

INSTRUCTIONS

OVER-VOLTAGE PROTECTOR (OVP)



DAIRYLAND
ELECTRICAL INDUSTRIES

ALWAYS RUGGED. ALWAYS RELIABLE.



READ ENTIRE DOCUMENT BEFORE INSTALLING

APPLICATION CONSIDERATIONS

When the OVP is used for DC isolation/AC grounding (or coupling), the OVP is a high impedance device for both AC and DC up to the voltage blocking level selected and an “effective grounding path” (or coupling path) for any voltage that attempts to exceed the voltage blocking level. The blocking voltage (which is user selected at 1 to 4 volts when ordering an OVP) is identified by the “A/B” part of the model number located on the nameplate, where “A” is the negative blocking voltage level and B is the positive blocking voltage level in peak volts. All polarities are referenced from the flexible lead (the negative terminal) to the OVP housing (the positive terminal).

The OVP should only be installed where the steady state DC voltage is less than the blocking voltage selected and where there is no steady state AC voltage present. Before installation, confirm that this condition exists by measuring the AC and DC voltage between the two planned connection points.

RATINGS

The system on which the OVP is installed should be compatible with the ratings on the nameplate of the model ordered. The ratings available and the ratings of this OVP are listed as follows.

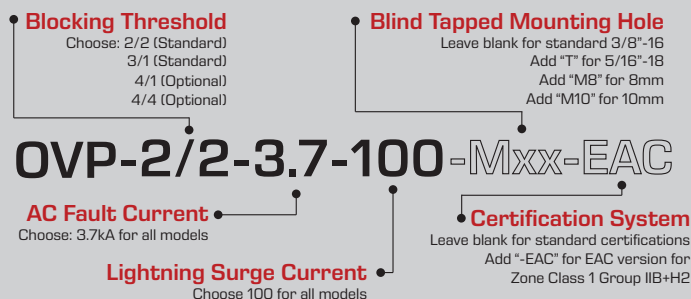
AC Fault Current Ratings (Amps AC-RMS Symmetrical 50/60 Hz)	
Cycles	3.7kA
1	6500
3	5000
10	4200
30	3700

Lightning Impulse Current Rating	
Peak Amperes	100,000
Note: 8x20 microsecond waveform	

The OVP is not rated for steady-state AC current. It is only rated for AC momentary fault current and lightning current. The OVP is not to be used where continuous AC current can flow through the device.

In the event that either of the above ratings are exceeded so that failure would occur, failure occurs in the shorted mode. In the shorted mode the unit will carry rated current, still function as an effective grounding (or coupling) path, but it will not be blocking DC current.

Model Number Chart



Note: For EAC products see separate EAC installation manual available at www.dairyland.com

Certifications

The OVP 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 1, Div. 1, Groups B, C D, and Zone 1, Group IIB + H2

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 1 & 2, Groups B,C,D by UL & C-UL per:
 - UL 1203, 5th Ed. & CSA C22.2 No.30, 3rd Ed.
- Safety Requirements for Electrical Equipment per:
 - UL 61010-1, 3rd Ed. & CSA C22.2 No. 61010-1, 3rd Ed.
 - Overvoltage Protection from Impulse (Lightning) Current: 100kA (8 x 20µs)
 - Enclosure Rating: NEMA 6P
 - Temperature Range: -45°C to +85°C (-49°F to +185°F)

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

- Zone 1, Gas Group IIB + H2, Flameproof “db”
- EN IEC 60079-0: 2018
- EN 60079-1: 2014
- IEC 60079-0: 2017
- IEC 60079-1: 2014-06
- Overvoltage Protection from Impulse (Lightning) Current: 100kA (8 x 20µs)
- Temperature Range: -20°C to +60°C
- Enclosure Rating: IP68

EAC: Russia, Kazakhstan, etc. by NANIO-CCVE:

- Zone 1, Gas Group IIB + H2, Flameproof “d”
- GOST 31610.0-2014 (IEC 60079-0:2011)
- GOST IEC 60079-1-2011
- Temperature Range: -45°C to +85°C



! 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.

NOTICE

Note: Explosion Hazard - Substitution of any component may impair suitability for Class I, Division 1.

DC Leakage Current vs. Voltage

The DC leakage current for any OVP model is typically less than 10 milliamperes at the maximum blocking voltage selected. At normal cathodic protection voltages, the leakage current is less than 1.0 milliamperes which is insignificant to a cathodic protection system.

