

EU-TYPE EXAMINATION CERTIFICATE



[1]

[2]

**Equipment or Protective System intended for use
in Potentially Explosive Atmospheres
Directive 2014/34/EU**

[3]

EU-Type Examination Certificate Number: **DEMKO 09 ATEX 0813748X Rev. 5**

[4]

Product: **One Series Electronic Pressure and Temperature Switches**

[5]

Manufacturer: **United Electric Controls**

[6]

Address: **180 Dexter Avenue, Watertown, MA 02471 USA**

[7]

This product and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

[8]

UL International Demko A/S, notified body number 0539 in accordance with Article 17 of the Council Directive 2014/34/EU of 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to design and construction of product intended for use in potentially explosive atmospheres given in Annex II to the Directive.
The examination and test results are recorded in confidential report no. **4787329681-09ATEX0813748X**

[9]

Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0:2012+A11:2013

EN 60079-1:2014

EN 60079-11:2012

EN 60079-31:2014

[10]

If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

[11]

This EU-Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by the certificate.

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The marking of the equipment or protective system shall include the following:

Series 1XSWLL:

II 1 G Ex ia IIC T4 Ga

II 1 D Ex ia IIIC T135°C Da

II 2 G Ex db IIC T3/T5 Gb

II 2 D Ex tb IIIC T90°C Db

Series 2X2D, 2X3A, 2X4D, 2XLP, 8X2D4X3A, 2SLP:

II 2 G Ex db IIC T3/T5 Gb

II 2 D Ex tb IIIC T90°C Db

Series 1XTXSW, 1XTX00:

II 2 G Ex db IIC T3/T5 Gb

II 2 D Ex tb IIIC T90°C Db

Series 1XSWHL, 1XSWHH:

II 2 G Ex db IIC T3/T5 Gb

II 2 D Ex tb IIIC T90°C Db

Certification Manager
Jan-Erik Storgaard

This is to certify that the sample(s) of the Equipment described herein ("Certified Equipment") has been investigated and found in compliance with the Standard(s) indicated on this Certificate, in accordance with the ATEX Equipment Certification Program Requirements. This certificate and test results obtained apply only to the equipment sample(s) submitted by the Manufacturer. UL did not select the sample(s) or determine whether the sample(s) provided were representative of other manufactured equipment. UL has not established Follow-Up Service or other surveillance of the equipment. The Manufacturer is solely and fully responsible for conformity of all equipment to all applicable Standards, specifications, requirements or Directives. The test results may not be used, in whole or in part, in any other document without UL's prior written approval.

Date of issue: 2009-03-10

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Notified Body

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Description of Product

The devices are pressure and temperature operated switches, with a solid-state switch mechanism, an LCD (Liquid Crystal Display), a flameproof enclosure and may contain solid-state analog outputs. The metal enclosure consists of a body and a cover with a glass window, as well as two conduit entries and a sensor port. The cover is secured to the body by a threaded joint. The window is cemented into the cover and additionally secured by a retaining ring that threads into the cover. The sensors engage the body of the enclosure by a threaded joint. The devices are provided with terminal blocks for field installation.

Nomenclature:

$\frac{2X}{I}$	$\frac{2D}{II}$	$\frac{0}{III}$	$\frac{0}{IV}$	$\frac{P}{V}$	$\frac{10}{VI}$	$\frac{M124}{VII}$
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I – Series Designation

- 2X – 2-wire switch
- 2S – Safety Transmitter
- 4X – 4-wire switch
- 8X – 8-wire switch

II – Input Voltage

- 2D – 12-30 Vdc (2X Models); 10-30 Vdc (8X Models)
- 4D – 30-50 Vdc (2X Models)
- 3A – 90-130 Vac or Vdc (2X Models); 90-130 Vac (4X Models)
- LP – 10-36 Vdc (2X Models)
- LP – 20-40 Vdc (2S Models)

III – Analog Output

- 0 – None
- 4 – 4-20 mA (DC)

IV – Switch Output

2X2D Models:

- N – None
- 0 – 12-30 Vdc, 40 mA

2X4D Models:

- N – None
- 0 – 30-50 Vdc, 40mA

2X3A Models:

- N – None
- 0 – 90-130 Vac or Vdc, 100 mA

2XLP Models:

- N – None
- 1 – 0-140 Vac or Vdc, 0.6 A SSR
- 3 – 0-280 Vac or Vdc, 0.3 A SSR

2SLP Models:

- N – None
- 7 – 12 – 240 Vac, 5.0 A

4X3A Models:

- N – None
- 1 – 24-280 Vac, 10 A SSR

8X2D Models:

- N – None
- 2 – SW1: 75-250 Vac, 1.5 A SSR; SW2: 75-250 Vac, 1.5 A SSR
- 4 – SW1: 75-250 Vac, 1.5 A SSR; SW2: 0-140 Vac or Vdc, 0.6 A SSR
- 5 – SW1: 0-140 Vac or Vdc, 0.6 A SSR; SW2: 0-140 Vac or Vdc, 0.6 A SSR

V – Sensor Type

- P – Pressure Sensor
- T – Temperature Sensor
- K – Differential Pressure Sensor

VI – Sensor Model

Pressure Sensors:

- 06 -14.7 to 30 psi
- 08 - 0.8 – 14.7 psi
- 10 – 0 to 5 psi (0.345 bar)
- 11 – 0 to 15 psi (1.034 bar)
- 12 – 0 to 30 psi (2.068 bar)
- 13 – 0 to 50 psi (3.447 bar)
- 14 – 0 to 100 psi (6.895 bar)
- 15 – 0 to 300 psi (20.68 bar)
- 16 – 0 to 500 psi (34.47 bar)
- 17 – 0 to 1000 psi (68.95 bar)
- 18 – 0 to 3000 psi (206.84 bar)
- 19 – 0 to 4500 psi (275.79 bar)
- 20 – 0 to 6000 psi (413.69 bar)

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Temperature Sensors:

- L1 – 4 in. Length Local Mount
- L2 – 6 in. Length Local Mount
- L3 – 10 in. Length Local Mount
- R1 – 6 ft. Remote Probe Low Temp
- RC – Custom Length Remote Probe Low Temp
- H1 – 6 ft. Remote Probe High Temp
- HC – Custom Length Remote Probe High Temp
- C1 – 6 ft. Remote Probe Low Temp
- CC – Custom Length Remote Probe Low Temp
- TC – Custom Length Thermowell
- Ux – User Installed Sensor, where “x” is any alphanumeric character denoting sensor temperature range

Differential Pressure Sensors:

- 10 – 0 to 5 psid (0.345 bar)
- 11 – 0 to 50 psid (3.447 bar)
- 12 – 0 to 100 psid (6.895 bar)
- 13 – 0 to 200 psid (13.790 bar)

VII – Options

M-70 or Four character alphanumeric code not affecting electrical or mechanical ratings of the device

Customer Specification Number

The above nomenclature may be replaced by 2X/4X/8X, followed by a five-digit code, corresponding to a configuration per the preceding nomenclature per customer, not affecting maximum electrical ratings or maximum mechanical ratings. Changes to the preceding nomenclature are not allowed, except for new sensor model ranges only, so long as (a) maximum electrical/mechanical ratings as tested are not exceeded and (b) sensor assembly configurations are approved to or above the range specified.

For the 1XSWLL series:

$\frac{1X}{I}$	$\frac{SW}{II}$	$\frac{L}{III}$	$\frac{L}{IV}$	$\frac{P}{V}$	$\frac{10}{VI}$	$\frac{M124}{VII}$
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I – Series Designation

1X – 2-wire switch

II – Type

SW – Switch only

III – Input Voltage (Range)

L – Low Voltage, 7.8 – 50 Vdc

IV – Input Current

L – Low Current, @ .1 A

V – Sensor Type

- P – Pressure Sensor
- T – Temperature Sensor
- K – Differential Pressure Sensor

