



**Innovative Technology® TVSS Products**  
**XT-40 & IT-RSS**  
Installation

Instruction Manual:  
**IM01005012E**  
Rev. 1 – February 2007

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**XT-40 / IT-RSS**

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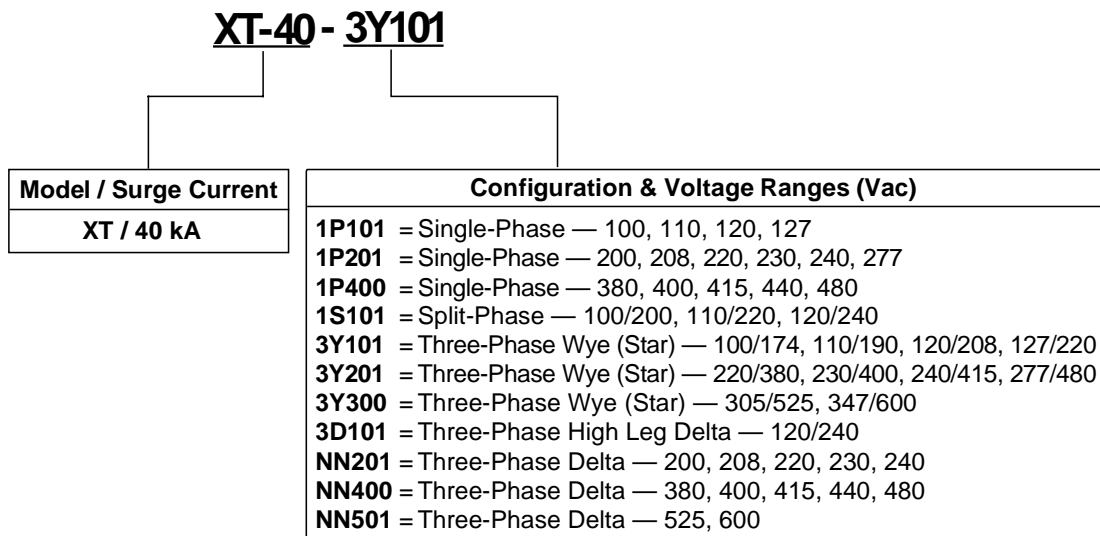
# 1 INTRODUCTION

## 1.1 Scope

This installation manual contains the information necessary to install Eaton Corporation's XT-40 and IT-RSS Surge Protective Devices (SPDs). System wiring and voltage information for these devices are provided in Sections 1.2 and 1.3.

If you require further information regarding a particular installation, contact Power Quality Technical Support at 1-800-809-2772.

## 1.2 XT-40 Catalog Numbering System



In this example, Catalog Number **XT-40-3Y101** identifies an XT model with the following features and ratings:

- Surge Current Rating of 40 kA
- Three-Phase WYE Configuration
- Voltage Range of 100 to 220 Vac

## 1.3 IT-RSS System Wiring and Maximum Voltages

Model Number	System Wiring	Phase to Phase	Line to Ground
IT-RSS	Split Phase	288 Vac	144 Vac

## 1.4 Safety Precautions

A licensed/qualified electrician must complete all instructions and measurements described in this instruction in accordance with the U.S. National Electrical Code, state and local codes, or other applicable country codes. The U.S. National Electrical Code and state and local requirements (or other applicable country codes) supersede this instruction. Read and understand all instructions before beginning installation.



**WARNING!** The use of the word **WARNING** in this manual denotes a potential hazard associated with the use of this equipment. It calls attention to a procedure, practice, or condition, or the like, which if not correctly performed or adhered to, could result in personal injury or death.



**CAUTION** The use of the word **CAUTION** in this manual denotes a potential hazard associated with the use of this equipment. It calls attention to a procedure, practice, condition, or the like, which if not correctly performed or adhered to, could result in damage to the equipment.

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**WARNING! SHOCK HAZARDS:**

**IMPROPER INSTALLATION CAN CAUSE DEATH, INJURY AND/OR EQUIPMENT DAMAGE.**

Follow all warnings and cautions. Completely read and understand the information in this document before attempting to install or operate this equipment.

