

# Absolute rotary encoder

## CD\_582+FS

Functional safety – as small as 58 mm



**Safety  
Integrated**

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## CD\_582+FS – functional safety in standard industrial form factor



### Technology

#### **\_ Efficient design**

Everything the application needs – reduce to the max.

#### **\_ Certified according to DIN EN 62061 (SIL) und 61508 (PL) by TÜV NRW**

CD\_582+FS are developed and certified according the two leading standards for devices providing integrated safety. Most application standards refer to these basic standards and thus CD\_582+FS fits into these applications.

#### **\_ safety validated process data**

CD582+FS provides safety evaluated process data as absolute position values for connected F-Hosts. The safety protected data channel completely supports the concept of integrated safety. Received and verified input data may be used in a functional safe applications without addl. plausibility check.



**\_ SIL2/PLd, cat3;  
SIL3/PLe, cat4**

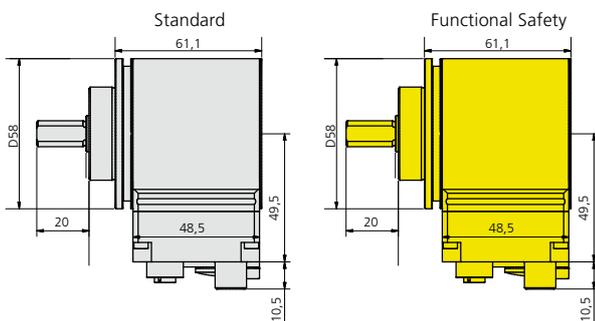
SIL 2 or SIL 3 – use the same mechanical and electrical features with precise the safety level your application needs.

**\_ architecture according category 4  
„two encoders in one“**

CD\_58+FS was designed with category 4 architecture in focus. That means that you can replace existing solutions with two separate encoders on a common shaft by this one-piece-solution.

## Mechanics

**\_ Mounting space**



CD582+FS uses the same installation space as standard encoders in size 58mm would use. Installation situation can be used as before.

**\_ Robust magnetic/optic multiturn rotary encoder CD\_582M+FS**

13 bit resolution within one revolution (singleturn)  
16 bit revolutions (multiturn)

**\_ rugged double magnetic multiturn rotary encoder CD\_582MM+FS**

13 bit resolution within one revolution (singleturn)  
16 bit revolutions (multiturn)

Solid shaft

Blind shaft

Hollow shaft



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## C\_\_582 – the next generation: Standard form factor with so many possibilities

- Solid shaft, clamping flange
- Slip-on hollow shaft up to 15 mm
- Hollow-through-shaft up to 15 mm

Safety integrated multiturn rotary encoders are available with solid shaft, blind shaft and hollow through shaft up to 15 mm. Plenty of available flange geometries adapt the encoders perfect into the specific application.

- Shafts with form closure

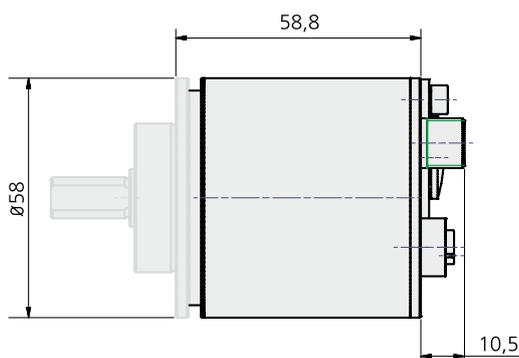
Solid shaft, blind shaft or hollow shafts are connected by form closure (keyway) to the driving shaft.



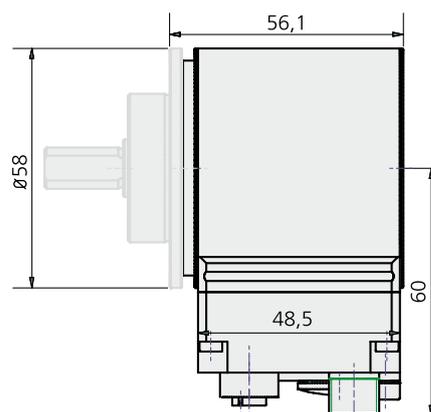
- Connectors axial or radial

Mounting space is valuable. Do not let cabling interfere with other parts and components. For solid and slip-on shafts (blind shaft), you can choose between connectors axial (at the side opposite to the shaft) or radial (at the side of the encoder housing).

