

Installation and Service Instructions for CX Weather-Sealed Explosion-proof Switches


ISSUE 7
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0518



WARNING IF USED IN APPLICATIONS CONCERNING HUMAN SAFETY

- Only use NC direct opening ("positive opening"/"positive break") contacts, identified by the symbol .
- Do NOT use flexible/adjustable actuators. Only use actuators designed for safety applications.
- Do NOT defeat, tamper, remove, or bypass this switch.
- Hazardous voltage, disconnect power before servicing.
- Strictly adhere to all installation and maintenance instructions.
- Consult with local safety agencies and their requirements when designing a machine-control link, interface and all control elements that affect safety.

Failure to comply with these instructions could result in death or serious injury.

GENERAL INFORMATION

Sealed construction for Honeywell CX explosion-proof switches provides protection from the entry of water, dust and oil as defined in NEMA 3, 4, 4X, 6, 6P, 13, and IP66/IP67 as defined in IEC 529.

CX Series products with conduit types 3/4-14NPT also meet the North American Hazardous Locations Designation: Class I, Group C and D; Class II, Groups E, F and G. CX listings beginning with numbers 14, 16, 24, 26, 36, or 84 (example: 14CX1) also meet Class I, Group B. These explosion-proof and weather-sealed switches are protected from flammable hydrocarbon atmospheres, metal dust, coal dust, and grain dust, and comply with UL Standard: UL 894 and UL 1203, CSA Standard: C22.2 no. 25-1966, C22.2 no. 30-M1986.

Select CX Series products also meet the European Hazardous Locations Designation: Categories II 2 G Ex d IIC T6 and II 2 D tD A21, KEMA 01ATEX2111X and complies with the European Directive on Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres (94/9/EC) commonly referred to as the ATEX Directive. Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN60079-0: 2006, EN60079-1: 2004, EN61241-0: 2006 and EN61241-1: 2004. The European-approved products have a temperature range of -40 °C to 70 °C [-40 °F to 158 °F], and when used within the maximum voltage and current specified on the product will have no heating problems.

Notice: For ambient temperatures above 60 °C [140 °F], cables and cable glands suitable for a temperature of at least 80 °C [176 °F] shall be used. For use in potentially explosive atmospheres caused by the presence of flammable gases, fluids or vapors. The cable entry devices and the closing elements of unused apertures shall be of a certified flameproof type, suitable for the conditions of use and correctly installed. For use in potentially explosive atmospheres caused by the presence of combustible dust. The cable entry devices and the closing elements of unused apertures shall be of a certified flameproof type, suitable for the conditions of use and correctly installed. The minimum ingress protection requirement of IP6X according to EN 60529 must be satisfied. Refer to the Certificate IECEx TSA 06.0003X for conditions of safe use.

Application Note: Enclosures are based, in general, on the broad definitions outlined in NEMA standards. Therefore, it will be necessary for the user to determine that a particular enclosure is adequate when exposed to the specific conditions that might exist in intended applications. Except as might otherwise be noted, all references to products relative to NEMA enclosure types are based on MICRO SWITCH evaluation only.

IMPORTANT: Switches without shaft re-storing force do not have overtravel stops. On switches with potentiometers, use care to insure that overtravel does not exceed 125° in the application and during set-up.

LEVER POSITIONING

Loosen the screw with a 9/64 inch hexagon key wrench, move the lever to the desired position and securely tighten the screw until the "teller tab" can no longer be moved by hand. Then tighten the screw another 1/8 to 1/4 turn to assure that the lever is tight on the shaft. Hexagon key wrenches are provided in adjusting tool set LSZ4005 for this purpose.

CAM ADJUSTMENT

Pretravel, overtravel, and actuation sequencing can be adjusted and/or modified in the field. No tools are required.

To Adjust Plunger Types:

1. Lift cam follower.



- Turn cam wheel to be adjusted to desired position. Each notch on the wheel represents a change in operation point of 0,116 mm (.0045 in.). Moving the cam wheel in the direction away from the base housing advances the operate point. Pretravel **decreases** and overtravel thereby **increases**. When positioning cams, be sure the cam follower is allowed to utilize the full rise of the cam. This is required to provide adequate overtravel and release travel of the basic switches.

