

Instructions for M400 2-Wire G2 Series multi-parameter transmitters – IECEx, ATEX, UKCA

M400 series multi-parameter transmitters are produced by Mettler-Toledo GmbH. It has passed the inspection of IECEx and conforms to following standards:


– IEC 60079-0 : 2017 Ed.7.0
 – EN IEC 60079-0 : 2018
 Part 0: Equipment – General requirements

– IEC 60079-11 : 2011 Ed.6.0
 – EN 60079-11 : 2012
 Part 11: Equipment protection by intrinsic safety “i”

Ex Marking for IECEx:

– Ex ib [ia Ga] IIC T4 Gb
 – Ex ib [ia Da] IIIC T80°C Db IP66

Ex Marking for ATEX, UKCA:

 II 2(1)G Ex ib [ia Ga] IIC T4 Gb
 II 2(1)D Ex ib [ia Da] IIIC T80°C Db IP66

Certificate No.:

– IECEx CSA 23.0028X
 – CSANe 23ATEX1126X
 – CSAE 23UKEX1096X

Specific conditions of use for IECEx/ATEX/UKCA

- i. Install only as per installation instruction.
- ii. 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.
- iii. 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/EN 60079-0.
- iv. 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).
- v. Resistance to impact was tested corresponding to the low risk of mechanical danger. The device has to be protected against strong impacts.
- vi. The enclosure is manufactured from aluminum alloy. In rare cases, ignition sources due to impact and friction sparks could occur. This shall be considered when the transmitter is being installed in Zone 0 locations for group II level of protection Ga.

For connection to intrinsically safe circuits, use the following maximum values

Terminal No.	Function	Entity parameters					
1, 2, 3, 4	ES485 Easy clean	$U_i/V_{max}=7.2V$	$i_i/I_{max}=20mA$	$P_i=0.15W$	$L_i=0$	$C_i=0.3\mu F$	
5, 6	Digital Input 1	$U_i/V_{max}=30V$	$i_i/I_{max}=100mA$	$P_i=0.8W$	$L_i=0$	$C_i=0$	
7, 8	Digital Input 2	$U_i/V_{max}=30V$	$i_i/I_{max}=100mA$	$P_i=0.8W$	$L_i=0$	$C_i=0$	
9, 10	OC1 Output	$U_i/V_{max}=30V$	$i_i/I_{max}=100mA$	$P_i=0.8W$	$L_i=0$	$C_i=0$	
11, 12	OC2 Output	$U_i/V_{max}=30V$	$i_i/I_{max}=100mA$	$P_i=0.8W$	$L_i=0$	$C_i=0$	
13, 14	Aout1 (HART)	$U_i/V_{max}=30V$	$i_i/I_{max}=100mA$	$P_i=0.8W$	$L_i=0$	$C_i=15nF$	
15, 16	Aout2	$U_i/V_{max}=30V$	$i_i/I_{max}=100mA$	$P_i=0.8W$	$L_i=0$	$C_i=15nF$	
P, Q	Analog Input	$U_i/V_{max}=30V$	$i_i/I_{max}=100mA$	$P_i=0.8W$	$L_i=0$	$C_i=15nF$	
N, O	RS485 Sensor	$U_o/V_{sc}=5.88V$	$i_o/I_{sc}=13.5mA$	$P_o=19.9mW$	$L_o/L_a=1mH$	$C_o/C_a=3.3\mu F$	
		$U_i/V_{max}=10V$	$i_i/I_{max}=100mA$	$P_i=500mW$	$L_i=0mH$	$C_i=0\mu F$	
L, M	One-wire Sensor	$U_o/V_{sc}=5.88V$	$i_o/I_{sc}=21.3mA$	$P_o=31.3mW$	$L_o/L_a=1mH$	$C_o/C_a=2.8\mu F$	
J, K wrt I	Temperature Sensor	$U_o/V_{sc}=5.88V$	$i_o/I_{sc}=5.4mA$	$P_o=8.0mW$	$L_o/L_a=5mH$	$C_o/C_a=2\mu F$	
B, C, D, H	Dissolved Oxygen Sensor	$U_o/V_{sc}=11.24V$	$i_o/I_{sc}=2.3mA$	$P_o=6.3mW$	$L_o/L_a=1mH$	$C_o/C_a=0.84\mu F$	
A, B, E wrt G	Conductivity Sensor	$U_o/V_{sc}=5.88V$	$i_o/I_{sc}=25.7mA$	$P_o=37.8mW$	$L_o/L_a=1mH$	$C_o/C_a=2.5\mu F$	
A, E wrt G	pH Sensor	$U_o/V_{sc}=5.88V$	$i_o/I_{sc}=1.3mA$	$P_o=1.9mW$	$L_o/L_a=5mH$	$C_o/C_a=2.1\mu F$	