VI – Sensor Model

Pressure Sensors:

- 06 – 14.7 to 30 psi
- 08 – 14.7 to 100 psi
- 10 – 0 to 5 psi
- 11 – 0 to 15 psi
- 12 – 0 to 30 psi
- 13 – 0 to 50 psi
- 14 – 0 to 100 psi
- 15 – 0 to 300 psi
- 16 – 0 to 500 psi
- 17 – 0 to 1000 psi
- 18 – 0 to 3000 psi
- 19 – 0 to 4500 psi
- 20 – 0 to 6000 psi

Temperature Sensors:

- L1 – 4 in. Length Local Mount
- L2 – 6 in. Length Local Mount
- L3 – 10 in. Length Local Mount
- R1 – 6 ft. Remote Probe Low Temp
- RC – Custom Length Remote Probe Low Temp
- H1 – 6 ft. Remote Probe High Temp
- HC – Custom Length Remote Probe High Temp
- C1 – 6 ft. Remote Probe Low Temp
- CC – Custom Length Remote Probe Low Temp

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Differential Pressure Sensors:

- 10 – 0 to 5 psid
- 11 – 0 to 50 psid
- 12 – 0 to 100 psid
- 13 – 0 to 200 psid

VII – Options

M-041 Dual Seal Adapter or Four character alphanumeric code not affecting electrical or mechanical ratings of the device

For the 1XTX series:

<u>1X</u>	<u>TX</u>	<u>00</u>	<u>P</u>	<u>10</u>	<u>M124</u>
I	II	III	IV	V	VI

I – Series Designation

1X – 2-wire switch

II – Communication

TX – 4-20 mA Transmitter

III – Output

SW – Switch Outputs
 00 – No Switch Outputs

IV – Sensor Type

P – Pressure Sensor
 T – Temperature Sensor
 K – Differential Pressure Sensor

V – Sensor Model

Pressure Sensors:

- 06 – 14.7 to 30 psi
- 08 – 14.7 to 100 psi
- 10 – 0 to 5 psi
- 11 – 0 to 15 psi
- 12 – 0 to 30 psi
- 13 – 0 to 50 psi
- 14 – 0 to 100 psi
- 15 – 0 to 300 psi
- 16 – 0 to 500 psi
- 17 – 0 to 1000 psi
- 18 – 0 to 3000 psi
- 19 – 0 to 4500 psi
- 20 – 0 to 6000 psi

Temperature Sensors:

- L1 – 4 in. Length Local Mount
- L2 – 6 in. Length Local Mount
- L3 – 10 in. Length Local Mount
- R1 – 6 ft. Remote Probe Low Temp
- RC – Custom Length Remote Probe Low Temp
- H1 – 6 ft. Remote Probe High Temp
- HC – Custom Length Remote Probe High Temp
- C1 – 6 ft. Remote Probe Low Temp
- CC – Custom Length Remote Probe Low Temp

Differential Pressure Sensors:

- 10 – 0 to 5 psid
- 11 – 0 to 50 psid
- 12 – 0 to 100 psid
- 13 – 0 to 200 psid

VI – Options

M-041 Dual Seal Adapter or Four character alphanumeric code not affecting electrical or mechanical ratings of the device

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For Models 1XSWHL, 1XSWHH:

1X SW HL P 10 M041
I II III VI VII VIII

I – Series Designation

1X – 1X Series

II- Communication

SW – Switch output

III – Output

HL – 70 – 240 VAC/VDC 10 A max. De-rate 1Ma per 1°C > 25°C

HH – 24 – 280 VAC/VDC 10 A max. De-rate 8% per 10°C > 25°C

IV – Sensor Type

P – Pressure Sensor

T – Temperature Sensor

K – Differential Pressure Sensor

VI – Sensor Model

Pressure Sensors:

06 – 14.7 to 30 psi

08 – 14.7 to 100 psi

10 – 0 to 5 psi

11 – 0 to 15 psi

12 – 0 to 30 psi

13 – 0 to 50 psi

14 – 0 to 100 psi

15 – 0 to 300 psi

16 – 0 to 500 psi

17 – 0 to 1000 psi

18 – 0 to 3000 psi

19 – 0 to 4500 psi

20 – 0 to 6000 psi

Temperature Sensors:

L1 – 4 in. Length Local Mount

L2 – 6 in. Length Local Mount

L3 – 10 in. Length Local Mount

R1 – 6 ft. Remote Probe Low Temp

RC – Custom Length Remote Probe Low Temp

H1 – 6 ft. Remote Probe High Temp

HC – Custom Length Remote Probe High Temp

C1 – 6 ft. Remote Probe Low Temp

CC – Custom Length Remote Probe Low Temp

Differential Pressure Sensors:

10 – 0 to 5 psid

11 – 0 to 50 psid

12 – 0 to 100 psid

13 – 0 to 200 psid

VII – Options

M-041 - Dual Seal Adapter

Four character alphanumeric code other than M-041 are single seal. These do not affect electrical or mechanical ratings of the device.

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Temperature Range

The relation between ambient temperature and the assigned temperature class is as follows:

Ambient Temperature Range	Temperature Class	Model
-40°C to +85°C	T5 ("db") or T3 ("db") Pressure sens or models P06-P16) or T4 ("ia") or T90 ("db")	1XSWLL
-40°C to +80°C	T5 or T3 (Pressure sensor models P06-P16) Or T90 ("db")	1XTXSW, 1XTX00,
-40°C to +85°C	T5 or T3 (Pressure sensor models P06-P16) T90 ("db")	2X2D, 2X3A, 2X4D
-40°C to +80°C	T5 or T3 (Pressure sensor models P06-P16) T90 ("db")	2XLP, 8X2D
-40°C to +70°C	T5 or T3 (Pressure sensor models P06-P16) T90 ("db")	4X3A, 2SLP
-40°C to +80°C	T5 or T3 (Pressure sensor models P06-P16) or T90 ("tb")	1XSWHL, 1XSWHH

Electrical Data

MODEL	INPUT Voltage	SWITCH OUTPUT (+)	ANALOG OUTPUT	IAW Circuit
2X2D	12-30Vdc	12-30Vdc, 40mA	N/A	N/A
2X3A	90-130Vac or Vdc	90-130Vac or Vdc, 100mA	N/A	N/A
2X4D	30-50Vdc	30-50Vdc, 40mA	N/A	N/A
2XLP	10-36Vdc	0-140Vac or Vdc, 0.6A; or 0-280Vac or Vdc, 0.3A	4-20mA	N/A
2SLP	20- 40 Vdc	12 – 240Vac, 5.0 A	4 – 20 mA	N/A
4X3A	90-130Vac	24-280Vac, 10A	N/A	N/A
8X2D	10-30Vdc	0-140Vac or Vdc, 0.6A; and/or 75-250Vac, 1.5A	4-20mA	N/A
1XSWLL	"d" /" nA" (+): 7.8-50Vdc "ia": Ui = 12 V; li = 20mA; Pi= 60mW, Ci = 23.1nF, Li = 705 uH	N/A	N/A	"d" /" nA" (+): 7.8-50Vdc "ia": Ui = 12 V; li = 20mA; Pi= 60mW, Ci = 23.1nF, Li = 705 uH
1XTXSW	30 Vdc 20mA	0-280 Vac, 300 mA	4-20 mA	30 Vdc, 20mA
1XTX00	30 Vdc 20mA	-	4-20 mA	30 Vdc, 20mA
1XSWHL	N/A (++)-	70-240 Vac/Vdc, 10 A	N/A	7.8-50 V dc, 100 mA max
1XSWHH	70-240 V AC, 100 mA	24-280 Vac/Vdc, 10 A	N/A	7.8-50 V dc, 100 mA max

+ - Switch current outputs are de-rated, based on ambient temperature, as shown in the "Switch Ratings Table" provided in the Installation Instructions (Drawing No. IM_ONEX, IM_ONE Safety, IM_1XTXSW-01, IM_ONETXSW-04, and IM_1XTXSW-05).