IMPORTANT: Do not use the set screw in the cam follower to adjust travel characteristics.

- Release cam wheel.
- Release cam follower.

To Adjust Rotary Types:

- Lift cam follower.
- Move cam wheel axially to disengage teeth on wheel from teeth on shaft disc.
- Turn cam wheel to desired position. Turning in direction of shaft rotation advances operate point. Pretravel **decreases** and overtravel thereby **increases**. Each notch on the cam wheel represents an operating point change of 7°20'. The symbols on the cam wheel simplify changing rotation from clockwise to counterclockwise to center neutral, or vice versa. If the switch operates on clockwise **and** counterclockwise rotation, the pointer on the cam follower lines up with symbol \triangle or symbol \triangle on the cam wheel. When symbol \triangle lines up, pretravel of 15° max. is obtained. When symbol \triangle lines up, 80° max., pretravel is obtained. Operation is in the direction of the inclined surface of the symbol when \triangle or \triangle lines up with the pointer on the cam follower.
- When cam wheel has been rotated to desired location, release cam wheel to engage with mating shaft disc.
- Release cam follower



CX Wiring Methods

Honeywell recommends that conduit be installed per NEC articles 501-4 and 501-5.

REPLACEMENT PARTS

Replacement switch assemblies consist of the components subject to mechanical or electrical wear. They include basic switches, cam wheels, cam followers, and springs. The assemblies are factory adjusted to have the same operating characteristics as new complete switches.

How to Order

Catalog listings for complete switches can be converted to replacement switch assembly catalog listings as follows:

Momentary action rotary or plunger actuated switches with shaft or plunger restoring force: To order a replacement assembly, change the first digit in the catalog listing for a complete switch to **9** for rotary switches or to **10** for plunger switches.

For example, the replacement switch assembly for a **12CX5** rotary switch = **92CX5**. The replacement switch assembly for a **36CX2** plunger switch = **106CX2**.

Maintained action rotary switches without shaft restoring force: To order a replacement assembly, change the first digit to a **9** and drop the first digit following the letters CX.

Example: **12CX12=92CX2**

Printed circuit board (includes potentiometer) for 4-20 mA current output CX switches: **15PA261-CX**.



Plunger Switch Assembly



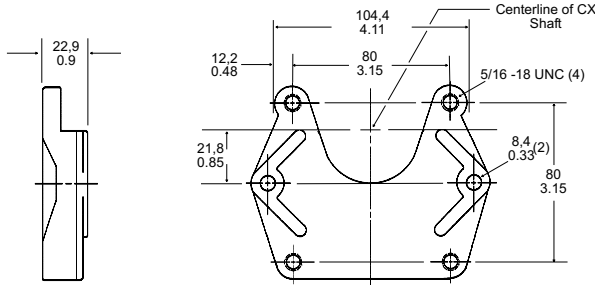
Rotary Switch Assembly

REPLACEMENT LEVERS

To order replacement levers, order the part number which is metal stamped on either the lever or the hub. **Only nonsparking levers can be used to retain the explosion-proof properties.**

MOUNTING ADAPTER —15PA148-CX

Available for adapting CX to existing 2 hole mount.

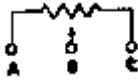


ANALOG POSITION-SENSING UNITS

1. Resistive Output

- Specifications:
- 500 ohms ±10% in center (free position)
 - 975 ohms max. at 105° rotation clockwise (CW)
 - 25 ohms min. at 105° rotation CCW
 - 2 watts power at 70°C/150°F at full scale

Wiring Diagram



2. Current Output (4 to 20 mA)

The signal from the position-sensing unit is converted to a two-wire 4 to 20 mA current output.