Note: Parameters for terminal "A" to "K" are for analog sensors, thus they are not applicable for product models named "M400 2aH Type b ISM d"

Instructions for M400 2-Wire G2 Series multi-parameter transmitters – CSA

PRODUCTS

CLASS - C225802 - PROCESS CONTROL EQUIPMENT-For Hazardous Locations-

Intrinsically safe version

Class I, Division 1, Groups A, B, C, D T4

Class II, Division 1, Groups E, F, G T4

Class III, Division 1

Ex ia IIC T4 Ga

Ex ia IIIC T80°C Db

Ex ib [ia Ga] IIC T4 Gb

Ex ib [ia Da] IIIC T80°C Db

Non-incendive version

Class I, Division 2, Groups A, B, C and D T4A

Ex ec ic IIC T4 Gc

CLASS - C225882 - PROCESS CONTROL EQUIPMENT-For Hazardous Locations - Certified to US Standards

Intrinsically safe version

Class I, Division 1, Groups A, B, C, D T4

Class II, Division 1, Groups E, F, G T4

Class III, Division 1

Class I, Zone 0, AEx ia IIC T4 Ga

Zone 21, AEx ia IIIC T80°C Db IP66

Class I, Zone 1, AEx ib [ia Ga] IIC T4 Gb

Zone 21, AEx ib [ia Da] IIIC T80°C Db IP66

Non-incendive version

Class I, Division 2, Groups A, B, C and D T4A

Class I, Zone 2, AEx ec ic IIC T4 Gc

M400 2-wire G2 series multi-parameter transmitter, Model M400 2aH Type b c d; Temp. code T4/T4A, $-20^{\circ}\text{C} \leq T_{amb} \leq 60^{\circ}\text{C}$; Enclosure: Type 4X / IP66.

The M400 is available in different versions. Model designations of the “M400 2aH Type b c d” are as follows:

a = none: model for Zone 2 and Class I, Division 2

a = X: model for Zone 0 or 1 and Zone 21, Class I/II/III, Division 1

b = 2, 3 or any numbers: indicating firmware difference only for different sensors

