

CERTIFICATE OF COMPLIANCE

HAZARDOUS LOCATION ELECTRICAL EQUIPMENT PER CANADIAN REQUIREMENTS

This certificate is issued for the following equipment:

Stratos® Pro Type A2abB-c-d. Analyzing Unit

NI / I / 2 / ABCD / T4 Ta = 65 °C; Type 4X
DIP / II,III / 2 / FG / T4 Ta = 65 °C; Type 4X
I / 2 / Ex nA / IIC / T4, Ta = 65 °C; Type 4X
22 / Ex tD / T85 °C; Type 4X

where

a = Communications: 0, 1
b = Version: 1
c = Measuring Channel : MSPH , MSCOND, MSOXY, CC, PH, COND, CONDI, OXY, CO2
d = 2nd Current Output: 0, 1

Stratos® Pro Type A2abX-c-d. Analyzing Unit

IS / I,II,III / 1 / ABCDEFG / T4 Ta = -20 °C to 65 °C; - 212.002 300 Entity*; Type 4X
I / 0 / Ex ia IIC / T4 Ta = -20 °C to 65 °C; - 212.002 300 Entity*; Type 4X
NI / I / 2 / ABCD / T4 Ta = 65 °C; Type 4X
DIP / II,III / 2 / FG / T4 Ta = 65 °C; Type 4X
I / 2 / Ex nA / IIC / T4, Ta = 65 °C; Type 4X
22 / Ex tD / T85 °C; Type 4X

where

a = Communications: 0, 1
b = Version: 1
c = Measuring Channel : MSPH , MSCOND, MSOXY, CC, PH, COND, CONDI, OXY, CO2
d = 2nd Current Output: 0, 1

MK interface / RS 485

Entity Parameters*: ST15 / Terminals KL1, 2, 3, 4
Output: Uo (Voc) = 5 V, Io (Isc) = 124 mA, Po = 155 mW

Class I, Zone 0, Group IIC	Co (Ca) = 83.2 µF	Lo (La) = 2 mH
Class I, Division 1, Groups A & B		
Class I, Zone 0, Group IIB	Co (Ca) = 1000 µF	Lo (La) = 8.5 mH
Class I, Division 1, Groups C & E		
Class I, Zone 0, Group IIA	Co (Ca) = 1000 µF	Lo (La) = 16 mH
Class I, Division 1, Group D, F, & G		

Current output 1 / HART Entity Parameters*: Terminals KL8, KL9, ST1, ST2
 Input: U_i (V_{max}) = 30 V, I_i (I_{max}) = 100 mA, P_i = 800 mW, C_i = 5.3 nF, L_i = 2.5 μ H

Current output 2 Entity Parameters*: Terminals KL8 (KL16), KL17
 Input: U_i (V_{max}) = 30 V, I_i (I_{max}) = 100 mA, P_i = 800 mW, C_i = 5.3 nF, L_i = 2.5 μ H

Current input Entity Parameters*: Terminals KL5, 6
 Input: U_i (V_{max}) = 30 V, I_i (I_{max}) = 100 mA, P_i = 800 mW, C_i = 12 nF, L_i = 0

OK inputs HOLD, CONTROL Entity Parameters*: Terminals KL10, 11 and KL13, 14
 Input: U_i (V_{max}) = 30 V, I_i (I_{max}) = 100 mA, P_i = 1 W, C_i = 0, L_i = 0

with MK-pH Module, Control Drawing 212.002 110

pH Measuring Loop

Entity Parameters*: Terminals A, B, C, K
 Output: U_o (V_{oc}) = 15 V, I_o (I_{sc}) = 19.9 mA, P_o = 49.8 mW

Class I, Zone 0, Group IIC	C_o (Ca) = 553 nF	L_o (La) = 90 mH
Class I, Division 1, Groups A & B		
Class I, Zone 0, Group IIB	C_o (Ca) = 3.52 μ F	L_o (La) = 320 mH
Class I, Division 1, Groups C & E		
Class I, Zone 0, Group IIA	C_o (Ca) = 13.9 μ F	L_o (La) = 610 mH
Class I, Division 1, Group D, F, & G		

Temperature Measuring Loop

Entity Parameters*: Terminals H, I
 Output: U_o (V_{oc}) = 10 V, I_o (I_{sc}) = 18.3 mA, P_o = 45.7 mW