++ - The load from the switch also powers the electronic and does not need a separate power supply.

Installation Instructions

- Installation of the devices are depicted in the manufacturer's installation instructions.
- All cable entry devices shall be certified in type of explosion protection flameproof enclosure "d" with an IP66 rating, suitable for the conditions of use and correctly installed.
- If cables and cable glands are not used, a stopping box shall be provided within 2 inches of the enclosure.

Mounting Instructions

The mounting instructions of the devices are provided in the manufacturer's installation instructions.

Routine Tests

The welds between the fitting and sheath of the local welded temperature sensor and around the pressure connection housing of the pressure sensors must be leak tested in accordance with the manufacturer's procedure G-60.

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Descriptive Documents

The scheduled drawings are listed in the report no. provided under item no. [8] on page 1 of this EC-Type Examination Certificate.

[17]

Specific conditions of use:

Flameproof and Dust-Ignition Proof ("db" and "tb")

- Field wiring must be rated 105°C minimum. For ambient temperatures below –10°C, use suitable field wiring.
- Blanking elements from factory have been tested for flameproof "d" and dust "tb" with the enclosure as an assembly and carry no markings.

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- A suitable thermowell made from corrosion-resistant material and engaging 5 threads minimum (with thread sealant) is required for the local spring loaded temperature sensor to maintain IP66.
 - User installed temperature sensors must be certified to flameproof “d” and dust “tb” requirements for the same groups and ambient temperature range, made from a corrosion resistant material, and engage 5 threads min with grease required on threads. This EC-Type Examination Certificate applies to the device described herein only and does not cover the user installed temperature sensor.
 - Flameproof joint and gap details:
 - Enclosure to cover threaded joint: 4”-16 UN-2, 7 threads engaged minimum.
 - Glass to cover cemented joint: 0.753” (19.1 mm) rabbet/spigot minimum length
 - Breather element threaded joint: ¼”-20 UNC-2, 10 threads engaged minimum
 - Electrical conduit threaded joint: ¾”-14 NPT, 5 threads engaged minimum
 - Enclosure to sensor threaded joint:
 - Pressure models: 1”-20 UNEF-2, 10 threads engaged minimum
 - Temperature models: ½”-14 NPT, 5 threads engaged minimum
 - Remote and local spring loaded temperature sensor gap joints: 0.0045” (0.114 mm) maximum annular gap by 1.25” (31.8 mm) minimum length
 - The unit must be cleaned with a damp cloth to avoid static discharge.
 - Dual Seal Adaptor Option:
 - Threaded Dual Seal Adaptor Option Enclosure to One Series Enclosure : 1”-20 UNEF-2, 10 threads engaged minimum
 - Breather element threaded joint: ¼”-20 UNC-2, 10 threads engaged minimum
 - Secondary Seal Housing to union housing joint: 0.580” (14.73 mm) rabbet/spigot minimum length, maximum gap 0.003 in. (0.08 mm).
 - Sensor to union housing joint: 0.580” (14.73 mm) rabbet/spigot minimum length, maximum annular gap 0.003 in. (0.08 mm).
 - Threaded Dual Seal Adaptor Option to Sensor 1”-20 UNEF-2, 10 threads engaged minimum or ½”-14 NPT 5 threads engaged minimum.
- Intrinsic Safety (“ia”)
- Enclosure and cover are made from Aluminum Alloy, do not strike with heavy object
 - Separation Distances were assessed to Annex F
 - The device must be powered by galvanic isolated intrinsic safety barriers.

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Essential Health and Safety Requirements

The Essential Health and Safety Requirements (EHSRs) are covered by the standards listed at item 9.

Additional information

The device has in addition passed the tests for Ingress Protection to IP 66 in accordance with EN60529:1991+A1:2000+A2:2013.

The manufacturer shall inform the notified body concerning all modifications to the technical documentation as described in Annex III to Directive 2014/34/EU of the European Parliament and the Council of 26 February 2014.