**IMPROPER WIRING COULD CAUSE DEATH, INJURY, AND/OR EQUIPMENT DAMAGE.** Only licensed/qualified electricians who are trained in the installation and service of electrical devices are to service this equipment.

**USE APPROPRIATE SAFETY PRECAUTIONS AND EQUIPMENT FOR ARC FLASH PROTECTION.**

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## 2 INSTALLATION

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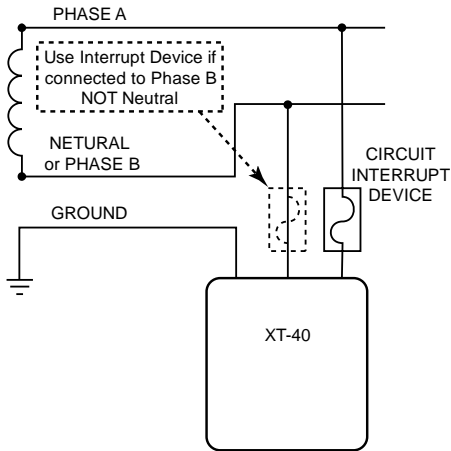
### 2.1 Before Installation

Perform or plan the following before installing the SPD:

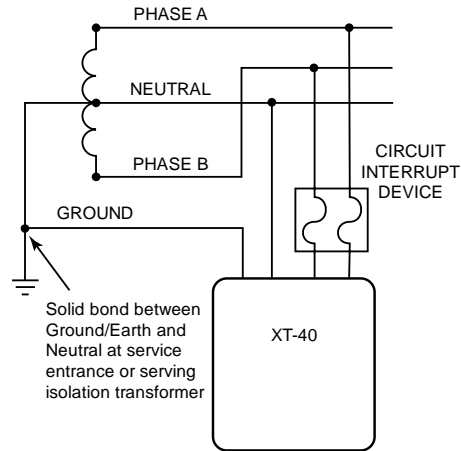
1. Locate your electrical system's applicable wiring diagram in Sections 2.2 & 2.3
2. Verify that your electrical system's voltage and wiring configuration matches that of the SPD as shown on its label.
3. **De-energize the SPD**, and follow safe work practices to avoid an electrical shock hazard.
4. Ensure that a Neutral to Ground/Earth bond is present at the SPD. Note that the SPD may be damaged if not connected to ground.
5. Measure the voltage between Neutral and Ground. If this voltage is greater than 5 Vac, then a problem may exist in the electrical system. The SPD can still be installed under this condition, but a licensed/qualified electrician should be consulted to correct the problem.
6. The SPD can be mounted in any position. If necessary, the cover may be rotated 180 degrees to improve readability of the label. When removing the cover, be careful not to damage the indicator light circuit board or wiring attached to the cover.
7. **Isolated Ground:** The SPD's ground wire is internally bonded to its housing. If the electrical system utilizes an isolated ground, then the SPD's housing must also be isolated from ground using insulated conduit fittings, and its ground wire must be connected to the system's isolated ground bus.
8. Plan to use weatherproof (corrosion resistant) conduit and fittings to maintain the enclosure's NEMA 4 (IP66) or 4X rating.
9. Plan to install the SPD as close as possible to the electrical panel. Long lead lengths and sharp bends between the SPD and the panel will degrade the performance of the SPD.
10. Plan to install 30 A circuit interrupt devices as described in Section 2.4.