INSTALLATION INSTRUCTIONS

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 insulated gloves, a shorting cable approximately 3 ft (0.91 m) long with insulated 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 insulated 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 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/Conductor Connections

The OVP should be mounted so that the total length of conductor required is minimized. All conductors have inductance which will cause a significant voltage drop per unit of conductor length under high values of lightning impulse current.

To minimize the voltage developed between the two OVP connection points, install the OVP as close as practical to the required connection points and cut the conductor to the shortest possible length during installation.

For most isolated joint applications the OVP can be installed with about 6 inches (≈ 150 mm) of conductor. The standard conductor length furnished with the OVP is 12" (≈ 300 mm) unless a longer length has been specified. Refer to the attached figure for the mounting option ordered.

For more information on conductor length, please view our web article: [Conductor Length](#).

Mounting Accessories

Numerous mounting accessories are available from Dairyland to aid in the proper installation of the OVP. 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](#).

Polarity

For a visual diagram, see the "Polarity Wiring Diagram" on the next page. The OVP enclosure is the positive (+) terminal and the single conductor is the negative (-) terminal. Connect the negative conductor to the cathodically protected structure and the positive conductor to ground. In isolated joint (or similar) applications where each side of the joint is cathodically protected, connect the negative conductor to the more negative side of the joint.

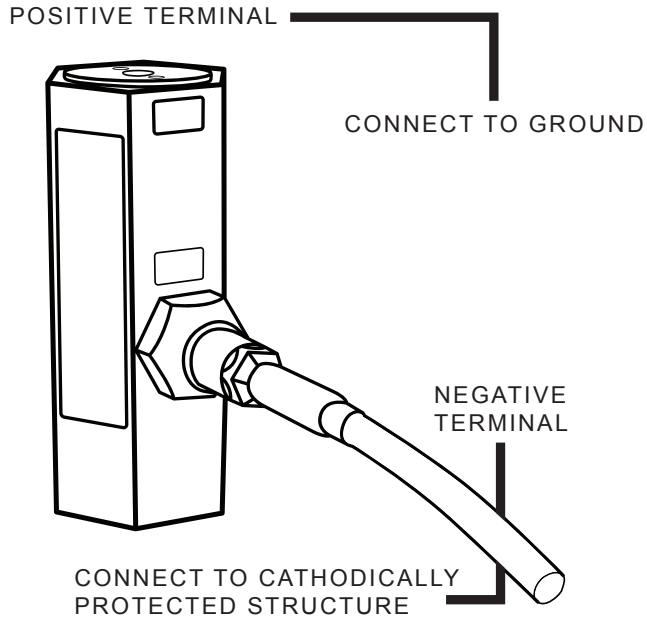
Welding

If preferred and allowed, the OVP lead may be thermo-welded to the structure.

