

Absolute rotary encoder Functional Safety SIL2, SIL3

Series 582, 75, 88



**Safety
Integrated**

CD_582+FS – functional safety in standard industrial form factor



CDH 582+FS
radial connection



CDV 582+FS
axial connection

Technology

- _ Efficient design
- _ DIN EN 61508 / DIN EN 62061 (SIL)
DIN EN ISO 13849 (PL)
- _ safety validated process data

Everything the application needs – reduce to the max.

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.

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.

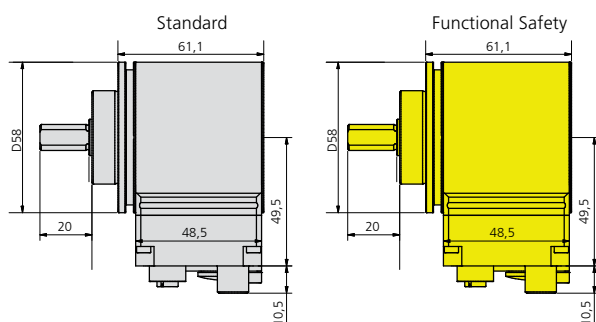


_ SIL2/PLd, cat3;
SIL3/PLe, cat4

_ architecture according category 4
"two encoders in one"

Mechanics

_ Mounting space



_ Robust magnetic/optic multiturn
rotary encoder CD_582M+FS

_ rugged double magnetic multiturn
rotary encoder CD_582MM+FS

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

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.

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

_ 13 bit resolution within one revolution (singleturn)
_ 16 bit revolutions (multiturn)
Option, additional interfaces
_ SSI (programmable)
_ INC (programmable)
_ SIN/COS (1024 steps per turn, non-programmable)

_ 13 bit resolution within one revolution (singleturn)
_ 16 bit revolutions (multiturn)
Option, additional interfaces
_ SSI (programmable)

Solid shaft

Blind shaft

Hollow shaft



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

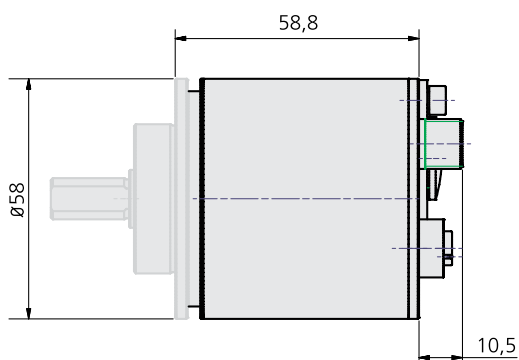
Solid shaft, blind shaft or hollow shafts are connected by form closure (keyway) to the driving shaft.



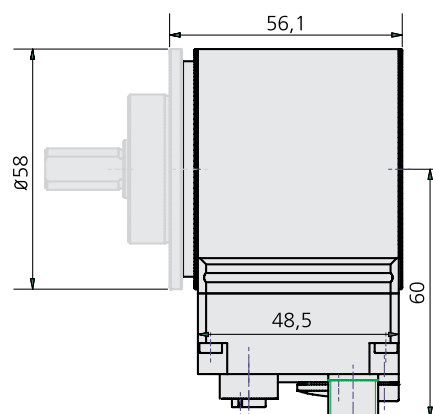
- Connectors axial or radial

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.

CD_582+FS – PROFINET / PROFISafe

PROFINET / PROFISafe



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

_ TCI implementation

_ Legacy-Mode

_ Encoder Profile 4.2

_ 32 bit data words

_ PROFINET with IRT

_ Shared device / grey and safe world

_ Shared Device / up to 4 safety instances

_ Direct readout of the two encoder channels by bus

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

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

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.

CD_582+FS EPN fulfils the Profinet Encoder Profile issued by Profibus-International user organisation for both, the grey and the secured data channel.

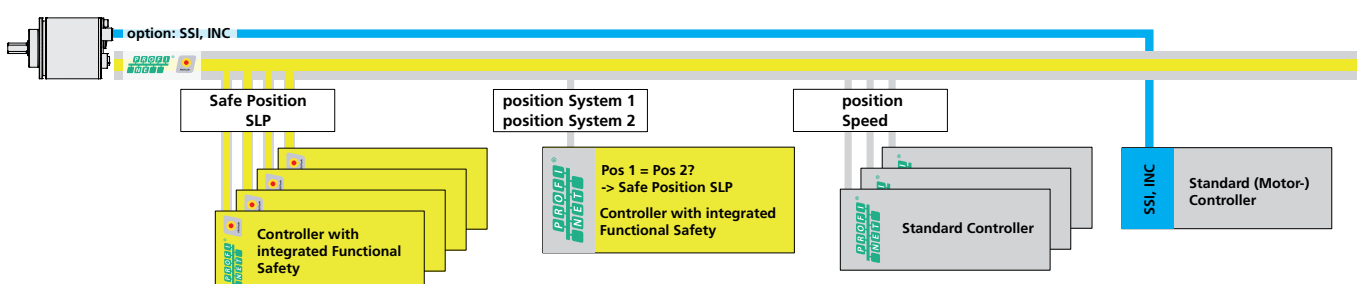
Full resolution in a single telegram – the full bandwidth for position or speed value can be transmitted in a single data word with 32 bit payload.