Class I, Zone 0, Group IIC	C_o (Ca) = 2.87 μ F	L_o (La) = 95 mH
Class I, Division 1, Groups A & B		
Class I, Zone 0, Group IIB	C_o (Ca) = 19.87 μ F	L_o (La) = 350 mH
Class I, Division 1, Groups C & E		
Class I, Zone 0, Group IIA	C_o (Ca) = 99 μ F	L_o (La) = 630 mH
Class I, Division 1, Group D, F, & G		

pH / Temperature Measuring Loop

Entity Parameters*: Terminals A, B, C, H, I, K
 Output: U_o (V_{oc}) = 15 V, I_o (I_{sc}) = 38.2 mA, P_o = 95.5 mW

Class I, Zone 0, Group IIC	C_o (Ca) = 432 nF	L_o (La) = 23 mH
Class I, Division 1, Groups A & B		
Class I, Zone 0, Group IIB	C_o (Ca) = 3.4 μ F	L_o (La) = 90 mH
Class I, Division 1, Groups C & E		
Class I, Zone 0, Group IIA	C_o (Ca) = 13.8 μ F	L_o (La) = 180 mH
Class I, Division 1, Group D, F, & G		

pH / ISM / Temperature Measuring Loop

Entity Parameters*: Terminals A, B, C, F, G, H, I, K
 Output: U_o (V_{oc}) = 15 V, I_o (I_{sc}) = 48.7 mA, P_o = 122 mW

Class I, Zone 0, Group IIC	C_o (Ca) = 432 nF	L_o (La) = 432 nF
Class I, Division 1, Groups A & B		
Class I, Zone 0, Group IIB	C_o (Ca) = 3.4 μ F	L_o (La) = 55 mH
Class I, Division 1, Groups C & E		
Class I, Zone 0, Group IIA	C_o (Ca) = 13.8 μ F	L_o (La) = 130 mH
Class I, Division 1, Group D, F, & G		



Member of the FM Global Group

pH / Supply / Temperature Measuring Loop

Entity Parameters*: Terminals A, B, C, D, E, H, I, K

Input: Output: Uo (Voc) = 15 V, Io (Isc) = 93.8 mA, Po = 200 mW

Class I, Zone 0, Group IIC	Co (Ca) = 379 nF	Lo (La) = 4 mH
Class I, Division 1, Groups A & B		
Class I, Zone 0, Group IIB	Co (Ca) = 3.35 μ F	Lo (La) = 19 mH
Class I, Division 1, Groups C & E		
Class I, Zone 0, Group IIA	Co (Ca) = 13.8 μ F	Lo (La) = 40 mH
Class I, Division 1, Group D, F, & G		

pH / Supply / ISM / Temperature Measuring Loop

Entity Parameters*: Terminals A, B, C, D, E, F, G, H, I, K

Output: Uo (Voc) = 15 V, Io (Isc) = 104.3 mA, Po = 200 mW

Class I, Zone 0, Group IIC	Co (Ca) = 379 nF	Lo (La) = 3 mH
Class I, Division 1, Groups A & B		
Class I, Zone 0, Group IIB	Co (Ca) = 3.35 μ F	Lo (La) = 12 mH
Class I, Division 1, Groups C & E		
Class I, Zone 0, Group IIA	Co (Ca) = 13.8 μ F	Lo (La) = 24 mH
Class I, Division 1, Group D, F, & G		

ISM Measuring Loop

Entity Parameters*: Terminals F, G

Output: Uo (Voc) = 15 V, Io (Isc) = 10.6 mA, Po = 26.6 mW

Class I, Zone 0, Group IIC	Co (Ca) = 580 nF	Lo (La) = 300 mH
Class I, Division 1, Groups A & B		
Class I, Zone 0, Group IIB	Co (Ca) = 3.55 μ F	Lo (La) = 1000 mH
Class I, Division 1, Groups C & E		
Class I, Zone 0, Group IIA	Co (Ca) = 14 μ F	Lo (La) = 1000 mH
Class I, Division 1, Group D, F, & G		

with MK-OXY module, Control Drawing 212.002 120

OXY Measuring Loop

Entity Parameters*: Terminals A, B, C, D, I

Output: Uo (Voc) = 15 V, Io (Isc) = 8.2 mA, Po = 20.5 mW

Class I, Zone 0, Group IIC	Co (Ca) = 580 nF	Lo (La) = 500 mH
Class I, Division 1, Groups A & B		
Class I, Zone 0, Group IIB	Co (Ca) = 3.55 μ F	Lo (La) = 1000 mH
Class I, Division 1, Groups C & E		
Class I, Zone 0, Group IIA	Co (Ca) = 14 μ F	Lo (La) = 1000 mH
Class I, Division 1, Group D, F, & G		