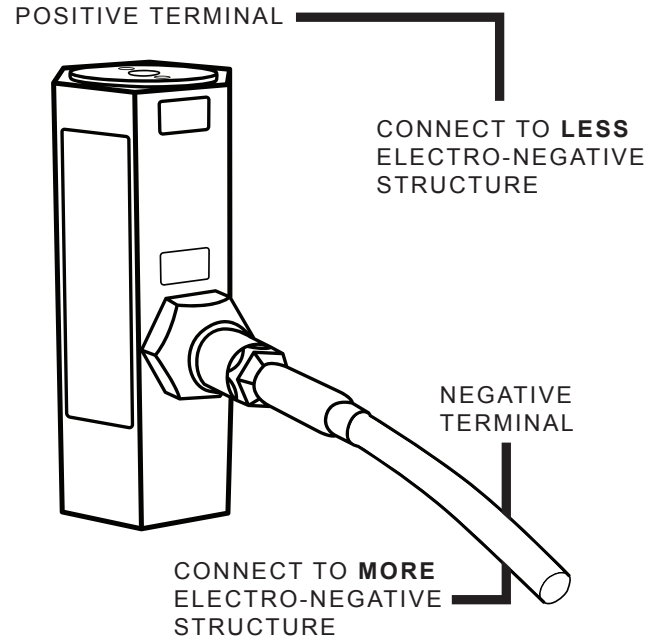


POLARITY WIRING DIAGRAM

FOR CONNECTIONS BETWEEN A CATHODICALLY PROTECTED STRUCTURE AND GROUND





FOR CONNECTIONS BETWEEN TWO DIFFERENT CATHODICALLY PROTECTED STRUCTURES





ATEX/IECEX COMMENTS

- The device shall be placed into service in accordance with the ratings and limitations stated in the installation and operating instructions.
- The OVP can be ordered with various tapped holes in one end for mounting to threaded studs up to 3/8" or M10. The following guidelines must be followed to install in compliance with the OVP ATEX/IECEX certifications:
 1. Apply the TefGel corrosion inhibitor (provided) on the threads of the stud.
 2. Thread a hex nut on the stud so it is 1/2" (12.5 mm) maximum from the end of the stud. This nut will be provided with the stud on which the OVP is to be installed.
 3. Thread the OVP body on the stud to where it almost touches the nut.
 4. If the OVP lead is not oriented in the desired direction to attach the lead and its terminal to the other stud, unscrew the OVP from the stud until the desired lead orientation is obtained.
 5. Hold the OVP in position and securely tighten the hex nut against the bottom of the OVP to complete the connection.
- If the OVP is to be removed from service for any reason, prior to removal, use a current-rated grounding jumper to temporarily connect the two structures being decoupled in the event the pipeline lead rises to an unsafe potential when it is removed from the OVP. If the voltage of the structure is not at a safe touch potential then insulating gloves should be used.
- 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.
- 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.
- This equipment complies with the standards listed on page 1 per certificate numbers: DEMKO 14 ATEX 1211937X and IECEX UL 14.0027X and UL21UKEX2250X.
- This equipment is marked:
 II 2 G Ex db IIB+H2 T5 Gb (-45°C ≤ Ta ≤ +85°C)
 0539

Contact Dairyland Electrical Industries for information on the dimensions of the flameproof joints.



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 OVP 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 OVP 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 OVP being installed. If this is not the case, the OVP will be conducting current, which may adversely affect cathodic protection.

If the cathodic protection system is ON, the DC voltage between the OVP 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 OVP terminals, further testing is required as described below. However, if both sides of the OVP 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 OVP terminals.

The AC and DC current flow through the OVP 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 OVP threshold level selected, thereby indicating an improper application or a failed OVP.