PROFINET 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.

„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.

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.

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.



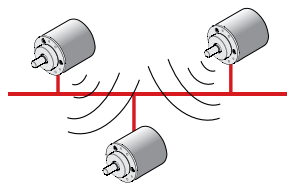
PROFISAFE V2.6.1

extended "F-Dest"-address

Reintegration after passivation

"On the fly" preset for adjustment during the process

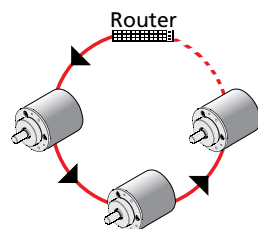
Neighborhood detection



Fast Startup for quick system availability



Media-Redundancy Protocol for highest reliability



Bus synchronized

CD_582M+FS implements the basic protocol (BP) and extended Protocol (XP) according to PROFIsafe standard V2.6.1.

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

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.

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.

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.

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.*

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.*

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.

CD_582+FS – EtherNet/IP / CIP Safety

EtherNet/IP / CIP Safety



_ SNCT Device Applet

Windows application for setting and saving the encoder parameters via Ethernet / IP. The user has the option of evaluating operating data, evaluating detailed diagnostic information and carrying out firmware updates.

_ CIP Encoder Device Profile 0x22

The CD_582 + FS EIP encoders meet the established protocol standard for absolute encoders from ODVA.

_ 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.

_ Hybrid Device

The CD_582 + FS EIP connects to the safety-related control as a safe device using the CIP safety protocol. At the same time, the encoder value can also be read via the non-safe channel, e.g. can be read out by further controls.

_ Direct readout of the two encoder channels by bus

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

_ The CIP Networks Library - Volume 7 CIP Safety, Ed. 2.16

CD_582 + FS EIP complies with the current CIP safety standard version 2.16 and thus fits seamlessly into the latest safety architecture.

_ ACD: Address Collision Detection

CD_582 + FS EIP recognizes duplicate network addresses and thus enables the user to quickly identify incorrect configurations during setup.

_ DHCP

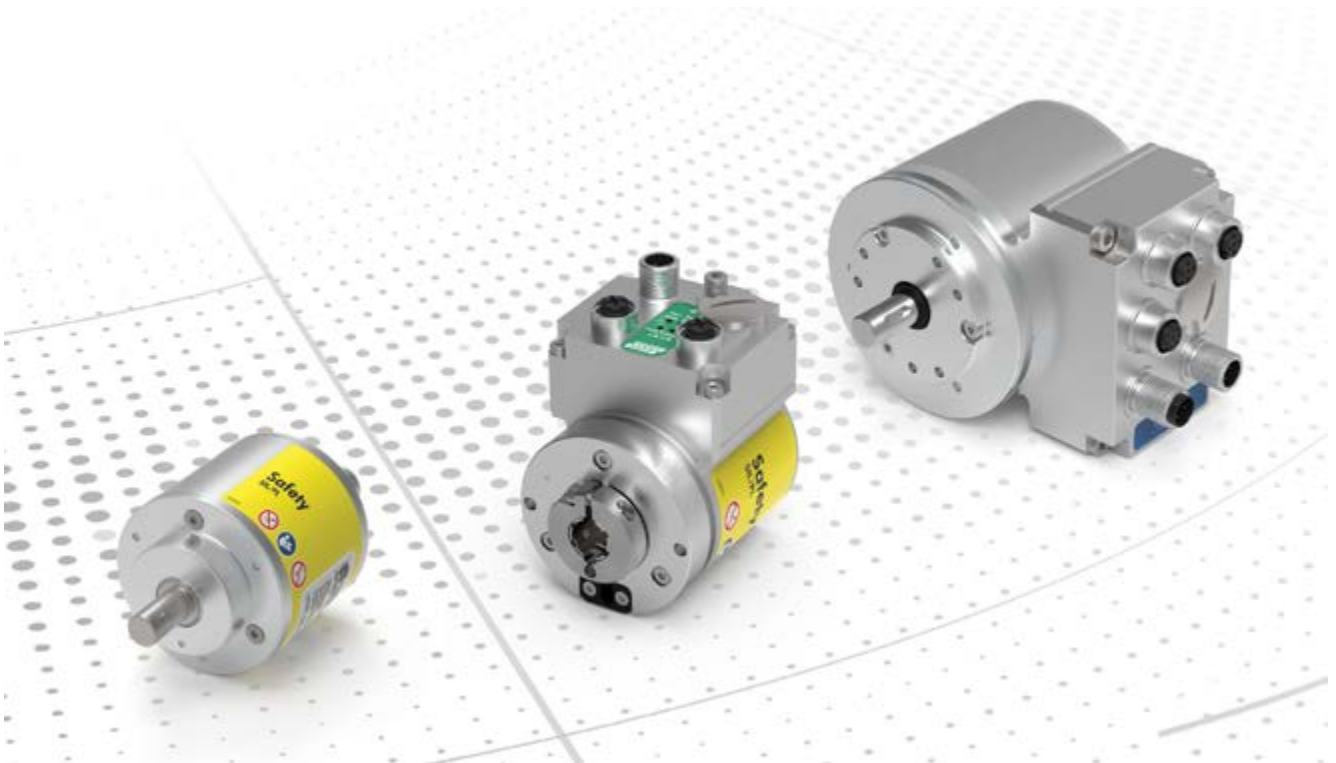
Ethernet / IP uses mechanisms of TCP / IP for network communication, including DHCP, to distribute the network addresses when a system is started.

