

CERTIFICATE OF CONFORMITY



Member of the FM Global Group

1. HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT PER US REQUIREMENTS

2. **Certificate No:** FM21US0078
3. **Equipment:** Modular Measuring Systems,
(Type Reference and Name) Model Stratos Multi Type E401X..., Model Stratos Pro, Types A201X..., A211X..., A201B..., Types A221X..., A231X..., with an MK Module
4. **Name of Listing Company:** Knick Elektronische Messgeräte GmbH & Co KG
5. **Address of Listing Company:** Beuckestraße 22 , 14163 Berlin, Germany
6. The examination and test results are recorded in confidential report number:

PR460294 dated 1st November 2021

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/UL 60079-15:2020, ANSI/IEC 60529:2020, ANSI/UL 61010-1:2004, ANSI/UL 121201:2019

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.

Certificate issued by:

J.E. Marquedant
VP, Manager - Electrical Systems

2 November 2023

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:

See Annex.

12. **Description of Equipment:**

General -

E401X... - The Stratos® Multi Type E401X... is a 4-wire transmitter for Memosens, analog, and digital sensors. It is used to measure and process electrochemical quantities in liquids in explosive atmospheres. The main unit includes an electronic circuit with the connection terminals, a slot for the measuring module MK-...X, a backlit LCD, and a keypad, all in a single enclosure.

An optional memory card Type ZU1080-S-X-... can be used for data recording and firmware update and repair. The MCARD is an accessory to Stratos Multi E401X... and not an independent intrinsically safe / non-incendive apparatus, therefore not marked as an intrinsically safe apparatus. The MCARD is built into a housing which might not be opened while energized. If the MCARD is plugged into the Stratos Multi E401 MCARD connector, then the MCARD circuit is part of the Stratos Multi E401X... intrinsically safe "ic" circuit and the MCARD's micro USB connector is not accessible. The MCARD is powered from a limited energy supply by the Stratos Multi E401 Digi Module internally. If the MCARD is outside the transmitter, the micro USB connector is accessible and restricted to use in a non-hazardous area.

Stratos® Multi Type E401X... is provided with various isolated and non-isolated inputs, relay contacts and outputs. The internal relays are assessed as "nC" / non-incendive. All signal outputs are available as display and as an analogue output value (4 to 20 mA current signal with or without HART).

A201X..., A211X... - The Stratos® Pro Type A201X... and A211X... are 2-wire transmitters for Memosens, analog, and digital sensors. They are used to measure and process electrochemical quantities in liquids in explosive atmospheres. For both, the main unit includes an electronic circuit with the connection terminals, a slot for the measuring module MK-...X, a backlit LCD, and a keypad, all in a single enclosure.

A221X..., A231X... - The Stratos® Pro Type A221X... and A231X... are 2-wire PA/FF transmitters with Fieldbus technology for Memosens, analog, and digital sensors. They are used to measure and process electrochemical quantities in liquids in explosive atmospheres. For both, the main unit includes an electronic circuit with the connection terminals, a slot for the measuring module MK-...X, a backlit LCD, and a keypad, all in a single enclosure.

A201B... - The Stratos® Pro Type A201B is a 2-wire transmitter for Memosens, analog, and digital sensors. It is used to measure and process electrochemical quantities in liquids in explosive atmospheres. The main unit includes an electronic circuit with the connection terminals, a slot for the measuring module MK-...B, a backlit LCD, and a keypad, all in a single enclosure.

Construction -

For all models, the enclosure is made of UV-resistant molded plastic and can be mounted on walls, pipes or panels. The enclosure is rated Type 4X, IP66/IP67.

MK Modules

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Entity Parameters - See Control Drawings below

MK-...X applicable for E401X..., and A2**X...,

MK-...B applicable for A201B...

Type	Measurement Loop	Terminals	Control drawing
MK-PH015X MK-PH015B	pH	A, B, C, K	212.002-110
	Temperature	H, I	
	pH / Temperature	A, B, C, H, I, K	
	ISM	F, G	
	pH / ISM / Temperature	A, B, C, F, G, H, I, K	
	pH / Supply / Temperature	A, B, C, D, E, H, I, K	
	pH / Supply / ISM / Temperature	A, B, C, D, E, F, G, H, I, K	
MK-OXY045X MK-OKY045B	OXY	A, B, C, D, I	212.002-120
	Temperature	G, H	
	OXY / Temperature	A, B, C, D, G, H, I	
	ISM	E, F	
	OXY / ISM / Temperature	A, B, C, D, E, F, G, H, I	
MK-COND025X MK-COND025B	Conductivity	A, B, C, D, H	212.002-130
	Temperature	E, F, G	
	Conductivity / Temperature	A, B, C, D, E, F, G, H	
MK-CONDI035X MK-CONDI035B	Conductivity	A, B, C, D, H	212.002-140
	Temperature	E, F, G	
	Conductivity / Temperature	A, B, C, D, E, F, G, H	
MK-MS095X	Memosens-Interface	A, B, C, D, E	212.002-150

13. Specific Conditions of Use:

None.

