

# Installation Instructions

## E52Q Cube Style Inductive Proximity Sensor



### WARNING

**IN ORDER TO AVOID ELECTRIC SHOCK OR OTHER POSSIBLE INJURY:**

- **DO NOT USE THIS PRODUCT FOR HUMAN SAFETY APPLICATIONS. IT WAS NOT DESIGNED, TESTED OR RECOMMENDED FOR THIS USE.**
- **DO NOT USE THIS PRODUCT IN HAZARDOUS LOCATIONS (E.G. EXPLOSIVE ATMOSPHERES). IT WAS NOT DESIGNED, TESTED OR RECOMMENDED FOR THIS USE.**
- **ENSURE THE PRODUCT IS PROPERLY WIRED TO THE CORRECT POWER SUPPLY FOR THE APPLICATION. REFER TO THE SPECIFICATIONS AND WIRING DIAGRAMS IN THIS MANUAL.**

### INTRODUCTION

The Cutler-Hammer E52Q Series from Eaton's electrical business is a high performance cube inductive proximity sensor. The E52Q Series provides long range sensing capabilities in a rugged, compact and industry-standard package size.



The E52Q Series features Eaton's exclusive Autoconfigure technology, which automatically detects NPN or PNP wiring states and switches the sensor accordingly, without user intervention. Furthermore, the E52Q Series utilizes complementary outputs on DC models to further reduce the number of units needed to cover a wide array of inductive sensing applications.

The E52Q Series is available in either AC/DC 2-Wire or DC 4-Wire varieties. The built-in mounting bracket is made of high quality zinc die cast alloy and the Ryton™ enclosure is fully potted to protect the sensing components from shock, vibration and chemical intrusion. The five-way adjustable sensing head can be configured for either side- or top-sensing. Dual LEDs indicate both power and output status. All models are available with either mini or micro connectors.

### BASIC OPERATION

Inductive proximity sensors generate a high frequency oscillating magnetic field in the vicinity of the sensing head. When a metal object enters this field, it changes the field loading of the oscillator coil. This change is recognized by a detector circuit, which then energizes the output.

The E52Q Series will detect all metals, but will detect steel best. The exact distance at which a target is detected is determined by its size, thickness and type of metal. To determine sensing distance with your target, see below.

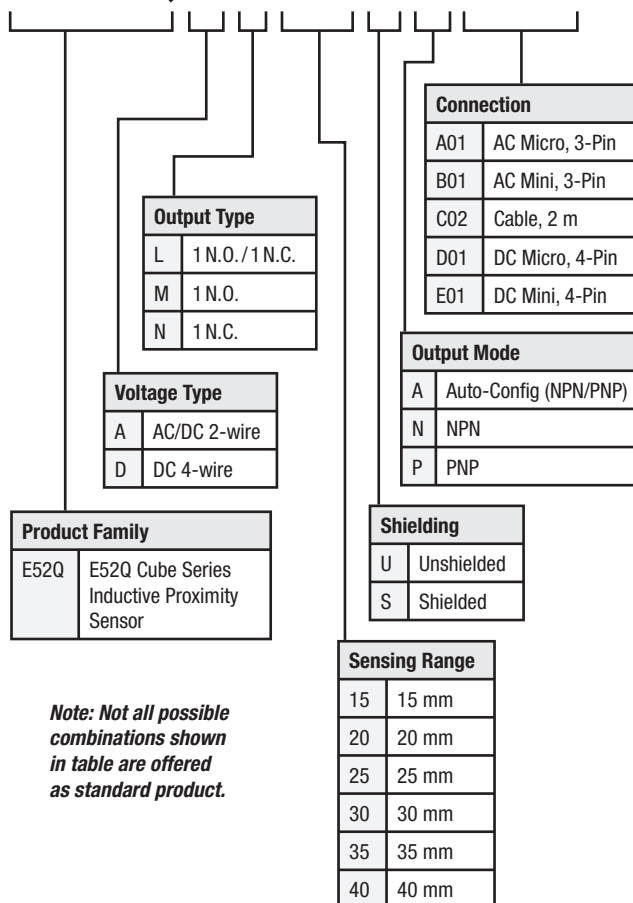
### CORRECTION FACTORS FOR METALS

Sensing range is determined by target size, thickness and metal type. The below correction factors assume standard target sizes (see *Specifications*). These curves must be corrected for smaller-than-standard targets and other metals.

Target Material	Corrective Factor
Steel 1020	1.00
Stainless Steel 400	0.90
Stainless Steel 300	0.70
Brass	0.54
Aluminum	0.50
Copper	0.46

### MODELS COVERED IN THIS MANUAL

# E52QAL50SAA01



*Note: Not all possible combinations shown in table are offered as standard product.*

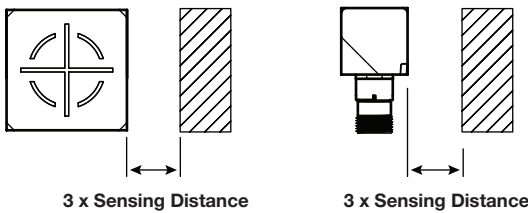
**MOUNTING CONSIDERATIONS**

The sensor should be mounted using two #8 bolts through the mounting holes provided. (Mounting hardware is not included.) The sensor can be mounted to any surface without affecting sensor performance, but it is recommended to use a solid base to ensure reliable operation.