Temperature Measuring Loop

Entity Parameters*: Terminals G, H

Output: Uo (Voc) = 10 V, Io (Isc) = 1.6 mA, Po = 4 mW

Class I, Zone 0, Group IIC	Co (Ca) = 2.88 μ F	Lo (La) = 1000 mH
Class I, Division 1, Groups A & B		
Class I, Zone 0, Group IIB	Co (Ca) = 19.8 μ F	Lo (La) = 1000 mH
Class I, Division 1, Groups C & E		
Class I, Zone 0, Group IIA	Co (Ca) = 99 μ F	Lo (La) = 1000 mH
Class I, Division 1, Group D, F, & G		

OXY / Temperature Measuring Loop

Entity Parameters*: Terminals A, B, C, D, G, H, I

Output: Uo (Voc) = 15 V, Io (Isc) = 9.7 mA, Po = 25 mW

Class I, Zone 0, Group IIC	Co (Ca) = 481 nF	Lo (La) = 300 mH
Class I, Division 1, Groups A & B		
Class I, Zone 0, Group IIB	Co (Ca) = 3.46 μ F	Lo (La) = 1000 mH
Class I, Division 1, Groups C & E		
Class I, Zone 0, Group IIA	Co (Ca) = 13.9 μ F	Lo (La) = 1000 mH

Class I, Division 1, Group D, F, & G

OXY / ISM / Temperature Measuring

Loop Entity Parameters*: Terminals A, B, C, D, E, F, G, H, I
 Output: Uo (Voc) = 15 V, Io (Isc) = 20.2 mA, Po = 50.5 mW

Class I, Zone 0, Group IIC	Co (Ca) = 481 nF	Lo (La) = 90 mH
Class I, Division 1, Groups A & B		
Class I, Zone 0, Group IIB	Co (Ca) = 3.46 μ F	Lo (La) = 320 mH
Class I, Division 1, Groups C & E		
Class I, Zone 0, Group IIA	Co (Ca) = 13.9 μ F	Lo (La) = 630 mH
Class I, Division 1, Group D, F, & G		

ISM Measuring Loop

Entity Parameters*: Terminals E, F
 Output: Uo (Voc) = 15 V, Io (Isc) = 10.6 mA, Po = 26.6 mW

Class I, Zone 0, Group IIC	Co (Ca) = 580 nF	Lo (La) = 300 mH
Class I, Division 1, Groups A & B		
Class I, Zone 0, Group IIB	Co (Ca) = 3.55 μ F	Lo (La) = 1000 mH
Class I, Division 1, Groups C & E		
Class I, Zone 0, Group IIA	Co (Ca) = 14 μ F	Lo (La) = 1000 mH
Class I, Division 1, Group D, F, & G		

with MK-COND module, Control Drawing 212.002 130

Conductivity Measuring Loop

Entity Parameters*: Terminals A, B, C, D, H
 Output: Uo (Voc) = 5 V, Io (Isc) = 36 mA, Po = 45 mW

Class I, Zone 0, Group IIC	Co (Ca) = 100 μ F	Lo (La) = 25 mH
Class I, Division 1, Groups A & B		
Class I, Zone 0, Group IIB	Co (Ca) = 1000 μ F	Lo (La) = 100 mH
Class I, Division 1, Groups C & E		
Class I, Zone 0, Group IIA	Co (Ca) = 1000 μ F	Lo (La) = 210 mH
Class I, Division 1, Group D, F, & G		

Temperature Measuring Loop

Entity Parameters*: Terminals E, F, G
 Output: Uo (Voc) = 5 V, Io (Isc) = 27 mA, Po = 34 mW

Class I, Zone 0, Group IIC	Co (Ca) = 100 μ F	Lo (La) = 50 mH
Class I, Division 1, Groups A & B		
Class I, Zone 0, Group IIB	Co (Ca) = 1000 μ F	Lo (La) = 200 mH
Class I, Division 1, Groups C & E		
Class I, Zone 0, Group IIA	Co (Ca) = 1000 μ F	Lo (La) = 400 mH
Class I, Division 1, Group D, F, & G		

Conductivity / Temperature Measuring Loop

Entity Parameters*: Terminals A, B, C, D, E, F, G, H
 Output: Uo (Voc) = 5 V, Io (Isc) = 63 mA, Po = 79 mW