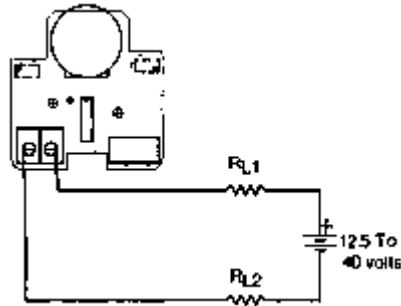
Specifications:

- Voltage compliance range: 12.5 to 40 VDC
- Maximum load resistance:

$$R_{L \text{ max}} = \frac{V \text{ Supply} - 12.5}{20 \text{ mA}}$$

- Current signal output: 4-20mA
- Span: Adjustable from 15° to 90° of angular rotation
- Null: 4 mA position may be set at any angular position

Typical Wiring Connections:



ROTARY ACTUATION

Catalog Listing Prefix (*listing indicates replacement parts)	11CX, 21CX, 61CX, 71CX, 81CX, 281CX, 91CX*	12CX, 22CX, 62CX, 72CX, 82CX, 282CX, 92CX*	14CX, 24CX, 64CX, 74CX, 84CX, 284CX, 94CX*	16CX, 26CX, 66CX, 76CX, 86CX, 286CX, 96CX*	1172CX, 2172CX, 9172CX*
Pretravel, max.	15°	15°	30°	30°	15°
Differential Travel, max.	5°	10°	25°	20°	5°
Overtravel, min.	90°	90°	75°	75°	90°
Circuitry	Single-Pole Double-Throw	Single-Pole Double-Throw	Double-Pole Double-Throw	Single-Pole Double-Throw	(Gold Contact) Single-Pole Double-Throw
Electrical Ratings	UL/CSA Rating: L96 15 A, 120, 240, or 480 Vac. ½ Hp, 120 Vac; ¼ Hp, 240 Vac 0.5 A, 125 Vdc, 0.25 A, 250 Vdc.	UL/CSA Rating: L23 20 A, 120, 240, or 480 Vac. 1 Hp, 120 Vac; 2 Hp, 240 Vac 0.5 A, 125 Vdc, 0.25 A, 250 Vdc.	UL/CSA Rating: L59 10 A, 120 or 240 Vac. 0.3 A, 125 Vdc, 0.15 A, 250 Vdc.	UL/CSA Rating: L22 1 A, 125 Vac.	UL/CSA Rating: L22 1 A, 125 Vac

PLUNGER ACTUATION

Catalog Listing Prefix (*listing indicates replacement parts)	31CX, , 41CX, 101CX*	32CX, 42CX, 102CX*		36CX, 46CX, 106CX*	3172CX
Circuitry	Single-Pole Double-Throw	Single-Pole Double-Throw		Single-Pole Double-Throw	(Gold Contact) Single-Pole Double-Throw
Electrical Ratings	UL/CSA Rating: L96 15 A, 120, 240, or 480 Vac. ½ Hp, 120 Vac; ¼ Hp, 240 Vac 0.5 A, 125 Vdc, 0.25 A, 250 Vdc.	UL/CSA Rating: L23 20 A, 120, 240, or 480 Vac. 1 Hp, 120 Vac; 2 Hp, 240 Vac 0.5 A, 125 Vdc, 0.25 A, 250 Vdc.		UL/CSA Rating: L22 1 A, 125 Vac.	UL/CSA Rating: L22 1 A, 125 Vac
Pretravel, max.	2.5 mm [0.10 in]				
Differential Travel, max.			1 mm [0.04 in]	2 mm [0.08 in]	1 mm [0.04 in]
Overtravel, min.	4.75 mm [0.19 in]				

