



INSTRUCTIONS

OVER-VOLTAGE PROTECTOR 2 (OVP2)

READ ENTIRE DOCUMENT BEFORE INSTALLING



INTRODUCTION

The Over Voltage Protector 2 (OVP2) is a solid-state DC and AC isolation device designed for use in conjunction with cathodically protected equipment located in Class I, Division 2 hazardous (classified) locations or ordinary (non-hazardous) locations. The OVP2 is suitable for: (1) over-voltage protection of isolation joints and similar structures and equipment, (2) tank isolation from ground, and (3) decoupling dissimilar metals that must otherwise be bonded for safety.

The OVP2 can be used in a variety of different applications, each of which requires specific installation guidelines. These installation instructions cover the following common applications and arrangements.

- Dimensioned outlined drawing
- Over-Voltage protection for isolation joints
- General use mounting by banding
- General use mounting in a pedestal
- General use mounting by using pin brazed studs

If your application is not covered by these installation instructions, contact Dairyland. Technical information for applications is available on the Dairyland website.

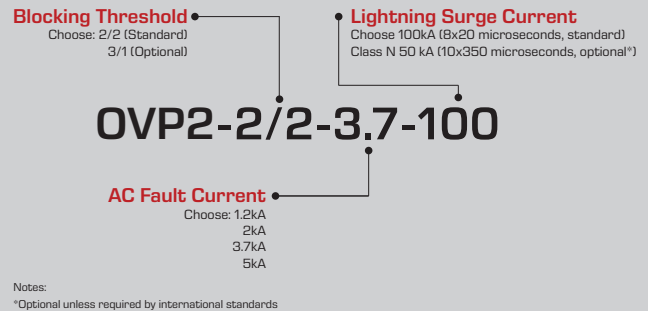
⚠ WARNING

During installation, the voltage on the structure may rise to an unsafe level (i.e., due to induced AC, AC fault or lightning on the structure). Sparking and current flow may occur when connecting or disconnecting decouplers or over-voltage protectors. Assure that this does not occur in hazardous locations where gases or vapors may be present. All necessary safety precautions must be taken by the user to avoid unsafe worker conditions, including arcing, in accordance with applicable industry and/or company-required practices. Dairyland provides suggested procedures for installing and operating this equipment (See the section on Worker Safety) but the user must be responsible for and approve the procedures to be used by its workers when installing the equipment because Dairyland cannot be familiar with each user's safety guidelines.

⚠ WARNING

Note: Explosion Hazard - Substitution of any component may impair suitability for Class I, Division 2.

Model Number Chart



Certifications

The OVP2 has been tested by Nationally Recognized Testing Laboratories (NRTLs) for compliance to independent standards in its operation, ratings, and construction. This includes compliance to standards for:

Class I, Div. 2, Groups A, B, C, D and Zone 2, Group IIC

Class & Division System: UL (United States) and C-UL (Canada)

- Effective Ground Fault Current Path per:
 - NFPA 70 (US National Electric Code – NEC): Article 250.4(A)(5)
 - CSA C22.1 (Canadian Electric Code, Part I): 10-100 & 10-500
- Isolation of Objectionable DC Ground Currents per:
 - NFPA 70: Article 250.6(E)
 - CSA C22.1: 10-100 & 10-500
- Hazardous Location Use:
Class 1, Division 2, Groups A, B,C,D by UL & C-UL per:
 - UL 121201, 9th Ed. and CSA C22.2 No.213-17
- Safety Requirements for Electrical Equipment per:
 - UL 61010-1, 3rd Ed. & CSA C22.2 No. 61010-1
 - Overvoltage Protection from Impulse (Lightning) Current: 100kA (8 x 20µs)
 - Enclosure Rating: IP68 (Submersible to 2 meters depth)
 - Temperature Range: -45°C to +65°C (-49°F to +149°F)

Zone System: ATEX / IECEx / UKEx (Europe / International / UK), ATEX per directive 2014/34/EU (Equipment for use in Potentially Explosive Atmospheres):

- Zone 2, Group IIC, Increased Safety “ec”
- EN IEC 60079-0: 2018
- EN IEC 60079-7: 2015+A1:2018
- EC 60079-0: 2017
- IEC 60079-7: 2017
- Overvoltage Protection from Impulse (Lightning) Current: 100kA (8 x 20µs)
- Temperature Range: -45°C to +65°C
- Enclosure Rating: IP68



INSTALLATION GUIDELINES

These general instructions apply to all applications.

