



RPS-409A-IS2 User Manual

Introduction:

The RPS-409A-IS2 is an intrinsically safe analog ultrasonic sensor available in a variety of ranges. The RPS-409A-IS2 sensors can be used in hazardous gas or dust environments classified as Zone 0, 1, 2, 20, 21, or 22 for ANZEx, ATEX, & IECEx, and Class I, II, or III for UL/cUL when used with approved intrinsic safety barrier(s). The sensor is self-contained in a 30 mm barrel style enclosure, and is powered by 16 - 30 V dc with reverse polarity protection.

The RPS-409A-IS2 has a short circuit protected 0 - 10 V dc analog output. The analog voltage is a fixed volts per inch based on the maximum range of the unit. For example when using the RPS-409A-80-IS2, the output is a linear 0.125 V per inch. A target placed 10 inches from the sensor will result in an output of 1.25 V or a target placed at 80 inches from the sensor will result in an output of 10 V.

The RPS-409A-IS2 has built-in temperature compensation to provide accurate readings throughout the entire operating temperature range.

In addition to the analog output line the sensor also has a Sync/Tx line. This line can be used for connecting multiple sensors together (Sync) to prevent cross talk, or to control when the sensor transmits (Tx).

The RPS-409A-IS2 is designed to take advantage of today's PLC and computer analog input cards. The numerical values that are programmed into the PLC or computer will determine the zero and span of the sensor.

Safety Instructions:

1. Installation of this product must be conducted in accordance with relevant installation regulations for explosive atmospheres, local and national electrical codes, and the product Control Drawing No. Ex05021114.
2. If the RPS-409A-IS2 is used in a manner not specified, the protection provided by the RPS-409A-IS2 may be impaired.
3. See Specific Conditions of Use for information on enclosure types.

Installation and Maintenance:

The RPS-409A-IS2 sensors are designed for indoor or outdoor use in locations where the temperature does not exceed the specified temperature range (T_a) of the sensor. The sensor has a 30 mm barrel style enclosure and comes with two jam nuts for easy mounting. The sensor can be mounted in any orientation provided dust and liquids do not accumulate on the face of the sensor. The performance of the sensor can be influenced by direct metal contact near the face; therefore, the following precaution should be taken into consideration when installing the sensor. Avoid direct metal contact with the front 0.5" (13 mm) of the sensor enclosure. See Figure A.

The end user is responsible for checking the chemical compatibility of the enclosure materials before use in an environment that has aggressive substances, such as solvents, that may affect the enclosure materials.

If the sensor requires cleaning use only detergents or solvents that are compatible with the enclosure materials.

Refer to Control Drawing No. Ex05021114 for further information on installation in hazardous locations.

Specific Conditions of Use:

To maintain the IP67 rating of the sensor, the cable assembly used to connect to the sensor must have an IP rating of IP67 or greater.

RPS-409A-IS2 sensors with Polyphenylene Sulfide (PPS) enclosure have static dissipative properties, and the following Specific Conditions of Use;

WARNING: DIELECTRIC STRENGTH OF ENCLOSURE IS NOT SUFFICIENT TO INSULATE THE RPS-409A-IS2 FROM OTHER EQUIPMENT. THE RPS-409A-IS2 MAY BE MOUNTED ONTO A METAL PART IF THE METAL PART IS EARTH GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE OR OTHER LOCAL CODES, AS APPLICABLE, OR IT MAY BE MOUNTED ON AN INSULATED PART. IN EITHER CASE, THE ENCLOSURE MUST BE SEGREGATED OR INSULATED FROM LIVE

PARTS.

AVERTISSEMENT: LA RÉSISTANCE DIÉLECTRIQUE DU BOITIER N'EST PAS SUFFISANTE POUR ISOLER LE RPS-409A-IS2 DES AUTRES ÉQUIPEMENTS. LE RPS-409A-IS2 PEUT ÊTRE FIXÉ SUR UNE PIÈCE MÉTALLIQUE SI LA PIÈCE MÉTALLIQUE EST MISE À TERRE CONFORMÉMENT AU CODE NATIONAL DE L'ÉLECTRICITÉ OU À D'AUTRES CODES LOCAUX, SELON LE CAS ÉCHÉANT, OU IL PEUT ÊTRE FIXÉ SUR UNE PIÈCE ISOLÉE. DANS LES DEUX CAS, LE BOITIER DOIT ÊTRE SÉPARÉ OU ISOLÉ DES PIÈCES SOUS TENSIONS.

RPS-409A-IS2 sensors with Polyvinyl Chloride (PVC) enclosure do not have static

dissipative properties, and the following Specific Conditions of Use;

WARNING: POTENTIAL ELECTROSTATIC CHARGING HAZARD, WIPE WITH A DAMP CLOTH.

AVERTISSEMENT: DANGER POTENTIEL DE CHARGES ÉLECTROSTATIQUES, ESSUYER AVEC UN CHIFFON HUMIDE.

Servicing:

The RPS-409A-IS2 sensors have no serviceable parts and require no adjustments or calibration in the field. If service is required please contact your local distributor or Migatron Corporation.

Model Number:

RPS – 409A – $\frac{\quad}{a} \frac{\quad}{b} \frac{\quad}{c} \frac{\quad}{d}$ – IS2 – $\frac{\quad}{e} \frac{\quad}{f} \frac{\quad}{g} \frac{\quad}{h}$

abc = Range

Maximum range of sensor given in inches. See datasheet for available ranges.
Contact Migatron Corp. for optional ranges.

d = Enclosure/Housing

Blank: Polyphenylene Sulfide (PPS) enclosure version with static dissipative properties.
See certificate for Specific Conditions of Use.
P: Polyvinyl Chloride (PVC) enclosure version without static dissipative properties.
See certificate for Specific Conditions of Use.

efgh = Additional features not related to safety.

