

Specification - CX1TZAI:

Supply: 24-240v ac/dc, 2 mA quiescent.
 Output: FET, 100mA max.
 Saturation Voltage: 5.5 volts max (output on).
 Ambient Temp: -15°C to +50°C.
 Output State: User programmable, normally ON (energised) or normally OFF (de-energised).

Calibration: User programmable for output mode, and operating range.

Sensing Range: Typically 2mm to 50mm at 25°C.
 Enclosure: Moulded Nylon. DIN threaded 30mm by 1.5mm pitch.

Protection: IP66.
 Relative Humidity: 90% RH.
 LED Indication: Green & Blue calibration/output LED's
 Cable (Std. length): 3 metres 2 core 600/1000V (or as order).

Specification - CX1TRAI:

Supply: 15-240V dc/24-240V ac.
 Output: SPCO relay, 60V ac/dc 3A max. Non-inductive

Ambient Temp: -15°C to +50°C.
 Output State: User programmable, normally ON (energised) or normally OFF (de-energised).

Calibration: User programmable for output mode, and operating range.

Sensing Range: Typically 2mm to 50mm at 25°C.
 Enclosure: Moulded Nylon. DIN threaded 30mm by 1.5mm pitch.

Protection: IP66.
 Relative Humidity: 90% RH.
 LED Indication: Green & Blue calibration/output LED's
 Cable (Std. length): 3 metres 2 core 600/1000V (or as order).

Specification - CX1TOAI:

Supply: 10-30V dc.
 Output: Fully protected, opto-isolated transistor. User selectable for npn/pnp use.

Ambient Temp: -15°C to +50°C.
 Output State: User programmable, normally ON (energised) or normally OFF (de-energised).

Calibration: User programmable for output mode, and operating range.

Sensing Range: Typically 2mm to 50mm at 25°C.
 Enclosure: Moulded Nylon. DIN threaded 30mm by 1.5mm pitch.

Protection: IP66.
 Relative Humidity: 90% RH.
 LED Indication: Green & Blue calibration/output LED's
 Cable (Std. length): 3 metres 4 core 600/1000V (or as order).

IECEX Certificate No: BAS 12.0118X

Ex ma IIC T5 Ga

Ex ma IIIC T100°C Da

Tamb= -15°C to +50°C IP66

For Certificate of Conformity go to www.iecex.com

The equipment is covered by a 12 months guarantee from the date of shipment. Any faults arising due to faulty materials or workmanship, within the guarantee period, will be corrected free of charge providing the equipment is returned to us carriage paid.

Provided that the equipment covered by these instructions is installed and operated as directed, it presents no hazard and conforms fully to health and safety regulations.

**DECLARATION OF CONFORMITY**

We, the undersigned, on behalf of Synatel Instrumentation Limited, hereby declare the products listed below conform to the relevant provisions of the legislation, as well as pertinent clauses of the standards and other normative documents mentioned herein.

EQUIPMENT DESCRIPTION: **30 MM AI SERIES OF PROXIMITY SWITCHES**
 PRODUCT NAMES: **IDE1TXXAI,PU1TXXAI,CXXTXXAI**

ATEX DIRECTIVE **2014/34/EU**
 CERTIFICATE No. : **Baseefa12ATEX0226X**
 ISSUED BY : **SGSBaseefa, Staden Lane, Buxton, Derbyshire, SK17 9RZ**

NOTIFIED BODY NO. : **1180**
 CATEGORIES : **1G Ex ma IIC T5 Ga
 1D Ex ma IIIC T100°C Da
 Tamb -15°C to 50°C , IP66**

BS EN 60079-0 :2012 **Explosive Atmospheres- General requirements**

BS EN 60079-18 :2009 **Equipment protection by encapsulation 'm'**

SPECIFIC CONDITIONS OF USE

1. The supply circuit shall be protected by a suitably rated fuse capable of interrupting a short circuit current of 1500 Amps.
2. The external connections shall meet the requirements for EPL Ga in accordance with EN 60079-26 and EPL Da in accordance with EN 60079-31.
3. Warning: Potential static ignition risk, clean only with a damp cloth.
4. The integral cable shall be terminated in a suitably certified enclosure or in the safe area.

