



FUNCTIONAL SAFETY CERTIFICATE

This is to certify that the

MTL4850 HART Multiplexer

manufactured by

Eaton Electric Ltd.

Great Marlings

Butterfield

Luton

Bedfordshire

LU2 8DL

United Kingdom

has been assessed by Sira Certification Service with reference to the
CASS methodologies and found to meet the requirements of

**IEC 61508-2:2010
Routes 1_H & 2_S
Systematic Capability (SC3)**

The Product and its associated failure data contained herein may be considered for connection
to 4-20mA instrument loops performing safety functions up to and including

SIL 3 capable with HFT=0 (1001) *

when used in accordance with the scope and conditions of this certificate.

* The product that has been certified is not implicit of the achieved Safety Integrity Level (SIL)
of the safety related system

Certification Manager:


Wayne Thomas

Initial Certification: 30th April 2012
This certificate issued: 20th September 2017
Renewal date: 19th September 2022

This certificate may only be reproduced in its entirety, without any change.



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**Sira Certification Service
Part of CSA Group UK**

Unit 6 Hawarden Industrial Park,
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Product description and scope of certification

The MTL4850 multiplexer is designed to monitor HART field devices connected to AI or AO field loops in safety-related measurement systems, communicating with an asset management system to provide data to HART configuration/maintenance software packages.

The MTL4850 itself does not perform a safety function, but it can be connected to a safety instrumented loop without interfering with the safety function performed by that loop.

Element Safety Function(s)

The safety function of the product when it is connected to a safety instrumented system is defined for the purposes of the assessment as:

'To not interfere with the analogue safety loop connected to the MTL4850 field terminals'.

This element safety function is being performed in Continuous Mode of operation as indicated by the certified failure data overleaf



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Certified Data in support of use in safety functions

The assessment has been carried out with reference to the *Conformity Assessment of Safety-related Systems* (CASS) methodology using the Route 1_H approach.

A Failure Mode and Effect Analysis (FMEDA) has established the failure modes and failure rates shown in Table 1 below. Failure rates have been taken from PD IEC TR 62380:2004 and a combination of FMD-91, PD IEC TR 62380:2004 and IEC 62061 used for failure mode distribution.

Table 1: Failure Data

Functional safety Parameter ³ required for connection to a safety-related system	Symbol	Element Safety Function: To not interfere with the analogue safety loop connected to the MTL4850 field terminals
Architectural constraints:	Type HFT SFF	B 0 99%
Random hardware failures:	λ	$\lambda_{DU} < 1.0E-08$ $\lambda_{DD} = 0$ $\lambda_S = 1.13E-05$
Probability of Failure on Demand:	PFD _{AVG}	Not applicable for continuous mode functions
Systematic Capability:	SC	SC 3
Demand Mode:		Continuous

Notes on the failure data:

- Failure rates stated in Table 1 are in units of *failures per hour*.
- Environment / stress criteria used in the FMEDA: 'Ground; stationary; non-weather protected' conditions.
- All failure modes of the HART communications have not been assessed and are not included in the above data



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Table 2: Information supporting the failure rate data

1	Product identification:	MTL4850 revision 03 onwards and firmware 1.02 onwards, as denoted on the product label.
2	Functional specification:	Refer to the MTL Instruments datasheet EPS MTL4850-1, Oct-2009
3-5	Random hardware failure rates:	Refer to previous table
6	Environment limits:	Temperature range Operating: –40°C to +70°C Non-operating: –40°C to +85°C Relative humidity 5% to 95% - non-condensing
7	Lifetime/replacement limits:	10 years
8	Proof Test requirements:	Not applicable to this product
9	Maintenance requirements:	No specific functional safety related requirements. For maintenance information, generally, refer to the Instruction Manual, INM4850-1, rev 2
10	Diagnostic coverage:	Diagnostics are performed for the dangerous failure modes but these are not relied upon for SIL 3 capability.
11	Diagnostic test interval:	1 minute on average but note comment in previous entry 10 above
12	Repair constraints:	No specific restraints. For servicing information, generally, refer to the Instruction Manual, INM4850-1, rev 2
13	Safe Failure Fraction:	Refer to previous table
14	Hardware fault tolerance (HFT):	Refer to previous table
15	Highest SIL (architecture/type A/B):	SIL3
16	Systematic failure constraints:	Failure modes of the HART communications have not been assessed and are not included in the above data. The SPI system should be isolated on any adjoining backplane or interface.
17	Evidence of similar conditions in previous use:	Compliance Route 2 _H (proven-in-use) not used
18	Evidence supporting the application under different conditions of use:	
19	Evidence of period of operational use:	
20	Statement of restrictions on functionality:	
21	Systematic capability:	SC 3
22	Systematic fault avoidance measures:	Based on techniques and measures used to avoid systematic failures introduced during the realisation lifecycle from 61508-2 Annex B.
23	Systematic fault tolerance measures:	The unit's fault status is alerted via the fault (solid state) relay contacts and LED on the top panel of the module.
24	Validation records:	As controlled under the certified FSM system and additional verification by Sira in report R56A26226A.