_ DLR: Device Level Ring

One ring for reliability. The Ethernet/IP interface of the CD_582M+FS supports the innovative Device Level Ring Protocol DLR. Normally Ethernet/IP only supports a linear/tree structure. A redundant connection is not primarily provided as standard. DLR 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.



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 size 75 mm (hollow shaft or solid shaft) and recently introduced size 58 mm (hollow, blind 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. With the newest series 582+FS, the most recent interface features are available in your secured application - by using same space as an ordinary 58mm Industrial Encoder.

Contents



















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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 with keyway	10, 12, 14, 15 mm with partial keyway	10, 12, 14, 15 mm with partial keyway
Connectors	Connectors radial, axial	Connectors radial	Connectors radial, axial
Ambient temperature	-40...+85°C	-40...+85°C	-40...+85°C
Protection class	IP 65	IP 54	IP 65
ATEX zone			
Interface	   	   	   
Option, additional interfaces (on request)	SSI INC SIN / COS	SSI INC SIN / COS	SSI INC SIN / COS
Weblink	www.tr-electronic.com/s/S018153	www.tr-electronic.com/s/S018153	www.tr-electronic.com/s/S018153
QR-Code			

Can't find the right variant? Please contact us (info@tr-electronic.de)
















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 with keyway	10, 12, 14, 15 mm with partial keyway	10, 12, 14, 15 mm with partial keyway
Connectors	Connectors radial, axial	Connectors radial	Connectors radial, axial
Ambient temperature	-40...+85°C	-40...+85°C	-40...+85°C
Protection class	IP 65	IP 54	IP 65
ATEX zone			
Interface	   	   	   
Option, additional interfaces (on request)	SSI	SSI	SSI
Weblink	www.tr-electronic.com/s/S018153	www.tr-electronic.com/s/S018153	www.tr-electronic.com/s/S018153
QR-Code			

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Optical detection (E)

Magnetic detection (M)

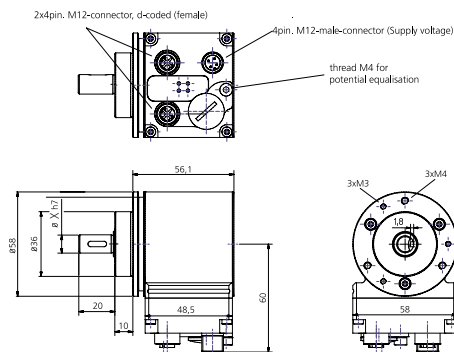
CDV75M	CDV75MM	CDH75M
		
Optical detection (E)	Magnetic detection (M)	Optical detection (E)
(M) Multi	(M) Multi	(M) Multi
11...27 VDC	11...27 VDC	11...27 VDC
28 bit	28 bit	28 bit
8192	8192	8192
32768	32768	32768
Fast optical main detection	Dewfall proof	Fast optical main detection
10mm with keyway	10mm with keyway	20mm with keyway
Connectors radial, cable glands radial (SSI)	Connectors radial, cable glands radial (SSI)	Connectors radial, cable glands radial (SSI)
-20...+70 °C	-40...+65°C	-20...+70 °C
IP 54	IP 65	IP 54
SSI   EtherCAT  POWERLINK	SSI   EtherCAT  POWERLINK	SSI   EtherCAT  POWERLINK
INC	INC	INC
www.tr-electronic.com/s/S007271	www.tr-electronic.com/s/S007271	www.tr-electronic.com/s/S007272
		

Can't find the right variant? Please contact us (info@tr-electronic.de)