LOW VOLTAGE DIRECTIVE 2014/35/EU

BS EN 61010-1 :2010 **General safety requirements for electrical equipment**
 BS EN60332-1-1 :2004 **Single cable flame propagation test**

EMC DIRECTIVE 2014/30/EU

BS EN 61000-6-3 :2007 **Electromagnetic Compatibility - General Emission Standard**
 BS EN 61000-6-1 :2007 **Electromagnetic Compatibility - General Immunity Standard**

RESTRICTION OF HAZARDOUS SUBSTANCES DIRECTIVE 2011/65/EU

No required or relevant standards are applicable

NAME: D. WHEAT

POSITION: DIRECTOR

SIGNED: 

ISSUE DATE : 31st January 2017

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Detection & Control - in Action

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PremierCap MK3
Type CX1TZAI, CX1TRAI & CX1TOAI
IECEX & ATEX APPROVED,
Programmable
Capacitance Sensors
Manual No: 2591

OPERATING INSTRUCTIONS

M2591B

INTRODUCTION:

The **PremierCap** is a moulded 30mm dia, threaded capacitance sensor. It is encapsulated to withstand moisture and vibration, and can be user programmed to fulfil many sensing applications; typically to detect presence or absence of granular or free-flowing powders or liquids in non-metallic containers (or detecting through a non-metallic panel).

Various output options are available:

CX1TZAI - 2 wire FET output,

CX1TRAI - 5 wire relay output or

CX1TOAI - 4 wire dc opto-isolated transistor output.

INSTALLATION:

The PremierCap detects most granular/powder/liquids. It **WILL NOT** detect through metal side walls, it will either detect through non-metallic containers or a suitable 'window' fitted to the side of a metal container. Alternatively, the sensor can be mounted through the side wall of the container/vessel. The sensor should not be used directly in abrasive materials; or in direct input flow paths of material. A protective shield (BAS3) is available, as an option, to mount the sensor if this cannot be avoided.

The **PremierCap** should be installed as detailed in this manual, check connections are correct before applying power to the unit. *To comply with the approvals, the fusing requirements **MUST** be adhered to. (See connections drawings).*

Wiring to the **PremierCap** can be any length, as required, using ordinary unscreened cable and in accordance with the conditions of safe use stated in the Declaration of Conformity. However, if long cable runs are to be used, the sensor wiring should **NOT** be positioned adjacent to cables carrying high voltage or current. Two locknuts are provided to mount the sensors in position. Mount securely to withstand vibration.

The **CX1TZAI*** must be wired through a load (see diagram). **DO NOT** connect directly across the supply without a load present.

The supply polarity is not important and the load can be connected in either wire. Output is rated at 100mA max.

The **CX1TRAI** is a 5 wire, relay output type sensor rated at 3A 60V ac non-inductive.

The **CX1TOAI** is a 10-30V dc supply sensor with opto-isolated transistor output, user configurable for npn/pnp use, rated at 30V dc 100mA max.

*CABLING:

Connect the sensor as shown in the connections diagram.

The **CX1TZAI** is designed to operate into most types of PLC input and as such it only requires approximately 10 milli-watts to operate correctly eg 5 volts at 2 milliamp. The cabling **MUST** be arranged in such a way as to prevent even the smallest amount of induced voltage from adjacent ac cables being present at the sensor.

Failure to do so will cause the sensor to be continually powered.

COMMISSIONING

The sensor is supplied in the normally energised state (Output ON with NO material present; Fail safe High), and calibrated midway typically working at 25mm (1"). However, see 'Calibrating' below to ensure correct operation.

Two LED's are provided on the rear for information purposes. Initially, these are used for user programming use, once installed the Blue LED shows output state.

To commission the units, proceed as follows:

CALIBRATING

The sensor **MUST** be installed before calibration takes place.

Connect the sensor to power and a suitable control unit. On the rear of the **PremierCap** there are two calibration points/LEDS. Magnets are used to programme required functions, the magnets are simply applied below the LED windows on the rear of the unit (**CalMag1** - green LED & **CalMag2** - blue LED). A **CalMag** twin magnetic programmer is supplied with each sensor.

There are a **maximum of 2 procedures** to fully programme the **PremierCap** CX1 range of sensors.

1 OUTPUT MODE/CALIBRATE EMPTY.

With the sensor installed in it's normal 'empty environment', including any localised tank/vessel framework or optional sensor pocket, ensure that there is no material present.

Decide: Do you need the output to be Normally Energised or Normally De-energised when NO material present?

With power **ON**, hold the **CalMag** programmer onto **CalMag1** & **CalMag2** points on the rear of the **PremierCap** sensor. The Green LED will glow static, the blue LED will flash at approximately 1 second intervals.

For **Energised** use (output **ON** with **NO** material present), (*Fail safe High*), remove the magnets when the blue LED is **ON**.

