



Certificate of Compliance

Certificate: 70209633

Master Contract: 274452

Project: 80035973

Date Issued: October 21, 2020

Issued to: KEM Kueppers Elektromechanik GmbH
Liebigstraße 5
85757 Karlsfeld,
Germany

Attention: Mr. David Sperber

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.



Issued by: *H. Gambell*
Hannah Gambell

PRODUCTS

CLASS 2258 04 – PROCESS CONTROL EQUIPMENT - Intrinsically Safe, Entity - For Hazardous Locations

CLASS 2258 84 – PROCESS CONTROL EQUIPMENT - Intrinsically Safe, Entity - For Hazardous Locations - Certified to US Standards

Canadian marking

Ex db ia IIC T6-T3 Gb

Ex tb IIIC T135°C Db

Ex ia IIIC T135°C Da

US marking:

Class I, II, III, Division 1, Groups A, B, C, D, E, F, G

Class I, Zone 1, AEx db ia IIC T6-T3 Gb

Zone 21, AEx tb IIIC T135°C Db

Zone 20, AEx ia IIIC T135°C Da

The TRICOR TCMQ Flow Sensor, Model TCMQ6400 and TCMQ018k; TCMQ070k; TCMQ180k sensor sizes DN15 (1/2"), DN25 (1"), DN50 (2") and DN80 (3"). Order codes TCMQabcd-eeff-gghh-ih-Vim-xxx, and TCMQabcd-eeff-gghh-ih-Wim-xxx. Ambient temperature -40°C to +60°C. MWP = 16,000 kPa (160 bar, 2320 xsi). Type 4X, IP67.

Intrinsically safe installations: The complete TRICOR TCMQ equipment has the following entity parameters: 4-Pin Connection- AB, 0 and 15V or connector X700 (Pin 1 = 15V, Pin 2 =0V, Pin 3 =A and Pin 4 =B) Ui =20V, Ii =484 mA, Pi =2.3 W, Ci = 1894pF, Li = 602 nH.



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Non-intrinsically safe installations (Ex db and Ex tb): rated voltage = 24 V d.c.

Where:

a = Flow rate 6, 0 or 1
b = Flow rate 4, 1, 7 or 8
c = Flow rate 0, 8 or 1
d = Flow rate K or 0
** = Sensor Connection
** = Wetted Parts
** = Process Connection
** = Comb. Installation length
* = Mech. Options (Temp.)
* = Mech. Options (Accuracy)
e = Electronic Options (equal Transmitter Variant) v or w
f = Electronic Interface (equal: I/O config Ch1) M
g = M = I/O Cards (equal: I/O config, Ch2, Ch3, Ch4) A
h, i and j = Ex Protection (equal: Ex approvals) ex, ex1, ex2, ex3 or ex4
*** = Remote Cable
*** = Customer Specific

CLASS 2258 04 – PROCESS CONTROL EQUIPMENT - Intrinsically Safe, Entity - For Hazardous Locations

CLASS 2258 84 – PROCESS CONTROL EQUIPMENT - Intrinsically Safe, Entity - For Hazardous Locations - Certified to US Standards

TRICOR TCD 9010 and TCD 9210 Flow Transmitter

Canadian marking:

Ex db ia [ia Ga] IIC T6 Gb
Ex db [ia Ga] IIC T6 Gb
Ex ia [ia] IIIC T85°C Da
Ex tb [ia Da] IIIC T85°C Db

US Marking:

CL I, II, III Div 1
Groups A, B, C, D, E, F, G
Cl 1, Zone 1 AEx db ia [ia Ga] IIC T6 Gb
Zone 20 AEx ia [ia] IIIC T85°C Db
Zone 21 AEx tb [ia Da] IIIC T85°C Db

The TRICOR TCD 9010 and TCD 9210 Flow Transmitter comprises of a flameproof “Ex d” component part (DSL enclosure) with two IS interfaces: a 4 wire ModBus IS interface and a 14 pin connector IS interface to a sensor.

The TRICOR enclosure for the TCD 9010 and TCD 9210 comprises an aluminum cylindrical enclosure with threaded cover. The cover is locked in place by a locking screw which impinges on the ribbed side wall of the



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cover. One end of the enclosure is fitted with a pedestal arrangement, for connecting the TRICOR TCD 9010 and TCD 9210 directly to the sensors via a 14 pin line bush connector.

The mounting arrangement allows for the interconnection of a cable between the TRICOR TCD 9010 and TCD 9210 housing and the sensors. The TRICOR enclosure wall is provided with an M20 threaded entry fitted with either a certified 4-Pin Flameproof 'Ex d' 4-pin electrical M12 connector or a separately approved ATEX/IECEX flameproof 'Ex d' cable gland to allow for the remote electrical connection of the TRICOR TCD 9010 and TCD 9210 ModBus circuit via several meters of cable. The enclosure is provided with internal and external earthing facilities.