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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 November 2021	Original Issue.
2 November 2023	<u>Supplement 1:</u> Report Reference: PR465638 dated 2 November 2023. Description of the Change(s): Addition of the Stratos Pro, Types A201X..., A211X..., A221X..., A231X..., A201B....

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ANNEX

Stratos Multi, Type E401X...

Equipment Ratings:

Nonincendive for Class I, Division 2, Groups A, B, C, D; Associated Intrinsically Safe for Class I, II, III, Division 1, Groups A, B, C, D, E, F and G; Increased safety 'ec' protection for Class I, Zone 2, Group IIC with intrinsically safe [ia] connections to Class I, Zone 0, Group IIC hazardous (classified) locations.

Markings:

Class I, Division 2, Groups A, B, C, D; T4, Ta = -20°C to +55°C, Type 4X, IP66/67

IS Associated Apparatus Class I, II, III, Division 1, Groups A thru G; T4, Ta = -20°C to +55°C, Type 4X, IP66/67

Class I, Zone 2, AEx ec [ia Ga] IIC T4 Gc Ta = -20°C to +55°C, Type 4X, IP66/67

Description of Equipment:

Modular Measuring System Model Stratos Multi, Type E401X...

Stratos® Multi Type E401X... is a 4-wire transmitter for Memosens, analog and digital sensors and is used to measure and process electrochemical properties of liquids in explosive atmospheres. The main unit includes an electronic circuit with the connection terminals, a slot for the measuring module MK-...X, a backlit LCD and a keypad, all in a single enclosure.

Electrical data:

Power Connections Um = 253 V:

80-230 V AC (15 VA) or 24-60 V DC (10W) Power AC/DC: Terminals KL17, KL18

Signal inputs: Um = 60 V SELV/PELV, Max = 30V AC/DC

Current loops: 4 to 22mA

Entity Parameters - Digital Sensor Interface RS 485 Terminals KL1, KL2, KL3, KL4, KL5 in accordance with control drawing 212.502-100: Uo (Voc) = 5.1 V; Io (Isc) = 130 mA; Po = 166 mW

Ca = 15 µF; Co (Ca) = 73 µF

Li = 95 µH; Lo (La) = 1.9 mH

Entity Parameters:

See control drawing 212.502-100 page 2.

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Stratos Pro, Type A201B...

Equipment Ratings:

Nonincendive with Nonincendive field wiring for Class I, II, III, Division 2, Groups A, B, C, D, F, G; T4; $-20^{\circ}\text{C} \leq \text{Ta} \leq +65^{\circ}\text{C}$;

AEx ic for Zone 2, Group IIC; T4, Gc; $-20^{\circ}\text{C} \leq \text{Ta} \leq +65^{\circ}\text{C}$;

AEx ic for Zone 22, Group IIIC; T135°C, Dc; $-20^{\circ}\text{C} \leq \text{Ta} \leq +65^{\circ}\text{C}$;

Type 4X, IP66/67.

Markings:

NI, Class I, Division 2, Groups ABCD, T4, nonincendive field wiring

NI, Class II, III, Division 2, Groups FG, T135°C, nonincendive field wiring

Class I, Zone 2, AEx ic IIC T4 Gc

Zone 22, AEx ic IIIC T135°C Dc

$-20^{\circ}\text{C} \leq \text{Ta} \leq +65^{\circ}\text{C}$

Description of Equipment:

Modular Measuring System Model Stratos Pro, Type A201B...

Stratos® Pro Type A201B... is a 2-wire transmitter for Memosens, analog and digital sensors and is used to measure and process electrochemical properties of liquids in explosive atmospheres. The main unit includes an electronic circuit with the connection terminals, a slot for the measuring module MK-...B, a backlit LCD and a keypad, all in a single enclosure.

Entity Parameters:

See control drawing 212.110-066 page 2.

Stratos Pro, Type A201X..., Type A211X...