SETUP INSTRUCTIONS FOR UNITS WITH 2-WIRE ANALOG (4 TO 20 mA) OUTPUT

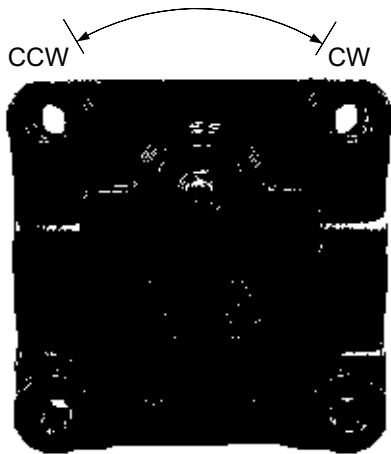


Figure 1. Shaft End View

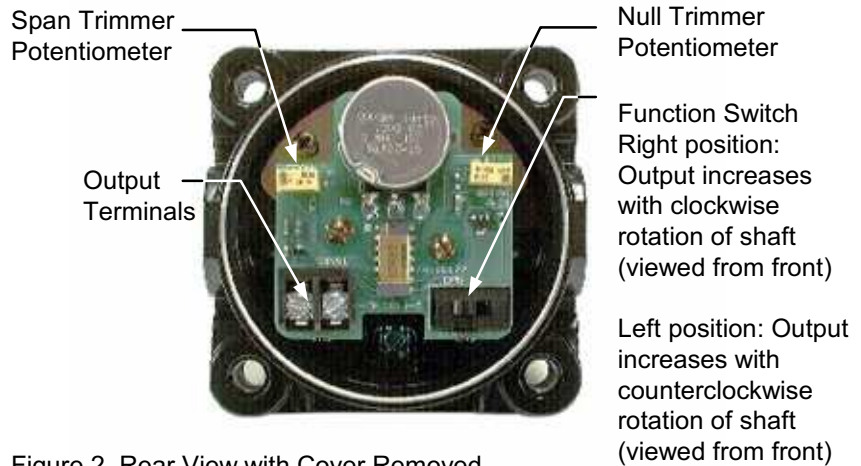


Figure 2. Rear View with Cover Removed

Procedure 1

1. Determine the position of the operating shaft as it relates to the valve and actuator (where the 4 mA output is required).
2. Remove cover and set the function switch to enable the output to be increased by counterclockwise (CCW) or clockwise (CW) motion of the shaft. Refer to figures 1 and 2.

Procedure 2

Reposition the shaft by using either Step 1 or 2, below.

Use step 1 if the function switch is set in the **CW** position.

1. Rotate operating shaft a quarter turn (90°) CCW and then a quarter turn CW (back to initial position).
Next, rotate shaft a half (180°) turn CW and then a half turn CCW (back to initial position.)

Use Step 2 if the function switch is set in the **CCW** position.

2. Rotate operating shaft a quarter turn (90°) CW and then a quarter turn CCW (back to the initial position).
Next, rotate shaft a half turn (180°) CCW and then a half turn CW (back to initial position).

Procedure 3

1. Wiring (See figure 3). Connect a 12.5 to 40 VDC (nominal) power supply to the positive (+) terminal. Connect an ammeter to the negative (-) terminal.