The external ModBus 4-pin M12 housing is a cast aluminum enclosure that has a single 4-pin M12 electrical connector fitted to the housing. The electrical connections to the 4-pin M12 electrical connector are intrinsically safe Ex 'ia' protected. The internal electrical wires to the 4-pin M12 electrical connector are fully potted within the connector housing. The connector is screw-secured to the connector housing via a threaded joint that forms a flamepath. The threaded joint and fully potted 4-pin M12 electrical connector are relied on to complete the flameproof 'Ex d' protection of the TCD 9010 and TCD 9210 Electronics chamber.

The following table details the various approval parameters:

| | |
|-----------------------------|--|
| Ex db ia [ia Ga] IIC T6 Gb | Um = 60V Rated voltage = 12-24V Rated current 100 mA Intrinsic safety supply: Ui =20V Ii =484 mA Pi =2.3 W Ci = 1894pF Li = 602 nH |
| Ex db [ia Ga] IIC T6 Gb | Um = 60V Rated voltage = 12-24V Rated current 100 mA |
| Ex ia [ia] IIIC T85°C Da | Intrinsic safety supply: Ui =20V Ii =484 mA Pi =2.3 W Ci = 1894pF Li = 602 nH |
| Ex tb [ia Da] IIIC T85°C Db | Um = 60V Rated voltage = 12-24V Rated current 100 mA |



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The following are the output parameters:

| Outputs | | |
|------------------|----------|--------------|
| Driver, ia IIC | Uo | 11.7V |
| | Io | 59.1mA |
| | Po | 171mW |
| | Co (IIC) | 1.54 μ F |
| | Lo (IIC) | 10.2 mH |
| Outputs | | |
| Pickup 1, ia IIC | Uo | 5.85V |
| | Io | 8.69 mA |
| | Po | 12.71 mW |
| | Ls | 1 μ H |
| | Co (IIC) | 43 μ F |
| | Lo (IIC) | 470.829mH |

| Outputs | | |
|------------------|----------|------------|
| Pickup 2, ia IIC | Uo | 5.85V |
| | Io | 8.69 mA |
| | Po | 12.71 mW |
| | Ls | 1 μ H |
| | Co (IIC) | 43 μ F |
| | Lo (IIC) | 470.829mH |

| Outputs | | |
|--------------|----------|--------------|
| Temp, ia IIC | Uo | 11.7V |
| | Io | 2.2 mA |
| | Po | 6.4 mW |
| | Co (IIC) | 1.54 μ F |
| | Lo (IIC) | 7.69H |

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Conditions of Acceptability:

Hazloc:

- i. The apparatus housing shall be connected to the potential equalising conductor in the hazardous area.
- ii. The maximum allowable process fluid temperatures with respect to temperature class for the device when used with potentially explosive gases in the following maximum ambient temperatures are:

| Ta (°C) | Maximum Process Temperature per Temperature Class (°C) | | | |
|---------|--|-----|-----|-----|
| | T6 | T5 | T4 | T3 |
| 60 | 70 | 70 | 70 | 70 |
| 55 | 85 | 100 | 100 | 100 |
| 50 | 85 | 100 | 130 | 130 |
| 45 | 85 | 100 | 135 | 160 |
| 40 | 85 | 100 | 135 | 190 |
| 35 | 85 | 100 | 135 | 200 |
| 30 | 85 | 100 | 135 | 200 |

- iii. The maximum allowable process fluid temperatures with respect to maximum surface temperatures for hazardous dusts for the device when used with hazardous dusts in the following maximum ambient temperatures are:

| <i>Applications with up to 500mm dust or isolation</i> | | <i>Applications with up to 5mm dust or isolation</i> | |
|--|-------------------|--|-------------------|
| Ta (°C) | Tprocess max (°C) | Ta (°C) | Tprocess max (°C) |
| 60 | -40 | 60 | 70 |
| 55 | -10 | 55 | 100 |
| 50 | 20 | 50 | 130 |
| 45 | 50 | 45 | 160 |
| 40 | 80 | 40 | 190 |
| 35 | 110 | 35 | 200 |
| 30 | 140 | 30 | 200 |

- If Tprocess ≤ 85°C, maximum surface temperature = 85°C.
- If Tprocess > 85°C, maximum surface temperature = process temperature.

- iv. The equipment internal circuits at the 4-Pin Connection – A, B, 0 and 15 V or Connector X700 (Pin 1 = 15 V, Pin 2 = 0 V, Pin 3 = A and Pin 4 = B) are not capable of withstanding a 500 V r.m.s. a.c. test to earth as required by clause 6.3.13 of IEC 60079-11:2011/EN 60079-11:2012. This shall be taken into account in any equipment installation.
- v. When the equipment is installed as ‘Ex d’, the connector (1/2” NPT or M20) shall be replaced with a suitably certified Ex d cable gland or Ex d Conduit Sealing Device and the voltage of the equipment shall not exceed 60 V d.c.
- vi. If the equipment is installed as flameproof only, it shall not subsequently be installed as intrinsically safe unless it can be verified that there has been no damage to the safety components within the intrinsically safe