Equipment Ratings:

Intrinsically safe (Entity) for Class I, II, III, Division 1, Groups A, B, C, D, E, F, G, T4; $-20^{\circ}\text{C} \leq \text{Ta} \leq +65^{\circ}\text{C}$;

Nonincendive with Nonincendive field wiring for Class I, II, III, Division 2, Groups A, B, C, D, F, G; T4; $-20^{\circ}\text{C} \leq \text{Ta} \leq +65^{\circ}\text{C}$;

AEx ia for Zone 0, Group IIC, T4, Ga; $-20^{\circ}\text{C} \leq \text{Ta} \leq +65^{\circ}\text{C}$;

AEx ib [ia Ga] for Zone 1 with connections for Zone 0, Group IIC; T4, Gb; $-20^{\circ}\text{C} \leq \text{Ta} \leq +65^{\circ}\text{C}$;

AEx ib [ia Da] for Zone 21 with connections for Zone 20, Group IIIC; T135°C, Db; $-20^{\circ}\text{C} \leq \text{Ta} \leq +65^{\circ}\text{C}$;

Type 4X, IP66/67.

Markings:

IS, Class I, II, III, Division 1, Groups ABCDEFG, T4

NI, Class I, Division 2, Groups ABCD, T4, nonincendive field wiring

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NI, Class II, III, Division 2, Groups FG, T135°C, nonincendive field wiring
Class I, Zone 0, AEx ia IIC T4 Ga
Class I, Zone 1, AEx ib [ia Ga] IIC T4 Gb
Zone 21, AEx ib [ia Da] IIC T135°C Db
 $-20^{\circ}\text{C} \leq \text{Ta} \leq +65^{\circ}\text{C}$

Description of Equipment:

Modular Measuring System Model Stratos Pro, Type A201X..., Type A211X...

Stratos® Pro Type A201X..., A211X... are 2-wire transmitters for Memosens, analog and digital sensors and are used to measure and process electrochemical properties of liquids in explosive atmospheres. The main unit includes an electronic circuit with the connection terminals, a slot for the measuring module MK-...X, a backlit LCD and a keypad, all in a single enclosure.

Entity Parameters:

See control drawing 212.110-066 page 2.

Stratos Pro, Type A221X..., Type A231X...

Equipment Ratings:

Intrinsically safe (FISCO) for Class I, II, III, Division 1, Groups A, B, C, D, E, F, G, T6...T4; $-20^{\circ}\text{C} \leq \text{Ta} \leq +65^{\circ}\text{C}$;
Nonincendive with Nonincendive field wiring for Class I, II, III, Division 2, Groups A, B, C, D, F, G; T6...T4; $-20^{\circ}\text{C} \leq \text{Ta} \leq +65^{\circ}\text{C}$;
AEx ia for Zone 0, Group IIC, T6...T4, Ga; $-20^{\circ}\text{C} \leq \text{Ta} \leq +65^{\circ}\text{C}$;
AEx ib [ia Ga] for Zone 1 with connections for Zone 0, Group IIC; T6...T4, Gb; $-20^{\circ}\text{C} \leq \text{Ta} \leq +65^{\circ}\text{C}$;
AEx ic [ia Ga] for Zone 2 with connections for Zone 0, Group IIC; T6...T4, Gc; $-20^{\circ}\text{C} \leq \text{Ta} \leq +65^{\circ}\text{C}$;
AEx ib [ia Da] for Zone 21 with connections for Zone 20, Group IIIC; T135°C, Db; $-20^{\circ}\text{C} \leq \text{Ta} \leq +65^{\circ}\text{C}$;
Type 4X, IP66/67.

Markings:

IS, Class I, II, III, Division 1, Groups ABCDEFG, T6...T4*
NI, Class I, Division 2, Groups ABCD, T6...T4, nonincendive field wiring
NI, Class II, III, Division 2, Groups FG, 135°C, nonincendive field wiring
Class I, Zone 0, AEx ia IIC T6...T4 Ga
Class I, Zone 1, AEx ib [ia Ga] IIC T6...T4 Gb
Class I, Zone 2, AEx ic [ia Ga] IIC T6...T4 Gc
Zone 21, AEx ib [ia Da] IIIC T135°C Gb
T6, T5: $-20^{\circ}\text{C} \leq \text{Ta} \leq +50^{\circ}\text{C}$
T4: $-20^{\circ}\text{C} \leq \text{Ta} \leq +65^{\circ}\text{C}$
T135°C: $-20^{\circ}\text{C} \leq \text{Ta} \leq +65^{\circ}\text{C}$

Description of Equipment:

Modular Measuring System Model Stratos Pro, Type A221X..., Type A231X...

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Entity Parameters:

See control drawing 212.120-066 page 2.

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