Connectors axial



Connectors radial



### **\_protective bearing**



CD\_582+FS can be equipped with a rugged bearing unit. This bearing unit handle big forces on the shaft. Application with driving chains or belts are possible.

## **Interface**

### **\_Parameterizable gearbox**

Fractional gearbox parameters (numerator / denominator) for almost any reproduction of gearbox factors. Also for exact detection of closed rotary axes.

### **\_Easy installation with open configuration options**

TR absolute rotary encoders fulfill the standards of the respective user organizations for parameterization. Users can thus navigate the standard parameters without difficulty. The free configuration also offers easy access to all functions which are available in addition to the standard functions.

### **\_Speed output with adjustable averaging**

The time base for the speed evaluation can be freely set within a range of one millisecond to one second and can also be scaled in any units.

### **\_Alarms and diagnostics**

How's about my machine? To know that at any time is one of the core aspects of industry 4.0. Be it capacity utilisation or upcoming services: C\_\_582 provides all necessary alarms and diagnostic messages for long term machine and plant surveillance.

### **\_Latest communication standards for Industry 4.0"**

The new C\_\_582 generation of industrial standard rotary encoders is rigorously equipped with state-of-the-art chip families.

### **\_Reset switch**

CD\_582+FS is equipped with a hardware reset switch. This resets the encoder to delivery state (factory settings) without the use of an engineering system or programming device.

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# C\_\_582 – the next generation: Standard form factor with so many possibilities

PROFINET / PROFIsafe



\_ Update time <1 ms (grey channel),  
<3 ms (safety channel)

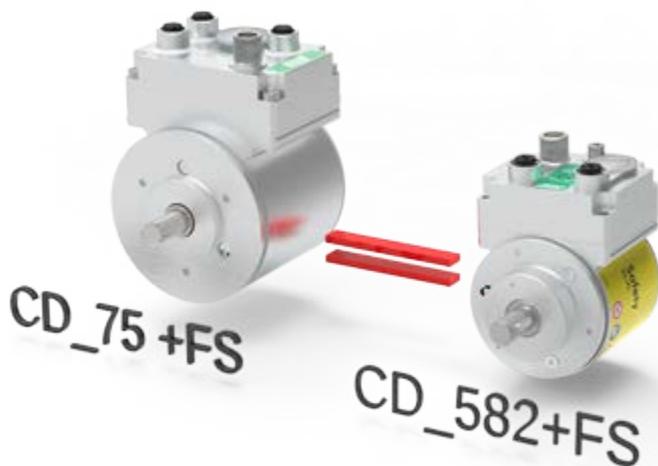
Suitable for quick position control with less than 1 ms encoder actual value updating for the bus output.

\_ TCI implementation

TR-Electronic provides a manufacturer specific device tool that links into the TCI-Interface of Siemens engineering systems (e.g. TIA Portal)

\_ Legacy-Mode

CD\_582+FS behaves identically to successful series CD\_75 by setting up in legacy mode. Function blocks that are already in use in existing safety programmes may be re-used without big changes into new projects.



\_ Encoder Profile 4.2

CD\_582+FS EPN fulfils the Profinet Encoder Profile issued by Profibus-International user organisation for both, the grey and the secured data channel.

\_ 32 bit data words

Full resolution in a single telegram – the full bandwidth for position or speed value can be transmitted in a single data word with 32 bit payload.

**\_ PROFINET with IRT**

PROFINET version uses the most recent standards and technology with long term availability. It is compliant with the current standards of PI user organisation. Synchronisation to the bus clock (IRT) allows precise positioning of multiple axes.

- \_ Secondary interface: \_ INK**
- \_ SIN / COS**
- \_ SSI**

For local speed monitoring and position control or secondary surveillance systems, addl. interface can provide either incremental (square), sine/cosine or absolute SSI position values.

