2	See Chapter Document Download on Page 29	☐
Verify that the measuring system can be used for the present automation task based on the specified safety requirements	• Intended use • Compliance with all technical data	• Chapter Intended use, Page 11 • Chapter Document Download -> Product data sheets, Page 29 • Interface-specific User Manual (Checklist, part 2 of 2)	☐
Meeting the assembly requirements defined in the Safety Manual	• Safe mechanical attachment of the measuring system and safe form-locking connection of the driving shaft to the measuring system	• Chapter Assembly, Page 19	☐
Supply voltage	• The power supply unit used must meet the requirements of	• Chapter Document Download -> Product data sheets, Page 29 • Interface-specific User Manual (Checklist, part 2 of 2)	☐
Proper – electrical installation (shielding) – Network installation	• Comply with general installation rules • Comply with wiring standards • Comply with the guidelines provided by the relevant field bus user organizations	• Interface-specific User Manual (Checklist, part 2 of 2)	☐
After commissioning and parameter changes – System test – Validation (Settings – Axis)	• During commissioning and whenever parameters have been changed – all relevant safety functions involved must be checked – if several (similar) axes are used, make sure that the settings have been made for the desired axis	• Interface-specific User Manual (Checklist, part 2 of 2)	☐

Continued on next page

Continued

Sub-item	Note	Reference	yes
Preset adjustment function	• Legacy mode: The preset adjustment function may only be executed when the axis in question is at standstill • Ensured the preset adjustment function can not be triggered unintentionally • After execution of the preset adjustment function, the new position must be checked before restarting	• Interface-specific User Manual (Checklist, part 2 of 2)	☐
Device replacement	• Ensure that the new device corresponds to the replaced device • All affected safety functions must be checked	• Chapter Replacing the measuring system, Page 24 • Interface-specific User Manual (Checklist, part 2 of 2)	☐
Verification and validation of the programming system (Control system / Software)	• Ensure that all functional and performance related requirements for the safety-related parts of the programming system are met. Particularly, this applies to changing the program version.	• Safety of machinery – safety related parts of control systems – DIN EN ISO 13849-1 – DIN EN ISO 13849-2	☐

8 Maintenance

The measuring system requires no maintenance by the operator.

However, if the bearing life of the product is exceeded within a service life of 20 years, the metering system must be taken out of service and sent to the manufacturer.

After 20 years of use, the measuring system must be subjected to a proof test.

For more information, please refer to these standards

– DIN EN 62061 and
– DIN EN 61508

titled “Safety of Machinery – Functional safety of electrical/electronic/programmable electronic safety-related systems”.