Dimensional Drawings

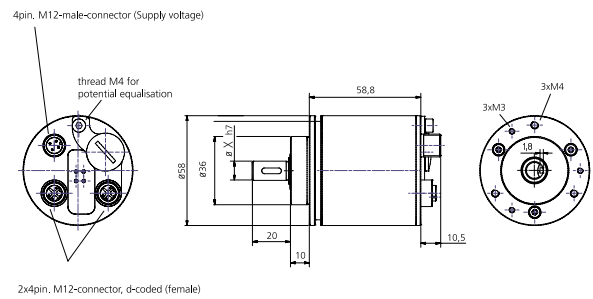
CDV582+FS RADIAL

Absolute-Encoder CDV582M+FS, CDV582MM+FS



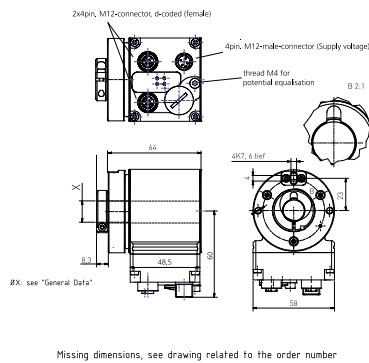
CDV582+FS AXIAL

Absolute-Encoder CDV582M+FS, CDV582MM+FS



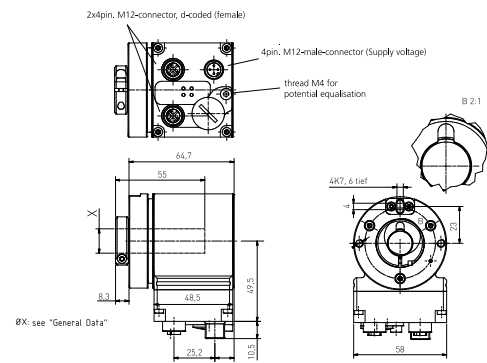
CDH582+FS RADIAL

Absolute-Encoder CDH582M+FS, CDH582MM+FS



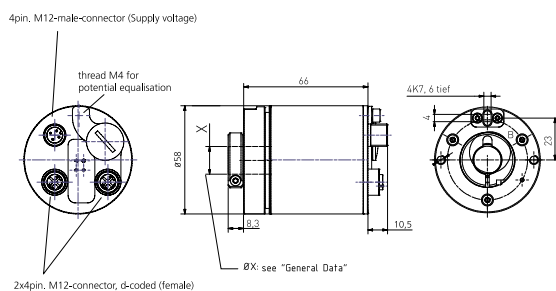
CDS582+FS RADIAL

Absolute-Encoder CDS582M+FS, CDS582MM+FS



CDS582+FS AXIAL

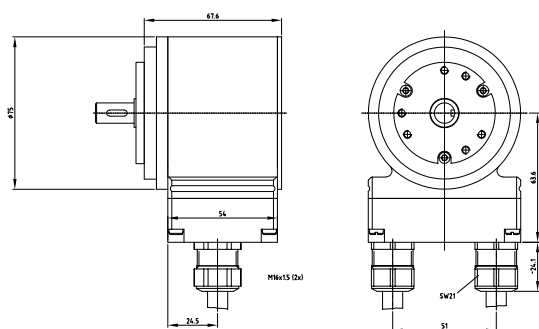
Absolute-Encoder CDS582M+FS, CDS582MM+FS



Dimensional Drawings

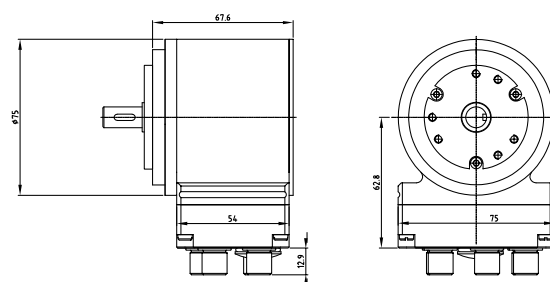
CDV75-SSI

Absolute encoder CDV75M - SSI



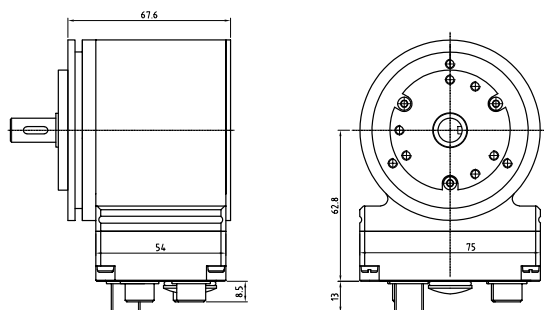
CDV75-PB

Absolute encoder CDV75M - PB



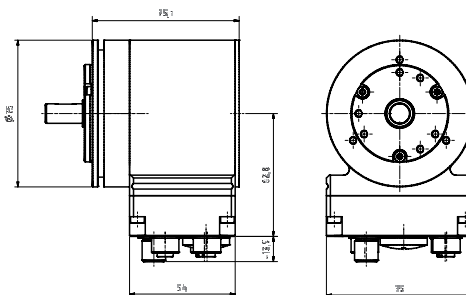
CDV75-PN / EPL / ETC

Absolute encoder CDV75M - PROFINET / PROFIsafe, - Powerlink / openSAFETY; - EtherCAT / FSoE