**\_ Shared device / grey and safe world**

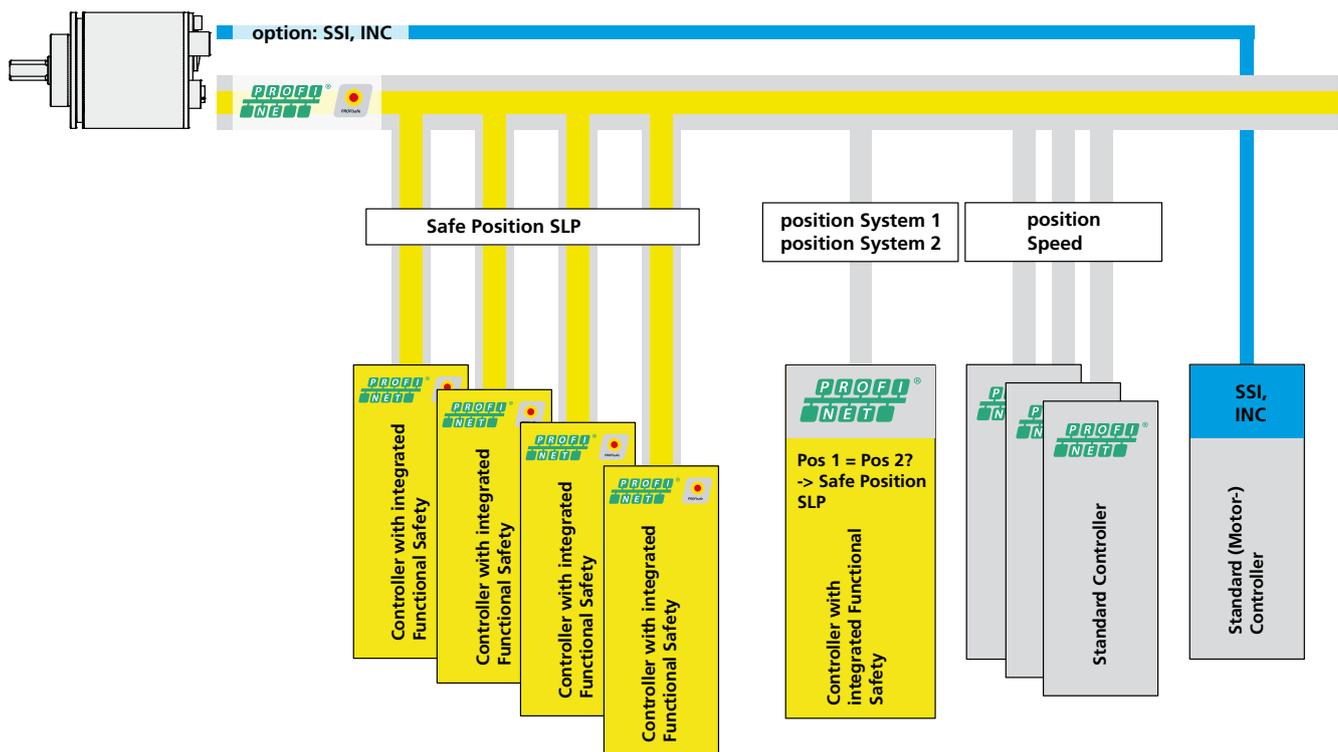
„Grey“ (non safe) position and speed values can be shared independently from one another. CD\_58+FS can provide values the same time to a high speed controller and a safety control system.

**\_ Shared Device / up to 4 safety instances**

Up to 4 safety controls can establish a secured communication channel to CD\_582+FS. No more need to hand over secured position values from one to the other safety control.

**\_ Direct readout of the two encoder channels by bus**

For non secured applications, the two detection channels can be read out directly via PROFINET IO. With this technology, you can realize installations with high availability.



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## \_ PROFISAFE V2.6.1

CD\_582M+FS implements the basic protocol (BP) and extended Protocol (XP) according to PROFIsafe standard V2.6.1.

## \_ extended „F-Dest“-address

Via TC-Integrated application, the user can choose „F-Dest-Addresses (PROFIsafe addressing) in range 1...65536 via software.