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circuit on which safety depends by, for example, an over-voltage at the supply terminals. The safety components on which intrinsic safety depends have been assessed up to an input voltage of 60 V d.c.

vii. Intrinsically safe installations only: A temporary connection of the TRICOR device to an uncertified programming or data download device is permitted, when the TRICOR device ANS is located in the non-hazardous area (typically prior to installation). Alternatively, such a connection may be made when the TRICOR device remains in the hazardous area, but the area is declared 'gas-free'. The uncertified programming or data download device shall be suitably-approved as a SELV supply to IEC 60950-1, IEC 61010-1 or an equivalent standard, with a maximum output voltage of 60 V. The input terminals of the TRICOR device have a maximum voltage $U_m = 60V$.

viii. The maximum pressure associated with the process medium in the internal pipes shall be limited to 160 bar.

Ordloc

i If at any time there is a conflict between the system safety provisions and any relevant local (national or regional) requirements, the local requirements always take precedence.

APPLICABLE REQUIREMENTS

| | |
|---|--|
| CAN/CSA-C22.2 No. 0-10 <i>August 2011</i> | General requirements — Canadian Electrical Code, Part II |
| CAN/CSA C22.2 No. 61010-1-12 (reaffirmed 2017) | Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use — Part 1: General Requirements |
| CAN/CSA-C22.2 No. 60079-0:15 | Explosive atmospheres – Part 0: Equipment – General requirements |
| CAN/CSA-C22.2 No. 60079-1:16 | Explosive atmospheres – Part 1: Equipment protection by flameproof enclosures “d” |
| CAN/CSA-C22.2 No. 60079-11:14 | Explosive atmospheres – Part 11: Equipment protection by intrinsic safety “i” |
| CAN/CSA-C22.2 No. 60079-31:15 | Explosive atmospheres – Part 31: Equipment dust ignition protection by enclosure “t” |
| ANSI/UL 61010-1-2016 | Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use — Part 1: General Requirements |
| ANSI/UL 60079-0-2013 | Explosive atmospheres – Part 0: Equipment – General requirements |
| ANSI/UL 60079-1-2015 | Explosive Atmospheres – Part 1: Equipment Protection by Flameproof Enclosures “d” |
| ANSI/UL 60079-11-2014 <i>Sixth Edition</i> | Explosive Atmospheres – Part 11: Equipment Protection by Intrinsic Safety “i” |
| ANSI/ISA-60079-31:2013 | Explosive Atmospheres – Part 31: Equipment Dust Ignition Protection by Enclosure “t” |
| FM 3615:2006 | Explosionproof Electrical Equipment General Requirements |
| FM 3600:1998 | Electrical Equipment For Use in Hazardous (classified) Locations- General Requirements |
| FM 3810:2005 | Electrical Equipment For Measurement, Control and Laboratory Use |



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MARKINGS

The following markings are provided on a CSA Accepted (Class 7923.01) or UL Recognized to Canadian requirements (PGJI8), and UL Recognized (PGJI2) or CSA Accepted to US Standards (Class 7923.81) adhesive nameplate, used with the printer and ribbon specified in the Listing, and is suitable for indoor and outdoor use on stainless steel, at a maximum service temperature of 100°C or higher. Nameplate is affixed to the side of the stainless steel sensor housing.

- Manufacturer's name: "KEM Kueppers Elektromechanik GmbH", or CSA Master Contract Number "274452", adjacent to the CSA Mark in lieu of manufacturer's name.
- Model Order Code: As specified in the PRODUCTS section, above.
- Electrical ratings: As specified in the PRODUCTS section, above.
- Ambient temperature rating: As specified in the PRODUCTS section, above.
- Manufacturing date in MMY format, or serial number, traceable to year and month of manufacture.
- Enclosure ratings: "Type 4X".
- Ingress Protection rating: "IP67", when specified in PRODUCTS section, above.
- Maximum Working Pressure (MWP) rating: As specified in the PRODUCTS section, above.
- The CSA Mark with or without "C" and "US" indicators, as shown on the Certificate of Conformity.
- Hazardous Location protection method designation
- Temperature code: As specified in the PRODUCTS section, above.
- Specification for Maximum Working Pressure: As specified in the PRODUCTS section, above.

Additionally, the following markings shall be provided on the equipment in a permanent manner:

- Terminal Designations adjacent to each field wiring terminal.
- The designation "GND", and/or ISO 60417, Symbol 5019, adjacent to the equipment ground (protective conductor) terminal.
- The following words, or suitable equivalent:
"OPEN CIRCUIT BEFORE REMOVING COVER" or "KEEP COVER TIGHT WHILE CIRCUITS ARE ALIVE", or "WARNING – DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT".

Note - Jurisdictions in Canada may require these markings to also be provided in French language. It is the responsibility of the manufacturer to provide bilingual marking, where applicable, in accordance with the requirements of the Provincial Regulatory Authorities. It is the responsibility of the manufacturer to determine this requirement and have bilingual wording added to the "Markings".