c = none: supporting both analog and digital (ISM) sensors

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

For connection to intrinsically safe circuits, use the following maximum values

Terminal No.	Function	Entity parameters						
1, 2, 3, 4	ES485 Easy clean	$U_i/V_{max}=7.2V$	$i_i/I_{max}=20mA$	$P_i=0.15W$	$L_i=0$	$C_i=0.3\mu F$		
5, 6	Digital Input 1	$U_i/V_{max}=30V$	$i_i/I_{max}=100mA$	$P_i=0.8W$	$L_i=0$	$C_i=0$		
7, 8	Digital Input 2	$U_i/V_{max}=30V$	$i_i/I_{max}=100mA$	$P_i=0.8W$	$L_i=0$	$C_i=0$		
9, 10	OC1 Output	$U_i/V_{max}=30V$	$i_i/I_{max}=100mA$	$P_i=0.8W$	$L_i=0$	$C_i=0$		
11, 12	OC2 Output	$U_i/V_{max}=30V$	$i_i/I_{max}=100mA$	$P_i=0.8W$	$L_i=0$	$C_i=0$		
13, 14	Aout1 (HART)	$U_i/V_{max}=30V$	$i_i/I_{max}=100mA$	$P_i=0.8W$	$L_i=0$	$C_i=15nF$		
15, 16	Aout2	$U_i/V_{max}=30V$	$i_i/I_{max}=100mA$	$P_i=0.8W$	$L_i=0$	$C_i=15nF$		
P, Q	Analog Input	$U_i/V_{max}=30V$	$i_i/I_{max}=100mA$	$P_i=0.8W$	$L_i=0$	$C_i=15nF$		
N, O	RS485 Sensor	$U_o/V_{sc}=5.88V$	$i_o/I_{sc}=13.5mA$	$P_o=19.9mW$	$L_o/L_a=1mH$	$C_o/C_a=3.3\mu F$		
		$U_i/V_{max}=10V$	$i_i/I_{max}=100mA$	$P_i=500mW$	$L_i=0mH$	$C_i=0\mu F$		
L, M	One-wire Sensor	$U_o/V_{sc}=5.88V$	$i_o/I_{sc}=21.3mA$	$P_o=31.3mW$	$L_o/L_a=1mH$	$C_o/C_a=2.8\mu F$		
J, K wrt I	Temperature Sensor	$U_o/V_{sc}=5.88V$	$i_o/I_{sc}=5.4mA$	$P_o=8.0mW$	$L_o/L_a=5mH$	$C_o/C_a=2\mu F$		
B, C, D, H	Dissolved Oxygen Sensor	$U_o/V_{sc}=11.24V$	$i_o/I_{sc}=2.3mA$	$P_o=6.3mW$	$L_o/L_a=1mH$	$C_o/C_a=0.84\mu F$		
A, B, E wrt G	Conductivity Sensor	$U_o/V_{sc}=5.88V$	$i_o/I_{sc}=25.7mA$	$P_o=37.8mW$	$L_o/L_a=1mH$	$C_o/C_a=2.5\mu F$		
A, E wrt G	pH Sensor	$U_o/V_{sc}=5.88V$	$i_o/I_{sc}=1.3mA$	$P_o=1.9mW$	$L_o/L_a=5mH$	$C_o/C_a=2.1\mu F$		

Note: Parameters for terminal "A" to "K" are for analog sensors, thus they are not applicable for product models named "M400 2aH Type b ISM d"

Conditions of Acceptability (Intrinsically safe version):

- i. The product shall be operated at an altitude no greater than 5000m.
- ii. Normal operation temperature is -20 to 60°C.
- iii. The units shall be used and installed by professional personnel or the submitter's trained personnel only.
- iv. The units are powered by external approved power supply.
- v. Final acceptance of this equipment when installed is subject to the jurisdiction of the local inspection authority.
- vi. 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.
- vii. All cable entry holes shall be fitted with either certified cable glands or blanking elements to maintain the level of explosion protection and enclosure ratings.
- viii. 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).

- ix. Resistance to impact was tested corresponding to the low risk of mechanical danger. The device has to be protected against strong impacts.
- x. The enclosure is manufactured from aluminum alloy. 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.
- xi. 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

Conditions of Acceptability (Non-incendive version):

- i. The product shall be operated at an altitude no greater than 5000m.
- ii. Normal operation temperature is -20 to 60°C.
- iii. The units shall be used and installed by professional personnel or the submitter's trained personnel only.
- iv. The units are powered by external approved power supply.
- v. Final acceptance of this equipment when installed is subject to the jurisdiction of the local inspection authority.
- vi. J5 and J6 on the main board shall not be used in the hazardous (classified) locations.
- vii. 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.
- viii. All cable entry holes shall be fitted with either certified cable glands or blanking elements to maintain the level of explosion protection and enclosure ratings.
- ix. 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).
- x. The product shall only be used in an area of not more than pollution degree 2, as defined in IEC 60664-1.
- xi. 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
- xii. 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

WARNINGS

- i. WARNING - EXPLOSION HAZARD - DO NOT CONNECT OR DISCONNECT WHILE CIRCUIT IS LIVE UNLESS AREA IS KNOWN TO BE NON-HAZARDOUS;
- ii. WARNING - POTENTIAL ELECTROSTATIC CHARGING HAZARD – SEE INSTRUCTIONS
- iii. WARNING - DO NOT OPEN WHEN ENERGIZED
- iv. WARNING - SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY
- v. WARNING - TO PREVENT IGNITION OF FLAMMABLE OR COMBUSTIBLE ATMOSPHERES, DISCONNECT POWER BEFORE SERVICING
- vi. AVERTISSEMENT - RISQUE D'EXPLOSION. NE PAS DEBRANCHER TANT QUE LE CIRCUIT EST SOUS TENSION, A MOINS QU'IL NE S'AGISSE D'UN EMPLACEMENT NON DANGEREUX