## PROFINET / PROFIsafe

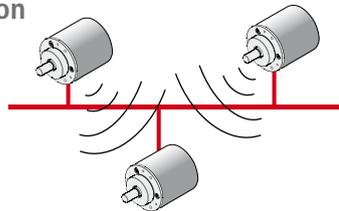
### \_ Reintegration after passivation

After a protocol failure, safety encoders enter a passive state. CD\_582+FS can be reintegrated into safety control mechanism without a global system restart.

### \_ “On the fly” preset for adjustment during the process

Preset values are transmitted via the real-time capable process image area. This means that absolute adjustments (also called “preset” or “offset adjustment”) can be performed synchronously with the control cycle even while the system is in operation. No more axis stops necessary.

### \_ Neighborhood detection



With neighborhood detection, you exchange devices without the use of an engineering tool. An encoder that is connected newly to the network can determine his position and function in the network by help of his physical neighbours and then requests the parameter data for this function from the master control.

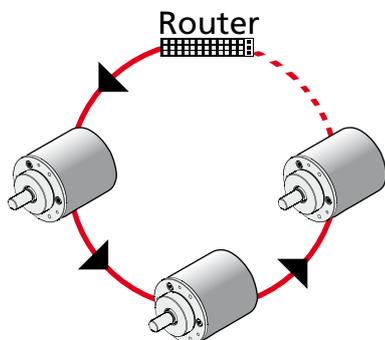
### \_ Fast Startup for quick system availability



The new CD\_582M+FS PROFINET starts faster than any other bus rotary encoder. Once configured, a stable, valid absolute position value is available in the PROFINET control just a few instants after restoration of supply. System startup is greatly accelerated and modular machine concepts in particular (with periodically decoupled modules) benefit directly from this technology.\*

\*CD\_582+FS EPN can be set up either for fast startup or media redundancy protocol.

## **Media-Redundancy Protocol for highest reliability**



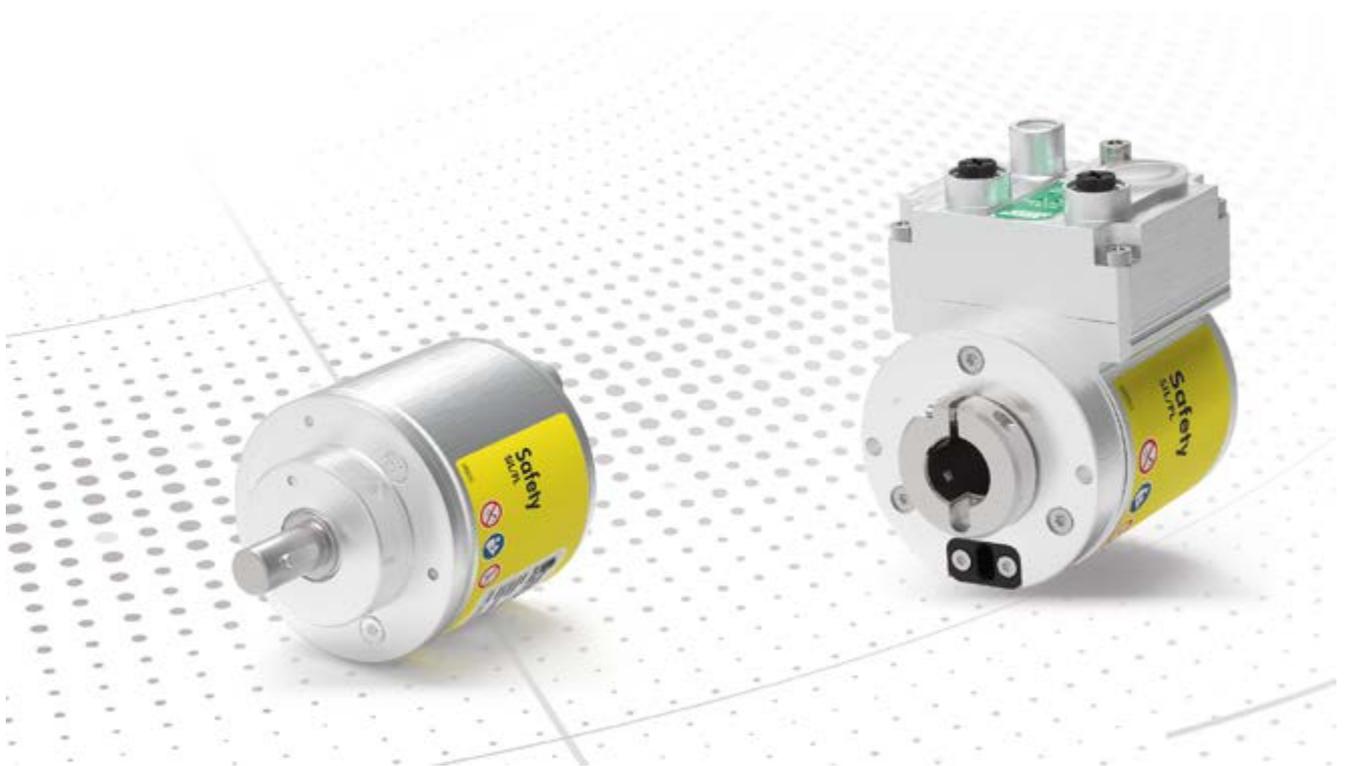
One ring for reliability. The PROFINET interface of the CD\_582M+FS supports the innovative Media Redundancy Protocol MRP. Normally PROFINET only supports a linear/tree structure. A redundant connection is not primarily provided as standard. MRP significantly increases availability with one simple device! Branches are connected to a ring with an additional line from the last node to the next switch. The appropriately configured nodes detect this. One of the nodes now disconnects this ring, by "ignoring" the second connection. If a connection fails (due to cable breakage or failure of a node), the nodes detect this and attempt to find another way to the rest of the system. The previously opened connection is now closed and all nodes are reconnected to the network.\*