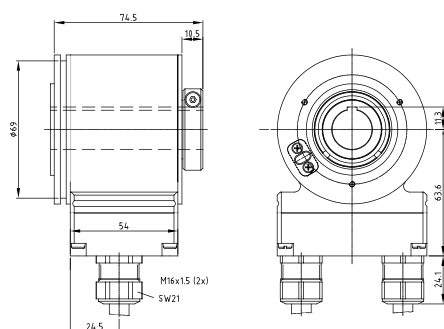
CDV75-PN

Absolute encoder CDV75M PROFINET / PROFIsafe+FS SealPack



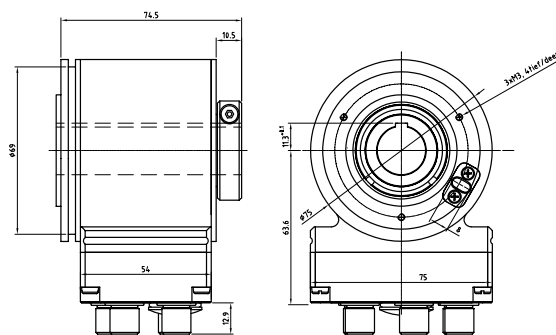
CDH75-SSI

Absolute encoder CDH75M - SSI



CDH75-PB

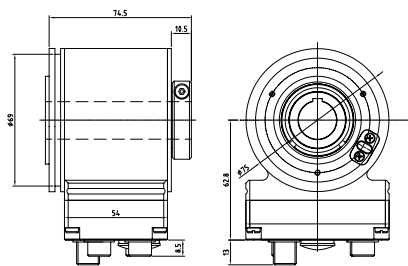
Absolute encoder CDH75M - PB



Dimensional Drawings

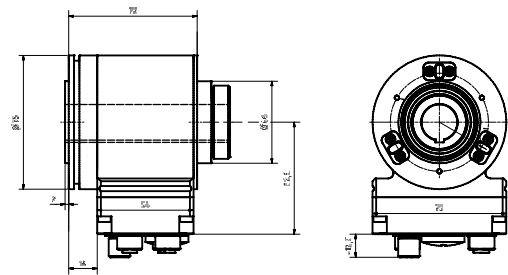
CDH75-PN / EPL / ETC

Absolute encoder CDH75M - PROFINET / PROFIsafe , - Powerlink / openSAFETY, - EtherCAT / FSoE



