

CERTIFICATE OF CONFORMITY



1. **HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT PER US REQUIREMENTS**
2. **Certificate No:** FM17US0240X
3. **Equipment:** M400 G2 Series, 1-Channel Multi-parameter Transmitter
(Type Reference and Name)
4. **Name of Listing Company:** Mettler-Toledo GmbH
5. **Address of Listing Company:** Im Hackacker 15 (Industrie Nord)
CH-8902 Urdorf, Canton of Zurich
Switzerland

6. The examination and test results are recorded in confidential report number:

3062122 dated 1st November 2018

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

FM Class 3600:2018, FM Class 3611:2018, FM Class 3810:2018,
ANSI/IEC 60529-2004:R2011, ANSI/UL 50E:2015, ANSI/UL 61010-1:2016, ANSI/UL 121201:2017

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:**

In type of protection nonincendive equipment, the multi-parameter transmitter equipment is certified to the following classification(s).

Nonincendive equipment for use in Class I, Division 2, Groups A, B, C and D; nonincendive for use in Class I, Zone 2, Group IIC, hazardous (classified) locations; and ordinary (unclassified) locations with an ambient temperature rating of -20 °C to +50 °C, indoor and outdoor (Type 4X; IP66) environments.

Certificate issued by:

J.E. Marquedant
VP, Manager, Electrical Systems

1 November 2018

Date

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

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11. The marking of the equipment shall include:

In type of protection nonincendive equipment, the multi-parameter transmitter equipment is labelled with the following marking(s).

Class I, Division 2, Groups A, B, C, D T4

Class I, Zone 2, Group IIC T4

Ta = -20 °C to +50 °C

Type 4X; IP66

WARNING – SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR DIVISION 2

12. **Description of Equipment:**

General – The M400 G2 Series 1-Channel Multi-parameter Transmitter is a single channel multi-parameter transmitter which is designed for use in hazardous (classified) locations. Collecting physical signals such as pH, dissolved oxygen, electrical conductivity (resistivity), process temperature, and process voltage, etc., it converts those signals into a standard 4-20 mA HART electrical signal. It is powered by 4-wire and can be connected to analog sensor or digital sensor to deliver digital output signals and relay output signals for alarm and control, representing pH, dissolved oxygen, electrical conductivity (resistivity), process temperature, and process voltage, etc. Depending on the model, the transmitter can be configured with the software or keys, for different parameter measurement or several separate measurements combined together.

The multi-parameter transmitter exists in three versions which can be configured with the software or touch panel or tactile keypads for different parameter measurements or several measurements combined together. They all have identical hardware, each of which are 4-wire, analog and ISM (intelligent sensor management, digital) sensor input, analog 4-20 mA current input for pressure compensation of oxygen measurement, two digital inputs for e.g. HOLD, four relay outputs for alarm, set points, etc.

The M400 Type 1 multi-parameter transmitter measures pH and conductivity.

The M400 Type 2 multi-parameter transmitter measures pH, conductivity, dissolved oxygen, dissolved carbon dioxide, and ozone.

The M400 Type 3 multi-parameter transmitter measures pH, conductivity, dissolved oxygen, gas-phase oxygen, dissolved carbon dioxide, and ozone.

Construction – The multi-parameter transmitter enclosure consists of an aluminum alloy, ADC12, housing (front cover and base) with an additional internal plastic housing incorporating the electronics sub-assembly attached to the rear/inside of the enclosure front cover. On the outside/external front cover, there is one LCD video black-n-white graphics array touch panel screen display covered by an overlay with four key tactile keypad membrane buttons which conveys measuring data and setup information. The enclosure base is equipped with four 0.75 in. diameter and one 1 in. diameter smoothly well-rounded openings for field wiring (M20 x 1.5 and M25 x 1.5 and NPT cable glands, hazardous (classified) location certified plugs, and 1/2 in. and 3/4 in. NPT conduit connections), provided for external field wiring connections. The enclosure front cover and base are internally bonded together. The enclosure base is equipped with an internal and external threaded ground terminal for installation practices. The internal threaded ground terminal is equipped with a factory-installed fixed 6 in. flying leadwire for installation practices when using metallic raceways, metallic cable glands or metallic rigid conduit. The equipment is designed for fixed installation via panel-, pipe- and wall- mounting configurations.

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The electronics assembly of the multi-parameter transmitter consists of a power supply printed circuit board, a main printed circuit board, a sensor printed circuit board, and wiring and snap-in and detachable screw terminals designed for external connection on both the power supply board and the sensor board.

For more specifics concerning construction and description details of the transmitter, reference the manufacturer's sales literature and specification sheets.

Ratings – The equipment is certified to the following ratings.

The ambient operating temperature range is -20 °C to +50 °C when properly mounted and installed.

The process temperature range of the pH/ORP (including pH/pNa) media is -30 °C to +130 °C, each depending on the model configuration and process fitting, with a maximum working pressure range of 0 to 1.5 MPa (0 to 218 psig) for pH electrodes and 0 to 1.2 MPa (0 to 174 psig) for oxygen sensors, with a maximum sensor cable measuring range of 20 m (analog) and 80 m (ISM, digital).

The process temperature range of the amperometric oxygen media is -10 °C to +130 °C, each depending on the model configuration and process fitting, with a maximum working pressure range of 0 to 1.2 MPa (0 to 174 psig) for oxygen sensors, with a maximum sensor cable measuring range of 20 m (analog) and 80 m (ISM, digital).

The process temperature range of the optical oxygen media is -20 °C to +121 °C, each depending on the model configuration and process fitting, with a maximum working pressure range of 0 to 1.2 MPa (0 to 174 psig) for oxygen sensors, with a maximum sensor cable measuring range of 50 m (ISM, digital).