- vii. AVERTISSEMENT- DANGER POTENTIEL DE CHARGES ELECTROSTATIQUES – VOIR INSTRUCTIONS
- viii. AVERTISSEMENT - NE PAS OUVRIR SOUS TENSION
- ix. AVERTISSEMENT : LA SUBSTITUTION DE COMPOSANTS PEUT COMPROMETTRE LA SECURITE INTRINSEQUE
- x. AVERTISSEMENT - POUR ÉVITER QUE DES ENVIRONNEMENTS INFLAMMABLES OU COMBUSTIBLES NE S'ENFLAMMENT, DÉBRANCHEZ L'ALIMENTATION ÉLECTRIQUE AVANT L'ENTRETIEN

APPLICABLE REQUIREMENTS

CSA Std C22.2 No. 213-17+UPD1(2018)+UPD2(2019) + UPD3(2021)	Non-incendive electrical equipment for use in Class I and II, Division 2 and Class III, Division 1 and 2 hazardous (Classified) locations
CAN/CSA-C22.2 No. 60079-0:19	Explosive atmospheres - Part 0: Equipment - General requirements
CAN/CSA-C22.2 No. 60079-11:14 (r2018)	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
CAN/CSA-C22.2 No. 60079-7:16 (r2021)	Electrical apparatus for explosive gas atmospheres - Part 7: Equipment protection by increased safety "e" electrical apparatus
CAN/CSA-C22.2 No. 61010-1-12 UPD1:2015, UPD2:2016, AMD1:2018	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements
CAN/CSA-C22.2 No.94.2:20	Enclosures for electrical equipment, environmental considerations
ANSI/UL 913-2019 Ed.8	Standard for Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations
ANSI/UL 121201-2021 Ninth Edition	Non incendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations
ANSI/UL 60079-0-2020 Ed.7	Explosive atmospheres - Part 0: Equipment – General Requirements
ANSI/UL 60079-11-2018 Ed.6	Explosive Atmospheres - Part 11: Equipment Protection by Intrinsic Safety "i"
ANSI/UL 60079-7-2017 (R2021) Ed.5	Explosive atmospheres - Part 15: Equipment protection by increased safety "e"
UL Std. No. 61010-1 3rd Edition (2012), AMD1:2018	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements
ANSI/UL50E-2020 Ed.3	Enclosures For Electrical Equipment, Environmental Considerations

Instructions for M400 2-Wire G2 Series multi-parameter transmitters – FM

PRODUCTS

PROCESS CONTROL EQUIPMENT-For Hazardous Locations - Certified to US Standards

Intrinsically safe version, in accordance with installation drawings 30868972 and 30868973
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 IP66
Zone 21, AEx ib [ia Da] IIIC T80°C Db IP66

Non-incendive version, in accordance with installation drawings 30868972 and 30868973
Class I, Division 2, Groups ABCD, T4A; NIFW
Class I, Zone 2, AEx ec ic IIC T4 Gc

M400 2-wire G2 series multi-parameter transmitter, Model M400 2aH Type b c d; Temp. code T4/T4A, $-20^{\circ}\text{C} \leq T_{\text{amb}} \leq 60^{\circ}\text{C}$; Enclosure: Type 4X / IP66.

The M400 is available in different versions. Model designations of the “M400 2aH Type b c d” are as follows:

a = none: model for Zone 2 and Class I, Division 2

a = X: model for Zone 0 or 1 and Zone 21, Class I/II/III, Division 1

b = 2, 3 or any numbers: indicating firmware difference only
for different sensors

c = none: supporting both analog and digital (ISM) sensors

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

For connection to intrinsically safe and NIFW circuits, use the following maximum values