## 2.2 XT-40 Wiring Diagrams

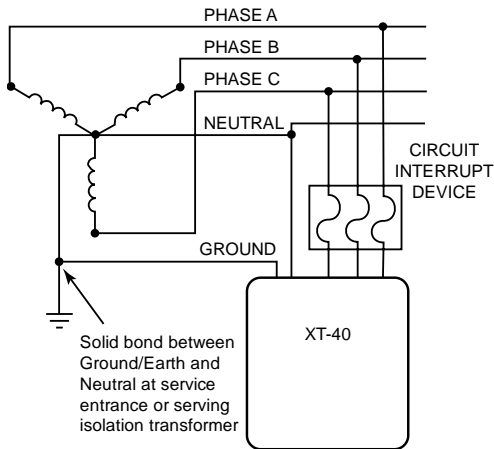
### Single Phase (1P101, 1P201)



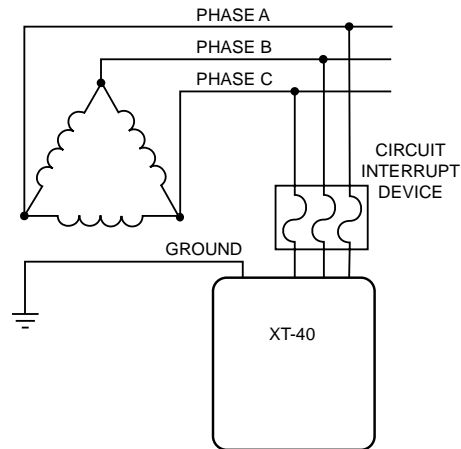
### Split Phase (1S101)



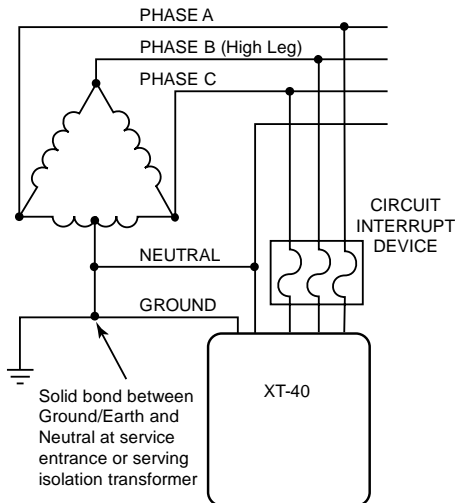
### 3-Phase Wye (Star) (3Y101, 3Y201, 3Y300)



### 3-Phase Delta (No Neut.) (NN201, NN400, NN501)

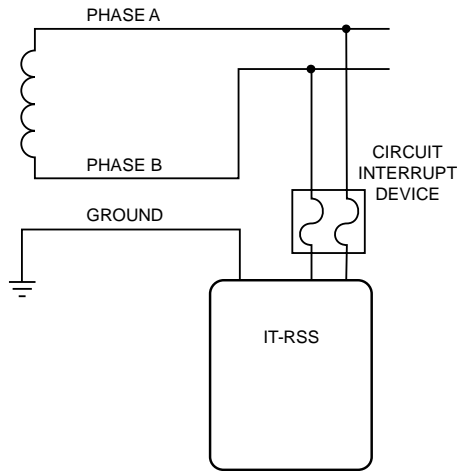


### 3-Phase Delta (High-Leg) (3D101)



### 2.3 IT-RSS Wiring Diagram

**Split Phase – 288 Vac Phase to Phase Max.**



### 2.4 Installing Circuit Interrupt Devices

The SPD must be connected to the electrical system through a 30 A circuit interrupt device as listed in Table 2-1. The circuit interrupt device can consist of fuses, individual circuit breakers (single breaker for each phase), or a multi-pole / single throw breaker.

A pre-existing breaker of rated load size may be utilized if provisions for multi-conductor connections are made according to U.S. NEC 110-14a (or other applicable country codes). Avoid using a pre-existing breaker that when operated will cause a critical system shut down.

For XT-40 Single Phase applications (refer to Section 2.2, Single Phase Diagram), note that if the Neutral wire is used as Phase B, then an additional interrupt device must be used for that phase.

