CERTIFICATE OF CONFORMITY

Member of the FM Global Group

1. **HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT PER US REQUIREMENTS**
2. **Certificate No:** **FM23US0110X**
3. **Equipment:** **M400 2-Wire G2 Series Multi-parameter Transmitter**
   (Type Reference and Name)
4. **Name of Listing Company:** **Mettler-Toledo GmbH (Nanikon)**
5. **Address of Listing Company:** **Im Hackacker 15, CH-8902 Urdorf, Switzerland**
6. The examination and test results are recorded in confidential report number:

   PR467335 dated 6 February 2024

7. FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:

   FM 3600:2022, FM 3610:2021, FM 3611:2021, FM 3810:2021, ANSI/UL 60079-0:2020, ANSI/UL 60079-7:2021, ANSI/UL 60079-11:2018, ANSI/IEC 60529:2020, ANSI/UL 61010-1:2019, ANSI/UL 121201:2021, ANSI/UL 50E:2020

8. If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.
9. This certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.
10. Equipment Ratings:

    See Annex

11. The marking of the equipment shall include:

    See Annex

12. **Description of Equipment:**

    General - Intrinsically safe M400 2-Wire G2 Series Multi-parameter Transmitter (hereinafter, transmitter) is used in hazardous areas, collecting physical signals such as pH, electrical conductivity (resistivity), dissolved oxygen,

Certificate issued by:

J.E. Marquedant
VP, Manager - Electrical Systems

6 February 2024
Date

To verify the availability of the Approved product, please refer to www.approvalguide.com

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process temperature etc., it converts those signals into a standard 4 - 20mA HART electrical signal. The transmitter is suitable for Zone 0, Zone 1 and Zone 21. The transmitter is a 2-wire, loop powered device and it can be connected to an analog sensor or digital sensor to deliver 4-20mA HART (including main and auxiliary 4-20mA) output signal, representing pH, conductivity (resistivity), dissolved oxygen and process temperature etc.. There are optional 0/4-20mA input, digital input signals, digital output signals for alarm and control. The transmitter consists of aluminum alloy housing (back cover and front cover), with three PCBs installed inside and are protected by an additional plastic cover. On the front cover, there is one LCD display and four membrane buttons. 35 terminals are designed for external connection.

The transmitter is rated for an ingress protection of Type 4X and IP66

Operation Temperature Ranges:
The ambient operating temperature range of the M400 2-Wire G2 Series Multi-parameter Transmitter is -20°C to +60°C.

Electrical data:
The M400 2-Wire G2 Series Multi-parameter Transmitter is powered by a suitable 14-30 Vdc power source.

See Annex for Model Codes and Intrinsic Safety/NIFW parameters.

13. **Specific Conditions of Use:**

    See Annex

14. **Test and Assessment Procedure and Conditions:**

    This Certificate has been issued in accordance with FM Approvals US Certification Requirements.

15. **Schedule Drawings**

    A copy of the technical documentation has been kept by FM Approvals.

16. **Certificate History**

    Details of the supplements to this certificate are described below:

Date	Description
6 February 2024	Original Issue.

ANNEX

M400 2aH Type b c d 2-Wire G2 Series Multi-parameter Transmitter

Equipment Ratings:

Nonincendive for Class I, Division 2, Groups ABCD, T4A in accordance with drawings 30868972 and 30868973
Increased safety protection and Intrinsically safe for Class I, Zone 2, AEx ec ic IIC T4 Gc in accordance with drawings 30868972 and 30868973
Type 4X, IP66

Markings:

Class I, Division 2, Groups ABCD, T4A; NIFW
Class I, Zone 2, AEx ec ic IIC T4 Gc
Type 4X, IP66

Description of Equipment:

M400 2aH Type b c d 2-Wire G2 Series Multi-parameter Transmitter
a = none
b = 2, 3 or any numbers: indicating firmware difference only for different sensors
c = none: supporting both analog and digital (ISM) sensors or
c = ISM: supporting digital (ISM) sensors only
d = any alphanumeric code and strings that is only with adjustment on firmware compared with the above models