Terminal No.	Function	Entity / NIFW parameters				
Main Board						
1, 2, 3, 4	ES485 Easy clean	$U_i/V_{max}=7.2V$	$i_i/I_{max}=20mA$	$P_i=0.15W$	$L_i=0$	$C_i=0.3\mu F$
5, 6	Digital Input 1	$U_i/V_{max}=30V$	$i_i/I_{max}=100mA$	$P_i=0.8W$	$L_i=0$	$C_i=0$
7, 8	Digital Input 2	$U_i/V_{max}=30V$	$i_i/I_{max}=100mA$	$P_i=0.8W$	$L_i=0$	$C_i=0$
9, 10	OC1 Output	$U_i/V_{max}=30V$	$i_i/I_{max}=100mA$	$P_i=0.8W$	$L_i=0$	$C_i=0$
11, 12	OC2 Output	$U_i/V_{max}=30V$	$i_i/I_{max}=100mA$	$P_i=0.8W$	$L_i=0$	$C_i=0$
13, 14	Aout1 (HART)	$U_i/V_{max}=30V$	$i_i/I_{max}=100mA$	$P_i=0.8W$	$L_i=0$	$C_i=15nF$
15, 16	Aout2	$U_i/V_{max}=30V$	$i_i/I_{max}=100mA$	$P_i=0.8W$	$L_i=0$	$C_i=15nF$
Sensor Board						
P, Q	Analog Input	$U_i/V_{max}=30V$	$i_i/I_{max}=100mA$	$P_i=0.8W$	$L_i=0$	$C_i=15nF$
N, O	RS485 Sensor	$U_o/V_{sc}=5.88V$	$i_o/I_{sc}=13.5mA$	$P_o=19.9mW$	$L_o/L_a=1mH$	$C_o/C_a=3.3\mu F$
L, M	One-wire Sensor	$U_i/V_{max}=10V$ $U_o/V_{sc}=5.88V$	$i_i/I_{max}=100mA$ $i_o/I_{sc}=21.3mA$	$P_i=500mW$ $P_o=31.3mW$	$L_i=0mH$ $L_o/L_a=1mH$	$C_i=0\mu F$ $C_o/C_a=2.8\mu F$
J, K wrt I	Temperature Sensor	$U_o/V_{sc}=5.88V$	$i_o/I_{sc}=5.4mA$	$P_o=8.0mW$	$L_o/L_a=5mH$	$C_o/C_a=2\mu F$
B, C, D, H	Dissolved Oxygen Sensor	$U_o/V_{sc}=11.24V$	$i_o/I_{sc}=2.3mA$	$P_o=6.3mW$	$L_o/L_a=1mH$	$C_o/C_a=0.84\mu F$
A, B, E wrt G	Conductivity Sensor	$U_o/V_{sc}=5.88V$	$i_o/I_{sc}=25.7mA$	$P_o=37.8mW$	$L_o/L_a=1mH$	$C_o/C_a=2.5\mu F$
A, E wrt G	pH Sensor	$U_o/V_{sc}=5.88V$	$i_o/I_{sc}=1.3mA$	$P_o=1.9mW$	$L_o/L_a=5mH$	$C_o/C_a=2.1\mu F$

Specific Conditions of Use (Intrinsically safe version):

- 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.
- 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.
- 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).
- Resistance to impact was tested corresponding to the low risk of mechanical danger. The device has to be protected against strong impacts.
- The enclosure is manufactured from aluminum alloy. 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

Specific Conditions of Use (Non-incendive version):

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 The equipment has to be protected against strong impacts
6. The product shall only be used in an area of not more than 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 at least the maximum service temperature in the final installation.

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

APPLICABLE REQUIREMENTS

FM Class 3610: 2021	Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II & III, Division 1, Hazardous (Classified) Locations
FM Class 3600: 2022	Electrical Equipment for Use In Hazardous (Classified) Locations - General Requirements
FM Class 3611: 2021	Non-incendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations
FM Class 3810: 2021	Electrical Equipment for Measurement, Control and Laboratory Use
ANSI/IEC 60529: 2020	Degrees of Protection Provided by Enclosures (IP Code) (Identical National Adoption)
ANSI/UL 60079-0-2020	Explosive atmospheres - Part 0: Equipment – General Requirements
ANSI/UL 60079-11-2018	Explosive Atmospheres - Part 11: Equipment Protection by Intrinsic Safety "i"
ANSI/UL 60079-7-2021	Explosive atmospheres - Part 15: Equipment protection by increased safety "e"
ANSI/UL 61010-1:2019	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements
ANSI/UL 121201: 2021	Non-incendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations
ANSI/UL 50E: 2020	Enclosures For Electrical Equipment, Environmental Considerations