**Table 2-1. Wire and Circuit Interrupt Device Requirements**

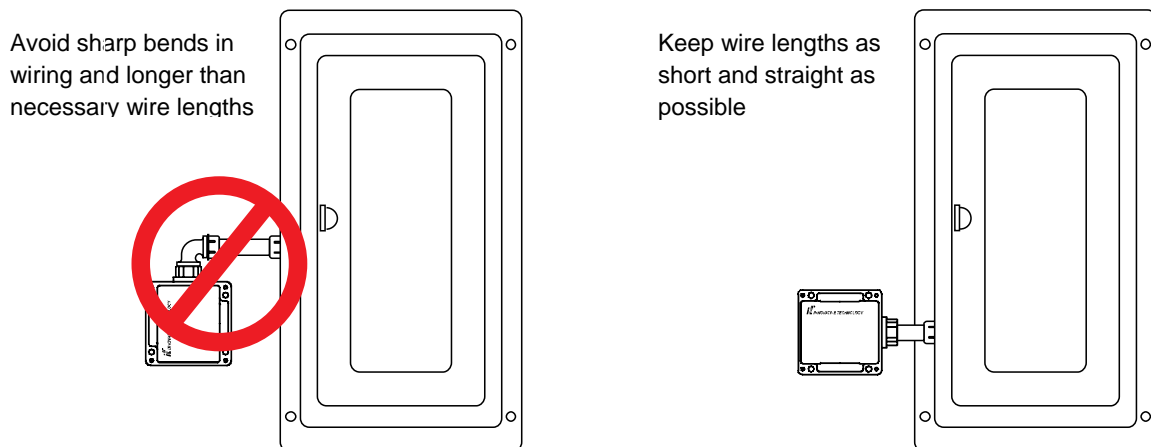
Models	Wire Size	Circuit Interrupt Device Required for Installation	
		Max. Current Rating	Type
XT-40	#10 AWG (6 mm <sup>2</sup> ) <b>Stranded Wire Included</b>	30 Amps	Class RK5 Fuse(s) or Single-Pole / Single Throw Breaker for each Phase or Multiple-Pole / Single Throw Breaker
IT-RSS			<b>Fuse(s) or Breaker(s) Not Included</b>

## 2.5 Conduit Installation

When planning the conduit installation, avoid using 90° elbows and keep the conduit run as short and straight as possible. See Figure 2-1. When applicable, use weatherproof (corrosion resistant) conduit and fittings to maintain the enclosure's NEMA 4 or 4X rating.

If the system utilizes an isolated ground, then the SPD's housing must be isolated from ground using insulated conduit fittings.

**Figure 2-1. Conduit Installation Guidelines**



## 2.6 Mounting the SPD

The SPD is to be installed through a panel knockout and via its mounting feet. Place SPD against mounting surface and mark feet positions. Complete conduit connection installation. Screw box to surface with appropriate screws. Mounting dimensions and weight are shown in Figure 2-2.

Mount the SPD to provide the shortest and straightest possible wire installation from the SPD to the system bus. **Excessive wire length and sharp bends will degrade suppressor performance; therefore, avoid excessive wire length and sharp bends when all possible.**

If installing on a system other than an electrical panel, mount SPD in close proximity to the system being protected using the necessary means for mounting.

**Note:** *A circuit interrupt device is still required when installing suppressor on a system other than an electrical panel.*

