SURGE Series
Lightning and Transient Protector
Installation Manual

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1 INTRODUCTION

Long, horizontal lengths of cable that run between instruments and loggers are susceptible to transient electrical fields, which can be destructive to both sensors and data loggers. RST's SURGE Series lightning and transient protectors can be installed to divert these transients to ground, protecting delicate instruments and valuable data.

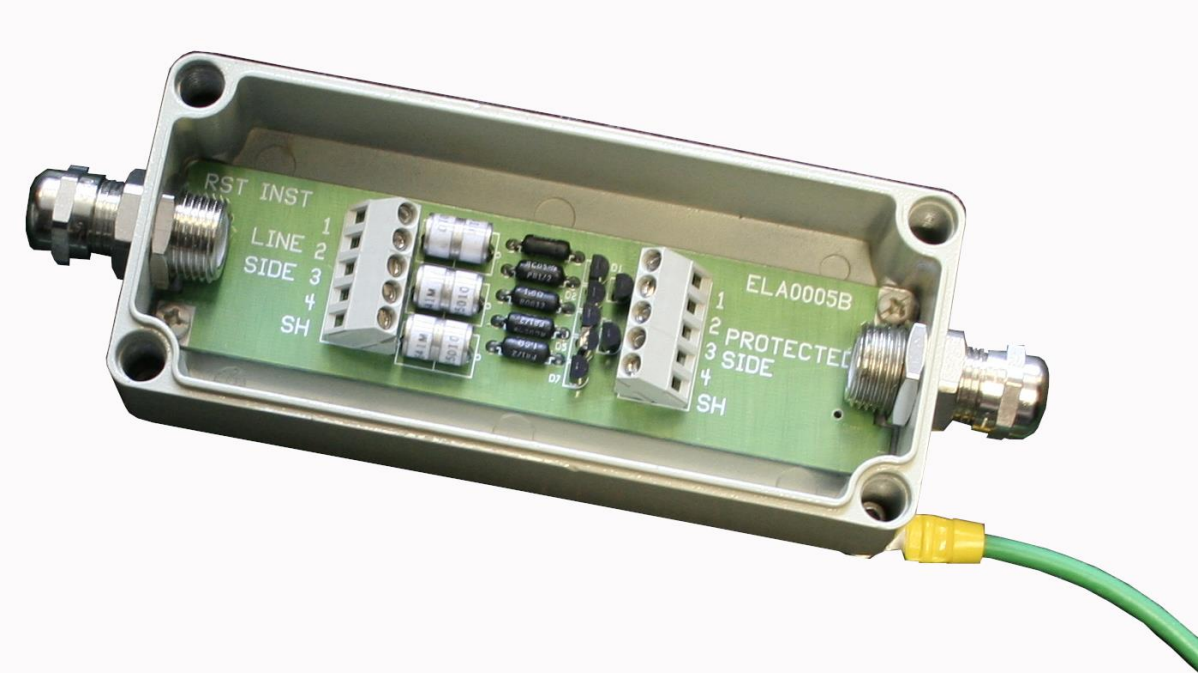

FIGURE 1-1 4N: 4-WIRE AND SHIELD STAND-ALONE SURGE PROTECTOR

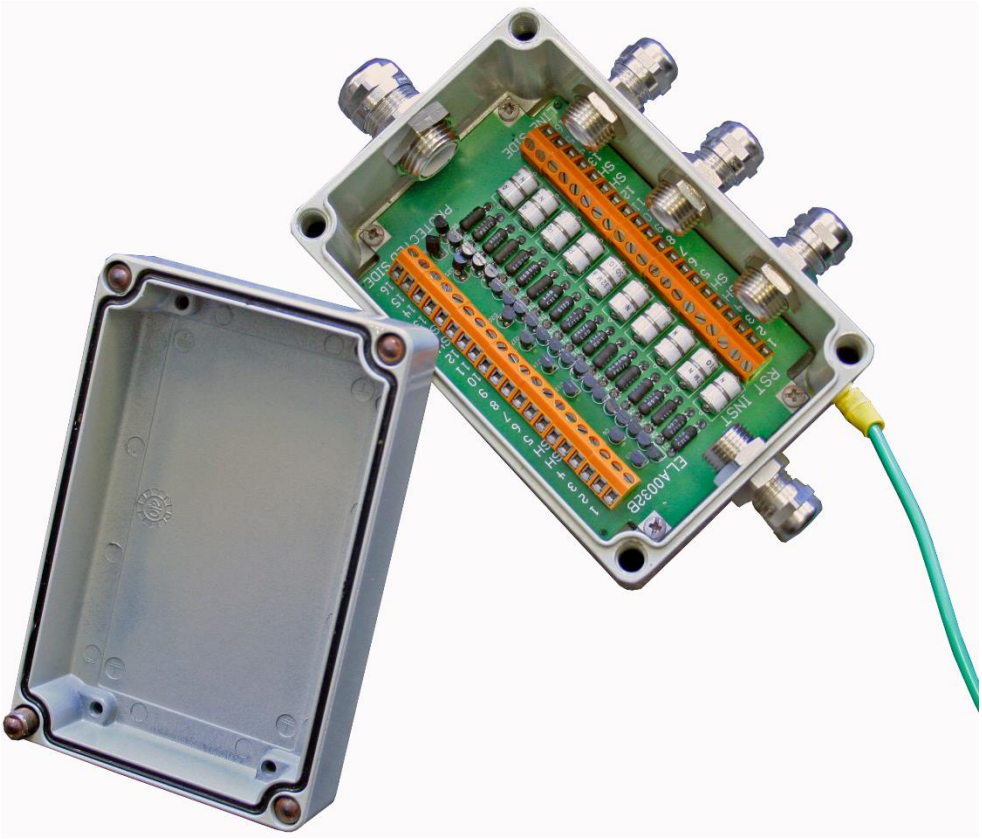

FIGURE 1-2 16N: 16-WIRE AND SHIELD STAND-ALONE SURGE PROTECTOR

1.1 TYPES OF SURGE PROTECTORS

This manual outlines installation instructions for two types of surge protectors manufactured by RST Instruments:

- A 4-wire and shield stand-alone transient protector in a NEMA-4X enclosure (Figure 1-1), and
- A 16-wire and shield stand-alone transient protector in a NEMA-4X enclosure (Figure 1-2).

Both models are designed to be installed directly on the cable, with the sensor or instrument wired to the “Protected Side” of the surge protector (see Figure 3-1 for an installation illustration).

2 SAFETY

Normal safety precautions should be followed and proper personal protective equipment (PPE) should be worn when working in the field with this equipment, including safety glasses and high-visibility clothing.

Care should be taken to ensure the inside of the NEMA-4X enclosure and the seal remain dry and free from dust, dirt, and moisture.

WARNING: USED WHEN AN OPERATING PROCEDURE OR PRACTICE, IF NOT CORRECTLY FOLLOWED, COULD RESULT IN PERSONAL INJURY OR LOSS OF LIFE.

CAUTION: USED WHEN AN OPERATING PROCEDURE OR PRACTICE, IF NOT STRICTLY OBSERVED, COULD RESULT IN DAMAGE TO OR DESTRUCTION OF EQUIPMENT.

NOTE: USED TO HIGHLIGHT SPECIFIC NON-SAFETY RELATED INFORMATION.

3 INSTALLATION

3.1 PRE-INSTALLATION

Before installation, it is important to consider the location where the unit will be installed:

- It should be placed as close as possible to, but not directly on top of, the instrument.
- Although the enclosure is weatherproof, it should not be submerged and should be placed slightly above the ground.

Figure 3-1 illustrates a typical installation. Please note that site-specific conditions may require adaptations. Contact RST with any questions or concerns.