Class I, Zone 0, Group IIC	Co (Ca) = 100 μ F	Lo (La) = 8 mH
Class I, Division 1, Groups A & B		
Class I, Zone 0, Group IIB	Co (Ca) = 1000 μ F	Lo (La) = 30 mH
Class I, Division 1, Groups C & E		
Class I, Zone 0, Group IIA	Co (Ca) = 1000 μ F	Lo (La) = 70 mH
Class I, Division 1, Group D, F, & G		

with MK-CONDI module, Control Drawing 212.002 140

Conductivity Measuring Loop

Entity Parameters*: Terminals A, B, C, D, H
 Output: U_o (Voc) = 10 V, I_o (Isc) = 97 mA, P_o = 121 mW

Class I, Zone 0, Group IIC	C_o (Ca) = 3 μ F	L_o (La) = 3 mH
Class I, Division 1, Groups A & B		
Class I, Zone 0, Group IIB	C_o (Ca) = 20 μ F	L_o (La) = 12 mH
Class I, Division 1, Groups C & E		
Class I, Zone 0, Group IIA	C_o (Ca) = 100 μ F	L_o (La) = 24 mH
Class I, Division 1, Group D, F, & G		

Temperature Measuring Loop

Entity Parameters*: Terminals E, F, G
 Output: U_o (Voc) = 10 V, I_o (Isc) = 13 mA, P_o = 16 mW

Class I, Zone 0, Group IIC	C_o (Ca) = 3 μ F	L_o (La) = 200 mH
Class I, Division 1, Groups A & B		
Class I, Zone 0, Group IIB	C_o (Ca) = 20 μ F	L_o (La) = 700 mH
Class I, Division 1, Groups C & E		
Class I, Zone 0, Group IIA	C_o (Ca) = 100 μ F	L_o (La) = 1000 mH
Class I, Division 1, Group D, F, & G		

Conductivity / Temperature Measuring Loop

Entity Parameters*: Terminals A, B, C, D, E, F, G, H
 Output: U_o (Voc) = 10 V, I_o (Isc) = 98 mA, P_o = 123 mW

Class I, Zone 0, Group IIC	C_o (Ca) = 3 μ F	L_o (La) = 3 mH
Class I, Division 1, Groups A & B		
Class I, Zone 0, Group IIB	C_o (Ca) = 20 μ F	L_o (La) = 12 mH
Class I, Division 1, Groups C & E		
Class I, Zone 0, Group IIA	C_o (Ca) = 100 μ F	L_o (La) = 24 mH
Class I, Division 1, Group D, F, & G		

Stratos® Pro Type A4abB-c/d. Analyzing Unit

NI / I / 2 / ABCD / T4 Ta = 55 °C; Type 4X
 DIP / II,III / 2 / FG / T4 Ta = 55 °C; Type 4X
 I / 2 / Ex nA / IIC / T4, Ta = 65 °C; Type 4X
 22 / Ex tD / T85 °C; Type 4X

where

- a = Communications: 0, 1
- b = Version: 1
- c = Measuring Channel 1: MSPH, MSCOND, MSOXY, CC, PH, COND, CONDI, OXY, CO2
- d = Measuring Channel 2: 0, MSPH, MSCOND, MSOXY

MK interface / RS 485 Entity Parameters*: ST1 Terminals 1, 2, 3, 4, 5
 Input: U_i (Vmax) = 5 V, I_i (Imax) = 160 mA, P_i = 200 mW, C_i = 34.7 μ F, L_i = 0

*Only for MK interface / RS 485 connection to intrinsically safe circuits



Equipment Ratings:

Intrinsically safe for Class I, Division 1, Groups A, B, C, and D hazardous (classified) locations, intrinsically safe for Class I, Zone 0, Group IIC hazardous for Group IIC atmospheres, suitable for Class I, Division 2, Groups A, B, C, and D, and suitable for Class I, Zone 2, Group IIC

FM Approved for:

Knick Elektronische Meßgeräte GmbH & Co. KG
Beuckestraße 22 D-14163 Berlin, Germany

This certifies that the equipment described has been found to comply with the following Approval Standards and other documents:

C22.2 No. 157	1992
C22.2 No. 213	1987
CAN/CSA-E60079-0	2002
CAN/CSA-E60079-11	2002

Original Project ID: 3037411

Approval Granted: *September 13, 2010*

Subsequent Revision Reports / Date Approval Amended

Report Number	Date	Report Number	Date
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FM Approvals LLC



J.E. Marquedant
Group Manager, Electrical

13 September 2010

Date