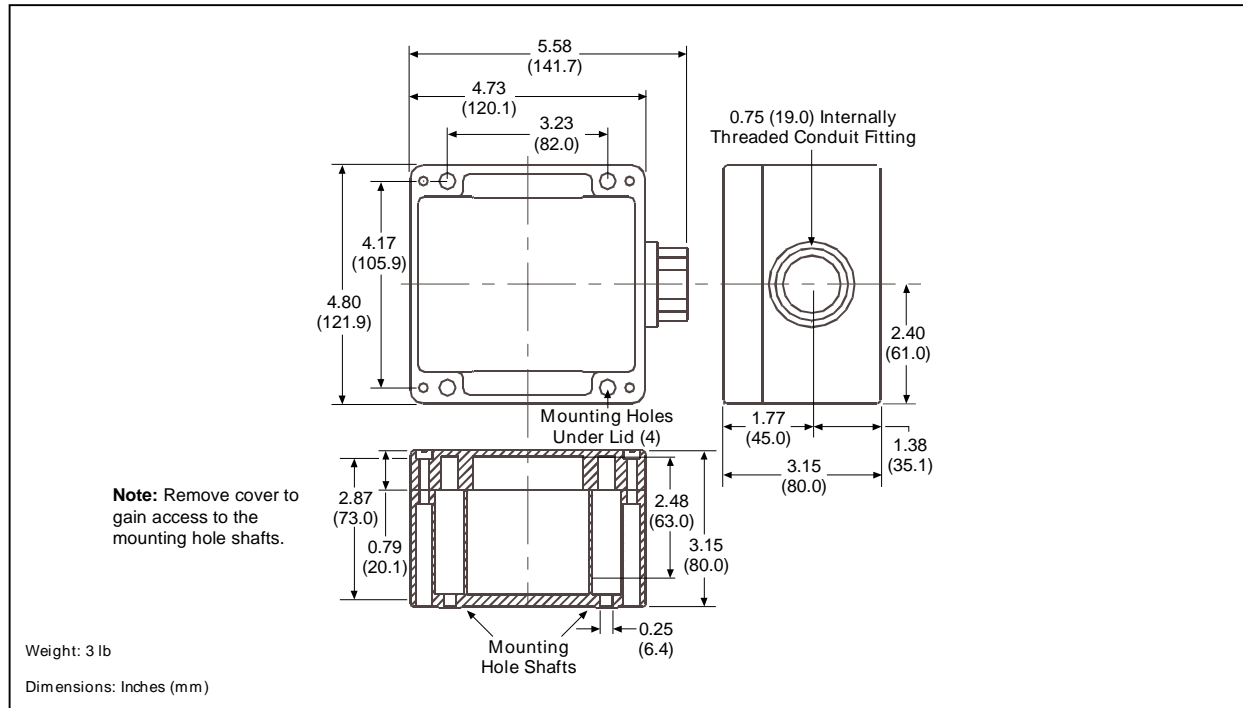
The SPD contains no position-oriented components and can be mounted upside down or sideways. Cover may be rotated 180 degrees to improve label readability. Take care to support cover to prevent damage to indicator light circuit board and wiring.



**WARNING!** Cover will not seal when rotated ONLY 90 degrees. This invalidates NEMA 4 rating and may create safety hazard.



Figure 2-2. XT-40 &amp; IT-RSS Mounting Dimensions



## 2.7 Wiring SPD to Electrical System

**Important!** When connecting the wires from the SPD to the electrical system, cut the wires as necessary to keep them as short as possible. In addition, to maximize the SPD's performance, also twist and bind the wires together to reduce the impedance of the wire.

1. Locate your electrical system's applicable wiring diagram in Section 2.2 or 2.3. Reference this wiring diagram as necessary in Steps 2, 3, and 4.
2. Connect the Ground wire (green) from the SPD to the system's Ground bus bar.

**Important!** If the system utilizes an isolated ground, then its ground wire must be connected to the system's isolated Ground bus.

3. For the XT-40, connect the Neutral wire (white) from the SPD to the system's Neutral bus bar (not required for 3-Phase Delta systems – NN201, NN400, and NN501).
4. Connect each Phase wire from the SPD through one of the circuit interrupt devices installed in Section 2.4 to the system's corresponding Phase voltage connection.

**Tip:** To ensure that the front panel phase voltage LEDs glow evenly, be sure that the phase wires are attached to their associated phase (A to A, B to B, and C to C). The wires or terminals of the SPD are marked with the intended phase for the electrical system (A, B, or C). Use a phase rotation meter to identify the electrical system's phase sequence prior to wiring the SPD — DO NOT trust existing markings.

## 2.8 Power Up and System Checkout

Apply system power and observe that the LED(s) on the front of the SPD should glow. One LED should glow for each Phase voltage being monitored.

Should there be a *significant* difference in brightness, check the phase rotation of the panel and ensure that the SPD's Phase wires are connected to the correct phase. Slight differences in brightness DO NOT indicate a faulty device, rather specification tolerance differences of the indicator circuit's components. LED brightness symmetry and/or level do not indicate the SPD's operational status.

**Notes:**



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For additional information please call:  
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