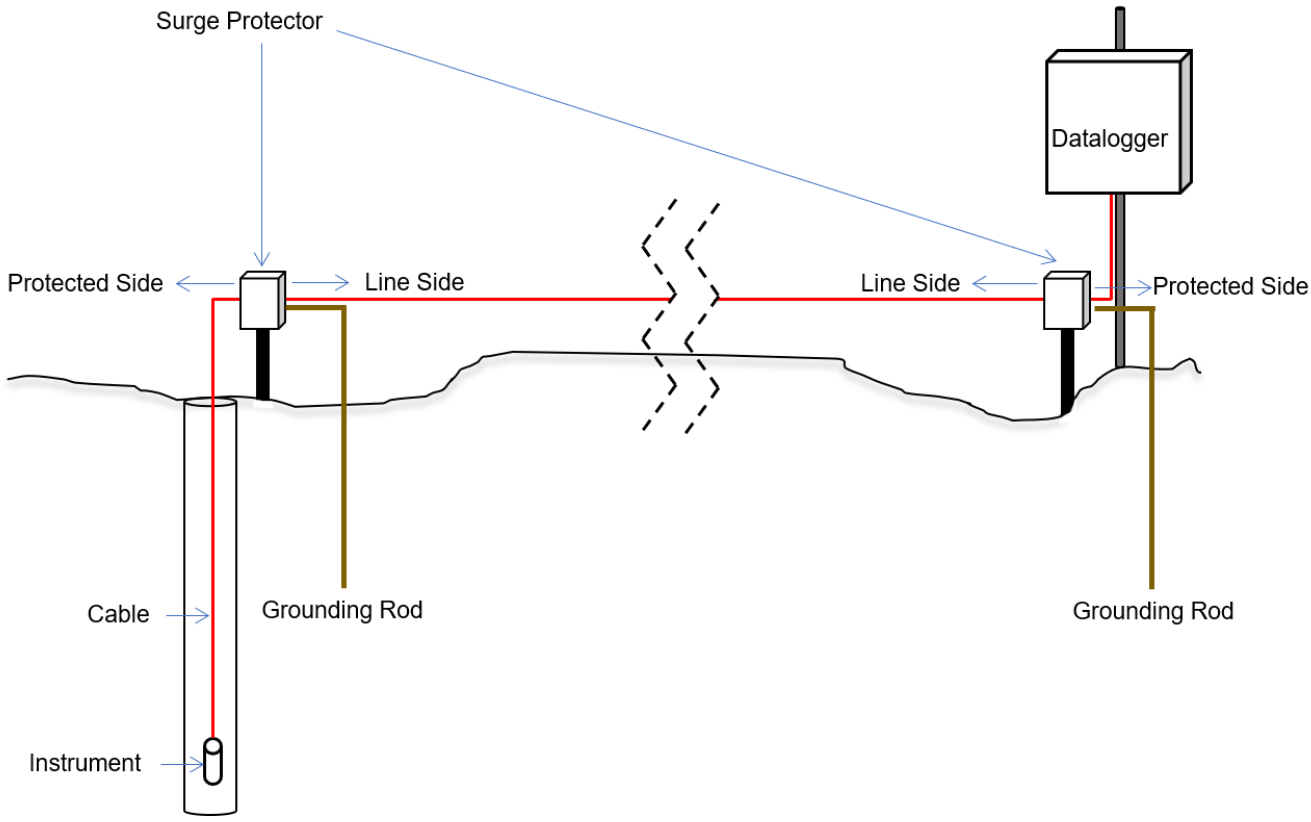

FIGURE 3-1 INSTALLATION DIAGRAM

3.2 TOOLS

The following tools are recommended to facilitate installation of the surge protectors:

- Two 20-mm open or small crescent wrenches,
- Philips # 2 screwdriver,
- Flat-head 2.5 mm screwdriver,
- Wire strippers, and
- Utility knife.

3.3 INSTALLATION PROCEDURE

The following instructions outline the steps for successfully installing a surge protector. Though the instructions feature the SURGE 4N: 4-Wire & Shield model, the same procedure may be used to install the SURGE 16N: 16-Wire & Shield model.

1 Loosen the cable glands using two 20 mm wrenches. For each gland, hold the bolt in place with one wrench and loosen the cap with the other wrench. Refer to Figure 3-2 for correct wrench placement.

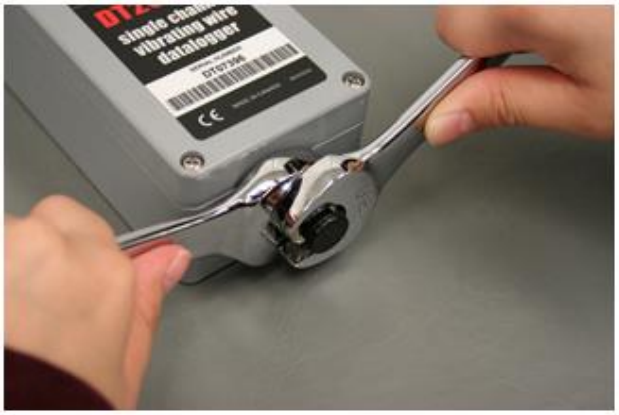

FIGURE 3-2 LOOSENING THE CABLE GLAND

CAUTION: ENSURE THE ENTIRE NUT BODY DOES NOT LOOSEN. LOOSEN ONLY THE GLAND.