Model Number Examples:



RPS-409A-40-IS2 = Maximum range 40" with PPS enclosure.

RPS-409A-40P-IS2 = Maximum range 40" with PVC enclosure.


Marking Label Example:

IECEX UL 12.0001X
Ex ia I/IIC T4 Ma/Ga
Ex ia IIIC T101°C Da
DEMKO 12 ATEX 1103028X

-40°C ≤ Ta ≤ +60°C
Warning: See User Manual
IP67

 0539  I M1
II 1 GD

S/N: # # # #
ANZEx 13.3010X

Migatron Corp.
RPS-409A-40-IS2
 TCode T4
US LISTED
Exia 4LA1

Proc. Cont. Eq. for use in CL I, GPS A,B,C,D; CL II, GPS E,F,G; CL III hazardous locations. Intrinsically Safe when installed per Control Dwg. No. Ex05021114





Specifications:

Entity Parameters	See Control Drawing No. Ex05021114
Power Input:	16 - 30 V dc Reverse Polarity Protected (A minimum of 24 V dc must be applied to the safety barrier) The maximum voltage U_m applied to a non-intrinsically safe apparatus or an intrinsic safety associated apparatus/equipment is 250 V rms or dc.
Input Current:	24 mA maximum (with 24 V dc applied to the safety barrier)
Output:	Analog Voltage Output 0 - 10 V (Load 100k Ohms to infinity) Short Circuit Protected
Connections:	M12 A-coded 4-Pin Male Receptacle Maximum torque 2 Nm or 18 lbf-in
Ambient Temperature:	$-40^{\circ}\text{C} \leq T_a \leq +60^{\circ}\text{C}$ ($-40^{\circ}\text{F} \leq T_a \leq +140^{\circ}\text{F}$)
Maximum Surface Temperature:	101°C (213°F), For installations in Zone 20/21/22, Group III dust environments, refer to EN/IEC 60079-14.
Humidity:	0 – 95% Non-Condensing
Enclosure Material:	Polyphenylene Sulfide (PPS) Enclosure with PPS or PPS and PTFE sensing face, or Polyvinyl Chloride (PVC) Enclosure with PVC sensing face
Protection:	IP67
Dimensions:	Length = 4.6" (117 mm) Diameter = 1.18" (30 mm)
Weight:	Approximately 115 g (4 ounces)
Explosion Protection:	Process Control Equipment Exia Intrinsically Safe/Sécurité Intrinsèque Apparatus for use in hazardous locations when installed per Control Drawing No. Ex05021114. Australia and New Zealand (Certificate # ANZEx 13.3010X) Ex ia I Ma Ex ia IIC T4 Ga Ex ia IIIC T101°C Da Canada and USA (UL/cUL File # E226209) Temperature Code T4 Class I, Division 1, Groups A, B, C, and D; Class II, Division 1 Groups E, F, and G, and Class III, Division 1

Specifications: (continued)

Explosion Protection:
(continued)

Europe (CENELEC) (Certificate # DEMKO 12 ATEX 1103028X)



0539



I M1 Ex ia I T4 Ma

II 1 G Ex ia IIC T4 Ga

II 1 D Ex ia IIIC T101°C Da

IECEX (Certificate # IECEX UL 12.0001X)

Ex ia I T4 Ma

Ex ia IIC T4 Ga

Ex ia IIIC T101°C Da

Standards: CSA C22.2 No. 60079-0
CSA C22.2 No. 60079-11
UL 913

EN IEC 60079-0:2018
EN 60079-11:2012
EN 50303:2000

IEC 60079-0:2017
IEC 60079-11:2011

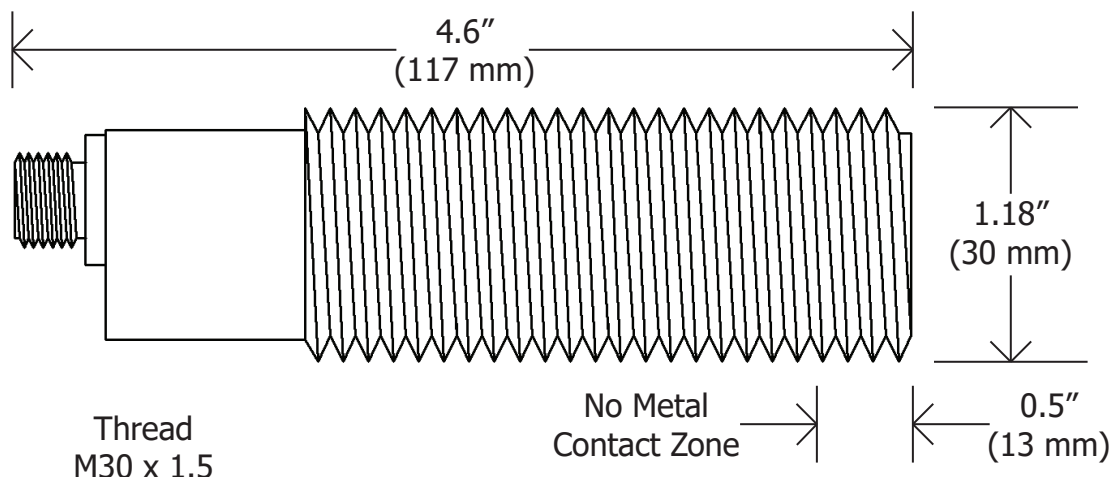


Figure A (Enclosure Dimensions)

Figure B
(Receptacle Diagram)
Maximum torque
2 Nm or 18 lbf-in



Pin 1 - Power
Pin 2 - Analog Output
Pin 3 - Ground
Pin 4 - Sync/Tx



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