Terminal No.	Function		Entity/NIFW parameters			
Main Board						
1, 2, 3, 4	ES485 Easy clean	Ui/Vmax=7.2V	Ii/Imax=20mA	Pi=0.15W	Li=0	Ci=0.3μF
5, 6	Digital Input 1	Ui/Vmax=30V	Ii/Imax=100mA	Pi=0.8W	Li=0	Ci=0
7, 8	Digital Input 2	Ui/Vmax=30V	Ii/Imax=100mA	Pi=0.8W	Li=0	Ci=0
9, 10	OC1 Output	Ui/Vmax=30V	Ii/Imax=100mA	Pi=0.8W	Li=0	Ci=0
11, 12	OC2 Output	Ui/Vmax=30V	Ii/Imax=100mA	Pi=0.8W	Li=0	Ci=0
13, 14	Aout1 (HART)	Ui/Vmax=30V	Ii/Imax=100mA	Pi=0.8W	Li=0	Ci=15nF

15, 16	Aout2	Ui/Vmax=30V	Ii/Imax=100mA	Pi=0.8W	Li=0	Ci=15nF
Sensor Board						
P, Q	Analog Input	Ui/Vmax=30V	Ii/Imax=100mA	Pi=0.8W	Li=0	Ci=15nF
N, O	RS485 Sensor	Uo/Vsc=5.88V Ui/Vmax=10V	Io/Isc=13.5mA Ii/Imax=100mA	Po=19.9mW Pi=500mW	Lo/La=1mH Li=0mH	Co/Ca=3.3µF Ci=0µF
L, M	One-wire Sensor	Uo/Vsc=5.88V	Io/Isc=21.3mA	Po=31.3mW	Lo/La=1mH	Co/Ca=2.8µF
J, K wrt I	Temperature Sensor	Uo/Vsc=5.88V	Io/Isc=5.4mA	Po=8.0mW	Lo/La=5mH	Co/Ca=2µF
B, C, D, H	Dissolved Oxygen Sensor	Uo/Vsc=11.24V	Io/Isc=2.3mA	Po=6.3mW	Lo/La=1mH	Co/Ca=0.84µF
A, B, E wrt G	Conductivity Sensor	Uo/Vsc=5.88V	Io/Isc=25.7mA	Po=37.8mW	Lo/La=1mH	Co/Ca=2.5µF
A, E wrt G	pH Sensor	Uo/Vsc=5.88V	Io/Isc=1.3mA	Po=1.9mW	Lo/La=5mH	Co/Ca=2.1µF

Specific Conditions of Use:

1. J5 and J6 on the main board shall not be used in the hazardous (classified) locations
2. Under certain extreme circumstances, the non-metallic parts incorporated in the enclosure of this equipment may generate an ignition-capable level of electrostatic charge. Therefore, the equipment shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. In addition, the equipment shall only be cleaned with a damp cloth.
3. All cable entry holes shall be fitted with either certified cable glands or blanking elements with degree of protection IP66 in compliance with the test of enclosure section of IEC 60079-0.
4. The display has not been tested for resistance to ultraviolet light. The display shall be protected from direct light (e.g. from sunlight or luminaires).
5. Resistance to impact was tested corresponding to the low risk of mechanical danger. The equipment has to be protected against strong impacts.
6. The equipment shall only be used in an area of at least pollution degree 2, as defined in IEC 60664-1
7. Transient protection shall be provided that is set at a level not exceeding 140% of the peak rated voltage value at the supply terminals to the equipment
8. The service temperature of branching point and entry point is as below. The end user shall select the cable and cable gland rated for at least the maximum service temperature in the final installation

Branching point (°C)	Entry point (°C)	Ambient temperature (°C)
63.1	62.3	60

M400 2XH Type b c d 2-Wire G2 Series Multi-parameter Transmitter

Equipment Ratings:

Intrinsically Safe for Class I, II, III Division 1, Groups ABCDEFG, T4 in accordance with installation drawings 30868972 and 30868973
Intrinsically Safe for Class I, Zone 0, AEx ia IIC T4 Ga in accordance with installation drawings 30868972 and 30868973
Intrinsically Safe for Class I, Zone 1, AEx ib IIC with Intrinsically Safe connections to Zone 0, [ia Ga] in accordance with installation drawings 30868972 and 30868973
Intrinsically Safe for Zone 21, AEx ia IIIC T80°C in accordance with installation drawings 30868972 and 30868973
Intrinsically Safe for Zone 21, AEx ib with Intrinsically Safe connections to Zone 20, [ia Da] in accordance with installation drawings 30868972 and 30868973
Type 4X, IP66

Markings:

IS Class I, II, III, Division 1, Groups ABCDEFG, T4
Class I, Zone 0, AEx ia IIC T4 Ga
Class I, Zone 1, AEx ib [ia Ga] IIC T4 Gb
Zone 21, AEx ia IIIC T80°C Db
Zone 21, AEx ib [ia Da] IIIC T80°C Db
Type 4X, IP66

Description of Equipment:

M400 2XH Type b c d 2-Wire G2 Series Multi-parameter Transmitter
b = 2, 3 or any numbers: indicating firmware difference only for different sensors
c = none: supporting both analog and digital (ISM) sensors or
c = ISM: supporting digital (ISM) sensors only
d = any alphanumeric code and strings that is only with adjustment on firmware compared with the above models

Intrinsic Safety Parameters:

Terminal No.	Function		Entity/NIFW parameters			
Main Board						
1, 2, 3, 4	ES485 Easy clean	Ui/Vmax=7.2V	Ii/Imax=20mA	Pi=0.15W	Li=0	Ci=0.3μF
5, 6	Digital Input 1	Ui/Vmax=30V	Ii/Imax=100mA	Pi=0.8W	Li=0	Ci=0
7, 8	Digital Input 2	Ui/Vmax=30V	Ii/Imax=100mA	Pi=0.8W	Li=0	Ci=0
9, 10	OC1 Output	Ui/Vmax=30V	Ii/Imax=100mA	Pi=0.8W	Li=0	Ci=0

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11, 12	OC2 Output	Ui/Vmax=30V	Ii/Imax=100mA	Pi=0.8W	Li=0	Ci=0
13, 14	Aout1 (HART)	Ui/Vmax=30V	Ii/Imax=100mA	Pi=0.8W	Li=0	Ci=15nF
15, 16	Aout2	Ui/Vmax=30V	Ii/Imax=100mA	Pi=0.8W	Li=0	Ci=15nF
Sensor Board						
P, Q	Analog Input	Ui/Vmax=30V	Ii/Imax=100mA	Pi=0.8W	Li=0	Ci=15nF
N, O	RS485 Sensor	Uo/Vsc=5.88V Ui/Vmax=10V	Io/Isc=13.5mA Ii/Imax=100mA	Po=19.9mW Pi=500mW	Lo/La=1mH Li=0mH	Co/Ca=3.3µF Ci=0µF
L, M	One-wire Sensor	Uo/Vsc=5.88V	Io/Isc=21.3mA	Po=31.3mW	Lo/La=1mH	Co/Ca=2.8µF
J, K wrt I	Temperature Sensor	Uo/Vsc=5.88V	Io/Isc=5.4mA	Po=8.0mW	Lo/La=5mH	Co/Ca=2µF
B, C, D, H	Dissolved Oxygen Sensor	Uo/Vsc=11.24V	Io/Isc=2.3mA	Po=6.3mW	Lo/La=1mH	Co/Ca=0.84µF
A, B, E wrt G	Conductivity Sensor	Uo/Vsc=5.88V	Io/Isc=25.7mA	Po=37.8mW	Lo/La=1mH	Co/Ca=2.5µF
A, E wrt G	pH Sensor	Uo/Vsc=5.88V	Io/Isc=1.3mA	Po=1.9mW	Lo/La=5mH	Co/Ca=2.1µF

Specific Conditions of Use:

1. Under certain extreme circumstances, the non-metallic parts incorporated in the enclosure of this equipment may generate an ignition-capable level of electrostatic charge. Therefore, the equipment shall not be installed in a location where the external conditions are conducive to the build-up of electrostatic charge on such surfaces. In addition, the equipment shall only be cleaned with a damp cloth.
2. All cable entry holes shall be fitted with either certified cable glands or blanking elements with degree of protection IP66 in compliance with the test of enclosure section of IEC 60079-0.
3. The display has not been tested for resistance to ultraviolet light. The display shall be protected from direct light (e.g. from sunlight or luminaires).
4. Resistance to impact was tested corresponding to the low risk of mechanical danger. The equipment has to be protected against strong impacts.
5. The enclosure is manufactured from aluminium In rare cases, ignition sources due to impact and friction sparks could occur. This shall be considered when the transmitter is installed in Zone 0 locations for Group II level of protection Ga.
6. The service temperature of branching point and entry point is as below. The end user shall select the cable and cable gland rated at least the maximum service temperature in the final installation.

Branching point (°C)	Entry point (°C)	Ambient temperature (°C)
63.1	62.3	60

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