30868972 B

Hazardous Classified Area

Unclassified Area

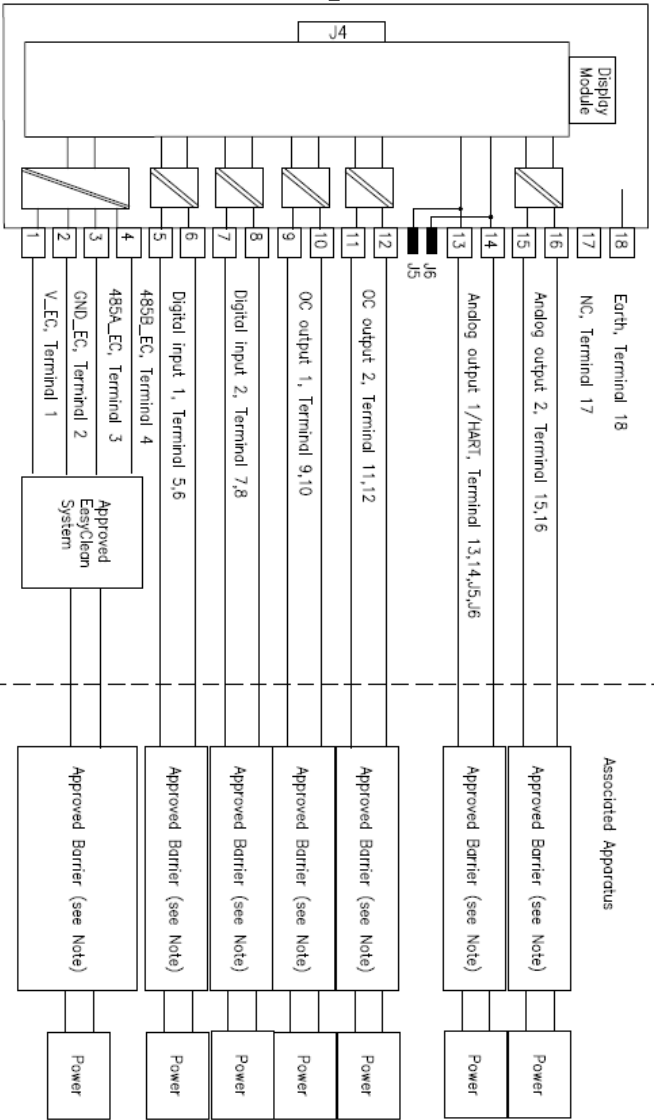
M400 2XH series Multi-parameter Transmitter
(Intrinsically safe version)
EXEX CSA 23.0028X
Ex ib [ia Ga] IIC T4 Gb
Ex ib [ia Da] IIC T80°C Db IP66

ATEX
CSAIE 23ATEX1128X
CSAE 23UXEX1096X
II 2(1) D Ex ib [ia Ga] IIC T4 Gb
II 2(1) D Ex ib [ia Da] IIC T80°C Db IP66

CSA
CSA23248019114X
Class I, Division 1, Groups A, B, C, D, T4
Class II, Division 1, Groups E, F, G, T4
Class III, Division 1
Ex in IIC T4 Ga
Ex in IIC T4 Gb
Class I, Zone 0, AEx in IIC T4 Gb
Zone 21, AEx in IIC T80°C Db IP66
-20 °C ≤ Ta ≤ +60 °C Enclosure, Type IX IP66
Install per drawing 30868972 and 30868973

FM
FM23US0110X
IS Class I, IIC, Div 1, GRP A, B, C, D, E, F, G, T4
Class I, Zone 0, AEx in IIC T4 Ga
Class I, Zone 1, AEx ib [ia Ga] IIC T4 Gb
Zone 21, AEx in IIC T80°C Db IP66
ATEX ib [ia Da] IIC T80°C Db IP66
Class I, Div 2, GRP A, B, C, D, E, F, G, T4
Class 1, Zone 2, AEx in IIC T4 Gb
-20 °C ≤ Ta ≤ +60 °C Enclosure, Type IX IP66
Install per drawing 30868972 and 30868973