Worker Safety

For worker safety during installation or removal, it is recommended that the user obtain certain equipment; namely a pair of electrically isolation gloves, a shorting cable approximately 3 ft (0.91 m) long with isolation clamps on each end, and a multi-meter to measure AC voltage. (Of these items, Dairyland offers a suitable 3 ft long shorting cable with isolation clamps, Model# BCL-1/0.) The following installation procedure assumes that these items are available. It is suggested that a grounding jumper be used as a safety precaution in the event the lead to the structure rises to an unsafe potential when it is disconnected during the installation or removal process or if an electrical disturbance occurs while the over-voltage protector is being installed. Be sure to remove the grounding jumper after the over-voltage protector is completely installed. If the structure voltage is not at a safe touch potential (i.e., >15VAC to ground per NACE SP0177), then insulating gloves should be used.

Mounting

Mount the OVP2 so that the total length of conductor to the connection points will be as short as possible if the OVP2 is going to be used to provide over-voltage protection from lightning. All conductors have inductance which will cause a significant voltage per unit of conductor length when subject to lightning impulse current. To minimize the voltage developed between the connection points, install the OVP2 as close as practical to the required connection points and cut the conductor to the shortest possible length during installation. For most isolation joint applications the OVP2 can, and should, be installed with less than 8" (200 mm) of conductor. Conductors can develop 1-3 kV/ft. (approx. 3-10 kV/meter) of length due to lightning; hence, for this reason, conductors should be kept as short as possible in lightning applications. Conductor length is not critical for limiting voltage due to 50 Hz or 60 Hz current.

Mounting Accessories

Numerous mounting accessories are available from Dairyland to aid in the proper installation of the OVP2. Full details and complete installation instructions are available on the Dairyland website here: [Dairyland Accessories](#).

Specific Installation Guidance

The Dairyland website contains detailed information on the installation methods specific to a given application. For wiring diagrams and/or application guidance, see [Dairyland Applications](#).

Mounting options must be ordered separately. Select the most appropriate option or contact Dairyland if a different mounting method is required.

Environmental Exposure

The OVP2 enclosure is rated IP68 and is suitable for indoor or outdoor use, in submersible and non-submersible applications. OVP2s may be submersed in non-freezing conditions up to 6.5 ft. (2 m) depth for occasional prolonged periods, though not continuously.

Polarity

For a visual diagram, see the "Polarity Wiring Diagram" on the next page. If the OVP2 purchased has asymmetrical blocking characteristics and it is being connected between a cathodically protected structure and ground, connect the negative terminal of the OVP2 to the cathodically protected structure and the positive terminal to ground. If being connected between two different cathodically protected systems, attach the negative terminal to the more negative structure and the positive terminal to the less negative structure. A label on the OVP2 housing shows the polarity of each terminal.

