



SIL

Functional Safety Certificate

No. 6G250107.ATM0U04

Certificate's Holder: Anhui Tongyi Measurement and Control Technology Co., Ltd.
Floor 4, Building 1, Internet Industrial Park, No. 17, Huayuan Avenue, Baohe District, Hefei, Anhui Province, China

Manufacturer: Anhui Tongyi Measurement and Control Technology Co., Ltd.
Floor 4, Building 1, Internet Industrial Park, No. 17, Huayuan Avenue, Baohe District, Hefei, Anhui Province, China

Product: Electric Capacity Type Liquidometer
Model(s): TY-822

Standard: Has been assessed per the relevant requirements of:
IEC 61508 Parts 1-7:2010

And meets requirements providing a level of integrity to:

Systematic Capability: SC 3 (SIL 3 Capable)

Random Capability: Type B Element

SIL 2 @ HFT=0; SIL 3 @ HFT=1; Route 2H

PFDavg and Architecture Constraints must be verified each application

* Safety Function:

The working principle of capacitive level gauge is based on the change of capacitance to detect the liquid level height. It is usually composed of a capacitor, and the capacitance value of the capacitor changes with the liquid level. When the liquid level rises, the capacitance value of the capacitor will increase. When the liquid level drops, the capacitance value of the capacitor will decrease. By measuring the change in capacitance value, the current liquid level height can be accurately determined.

* Is suitable to be safety function according to the description and the configuration defined in Annex 1.

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 3**. 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 07 January 2025

Expiry date 06 January 2030

For online check:



Approver:
Ente Certificazione Macchine
Legal Representative
Luca Bedonni



Ente Certificazione Macchine

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Annex I

No. 6G250107.ATM0U04

1. The product has met manufacturer design process requirements of Safety Integrity Level (SIL) 3. These are intended to achieve sufficient integrity against systematic errors of design by the manufacturer.

2. The product version of hardware components used for validation and type tests are the following:

Product:	Electric Capacity Type Liquidometer
Model(s):	TY-822

3. Acceptable environmental constraints for the system are recalled in the safety Manual. These elements must be checked for each integration operation of the product.

4. Hypothesis used for calculations are presented here under:

- The mode of operation is Low demand, which means less than 1 trip demand each year;

Component architecture	SIL Capability	Demand frequency	PFD
1oo1 configuration	SIL2	Low	6.84E-04
1oo2 configuration	SIL3	Low	2.28E-05

5. IEC 61508 Failure Rates in FIT*

Failure Category	λ_{SD}	λ_{SU}	λ_{DO}	λ_{DU}	SFF
Average	11	194	25.45	9.14	96.20%
Tests intervals=12months MTTR=24h					

*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.