The process temperature range of the dissolved carbon dioxide media is 0 °C to +130 °C, each depending on the model configuration and process fitting, with a maximum working pressure range of 0 to 0.3 MPa (0 to 42 psi) for carbon dioxide sensors, with a maximum sensor cable measuring range of 80 m (ISM, digital).

The process temperature range of the carbon dioxide hi (thermal conductivity) media is 0 °C to +50 °C, each depending on the model configuration and process fitting, with a maximum working pressure range of 0 to 2 MPa (0 to 290 psig) for inductive conductivity sensors, with a maximum sensor cable measuring range of 50 m (ISM, digital).

The process temperature range of the GPro 500 TDL media is 0 °C to +600 °C, each depending on the model configuration and process fitting, with a maximum working pressure range of 0 to 1 MPa (0 to 145 psig) for GPro 500 sensors, with a maximum sensor cable measuring range of 40 m (analog and ISM, digital).

The process temperature range of the dissolved ozone media is +5 °C to +50 °C, each depending on the model configuration and process fitting, with a maximum working pressure range of 0 to 0.3 MPa (0 to 45 psig) for ozone sensors, with a maximum sensor cable measuring range of 80 m (ISM, digital).

The process temperature range of the conductivity 4-e media is -40 °C to +200 °C, each depending on the model configuration and process fitting, with a maximum working pressure range of 0 to 3.4 MPa (0 to 493 psig) for conductivity sensors, with a maximum sensor cable measuring range of 30.5 m (4-e analog) and 80 m (4-e, ISM, digital).

The equipment is designated for installation transient overvoltages up to levels of overvoltage category II and environmentally classified as pollution degree 2.

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In type of protection nonincendive equipment, the multi-parameter transmitter equipment is connected to limited output Class 2 circuits and power source with the following nominal external supply values.

Power Supply and Signal Circuit (Terminals 1, 2) are:

$V_{max} (U) = 100-240 \text{ VAC}, 50/60 \text{ Hz}, P_i = 10 \text{ W}$ maximum

$V_{max} (U) = 20-30 \text{ VDC}, P_i = 10 \text{ W}$ maximum

$U_m = 250 \text{ V}$ maximum

In type of protection nonincendive equipment, the multi-parameter transmitter equipment is limited to the following nominal digital communication output supply values.

Relay Circuit; 2 SPDT (Terminals TB1-1, 2, 3; TB1-4, 5, 6) are:

$V_{max} (U\text{-Load}) = 250 \text{ VAC}, 50/60 \text{ Hz}, I_{max} (I\text{-Load}) = 3 \text{ A}, P_i (P\text{-Load}) = 1250 \text{ VA}$

$V_{max} (U\text{-Load}) = 30 \text{ VDC}, I_{max} (I\text{-Load}) = 3 \text{ A}, P_i (P\text{-Load}) = 40 \text{ W}$

Relay Circuit; 2 SPST (Reed Terminals TB1-7, 8; TB1-9, 10) are:

$V_{max} (U\text{-Load}) = 250 \text{ VAC}, 50/60 \text{ Hz}, I_{max} (I\text{-Load}) = 0.5 \text{ A}, P_i (P\text{-Load}) = 10 \text{ W}$

$V_{max} (U\text{-Load}) = 250 \text{ VDC}, I_{max} (I\text{-Load}) = 0.5 \text{ A}, P_i (P\text{-Load}) = 10 \text{ W}$

4-Wire HART Circuit (Terminals TB2-1, 2; or HART Hook Terminal) are:

$V_{oc} (U_0) = 16 \text{ VDC}, I_{sc} (I_0) = 100 \text{ mA}$

Model Codes – The equipment is identified with the following model code structure.

In type of protection nonincendive equipment, the multi-parameter transmitter equipment is designated with the following model code(s).

M400 G2 Type ab, 1-Channel Multi-Parameter Transmitter.

a = Type: 1, 2 or 3

b = Options not affecting safety, any alphanumeric code referring to non-electrical properties including documentation, delivery packing, language, and product associates, etc.

Part Number	Type	Sensor
30 374 111	M400 Type 1	pH, Conductivity
30 374 112	M400 Type 2	pH, Conductivity, Dissolved Oxygen, Dissolved Carbon Dioxide, Ozone
30 374 113	M400 Type 3	pH, Conductivity, Dissolved Oxygen, Dissolved Carbon Dioxide, Ozone, Gas-Phase Oxygen

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13. **Specific Conditions of Use:**

In type of protection nonincendive equipment, the multi-parameter transmitter equipment is designated with the following specific conditions of use.

1. For Division 2 and Zone 2 Approvals, the process sensors are suitable for non-flammable process connections to Class I, Division 2, Groups A, B, C and D and Class I, Zone 2, Group IIC, hazardous (classified) locations.
2. Process temperature no greater than +600 °C.
3. Potential Electrostatic Charging Hazard – To prevent the risk of electrostatic sparking, the non-metallic surface should only be cleaned with a damp cloth.
4. The installer shall provide transient over-voltage protection external to the equipment such that the voltage at the supply terminal of the equipment does not exceed 140 % of the voltage rating of the equipment
5. The overlay switch of the multi-parameter transmitter shall be protected from high risk of mechanical danger and ultraviolet light.
6. The panel mount gasket has not been tested for type of protection Type 4X or IP66. Type of protection Type 4X and IP66 refers to the transmitter enclosure only.
7. The maximum permitted ambient temperature of the multi-parameter transmitter is +50 °C. To avoid the effects of process temperatures and other thermal effects, care shall be taken to ensure the surrounding ambient temperature and the ambient temperature inside the equipment enclosure does not exceed +50 °C. Adherence to the manufacturer's installation manual must be followed for fulfillment of this requirement.

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
1 st November 2018	Original Issue.

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