FUNCTIONAL SAFETY

CERTIFICATE

CERTIFICATO – ZERTIFIKAT – CERTIFICADO – CERTIFICAT

The product:

High Temperature Velocity Transducer
5485C

Manufactured by:

Metrix Instruments Co.
8824 Fallbrook Dr. Houston, TX 77064
United States of America

suitable for the following safety function(s):

Generate an emf directly proportional to the oscillatory velocity applied to the sensor body by the external environment

has been assessed per the relevant requirements of

IEC 61508:2010 Parts 1 to 2

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 3
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.and Route 2_H	Type A
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 page 2

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:
MTXI-5485C-ENS-B01

Issued:
March 2nd, 2025

Valid until:
March 1st, 2028

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

BYHON SIL

ANAB
ANSI National Accreditation Board
ACCREDITED
ISO/IEC 17065
PRODUCT CERTIFICATION BODY
#8914

METRIX DOC NO: 1699560
REV: C

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 Seismic Transmitters 5485C

Configuration	λ_S	λ_{DU}	λ_{DD}
With Removal Cable (5485-AAA + 4850-AAA)	0	77	392
With integral Cable (5485-AAA-BBB)	0	78	311

Notes:

- All failure fates are in FIT (Failure In Time 1 FIT = 1 failure / 10^9 hours).
- The prescriptions contained in the safety manual QP064-46 shall be followed.
- The device, in both configurations, can be used for application up to SIL 2, with HFT=0, and SIL 3, with HFT=1.

CERTIFICATE NO:
MTXI-5485C-ENS-B01

Issued:
March 2nd, 2025

Valid until:
March 01st, 2028

The Functional Safety Assessment report no.

25-MTX-5485C-FSA-01

dated:
February 13rd, 2025

is an integral part of this certificate

Mod_12_CB Rev09

BYHON
Via Lepanto 23, 59100
Prato (PO)
ITALY

METRIX DOC NO: 1699560
REV: C

The following pages are the prior revisions of this certificate.

FUNCTIONAL SAFETY

CERTIFICATE

CERTIFICATO – ZERTIFIKAT – CERTIFICADO – CERTIFICAT

The product:

High Temperature Velocity Transducer
5485C

Manufactured by:

Metrix Instruments Co.
8824 Fallbrook Dr. Houston, TX 77064
United States of America

suitable for the following safety function(s):

Generate an emf directly proportional to the oscillatory velocity applied to the sensor body by the external environment

has been assessed per the relevant requirements of

IEC 61508:2010 Parts 1 to 7

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 3
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 A
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 page 2

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:
MTXI-5485C-ENS-E01
Revision: A

Issued:
February 28th, 2022

Valid until:
March 1st, 2025

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°010522EN04A

ANSI ACCREDITED
#8914
ISO/IEC 17065
Product Certification Body

METRIX DOC NO: 1699560
REV: B

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 Seismic Transmitters 5485C

Configuration	λ_S	λ_{DU}	λ_{DD}
With Removal Cable (5485-AAA + 4850-AAA)	0	77	392
With integral Cable (5485-AAA-BBB)	0	78	311

Notes:

- All failure fates are in FIT (Failure In Time 1 FIT = 1 failure / 10^9 hours).
- The device, in both configurations, can be used for application up to SIL 2, with HFT=0, and SIL 3, with HFT=1.

The prescriptions contained in the safety manual QP064-46 shall be followed.

CERTIFICATE NO:
MTXI-5485C-ENS-E01
Revision: A

Issued:
February 28th, 2022

Valid until:
March 01st, 2025

The Functional Safety Assessment report no.

22-MTX-5485C-FSA-01

dated:
February 23rd, 2022

is an integral part of this certificate

Mod_12_CB Rev03

BYHON
Via Lepanto 23, 59100
Prato (PO)
ITALY

The following pages are the prior revisions of this certificate.

CERTIFICATE

CERTIFICATO – ZERTIFICAT – CERTIFICADO – CERTIFICAT

The product:

High Temperature Velocity Transducer
5485C

Manufactured by:

Metrix Instrument Co.
8824 Fallbrook Drive, Houston
Texas 77064
United States

Is suitable for the following safety function(s):

Generate an emf directly proportional to the oscillatory velocity applied to the sensor body by the external environment, suitable to vibration monitoring of rotating machinery.

Has been assessed per the relevant requirements of:

IEC 61508:2010 Parts 1 to 7

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 3

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 A

Random Safety Integrity:

The estimated safety integrity, for each safety function, due to random hardware failures (including soft-errors) and random failures of data communication processes.

See page 2

The architectural constraints and the effects of random failures (PFD_{AVG}) must be verified for each specific application and safety function implemented by the E/E/PE safety-related system.

Certified by:

HON CONSULTING

Legal Representative:

Rosati Francesco
President of HON Consulting S.r.l.

CERTIFIED SIL3 CAPABLE
H-ON
IEC 61508:2010

CERTIFICATE NO:
MIC-5485-E01-ESLC-S01
Revision: **A**

Issued:
February 28th, 2017

Valid until:
February 27th, 2022

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

HON CONSULTING
FUNCTIONAL SAFETY TYPE APPROVED
FS

With the following ID number:

17-105S01A

METRIX DOC NO: 1699560
REV: A

The design of each Safety Instrumented Function 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 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 of 5485C High Temperature Velocity Transducer

with removable cable (5485C-AAA + 4850-AAA)				with integral cable (5485C-AAA-BBB)			
λ_{SU}	λ_{SD}	λ_{DU}	λ_{DD}	λ_{SU}	λ_{SD}	λ_{DU}	λ_{DD}
0	0	98	716	0	0	104	712

Note:

- All failure fates are in FIT (Failure In Time 1 FIT = 1 failure / 109 hours).

The prescriptions contained in the safety manual, available on the Metrix website, shall be followed.

CERTIFIED SIL3 CAPABLE IEC 61508:2010 H-ON

CERTIFICATE NO:
MIC-5485-E01-ESLC-S01
Revision: A

Issued:
February 28th, 2017

Valid until:
February 27th, 2022

The Functional Safety Assessment report no.

C306-105-021600_ESLC-S01_01

dated:
February 27st, 2017

is an integral part of this certificate