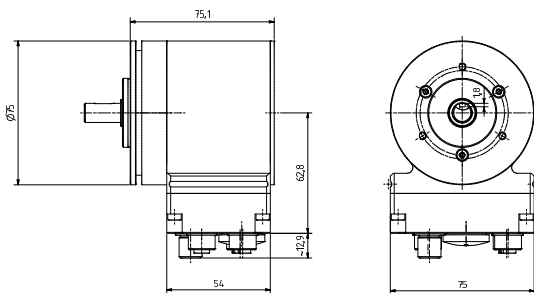
CDH75-PN

Absolute encoder CDH75M PROFINET / PROFIsafe+FS SealPack



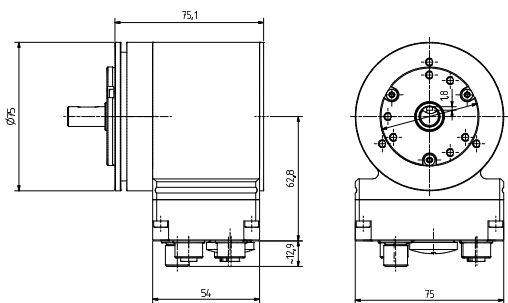
Seal Pack

Sample CDV75



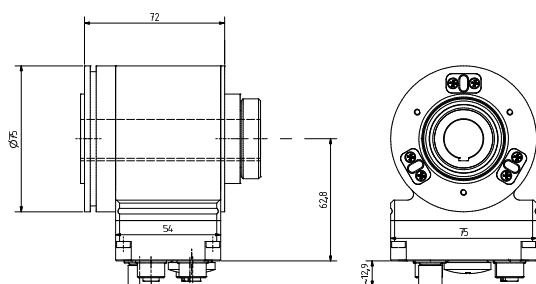
Stainless Steel

Sample CDV75



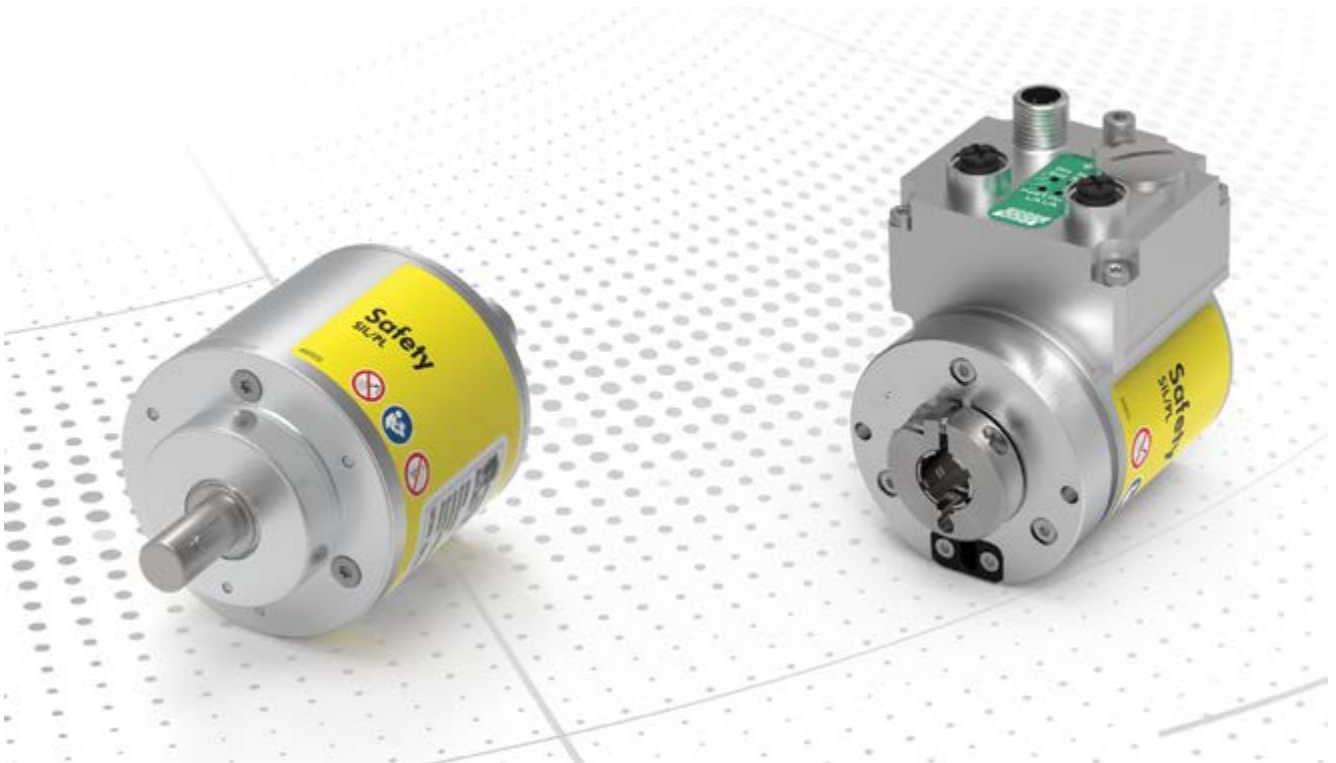
Seawater-resistant Aluminum

Sample CDH75





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.

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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 with keyway	10, 12, 14, 15 mm with partial keyway	10, 12, 14, 15 mm with partial keyway
Connectors	Connectors radial, axial	Connectors radial	Connectors radial, axial
Ambient temperature	-40...+85°C	-40...+85°C	-40...+85°C
Protection class	IP 65	IP 54	IP 65
ATEX zone			
Interface	 EtherNet/IP	 EtherNet/IP	 EtherNet/IP
Option, additional interfaces (on request)	SSI INC SIN / COS	SSI INC SIN / COS	SSI INC SIN / COS
Weblink	www.tr-electronic.com/s/S018153	www.tr-electronic.com/s/S018153	www.tr-electronic.com/s/S018153
QR-Code			

Can't find the right variant? Please contact us (info@tr-electronic.de)

Magnetic detection (M)

Product	CDV582MM+FS2	CDH582MM+FS2	CDS582MM+FS2
			
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 with keyway	10, 12, 14, 15 mm with partial keyway	10, 12, 14, 15 mm with partial keyway
Connectors	Connectors radial, axial	Connectors radial	Connectors radial, axial
Ambient temperature	-40...+85°C	-40...+85°C	-40...+85°C
Protection class	IP 65	IP 54	IP 65
ATEX zone			
Interfacew	   	   	   
Option, additional interfaces (on request)	SSI	SSI	SSI
Weblink	www.tr-electronic.com/s/S018153	www.tr-electronic.com/s/S018153	www.tr-electronic.com/s/S018153
QR-Code			

Dimensional Drawings

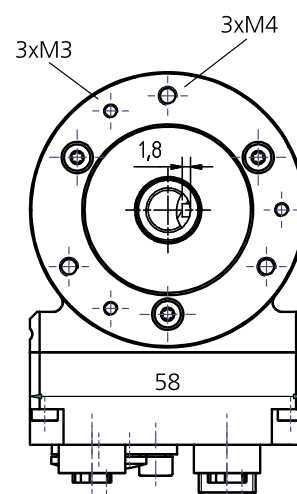
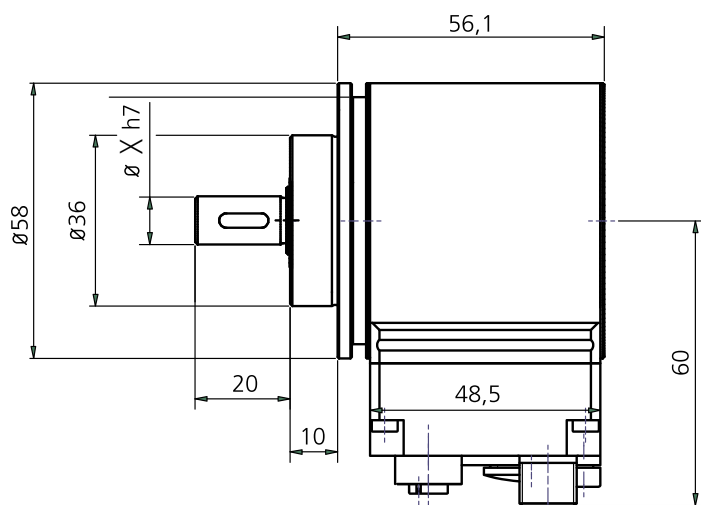
CDV582+FS RADIAL