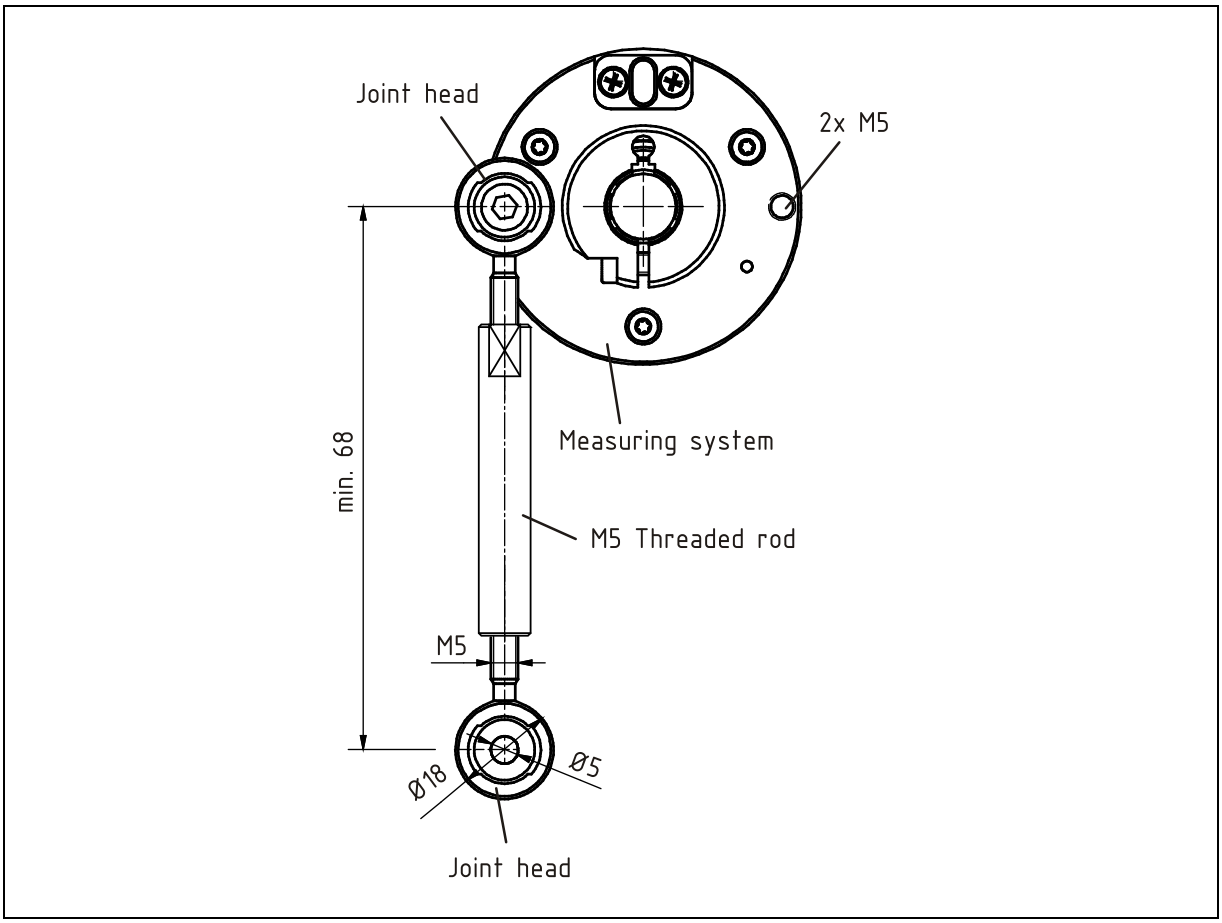
The procedure must be coordinated with the manufacturer.

9 Accessories

Protective caps / O-Ring

Designation	Part number
Protective cap yellow, M12x1 female thread with O-ring, IP65. Suitable for supply voltage connector	62-000-1664
Protective cap black, M12x1 male thread without O-ring, IP50. Suitable for bus and incremental interface connector	62-000-1344
O-Ring DIN-3771 7x1 NBR 70 SHORE Suitable for protective cap 62-000-1344 --> IP65	26-000-332

Optional torque holder with joint head and threaded rod M5



Designation	Part number
Joint head M5	49-280-002
Threaded rod M5, ∅ 10 mm x 60 mm	49-917-026
Threaded rod M5, ∅ 10 mm x 105 mm	49-995-200
Threaded rod M5, ∅ 10 mm x 360 mm	49-917-022

10 Document Download

Safety Manual

Designation	Link
Absolute Encoder CD_-582	www.tr-electronic.de/f/TR-ECE-BA-GB-0142

Interface-specific User Manuals

Designation	Link
PROFINET/PROFIsafe	www.tr-electronic.de/f/TR-ECE-BA-GB-0139

Pin assignments

Link
www.tr-electronic.com/service/downloads/pin-assignments.html

Product data sheets

Designation	Link
Absolute Encoder CD_-582	www.tr-electronic.com/s/S020955

EU Declaration of Conformity

Link
CD_582M +FS02: www.tr-electronic.de/f/TR-ECE-KE-DGB-0354 CD_582M +FS03: www.tr-electronic.de/f/TR-ECE-KE-DGB-0358