

SIL



Functional Safety Certificate

No. 0H200924.SPISU17

Technical Construction File no. TCF-SPIC- SIL

Certificate's Holder: Shanghai Princo Instrumentation Co., Ltd.
No.3638, Beiqing Road, Hua Xin Town, Qingpu District,
Shanghai, China

Product: L9 Radar Level Meter
Model(s): L9 SIL

Standard: Has been assessed per the relevant requirements of:
IEC 61508-2:2010

And meets requirements providing a level of integrity to:
Systematic Capability: SC2
Random Capability: Routes 1H & 1s
as an element/subsystem suitable for use in safety related systems performing
safety functions up to and including
SIL 2 capable with HFT = 0 (1001)*
SIL 3 capable with HFT = 1 (1002)*
when used in accordance with the scope and conditions of this certificate.

*Safety Function:

To monitor the level within the specified safety time. When the level output is abnormal, it
will enter the functional safety state.

*Application Restrictions:

The unit must be properly designed into a safety instrumented function per the safety
manual requirement.

* Is suitable to be safety function according to the description and the configuration
defined in Annex I

Verification Mark:



The Verification Mark can be
affixed on the product. It is NOT
permitted to alter the
Verification Mark in any way

Remark: This SIL Verification of Compliance has been issued on a voluntary basis. ECM confirms that a Test Report is existent for the above listed product(s) and found to meet the requirements of above standards for application in safety related system up to Safety Level of **SIL 2**.

The unit must be properly designed into a Safety Instrument Function as per the requirements in the Safety Manual. The Verification Mark shown above can be affixed on the product. It is NOT permitted to alter the Verification Mark in any way. In addition the Verification's Holder is NOT allowed to transfer the Verification to third parties. This certificate can be checked for validity at www.entecerma.it

Date of issue 24 September 2020

Expiry date 23 September 2025

Service Manager
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Annex I

No. 0H200924.SPISU17

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1. The use of the product must obey the required rules to conservation of SIL 2 properties.
2. The product version of hardware components used for validation are the following:

Component	Model
L9 Radar Level Meter	L9 SIL

3. Acceptable environmental constraints for the system are recalled in the safety Manual (Ref: [SIL-SPIC-01]). These elements must be checked for each integration operation of the product.
4. The SIL 2 capable certified Safety Instrumented Function is the following:
 - SF1: To monitor the level within the specified safety time.
 - SF2: When the level output is abnormal, it will enter the functional safety state.
5. Random Capability:
The SIL limit imposed by the Architectural Constraints must be met for each element.

Table 1: Summary for the worst case version -Failure rates

Failure category	Failure rates (in FIT)
Fail Dangerous Detected	1158
Fail detected (internal diagnostics or indirectly) $=\lambda_{SU}+\lambda_{DD}$	471
Fail low (detectable by the logic solver)	653
Fail High (detectable by the logic solver)	34
Fail Dangerous Undetected	364
No Effect	421
Annunciation Undetected	68
Not part	313
MTBF=MTTF+MTTR	49 years

Table 2: Summary for the worst case version -IEC 61508 Failure rates

λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}	SFF	DC	DCD
365FIT	136FIT	1158FIT	364FIT	82%	76%	76%

Table 3: Summary for the worst case version -PFD_{AVG} values

T[Proof]=1 year	T[Proof]=5 year	T[Proof]=10 year
PFD _{AVG} =1.70E-03	PFD _{AVG} =8.08E-03	PFD _{AVG} =1.62E-02

*FIT=1 failure/ 10⁹ hours

6. The Safety Integrated Level of the safety function using the product shall be calculated taking into account the characteristics of the whole system.