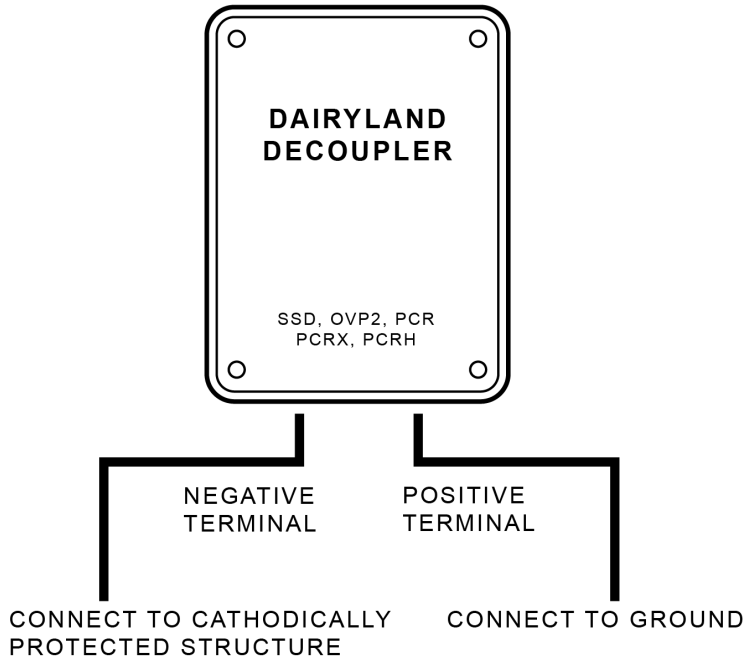
Enclosure

The standard enclosure is rated IP68 to 2 m depth (comparable to NEMA 6P). This enclosure is suitable for submersible applications.

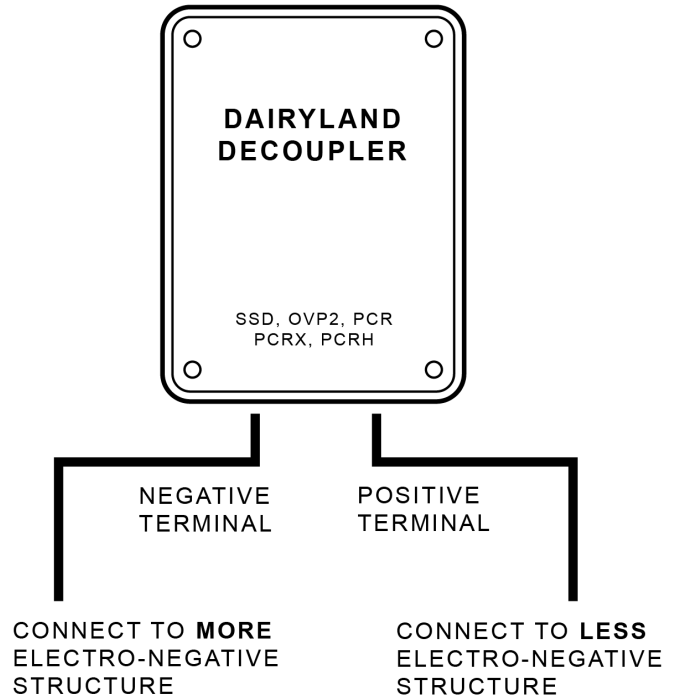


POLARITY WIRING DIAGRAM

FOR CONNECTIONS BETWEEN A CATHODICALLY PROTECTED STRUCTURE AND GROUND



FOR CONNECTIONS BETWEEN TWO DIFFERENT CATHODICALLY PROTECTED STRUCTURES





Field Testing

The best indication of a functional device comes from measuring an acceptable cathodic protection voltage on the protected structure, as a failed shorted product would affect CP levels. To confirm proper functioning of the OVP2 after installation and to assure that it is applied within its intended ratings, measure the peak AC voltage (i.e., $V_{ac-rms} \times 1.414$) and the DC voltage across the OVP2 terminals with a voltmeter and measure the AC and DC current flow through the conductor with a clamp-on ammeter. The peak steady-state AC voltage (if any is present) plus the DC voltage should be less than the threshold voltage of the OVP2 being installed. If this is not the case, the OVP2 will be conducting current, which may adversely affect cathodic protection.

If the cathodic protection system is ON, the DC voltage between the OVP2 terminals should be the difference between the cathodic protection voltage, measured with respect to a reference cell, and the galvanic potential of the grounding system material. If the cathodic protection system is ON and there is no DC voltage across the OVP2 terminals, further testing is required as described below. However, if both sides of the OVP2 are connected to cathodically protected systems, or if the cathodic protection voltage is the same as the galvanic potential of the grounding system, then it is possible to measure near zero volts DC across the OVP2 terminals.

