IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: IECEx UL 08.0017X

Issue No: 8

Status: **Current**

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Date of Issue: **2017-05-26**

Applicant: **United Electric Controls**
180 Dexter Avenue
Watertown, MA 02471
United States of America

Certificate history:
Issue No. 8 (2017-05-26)
Issue No. 7 (2017-01-31)
Issue No. 6 (2016-06-20)
Issue No. 5 (2016-04-05)
Issue No. 4 (2015-10-30)
Issue No. 3 (2015-06-18)
Issue No. 2 (2014-06-27)
Issue No. 1 (2014-04-29)
Issue No. 0 (2009-03-06)

Equipment: **One Series Electronic Pressure and Temperature Switches, Series 2X2D, 2SLP, 2X3A, 2X4D, 2XLP, 4X3A, 8X2D, 1XSWLL, 1XTXSW, 1XTX00, 1XSWHL, 1XSWHH**

Optional accessory:

Type of Protection: **Flameproof "db", Intrinsic safety "ia", Non-sparking "nA" and Dust Ignition Protection by Enclosure "tb"**

Marking:

Series 2X2D, 2SLP, 2X3A, 2X4D, 2XLP, 4X3A, 8X2D: Ex db IIC T3/T5 Gb (T3 for pressure sensor models P06-P16 only), Ex tb III C T90°C Db IP66

Series 1XSWLL: Ex ia IIC T4 Ga, Ex ia III C T135°C Da, Ex db IIC T3/T5 Gb (T3 for pressure sensor models P06-P16 only), Ex tb III C T90°C Db, Ex nA IIC T4 Gc

Series 1XTXSW, 1XTX00: Ex db IIC T3/T5 Gb (T3 for pressure sensor models P06-P16 only), Ex tb III C T90°C Db, Ex nA IIC T4 Gc

Series 1XSWHL, 1XSWHH: Ex db IIC T3/T5 Gb (T3 for pressure sensor models P06-P16 only), Ex tb III C T90°C Db, Ex nA IIC T4 Gc

Approved for issue on behalf of the IECEx Certification Body: Paul T. Kelly

Position: Principal Engineer - Global Hazardous Locations

Signature:
(for printed version)

Date: 2017-05-26

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:

UL LLC
333 Pfingsten Road
Northbrook IL 60062-2096
United States of America

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Manufacturer:	**United Electric Controls** 180 Dexter Avenue Watertown, MA 02471 **United States of America**	

Additional Manufacturing location(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

STANDARDS:

The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

IEC 60079-0 : 2011 Edition:6.0	Explosive atmospheres - Part 0: General requirements
IEC 60079-1 : 2014-06 Edition:7.0	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
IEC 60079-11 : 2011 Edition:6.0	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
IEC 60079-15 : 2010 Edition:4	Explosive atmospheres - Part 15: Equipment protection by type of protection "n"
IEC 60079-31 : 2013 Edition:2	Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"

*This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:

US/UL/ExTR08.0022/08

Quality Assessment Report:

US/UL/QAR07.0002/09

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Schedule

EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

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 base and a cover with a glass window, as well as two conduit entries and a sensor port. The cover is secured to the base 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 base of the enclosure by a threaded joint. The devices are provided with terminal blocks for field installation.

The 1XSWLL Model is the only model to have “d”, “ia”, “tb” and “nA” approvals.

See Annex for Nomenclatures and additional information.

SPECIFIC CONDITIONS OF USE: YES as shown below:

See Annex for Conditions of Certification.

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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above):

Issue 1: A new part number was added, 2SLP Series and an external coating material was added to all models. All models were updated to the most current edition of the standards.

Issue 2: Addition of Dual Seal Adaptor option.

Issue 3: Adding an additional Model 1XSWLL which includes IEC 60079-11 and IEC 60079-15.

Issue 4: Upgrade to latest edition of IEC 60079-1 for all models and addition of Models 1XTXSQ and 1XTX00.

Issue 5: Temperature code associated with P06 and P08 pressure sensors was changed due to the sensors being located on the flameproof enclosure with the breather assembly.

Issue 6: Addition of Models 1XSWHL, 1XSWHH, 1XSWHL Dual Seal, and 1XSWHH Dual Seal.

Issue 7: Alternate constructions of the main and relay PC boards, additional components and changes in resistor values.

Issue 8: Added alternate screw.

Annex:

Annex to IECEx UL 08.0017X Issue 8.pdf

Series	Input Voltage	Switch Output (+)	Analog Output
2X2D	12-30 Vdc	12-30 Vdc, 40mA	N/A
2X3A	90-130 Vac or Vdc	90-130 Vac or Vdc, 100mA	N/A
2X4D	30-50 Vdc	30-50 Vdc, 40mA	N/A
2XLP	10-36 Vdc	0-140 Vac or Vdc, 0.6A; or 0-280 Vac or Vdc, 0.3 A	4-20mA
2SLP	20-40 Vdc	12-240 Vac, 5.0A; or 0 – 30Vdc, 6.0 A; or 0 – 130Vdc, 2.5 A	4-20mA
4X3A	90-130 Vac	24-280Vac, 10 A	N/A
8X2D	10-30 Vdc	0-140Vac or Vdc, 0.6 A; and/or 75-250 Vac, 1.5A	4-20mA
1XSWLL	"db" /" nA" (+): 7.8-50Vdc "ia": Ui = 12 V; Ii = 20mA; Pi= 60mW, Ci = 23.1nF, Li = 705 uH	"db" /" nA" (+): 7.8-50Vdc "ia": Ui = 12 V; Ii = 20mA; Pi= 60mW, Ci = 23.1nF, Li = 705 uH	N/A
1XTX Series	30 Vdc 20 mA	0-280 Vac, 300 mA for 1XTXSW No switch outputs for 1XTX00	4-20 mA
1XSWHL	N/A (++)	70-240 V ac/dc, 100 mA	N/A
1XSWHH	70-240 Vac, 100 mA	24-280 V ac, 10 A	N/A

+ - 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.

Nomenclature:

2X	2D	0	0	P	10	M124
I	II	III	IV	V	VI	VII

I – Series Designation
- 2X – 2-wire switch
- 2S – Safety Transmitter
- 4X – 4-wire switch
- 8X – 8-wire switch

II – Input Power
- 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
- 8 – 0 – 30 Vdc, 6.0 A
- 9 – 0 – 130 Vdc, 2.5 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
- 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
- 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
- 11 – 0 to 50 psid
- 12 – 0 to 100 psid
- 13 – 0 to 200 psid

VII – Options

M041 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 1X Series

1X	SW	L	L	P	10	M124
I	II	III	IV	V	VI	VII

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

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:

_1X_	_TX_	_00	_P_	_10_	_M124_
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 Ouputs

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

For Series 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℃ › 25℃
HH – 24 – 280 VAC/VDC 10 A max. De-rate 8% per 10℃ › 25℃

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.

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.
- 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 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 annular gap 0.003 in. (0.08 mm).
    - Sensor to union housing joint: 0 .580" (14.73 mm) rabbet/spigot minimum length, maximum gap 0.003 in. (0.08 mm).
    - Threaded Dual Seal Adaptor Option to Sensor 1"-20 UNEF-2, 10 threads engaged minimum or 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.
- Device must be powered by a galvanic isolated intrinsic safety barrier.

Non-sparking ("nA")

- Not Applicable