For **De-energised** use (output **OFF** with **NO** material present), (*Fail safe Low*), remove the magnets when the blue LED is **OFF**. **Wait** for approximately 10 seconds for the green LED to turn **OFF**, the sensor output mode has now been set and the 'empty' setting is calibrated.

2 SENSING RANGE/SENSITIVITY.

The **PremierCap** has a programmable sensing range of approximately 2mm to 50mm increasing in 10 steps (5 x LED ON, 5 x LED OFF alternating).

To increase sensitivity:

*With power **ON**, hold one magnet from the **CalMag** programmer on to **CalMag2** LED window (Blue). The blue LED will flash staying constant when maximum range/sensitivity is achieved.*

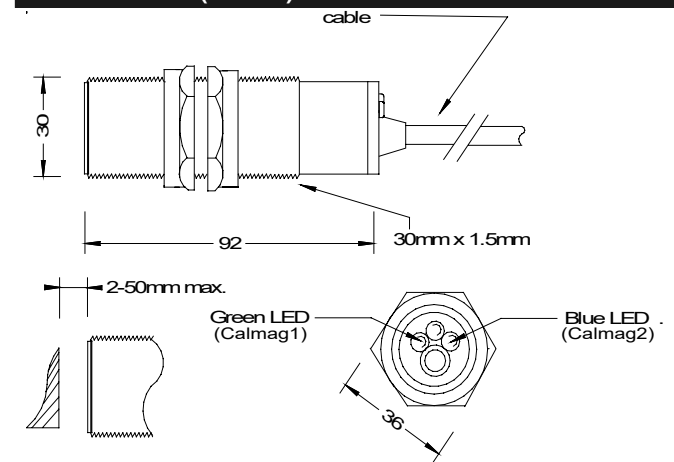
To decrease sensitivity:

*With power **ON**, hold one magnet from the **CalMag** programmer on to **CalMag1** LED window (Green). The green LED will flash staying constant when minimum range/sensitivity is achieved.*

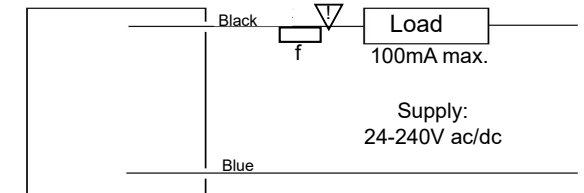
Normally De-energised: Increase range/sensitivity (**Calmag2**) until sensor 'just' switches on, reduce the range/sensitivity (**CalMag1**) until sensor switches off, decrease the range/sensitivity by one further increment of (**CalMag1**) Green LED. Sensor is now calibrated.

Normally Energised: Increase range/sensitivity (**Calmag2**) until sensor 'just' switches off, reduce the range/sensitivity (**CalMag1**) until sensor switches on, decrease the range/sensitivity by one further increment of (**CalMag1**) Green LED. Sensor is now calibrated.

DIMENSIONS (in mm):



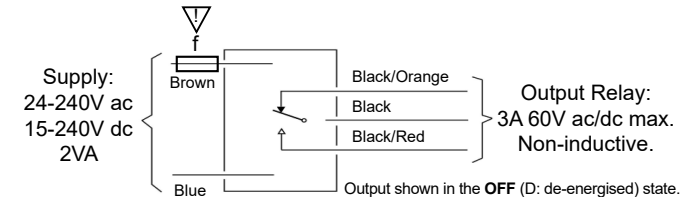
CONNECTIONS - CX1TZAI:



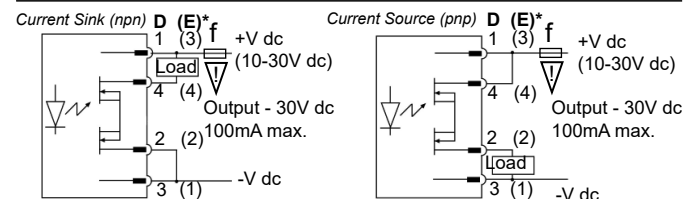
NOTE:

- 1) Supply polarity is not important & load can be connected in either lead.
- 2) Load **MUST** have the same voltage rating as supply being used.

CONNECTIONS - CX1TRAI:



CONNECTIONS - CX1TOAI:



Note*: Supply Connections:

Output normally **OFF** - use D connections,
Output normally **ON** - use (E) connections.

1 = Brown 2 = White
3 = Blue 4 = Black

NOTE: f= 1500A Capable fuse
500mA max. rating.
1 fuse per unit **MUST** be used.