## **Bus synchronized**

Position detection of CD\_582M+FS can be synchronized with bus clock. Unwanted dead times and jitter can be reduced to a minimum for perfect position control.

\*CD\_582+FS EPN can be set up either for fast startup or media redundancy protocol.

## Rotary Encoders - Functional Safety - SIL3 / PLe



### Functional safety up to SIL3 / PLe

Many applications in automation technology are subject to the highest safety requirements. By using SIL3/PLe-certified products you will achieve maximum safety in workplaces or environments that are shared by people and machines. Our absolute rotary encoders with SIL3 or PLe certification (safety rotary encoders) are available in sizes from 75 mm (hollow shaft or solid shaft). Standard interfaces such as Double SSI, PROFIsafe via PROFIBUS, PROFIsafe via PROFINET or Open-Safety via Powerlink or FSoE via EtherCAT guarantee optimal

safety and precision. The ATEX-compliant housing variant offers additional protection in explosive atmospheres. No separate modules are necessary for reliable position output, and there is no need to separately program a safety module - you couldn't get a simpler or more cost-effective solution.

## Optical detection (E)

Product	CDV582M+FS3 	CDH582M+FS3 	CDS582M+FS3 
Detection	Optical detection (E)	Optical detection (E)	Optical detection (E)
Single / multi	(M) Multi	(M) Multi	(M) Multi
Supply	10...30 VDC	10...30 VDC	10...30 VDC
Full resolution	29 bit	29 bit	29 bit
Steps per turn	8192	8192	8192
Number of turns	65536	65536	65536
Properties	Fast optical main detection	Fast optical main detection	Fast optical main detection
Shaft diameters available	10, 12, 14 mm; 1/4", 1/2", 3/8" with keyway	10, 12, 14, 15 mm; 1/4", 1/2", 3/8" with partial keyway	10, 12, 14, 15 mm; 1/4", 1/2", 3/8" with partial keyway
Connectors	Connectors radial, axial	Connectors radial	Connectors radial, axial
Ambient temperature	-20...+75°C	-20...+75°C	-20...+75°C
Protection class	IP 65	IP 54	IP 65
ATEX zone			
Interface			
Option, additional interfaces (on request)	<b>SSI</b> <b>INC</b>  <b>SIN / COS</b>	<b>SSI</b> <b>INC</b>  <b>SIN / COS</b>	<b>SSI</b> <b>INC</b>  <b>SIN / COS</b>
Weblink	<a href="http://www.tr-electronic.com/s/S018153">www.tr-electronic.com/s/S018153</a>	<a href="http://www.tr-electronic.com/s/S018153">www.tr-electronic.com/s/S018153</a>	<a href="http://www.tr-electronic.com/s/S018153">www.tr-electronic.com/s/S018153</a>
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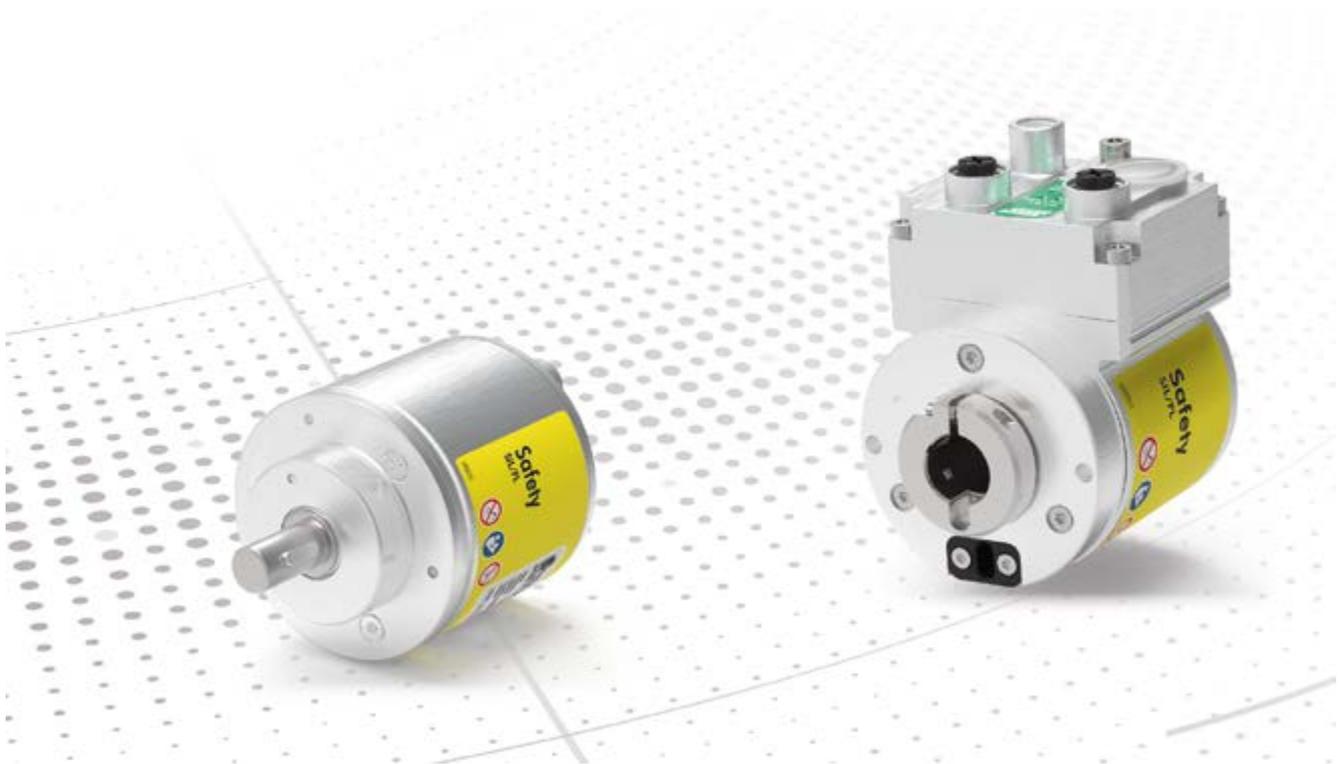
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## Magnetic detection (M)