The AC and DC current flow through the OVP2 conductor should be so low as to not be measurable with a clamp-on ammeter. A more sensitive meter may indicate DC current flow, but this value should be less than 10 mA at its rated DC blocking threshold voltage. If a higher current flow is present, this likely indicates that the absolute voltage ($V_{dc} + V_{peak AC}$) is above the OVP2 threshold level selected, thereby indicating an improper application or a failed OVP2.

If the absolute voltage across the OVP2 is less than or equal to the blocking voltage selected and there is measurable current flow, it is possible that the OVP2 has been damaged from excessive current. The OVP2 can be more comprehensively checked using a multimeter that has a resistance checking function. Before performing the following test, all normal safety regulations and practices should be observed, including those pertinent to hazardous locations when applicable.

- 1) Disconnect one conductor of the OVP2 so that it is isolated.
- 2) Connect the positive conductor of the multimeter to the OVP2 positive (+) terminal, which is the same as the OVP2 housing, and the negative (-) lead to the OVP2 flexible conductor. The resistance should be at least several hundred thousand ohms.
- 3) Then reverse the multimeter conductors. The resistance again should be at least several hundred thousand ohms. If the resistance measured is significantly lower, the OVP2 may be failed or damaged from excessive current.

If any field test results are inconclusive, or an OVP2 appears failed, Dairyland is willing to retest and repair (if required) any returned OVP2. Contact Dairyland.

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GENERAL COMMENTS

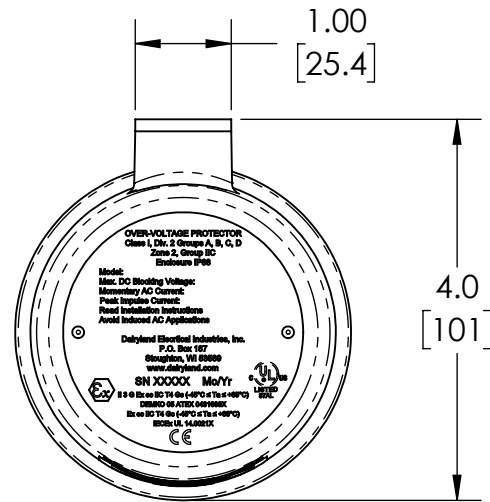
The OVP2 does not require routine maintenance, but if the cathodic protection voltage level near the OVP2 is below the normal or expected value, it is suggested that the unit be field tested following procedures available from Dairyland.

If a problem is suspected, contact Dairyland for trouble-shooting assistance.