Safe galvanic isolation
up to 1000Vrms



	U _N (V)/V _{max}	I _N /I _{max} (mA)	P _N (W)	U _N (mH)	C _N (nF)
Analog output 2, Terminal 15,16	30	100	0.8	0	15
Analog output 1/HART, Terminal 13,14,15,16	30	100	0.8	0	15
OC output 2, Terminal 11,12	30	100	0.8	0	0
OC output 1, Terminal 9,10	30	100	0.8	0	0
Digital input 2, Terminal 7,8	30	100	0.8	0	0
Digital input 1, Terminal 5,6	30	100	0.8	0	0
EasyClean, Terminal 1,2,3,4	7.2	20	0.15	0	300

In type of protection intrinsic safety Ex in IIC & ic MPM, only for connection to intrinsically safe circuits with the following maximum values

Marking	C.F. No.	Sign	Date	Pattern	Weight/Scale	Control Drawing, M400
Designer	Installation	Approval		S	1:1	
Check	Approval					
Technics	Date					

WARNING – SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY

Notes
1. Control equipment connected to the associated apparatus must not use or generate more than 250V.
2. At the time of installation, mark the selected type of protection on the equipment marking.
3. Refer to the conditions of acceptability and specific condition of use in Ex certificate.

30868973 B

Hazardous Classified Area
 Sensor Board
 belonging to
 MA00 2XH series
 Control drawing 30868972

Sensor Interface	In type of protection intrinsic safety Ex ia UC & is NPN, only for connection to intrinsically safe circuits with the following maximum values				
	U(V)	I(mA)	P(mW)	L(mH)	C(µF)
pH measuring loop, Terminal A,E,G	U ₀ /V _{sec} =5,98	I ₀ /I _{sec} =1,3	P ₀ =1,9	L ₀ /L ₀ =5	C ₀ /C ₀ =2,1
Conductivity measuring loop, Terminal A,B,E,G	U ₀ /V _{sec} =5,98	I ₀ /I _{sec} =25,7	P ₀ =37,8	L ₀ /L ₀ =1	C ₀ /C ₀ =2,5
DO measuring loop, Terminal B,C,D,H	U ₀ /V _{sec} =11,24	I ₀ /I _{sec} =2,3	P ₀ =6,3	L ₀ /L ₀ =1	C ₀ /C ₀ =0,84
Temperature measuring loop, Terminal I,J,K	U ₀ /V _{sec} =5,98	I ₀ /I _{sec} =5,4	P ₀ =8,0	L ₀ /L ₀ =5	C ₀ /C ₀ =2
One-wire measuring loop, Terminal L,M	U ₀ /V _{sec} =5,98	I ₀ /I _{sec} =21,3	P ₀ =31,3	L ₀ /L ₀ =1	C ₀ /C ₀ =2,8
485 measuring loop, Terminal N,O	U ₀ /V _{sec} =5,98	I ₀ /I _{sec} =13,5	P ₀ =19,9	L ₀ /L ₀ =1	C ₀ /C ₀ =3,3
485 measuring loop, Terminal N,O	U ₀ /V _{sec} =10	I ₀ /I _{sec} =100	P ₀ =500	L ₀ /L ₀ =1	C ₀ /C ₀ =0
Analog Input measuring loop, Terminal P,Q	U ₀ /V _{sec} =30	I ₀ /I _{sec} =100	P ₀ =800	L ₀ /L ₀ =1	C ₀ /C ₀ =0,015

The measuring circuits are galvanically connected.



Sensor Board Interface, I3
 Only to connect to
 Mainboard, MA00

WARNING – SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY
 WARNING – SUBSTITUTION OF COMPONENTS MAY IMPAIR THE SUITABILITY FOR ZONE 2

- Notes
 IECEx, ATEX, UKCA, CSA, FM
 1. When installed in MA00, Intrinsically Safe Equipment connecting to A~Q must be suitably approved or be a Simple Apparatus.
 2. A Simple Apparatus is defined as a device that does not generates more than 1,5V, 0,1A or 25mW.

Mettler-Toledo GmbH		Control Drawing, Sensor, MA00	
Math/Km	C.F. No.	Sign	Date
Designer	Standard	Pattern	Weight/Scale
Check	Approval	S	1:1
Technic	Date	1 Pages	Page 1
30868973 B			