CERTIFICATE OF CONFORMITY

1. **HAZARDOUS LOCATION ELECTRICAL EQUIPMENT PER CANADIAN REQUIREMENTS**
2. **Certificate No:** **FM17CA0105X**
3. **Equipment:** **MEMOSENS SE5**, SE6** and SE7**Sensors**
   (Type Reference and Name)
4. **Name of Listing Company:** **Knick Elektronische Messgeräte GmbH & Co. KG**
5. **Address of Listing Company:** **Beuckestrasse 22**
   Berlin 14163
   Germany
6. The examination and test results are recorded in confidential report number:

   3061513 dated 5th July 2018

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

   CAN/CSA- C22.2 No. 0-10:2015, C22.2 No. 213:2017, CAN/CSA-C22.2 No. 60079-0:2015, CAN/CSA-C22.2 No. 60079-11 :2014, CAN/CSA-C22.2 No. 60529 :2016, CAN/CSA-C22.2 No. 61010-1:2017

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:

    Intrinsically Safe for Class I, Division 1, Groups A, B, C and D; Class I, Zone 0, 1, 2, Ex ia IIC and Nonincendive for Class I, Division 2, Groups A, B, C, and D when installed with nonincendive field parameters hazardous locations with an ambient temperature rating of -20°C to +70°C.

Certificate issued by:

J.E. Marquedant

J.E. Marquedant
Vice President, Manager, Electrical Systems

27 May 2019
Date

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

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Canadian Certificate Of Conformity No: FM17CA0105X

11. The marking of the equipment shall include:

The equipment marking is size constrainted and contains the Certificate number, control drawing number and Zone rating.

Certificate Number:
FM17CA0105X

Reference to control drawing
214.410-240 (Inductive Sensor-Cable Connection System MEMOSENS)
214.410-250 (Inductive Conductivity Sensor SE680X)

The packaging contains, the information above and the following:

Rating:
Class I, DIV 2, Groups A,B,C,D

Class I, DIV 1, Groups A,B,C,D

Class I, Zone 0, 1, 2, IIC

Temperature Class and Temperature Range:

SE5aXb-cMSd, SE7aX/b-cMSd

Area Classification	Temperature Class	Ambient Temperature Range
Class I Division 1, Groups A, B, C, D Class I, Zone 0, Group IIC Class I, Division 2, Groups A, B, C, D Class I, Zone 2, Group IIC	T4 T6	-20°C to +100°C -20°C to +70°C

SE604X-MSa, SE605a-XMSb, SE6aX-bMSc d-e/f

Area Classification	Temperature Class	Ambient Temperature Range
Class I Division 1, Groups A, B, C, D Class I, Zone 0, Group IIC Class I, Division 2, Groups A, B, C, D Class I, Zone 2, Group IIC	T4 T6	-20°C to +100°C -20°C to +65°C

SE736X/a-NMSb, SE737X/a-NMSb

Area Classification	Temperature Class	Ambient Temperature Range
Class I Division 1, Groups A, B, C, D Class I, Zone 0, Group IIC Class I, Division 2, Groups A, B, C, D Class I, Zone 2, Group IIC	T4 T6	-5°C to +100C -5°C to +70°C

SE680X-a bU0c

Area Classification	Temperature Class	Ambient Temperature Range
Class I Division 1, Groups A, B, C, D Class I, Zone 0, Group IIC Class I, Division 2, Groups A, B, C, D Class I, Zone 2, Group IIC	T4 T6	-20°C to +100°C -20°C to +75°C

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12. **Description of Equipment:**

General - The MEMOSENS sensors are Digital Sensors families for pH/redox & temperature (SE5) conductivity & temperature (SE6) and oxygen & temperature (SE7) measurements.

The MEMOSENS Sensors are used in connection with a MEMOSENS measuring cables to measure different parameters of fluid media

The intrinsically safe inductive conductivity sensor type SE680X is equipped with an integrated PT1000 temperature probe and used for measurement of solutions with high conductivity and temperatures for different media.

Construction - The electronic components of the intrinsically safe sensors are completely encapsulated.

Ratings - The MEMOSENS Sensors must be used with a MEMOSENS cable CA/MS-aXb, CA/MS-aXb-L or an approved cable type identical in hardware and function.

The MEMOSENS cable can be connected to a transmitter with an intrinsically safe output with $V_O \leq V_{Omax}$, $I_O \leq I_{Omax}$, $P_O \leq P_{Omax}$, $C_i \leq C_{imax}$, $L_i \leq L_{imax}$ like the approved Knick Memosens transmitters for hazardous locations from the Protos, Stratos or Portavo series.

Transmitter entity parameters are as follows (linear output characteristic):

V_{Omax}	I_{Omax}	P_{Omax}	C_{imax}	L_{imax}
5.1 V	130 mA	166 mW	15 µF	95 µH

Transmitter entity parameters are as follows (trapezoid output characteristic):

V_{Omax}	I_{Omax}	P_{Omax}	C_{imax}	L_{imax}
5.04 V	80 mA	112 mW	14.1 µF	237.2 µH

The digital sensor SE680X can be connected to a transmitter with an intrinsically safe output with $V_O \leq V_i$, $I_O \leq I_i$, $P_O \leq P_i$, $C_O \leq C_i$, $L_O \leq L_i$ like the approved Knick Memosens transmitters for hazardous locations from the Protos, Stratos or Portavo series.