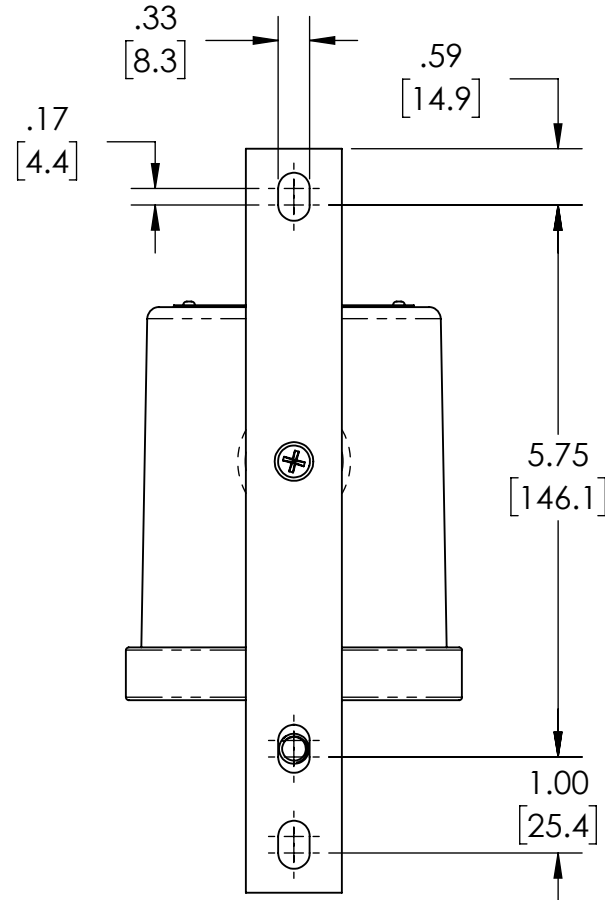
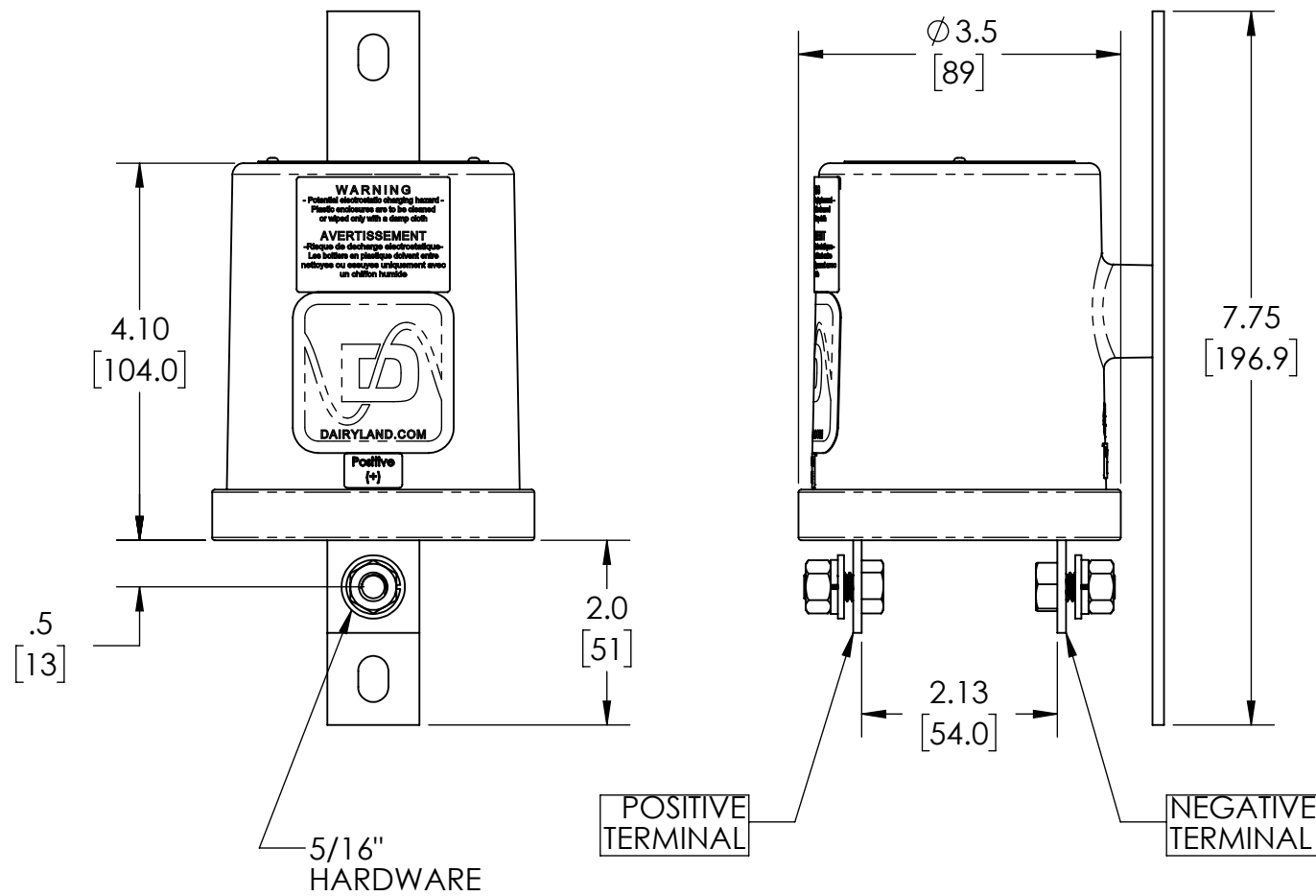
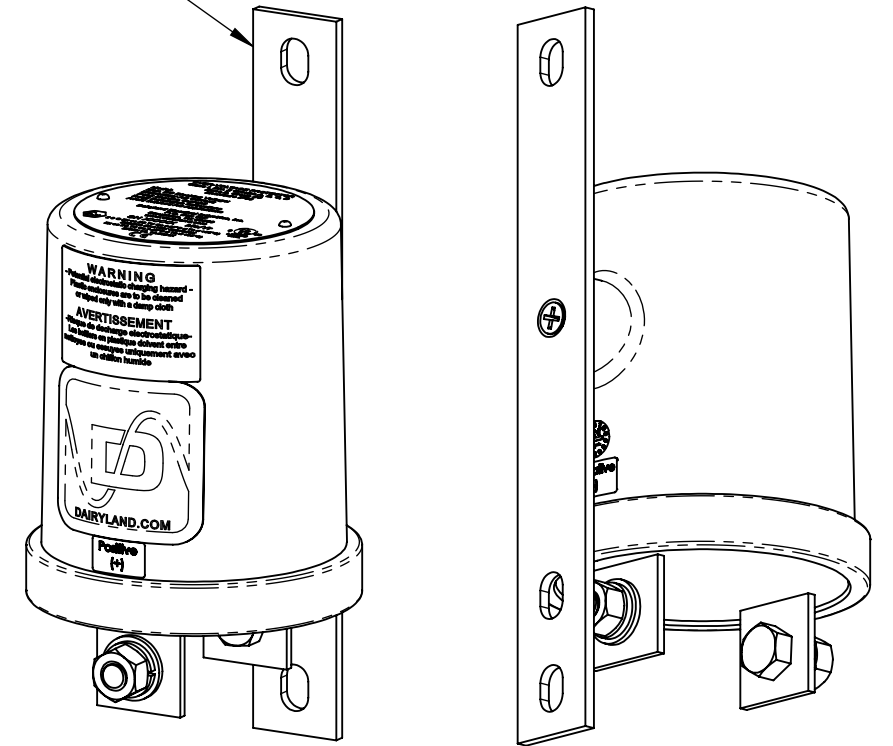
The OVP2 is designed to fail as a short-circuit to assure safety grounding at all times if the unit fails due to excessive AC fault current or lightning current beyond rating.