Absolute-Encoder CDV582M+FS, CDV582MM+FS

2x4pin. M12-connector, d-coded (female)

4pin. M12-male-connector (Supply voltage)

thread M4 for
potential equalisation

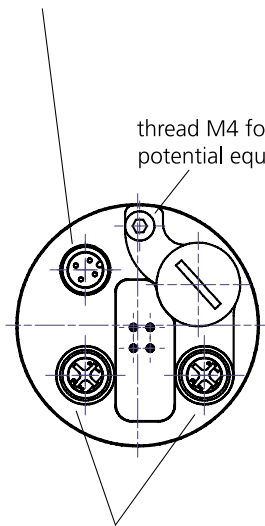


Dimensional Drawings

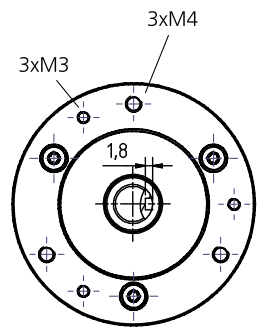
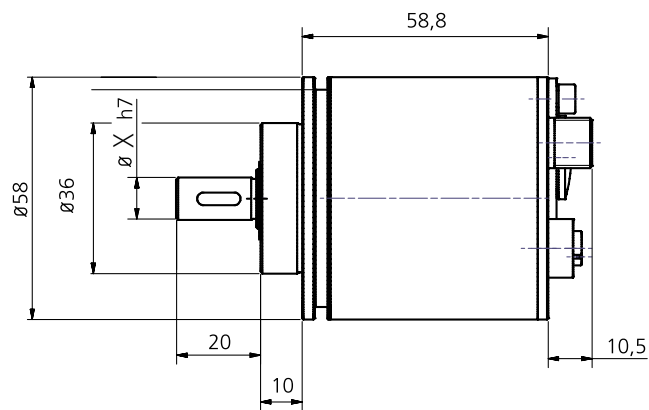
CDV582+FS AXIAL

Absolute-Encoder CDV582M+FS, CDV582MM+FS

4pin. M12-male-connector (Supply voltage)



2x4pin. M12-connector, d-coded (female)



Dimensional Drawings

CDH582+FS RADIAL

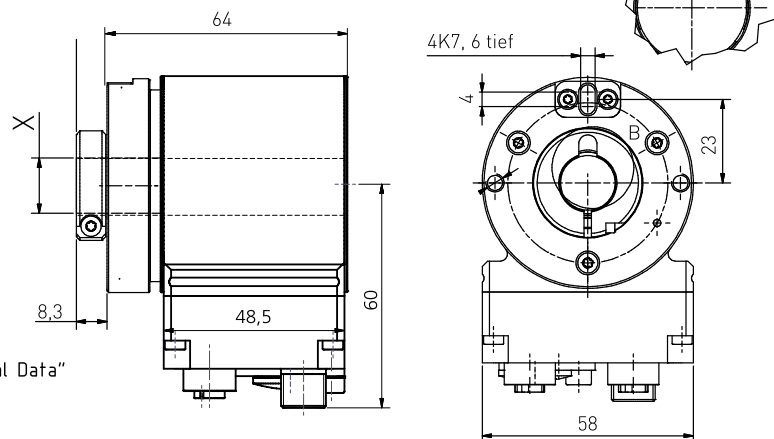
Absolue-Encoder CDH582M+FS, CDH582MM+FS

2x4pin. M12-connector, d-coded (female)

4pin. M12-male-connector (Supply voltage)

thread M4 for
potential equalisation

B 2:1



ØX: see "General Data"