The entity parameters of the digital sensor SE680X are as follows (linear output characteristic):

V_i	I_i	P_i	C_i	L_i
5.1 V	130 mA	166 mW	55 µF	negligibly small

Thermal Rating

MEMOSENS Cable Type	**Temperature Class**	**Ambient Temperature Range**
CA/MS-aXb a, b = Not safety related; Any	T4	-15 °C ≤ T_a ≤ +100 °C
	T6	-15 °C ≤ T_a ≤ +70 °C
CA/MS-aXb-L a, b = Not safety related; Any	T6	-10 °C ≤ T_a ≤ +50 °C

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SE5aXb-cMSd
a, b, c, d = Not safety related; Any
SE7aX/b-cMSd
a, b, c, d = Not safety related; Any

Area Classification	Temperature Class	Ambient Temperature Range	Maximum Process Temperature
Class I Division 1, Groups A, B, C, D Class I, Zone 0, Group IIC Class I, Division 2, Groups A, B, C, D Class I, Zone 2, Group IIC	T3	-20°C to +100°C	+135°C
	T4	-20°C to +100°C	+120°C
	T6	-20°C to +70°C	+70°C

SE604X-MSa
a = Not safety related; Any
SE605a-XMSb
a, b = Not safety related; Any
SE6aX-bMSc-d/e
a, b, c, d, e = Not safety related; Any

Area Classification	Temperature Class	Ambient Temperature Range	Maximum Process Temperature
Class I Division 1, Groups A, B, C, D Class I, Zone 0, Group IIC Class I, Division 2, Groups A, B, C, D Class I, Zone 2, Group IIC	T3	-20°C to +100°C	+135°C
	T4	-20°C to +100°C	+115°C
	T6	-20°C to +65°C	+65°C

SE736X/*-NMS*, SE737X/*-NMS*

Area Classification	Temperature Class	Ambient Temperature Range	Maximum Process Temperature
Class I Division 1, Groups A, B, C, D Class I, Zone 0, Group IIC Class I, Division 2, Groups A, B, C, D Class I, Zone 2, Group IIC	T3	-5°C to +100°C	+135°C
	T4	-5°C to +100C	+120°C
	T6	-5°C to +70°C	+70°C

SE680X-a bU0c
a, b = Not safety related; Any

Area Classification	Temperature Class	Ambient Temperature Range	Maximum Process Temperature
Class I Division 1, Groups A, B, C, D Class I, Zone 0, Group IIC Class I, Division 2, Groups A, B, C, D Class I, Zone 2, Group IIC	T3	-20°C to +100°C	+150°C
	T4	-20°C to +100°C	+125°C
	T6	-20°C to +75°C	+75°C

13. **Specific Conditions of Use:**

1. All metallic process connections must be bonded as required per the Canadian Electrical Code with electrostatically conductive(< 1 MΩ).
2. For the sensor type SE680X, SE604X-MSa, SE605a-XMSb, SE6aX-bMSc d-e/f and SE7aX/b-cMSd may

only be used in liquid media with a conductivity of at least 10 nS/cm.

3. The sensors may not be operated in electrostatically critical processing conditions. Intense vapour or dust flows directly impacting on the connection system must be avoided.
4. The sensors may be used in the following process temperature range:

SE5aXb-cMSd, SE7aX/b-cMSd

Temperature Class	Ambient Temperature Range	Maximum Process Temperature
T3	-20°C to +100°C	+135°C
T4	-20°C to +100°C	+120°C
T6	-20°C to +70°C	+70°C

SE604X-MSa, SE605a-XMSb, SE6aX-bMSc d-e/f

Temperature Class	Ambient Temperature Range	Maximum Process Temperature
T3	-20°C to +100°C	+135°C
T4	-20°C to +100°C	+115°C
T6	-20°C to +65°C	+65°C

SE736X/*-NMS*, SE737X/*-NMS*

Temperature Class	Ambient Temperature Range	Maximum Process Temperature
T3	-5°C to +100°C	+135°C
T4	-5°C to +100C	+120°C
T6	-5°C to +70°C	+70°C

SE680X-a bU0c

Temperature Class	Ambient Temperature Range	Maximum Process Temperature
T3	-20°C to +100°C	+150°C
T4	-20°C to +100°C	+125°C
T6	-20°C to +75°C	+75°C

5. The Memosens sensors SE5aXb-cMSd, SE604X-MSa, SE605a-XMSb, SE6aX-bMSc d-e/f and SE7aX/b-cMSd must be connected to a transmitter with an intrinsically safe output that provides output parameters equal to those defined on control drawing 214.410-240 and must be used in accordance with the requirements and limitations specified on control drawing.
6. The SE680X sensors must be connected to a transmitter with an intrinsically safe output that provides output parameters equal to those defined on control drawing 214.410-250 and must be used in accordance with the requirements and limitations specified on control drawing.

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

This Certificate has been issued in accordance with FM Approvals Canadian Certification Scheme.

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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
5th July 2018	Original Issue.
27th May 2019	Supplement 1: Report Reference: - RR217822 Dated 27th May 2019 Description of the Change: Corrected SE680X Description error

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