ATEX AND IECEX COMMENTS

- The device shall be placed into service in accordance with the ratings and limitations stated in the installation and operating instructions.
- No ongoing maintenance is required, as the device is designed to be maintenance-free, and is of solid-state construction with no moving, wearing, or serviceable parts.
- During installation the device should be handled and mounted in a location so that direct impact is minimized.
- Regular testing of the device is not required. Users who desire to verify the operating condition of the device should refer to the section entitled “Field Testing.” Observe all safety precautions described, in addition to industry or company safety practices.
- **WARNING:** Potential electrostatic charging hazard – Plastic enclosures are to be cleaned or wiped only with a damp cloth.
- Products marked CE, Ex II 3 G are Equipment Group II, Equipment Category 3, and comply with the Essential Health and Safety Requirements relating to the design and construction of such equipment given in Annex II to the Directive 2014/34/EU.
- This equipment is intended for use in area in which explosive atmospheres caused by gasses, vapors, mists, air or dust mixtures are unlikely to occur, or are likely to occur only infrequently and for short periods. Such locations correspond to Zone 2 classification according to ATEX Directive 2014/34/EU.
- This equipment complies with standards listed per certificate numbers DEMKO 05 ATEX 0431689X and IECEx UL 14.002X and UL21UKEX2249X.
- This equipment is marked: **CE** **Ex** II 3 G Ex ec IIC T4 Gc



MOUNTING BRACKET



- NOTES:
1. APPLIES TO ALL OVP2 MODELS.
 2. OPTIONAL STAINLESS STEEL MOUNTING BRACKET, PART NUMBER MTG-OVP2, MUST BE ORDERED SEPARATELY IF NEEDED.

ASME Y14.5M 2018 APPLIES 	MATERIAL: NA	DRAWN: JSJ	DATE DRAWN: 01/21/2021	 DAIRYLAND ELECTRICAL INDUSTRIES, INC. P.O. BOX 187 STOUGHTON, WI 53589 608-877-9900 DAIRYLAND.COM		
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