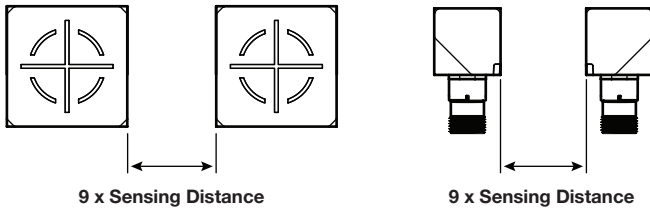
For all unshielded inductive sensors, ensure there is adequate distance between the sensor face any adjacent metals. See the below diagram for isolation distances.

When E52Q Series sensors are mounted side-by-side, there is the possibility of interaction between the magnetic fields of the sensors. This could cause unreliable operation. Follow the limitations noted in the below illustration when mounting sensors in the same location.

**Sensor Isolation Minimum Distances to Adjacent Metals**



**Sensor-to-Sensor Isolation Minimum Distances**



**TARGET POSITIONING**

To ensure reliable sensing performance, it is recommended to follow the general guidelines regarding target positioning below.

**Axial (Head On) Approach** — The target must be positioned so that a projection of the target covers at least half of the sensor’s face. Small targets should be positioned as close as possible to the origin of the sensing face (where the crosshairs overlap).

**Lateral (Side, Slide-By) Approach** — Position the target at a distance no greater than 75 percent of the models rated maximum sensing distance.

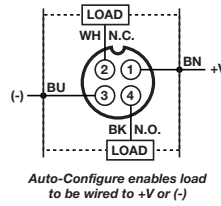
**AUTO-CONFIGURE OUTPUT DETECTION**

Available on DC 4-Wire models, Auto-Configure outputs automatically detect how the sensor’s output circuits have been wired and adjusts to either PNP (sourcing) or NPN (sinking) without user intervention. This process takes place at sensor power-up. If the output is changed without power cycling the sensor, the outputs will not be changed. To ensure your outputs are correct, always power down the sensor when making a change to the output configuration.

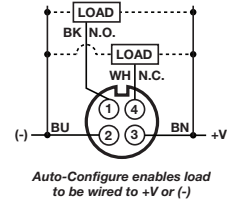
*Note: If Auto-Configure detects one output as NPN, both outputs will be set to NPN.*

**WIRING DIAGRAMS**

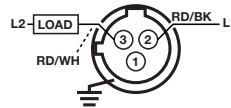
**DC Micro Connector (Models Ending -D01)**



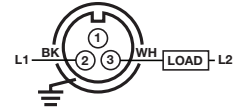
**DC Mini Connector (Models Ending -E01)**



**AC Micro Connector (Models Ending -A01)**



**AC Mini Connector (Models Ending -B01)**



**APPROXIMATE DIMENSIONS**

Model	A (Depth)	B (Depth)	C (Height)	D (Overall Height)
Micro Connector	40 (1.57)	40 (1.57)	40 (1.57)	69.2 (2.725)
Mini Connector				75.3 (2.97)

**SPECIFICATIONS**

	AC/DC 2-Wire	DC 4-Wire
Operating Voltage	20-250V AC 20-60V DC	10-48V DC
Load Current (Max.)	400 mA	300 mA
Burden Current	< 5 mA	< 25 mA
Off-State Leakage	AC Operation: < 2.0 mA Per Output DC Operation: < 1.5 mA	NPN Mode: < 400 µA PNP Mode: < 1 µA
Voltage Drop	< 10V (5V Nominal)	< 2.5V
Outputs	N.O. or N.C. by Model	Complementary (1N.O. / 1N.C.) with Auto-Config
Standard Target Size (Mild Steel)	120 mm x 120 mm	
Repetition Rate	30 Hz	100 Hz
Repeatability	< 3%	
Hysteresis (Max)	15%	
Time Delay Before Availability	300 msec	
Circuit Protection	Short Circuit Protection with Auto-Reset, Reverse Polarity	
Operating Temperature	-25° to +70°C (-13° to +158°F) <sup>2</sup>	
Temperature Drift	±10%	
Enclosure Rating	NEMA 4, 4X, 6, 6P, 12 and 13 (IP67 and IP68)	
Approvals	CE <sup>1</sup>	
Indicator LED	Green: Power Red: Output	

<sup>1</sup> Operating frequency 238 MHz. Conducting radio frequencies at operating frequency and between 2.4 MHz and 3.1 MHz may cause malfunction.  
<sup>2</sup> Will operate at -40° C, but range drift will occur.