

# FUNCTIONAL SAFETY CERTIFICATE

CERTIFICATO – ZERTIFIKAT – CERTIFICADO – CERTIFICAT

The product:

*Cable Extension Transducer  
CET5, CET7, CET12, CET20  
CANopen Safety Version*

Manufactured by:

Legal Location

*TSM SENSORS S.r.l.  
Via Roma, 110  
24021 Albino, Bergamo  
Italy*

Operative Location

*TSM SENSORS S.r.l.  
Via De Gasperi, 6/5  
25030 Zocco d'Erbusco, Brescia  
Italy*

suitable for the following safety function(s):

Provide a device output signal consistent with specifications with respect to angular and/or linear measurement.

has been assessed per the relevant requirements of

**IEC 61508:2010 Parts 1 to 3**

and meets the requirements providing the following:

## Systematic Capability:

The compliance with the requirements for the avoidance of systematic faults and the requirements for the control of systematic faults have been achieved following the compliance route 1<sub>S</sub>.

SC 2

## Hardware Safety Integrity:

The constraints on hardware safety integrity have been verified in order to achieve a sufficiently robust architecture taking into account the level of element and subsystem complexity following the compliance route 1<sub>H</sub>.

Type  
B

## Random Safety Integrity:

The estimated safety integrity, for each safety function, due to random hardware safe and dangerous failures rates (excluding "no part" and "no effect" contribution).

See  
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The architectural constraints and the effects of random failures (PFH/PFD<sub>AVG</sub>) must be verified for each specific application and safety function implemented by the E/E/PE safety-related system.

Certified by:

**BYHON**

BYHON Certification Director:

Rosati Francesco

CERTIFICATE No:  
TSMS-CETSE-ESE-E01  
Revision: A

Issued:  
March 20<sup>th</sup>, 2023

Valid until:  
March 19<sup>th</sup>, 2026

The owner of a valid certificate for an assessed product is authorized to affix the following mark and relative ID number, to all recognized devices which are identical to the product assessed.

**BYHON**  
**SIL** ✓

ID.N° 161623ES01A



#8914  
ISO/IEC 17065  
Product Certification Body

The design of each Safety Instrumented Function (SIF) shall meet the requirements listed in the reference standards that shall be selected by taking into account the specific application. Specific activities necessary to investigate and reach a judgment on the adequacy of the functional safety achieved by the E/E/PE safety-related system or compliant items (elements/subsystems) has been conducted by an independent assessor.

The following failure rates data shall be used to the PFH/PFD<sub>AVG</sub> estimation, taking into consideration all parameters such as redundancy, architectural constraints, diagnostic capability, also introduced by the whole system, including the considerations about the proof test and its effectiveness, mean time of restoration, up to the maintenance capability and its minimum characteristics.

**Failure rate for Cable Extension Transducer**

Configuration	$\lambda_s$	$\lambda_{DU}$	$\lambda_{DD}$
Without Integrated Inclination Sensor	50	222	1999
With Integrated Inclination Sensor	50	222	2420

Notes:

- All failure rates are in FIT (Failure In Time 1 FIT = 1 failure / 10<sup>9</sup> hours).
- The device can be used in stand-alone configuration, up to SIL 2 acc.to IEC 61508 and PLd acc. to ISO 13849.
- The firmware release considered to be covered by the certificate is FW2204R01XX.

The prescriptions contained in the safety manual MNL0006 shall be followed.

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The Functional Safety  
Assessment report no.

**23-TSM-CETSE-FSA-01**

dated:  
March 14<sup>th</sup>, 2023

is an integral part of this  
certificate



Mod\_12\_CB Rev05

BYHON  
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Prato (PO)  
ITALY

\*The Certificate shall be reproduced  
only in its original entirety.