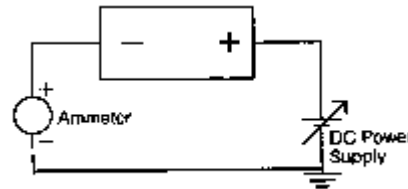


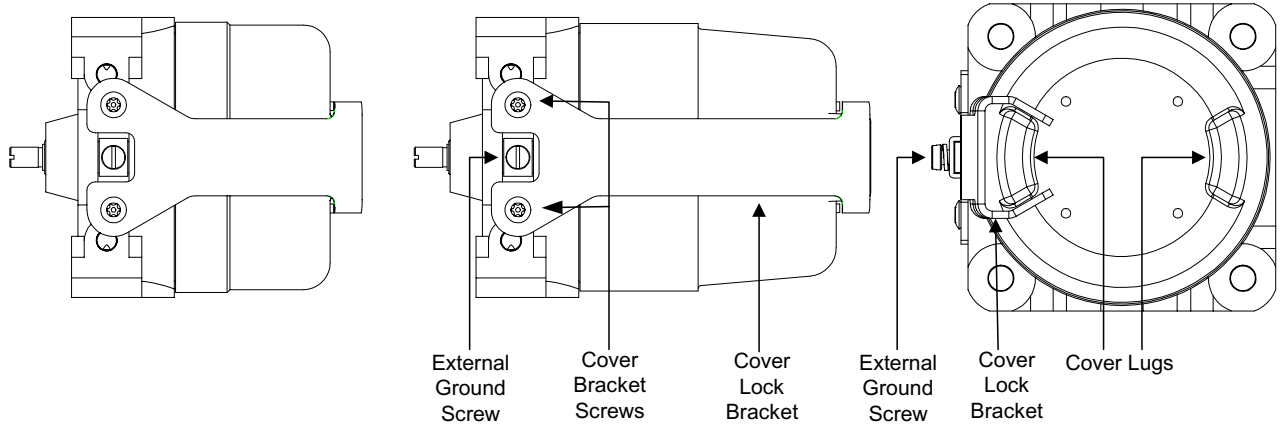
Figure 3. Wiring Diagram

2. Set shaft to position where 4 mA output is desired.
3. Adjust the null offset trimmer potentiometer (see figure 2) to generate 4 mA at this position. (Clockwise turn increases the output.)
4. Rotate shaft to position where 20 mA output is desired.
5. Adjust the span trimmer potentiometer (see figure 2) until output is 20 mA. (Clockwise turn increases output.)
6. Return shaft to initial position and check for 4 mA. Adjust offset null trimmer if necessary.
7. Return shaft to final position and check for 20 mA. Adjust span trimmer if necessary.

NOTE: Honeywell recommends repeating Procedure 3 after 50,000 operations.

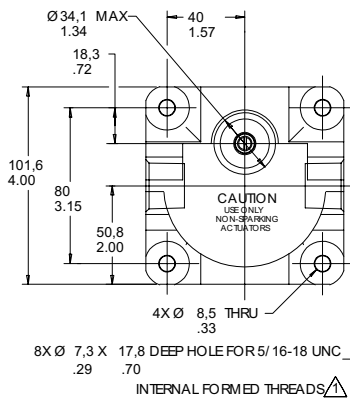
ASSEMBLE COVER LOCK BRACKET FOR EUROPEAN COMPLIANCE

1. Make sure switch cover is tightened so a lug aligns with the external ground screw.
2. Remove bracket screws and special screwdriver bit from bag included in the box.
3. Fit top of bracket around lug on the cover.
4. Fit external ground screw into notch in bottom of bracket. Screw holes in the bottom of the bracket should align with screw holes in the housing on either side of the external ground screw.
5. Use included screwdriver bit to tighten screws into the holes.

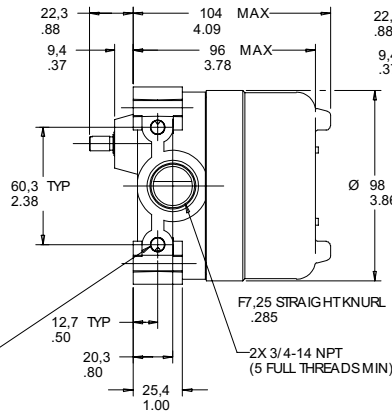


MOUNTING DIMENSIONS (FOR REFERENCE ONLY)

