

FUNCTIONAL SAFETY CERTIFICATE

CERTIFICATO – ZERTIFIKAT – CERTIFICADO – CERTIFICAT

The product:

***Inclinometer
TLP300
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 inclination 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_S.

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_H.

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_{AVG}) 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-TLP30-ESE-E01
Revision: A

Issued:
March 28th, 2023

Valid until:
March 27th, 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° 161623ES02A



#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_{AVG} 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 Inclinometer

Configuration	λ_s	λ_{DU}	λ_{DD}
TLP300 CANOPEN SAFETY	51	121	1481

Notes:

- All failure rates are in FIT (Failure In Time 1 FIT = 1 failure / 10⁹ 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 FW2205R01XX.

The prescriptions contained in the safety manual MNL0008 shall be followed.

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The Functional Safety
Assessment report no.

23-TSM-TLP30-FSA-01

dated:
March 27th, 2023

is an integral part of this
certificate



Mod_12_CB Rev05

BYHON
Via Lepanto 23, 59100
Prato (PO)
ITALY

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