Missing dimensions, see drawing related to the order number

Dimensional Drawings

CDS582+FS RADIAL

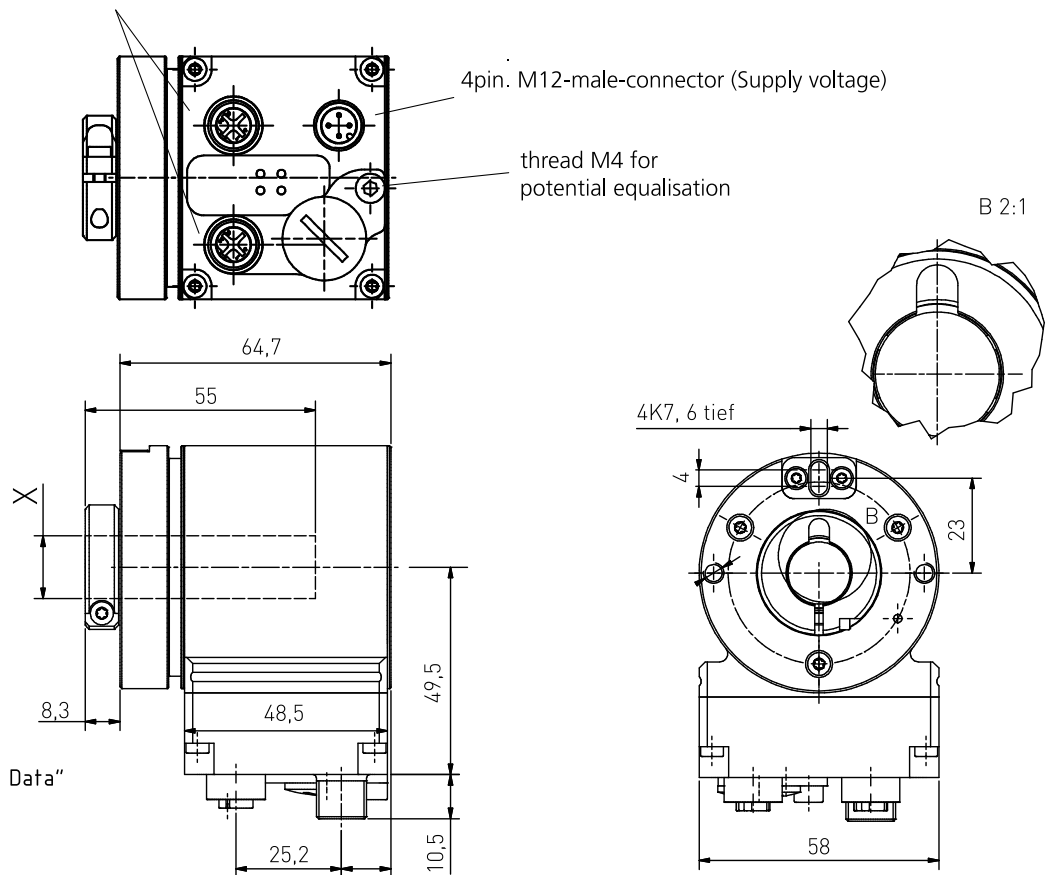
Absolute-Encoder CDS582M+FS, CDS582MM+FS

2x4pin. M12-connector, d-coded (female)

4pin. M12-male-connector (Supply voltage)

thread M4 for
potential equalisation

B 2:1

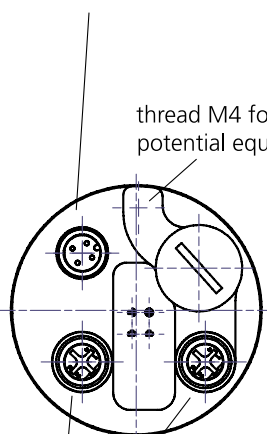


Dimensional Drawings

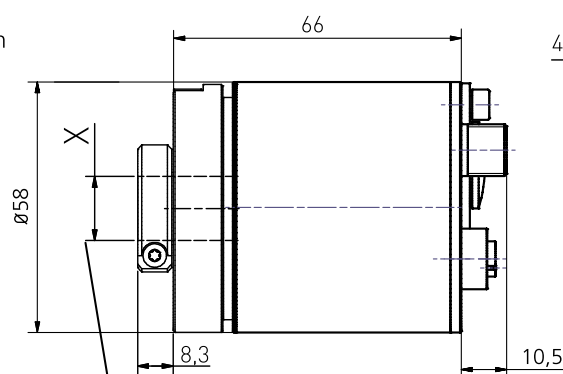
CDS582+FS AXIAL

Absolute-Encoder CDS582M+FS, CDS582MM+FS

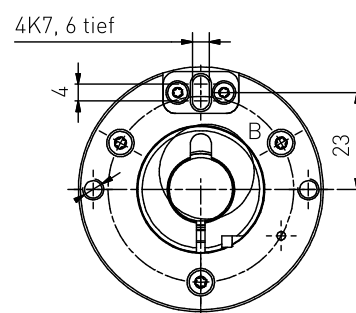
4pin. M12-male-connector (Supply voltage)



2x4pin. M12-connector, d-coded (female)



ØX: see "General Data"



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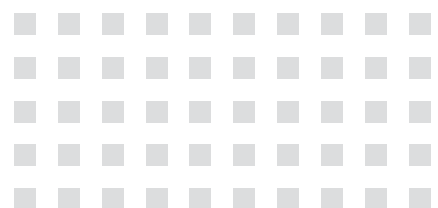
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Subject to technology and design modifications.

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