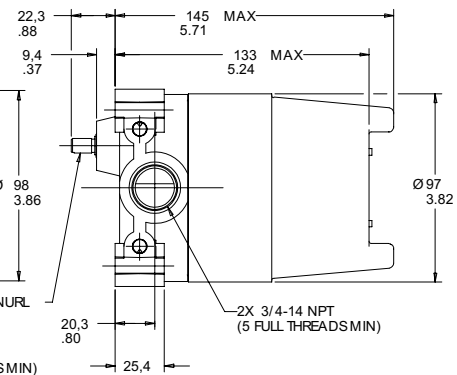
ROTARY



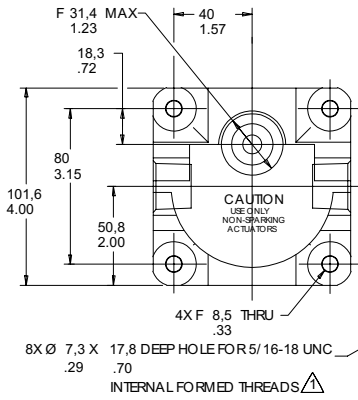
SHORT HOUSING



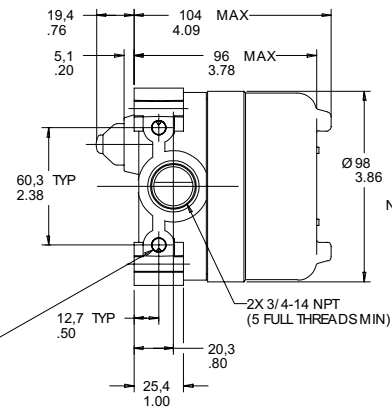
STANDARD HOUSING



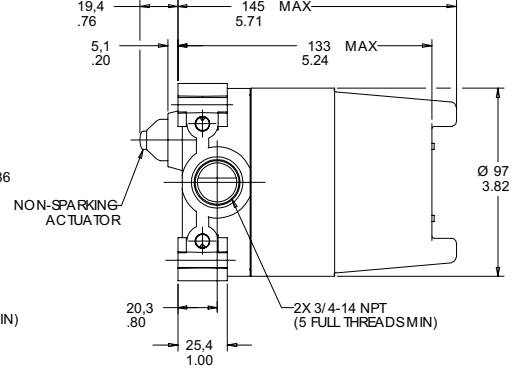
PLUNGER



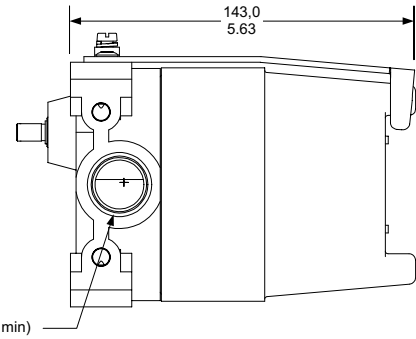
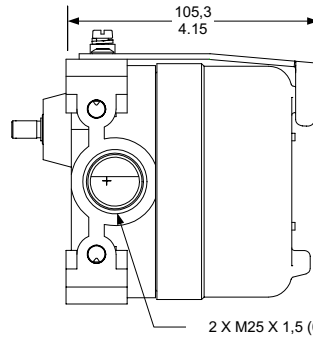
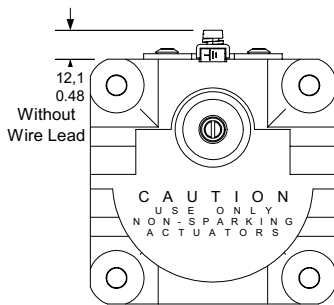
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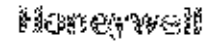


STANDARD HOUSING



\triangle THESE HOLES NOT FURNISHED ON 80CX SERIES





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Registered No 217306 (England)

EC Declaration of Conformity

Honeywell Control Systems Ltd. hereby declare that the products identified below conform to the essential requirements of the EC Directive(s) listed below and that the products supplied are in conformity with the type described in any EC Type Examination Certificate (EC TEC) identified below.

Manufacturer: Honeywell International, MICRO SWITCH Division,
Chicago & Spring Streets, Naperville, Illinois,
IL 61032-4353, USA

Product: Limit Switch - CX
See KEMA report number 0106866 QUA/EMC and supplement

<u>Directive (Amendments)</u>	<u>Conformity Details</u>	
2004/108/EC (consolidated 89/336)	Standards applied:	BS EN 61326:1997 (A1, A2, A3)
94/9/EC	Standards applied:	BS EN 60079-0:2006 BS EN 60079-1:2004 + A1 BS EN 61241-1:2004 + A1, A2 (EN 61241-0:2006)
	EC TEC No:	KEMA 01ATEX2111 X
	Notified Body:	KEMA Registered Quality B.V., Utrechtseweg 310, 6812 AR Arnhem, Nederland.
	Provisions fulfilled:	1.0, 1.1, 1.2.1, 1.2.3, 1.2.7, 1.2.9, 1.3.1, 1.3.2, 1.3.4, 1.4, 2.2

Signed on behalf of Honeywell Control Systems Ltd.:

Frank Turnbull, S & C, Chief Technical Officer.

Doc No: A352

Doc Issue: 1

Doc Date: 16/07/2007

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⚠ WARNING
OPENING PRODUCTS HAZARD
DO NOT OPEN these products when energized or in a flammable gas atmosphere.
Failure to comply with these instructions could result in death or serious injury.

WARRANTY/REMEDY

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective.

The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

⚠ WARNING
IMPROPER CONDUIT THREAD USE
DO NOT USE any other conduit thread than the one identified on the product. Verify that the mating threaded fitting is identical with the conduit thread shown on the product nameplate.
Failure to comply with these instructions could result in death or serious injury.

SALES AND SERVICE

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office or:

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