Product	CDV582MM+FS3	CDH582MM+FS3	CDS582MM+FS3
			
Detection	Magnetic detection (M)	Magnetic detection (M)	Magnetic detection (M)
Single / multi	(M) Multi	(M) Multi	(M) Multi
Supply	10...30 VDC	10...30 VDC	10...30 VDC
Full resolution	29 bit	29 bit	29 bit
Steps per turn	8192	8192	8192
Number of turns	65536	65536	65536
Properties	Dewfall proof	Dewfall proof	Dewfall proof
Shaft diameters available	10,12, 14 mm; 1/4", 1/2", 3/8" with keyway	10, 12, 14, 15mm; 1/4", 1/2", 3/8" with partial keyway	10, 12, 14, 15mm; 1/4", 1/2", 3/8" with partial keyway
Connectors	Connectors radial, axial	Connectors radial	Connectors radial, axial
Ambient temperature	-20...+75°C	-20...+75°C	-20...+75°C
Protection class	IP 65	IP 54	IP 65
ATEX zone			
Interface			
Option, additional interfaces (on request)	<b>SSI</b> <b>INC</b>  <b>SIN / COS</b>	<b>SSI</b> <b>INC</b>  <b>SIN / COS</b>	<b>SSI</b> <b>INC</b>  <b>SIN / COS</b>
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## Rotary Encoders- Functional Safety - SIL2 / PLd



### Functional safety up to SIL2 / PLd

Safety functions that mainly ensure the safety of the machine itself are mostly specified with SIL2 resp. PLd. For these applications, TR-Electronic provides an optimized absolute rotary encoder system. With a compact size of 58 mm, these real multiturn devices can be fitted with solid, blind or hollow shaft - all three equipped with the form closure required for safety applications realized by groove and parallel key. Blind and hollow shafts are available for shaft diameters up to 15 mm. Position reading value is transmitted via the secured protocol part directly into a safety certified control and can be used directly as "safe position" (SLP) for safety calculations.

## Optical detection (E)

Product	CDV582M+FS2	CDH582M+FS2	CDS582M+FS2	
				
Detection	Optical detection (E)	Optical detection (E)	Optical detection (E)	
Single / multi	(M) Multi	(M) Multi	(M) Multi	
Supply	10...30 VDC	10...30 VDC	10...30 VDC	
Full resolution	29 bit	29 bit	29 bit	
Steps per turn	8192	8192	8192	
Number of turns	65536	65536	65536	
Properties	Fast optical main detection	Fast optical main detection	Fast optical main detection	
Shaft diameters available	10, 12, 14 mm; 1/4", 1/2", 3/8" with keyway	10, 12, 14, 15 mm; 1/4", 1/2", 3/8" with partial keyway	10, 12, 14, 15 mm; 1/4", 1/2", 3/8" with partial keyway	
Connectors	Connectors radial, axial	Connectors radial	Connectors radial, axial	
Ambient temperature	-20...+75°C	-20...+75°C	-20...+75°C	
Protection class	IP 65	IP 54	IP 65	
ATEX zone				
Interface				
Option, additional interfaces (on request)	<b>SSI</b> <b>INC</b>  <b>SIN / COS</b>	<b>SSI</b> <b>INC</b>  <b>SIN / COS</b>	<b>SSI</b> <b>INC</b>  <b>SIN / COS</b>	
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QR-Code				

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## Magnetic detection (M)

CDV582MM+FS2	CDH582MM+FS2	CDS582MM+FS2
		
Magnetic detection (M)	Magnetic detection (M)	Magnetic detection (M)
(M) Multi	(M) Multi	(M) Multi
10...30 VDC	10...30 VDC	10...30 VDC
29 bit	29 bit	29 bit
8192	8192	8192
65536	65536	65536
Dewfall proof	Dewfall proof	Dewfall proof
10,12, 14 mm; 1/4", 1/2", 3/8" with keyway	10, 12, 14, 15mm; 1/4", 1/2", 3/8" with partial keyway	10, 12, 14, 15mm; 1/4", 1/2", 3/8" with partial keyway
Connectors radial, axial	Connectors radial	Connectors radial, axial
-20..+75°C	-20..+75°C	-20..+75°C
IP 65	IP 54	IP 65
		
<b>SSI      INC</b>	<b>SSI      INC</b>	<b>SSI      INC</b>
<b>SIN / COS</b>	<b>SIN / COS</b>	<b>SIN / COS</b>
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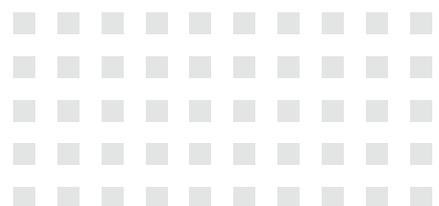
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Subject to technology and design modifications.

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