Management of functional safety

This product is controlled under the manufacturer's certified functional safety management system that meets the relevant requirements of IEC 61508-1:2010 clause 6. Refer to Sira certificate CASS 00015.

Identification of certified equipment

The certified equipment and its safe use is defined in the manufacturer's documentation listed in Table 1 below.

Table 3: Certified drawings

Document no.	Rev	Date	Document description
AD4850-3	1	07/2008	MTL4850 assembly drawing
AD4850-1	4	11/2010	MTL4850 final assembly
TC4850-1	2	11/2008	4850 final assembly
PLE4850-3	1	10/7/2008	MTL4850 PCB ASSEMBLY
TP4850-1	1	06/11/2008	4850 ASSEMBLY
SM4850-1	1		MTL4850 Safety Manual

Conditions of Certification

The validity of the certified base data is conditional on the manufacturer complying with the following conditions:

1. The manufacturer shall analyse failure data from returned products on an on-going basis. Sira Certification Service shall be informed in the event of any indication that the actual failure rates are worse than the certified failure rates. (A process to rate the validity of field data should be used. To this end, the manufacturer should co-operate with users to operate a formal field-experience feedback program).
2. Sira shall be notified in advance (with an impact analysis report) before any modifications to the certified equipment or the functional safety information in the user documentation is carried out. Sira may need to perform a re-assessment if modifications are judged to affect the product's functional safety certified herein.
3. On-going lifecycle activities associated with this product (e.g., modifications, corrective actions, field failure analysis) shall be subject to surveillance by Sira in accordance with 'Regulations Applicable to the Holders of Sira Certificates'.
4. This product shall be controlled under the manufacturer's certified FSM system (Sira certificate CASS 00015).
5. The manufacturer shall ensure that the SPI terminals on the mounting boards are unconnected (open circuit) in order to maintain the electrical isolation of the product.



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Conditions of Safe Use

The validity of the certified base data in any specific user application is conditional on the user complying with the following conditions:

1. The product shall only be mounted on either the HMP-HM64, HTP-SC32 or CPH-SCx mounting boards, with the signal connections of analogue signals through HCU16x or HTP-SC32x, supplied for this product by the manufacturer
2. Refer to the safety manual regarding advice about avoiding the possibility of HART messages corrupting operation of the safety instrumented system to which this product is connected to.
3. The user shall comply with the requirements given in the manufacturer's user documentation (referred to in Table 2 above) in regard to all relevant functional safety aspects such as application of use, installation, operation, maintenance, proof tests, maximum ratings, environmental conditions, repair, etc;
4. Selection of this equipment for connection to safety functions and the installation, configuration, overall validation, maintenance and repair shall only be carried out by competent personnel, observing all the manufacturer's conditions and recommendations in the user documentation.
5. All information associated with any field failures of this product should be collected under a dependability management process (e.g., IEC 60300-3-2) and reported to the manufacturer.

General Conditions and Notes

1. This certificate is based upon a functional safety assessment of the product described in Sira Test & Certification Assessment Report R56A26226A & R70065470B and any further reports referenced in that report (under previous Sira projects).
2. If certified product or system is found not to comply, Sira Certification Service should be notified immediately at the address shown on this certificate.
3. The use of this Certificate and the Sira Certification Mark that can be applied to the product or used in publicity material are subject to the 'Regulations Applicable to the Holders of Sira Certificates' and 'Supplementary Regulations Specific to Functional Safety Certification'.
4. This document remains the property of Sira and shall be returned when requested by the issuer.

Certificate History

Issue	Date	Report no.	Comment
03	22/02/2017	R56A26226A	Certificate re-issued following company name change.
04	20/09/2017	R70065470B	Certificate updated as a result of successful recertification cycle.



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