2 Remove the black cable plug from the cable gland.

3 Loosen the 4 Phillips screws on the top of the NEMA-4X enclosure. Lift the cover off.

4 Insert the cables with stripped wire ends through the cable glands and into the enclosure. Ensure the cable sheathes are inside the enclosure.

5 Loosen the screws on the terminal with a small flat-head screwdriver.

6 Wire the leads to the terminal. Table 3-1 provides a recommended wiring scheme. It is important to note that, aside from the shield, the order of the wires does not matter. However, it is critical that the order of the wires is maintained on both sides of the surge protector (for example, if the red wire is connected to 1 on the line side of the surge protector, the red wire MUST be connected to 1 on the protected side).

TABLE 3-1 RECOMMENDED WIRING SCHEME

Protected Side		Line Side	
Red	1	1	Red
Black	2	2	Black
Green	3	3	Green
White	4	4	White
Shield	SH	SH	Shield

CAUTION: ENSURE THAT THE INSTRUMENT IS WIRED TO THE "PROTECTED SIDE". FAILURE TO DO SO MAY RESULT IN LOSS OF EQUIPMENT DURING A TRANSIENT EVENT.

CAUTION: THE ORDER OF THE WIRES MUST BE MAINTAINED ON BOTH SIDES OF THE TERMINAL TO PROTECT BOTH THE INSTRUMENTS AND DATA LOGGERS. FAILURE TO DO SO MAY RESULT IN LOSS OF EQUIPMENT DURING A TRANSIENT EVENT.

NOTE: THE SURGE 16N CAN PROTECT UP TO FOUR SEPARATE INSTRUMENTS. TO WIRE MORE THAN ONE INSTRUMENT TO A SINGLE SURGE 16N UNIT, SIMPLY REPEAT THE RECOMMENDED WIRING SCHEME (TABLE 3-1) IN TERMINALS 5 – 8, 9 – 12, AND 13 – 16 UNTIL ALL UNITS HAVE BEEN WIRED TO THE TERMINALS.

7 Tighten the screws on the terminal to secure the leads.

8 Push the cable into the gland slightly before tightening to provide a bit of slack on the wires.

9 Tighten the cable glands using the same wrench placement as Step 1. Gently tug on the cable after each half turn to inspect cable mobility. Perform a final half turn once the cable is immobile.

10 Replace the cover of the NEMA-4X enclosure. Replace and tighten the 4 Phillips screws on the top.

11 Proceed with grounding the unit.

4 GROUNDING

Grounding the surge protectors is extremely important and must be done correctly to ensure instruments are protected from transient events. A grounding cable comes pre-installed on the surge protectors but will need to be secured to a grounding rod, which has been planted into the ground. The following instructions detail the steps necessary to correctly ground stand-alone units.

1 Select a location to install the grounding rod.

NOTE: SELECT A LOCATION WITH RELATIVELY SOFT EARTH THAT IS FREE FROM ROCKS AND DEBRIS.

2 Plant the grounding rod firmly into the ground.

3 Strip the free end of the grounding cable.

4 Run the grounding cable from the surge protector's enclosure to the grounding rod.

5 Loosen the bolt on the grounding rod's clamp.

6 Place the stripped end of the grounding wire underneath the clamp.

CAUTION: ENSURE THAT THE GROUNDING CABLE HAS SUFFICIENT CONTACT WITH THE GROUNDING ROD.

7 Secure the cable to the grounding rod with the clamp by tightening the bolt.

Please contact RST directly with any questions pertaining to the installation of the grounding stake.

5 SERVICE AND REPAIR

The product contains no user-serviceable parts. Contact RST for product service or repair not covered in this manual.

Appendix A **SPECIFICATIONS**

Item	Description
Conductors protected	SURGE 4N: 4+1 shield SURGE 16N: 16+4 Shield
Maximum transient current per line (1 event, 8/20 µs)	20,000 Amps
Minimum conduction threshold voltage	58 Volts
Peak pass-through voltage (common or normal mode)	77 Volts
Output clamp voltage	4 Volts
Series resistance per line	1.6 Ohms
Maximum leakage current	5 Microamps
Hold current	150 Milliamps
Maximum AC current (1-line cycle)	30 Amps RMS
Maximum continuous current	2 Amps