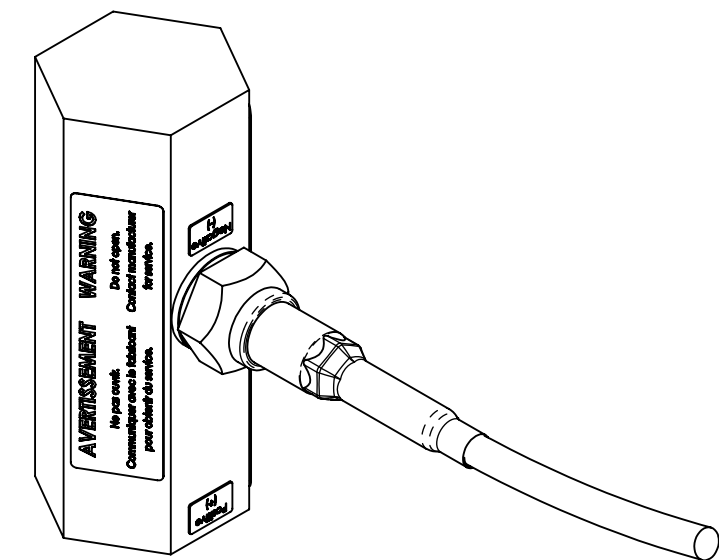
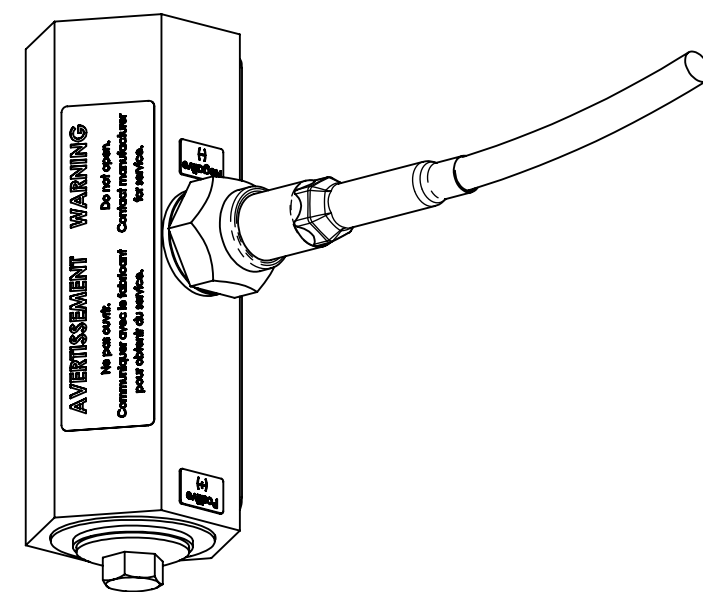
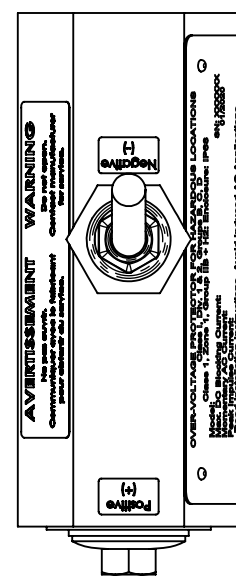
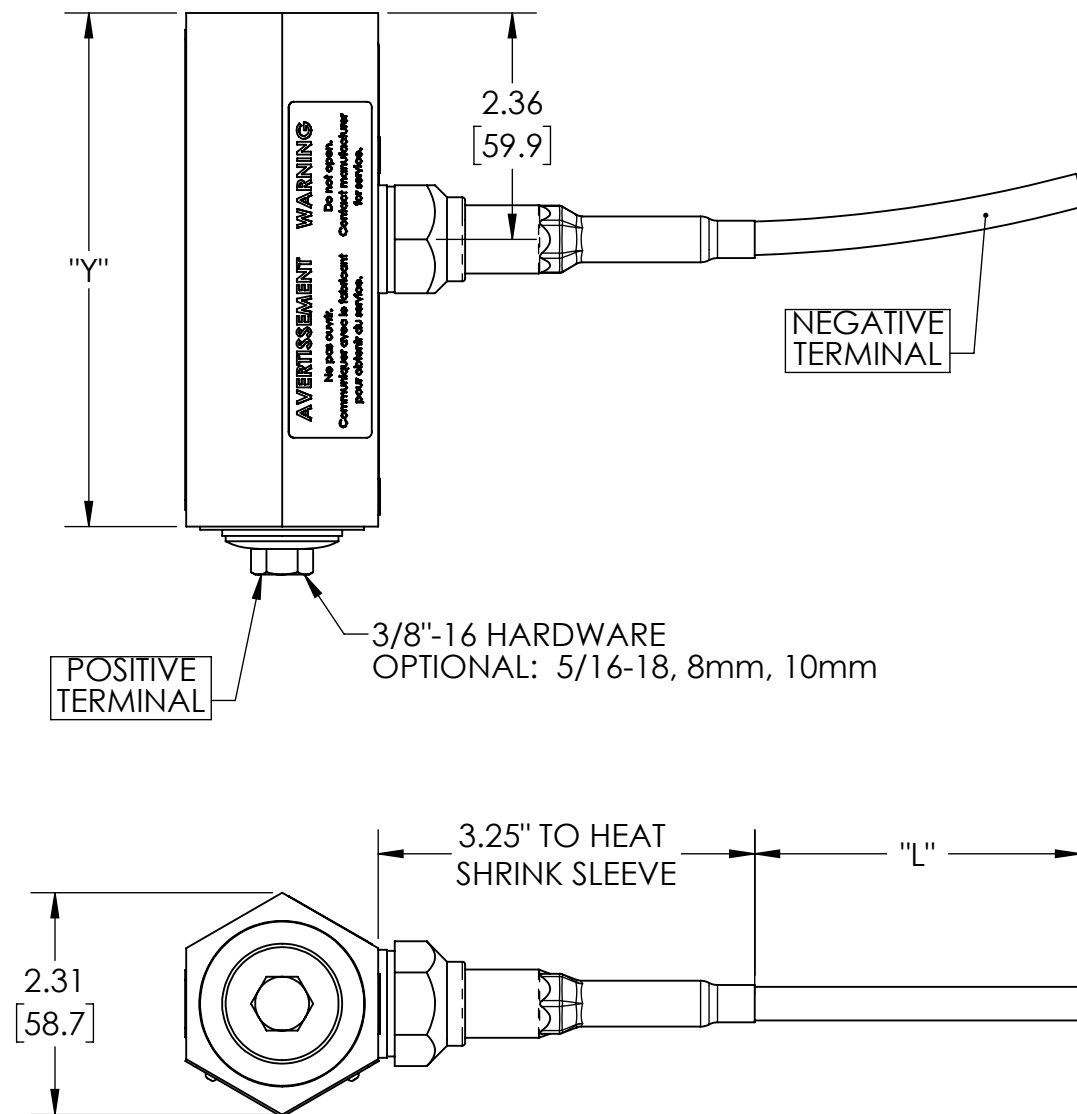
If the absolute voltage across the OVP is less than or equal to the blocking voltage selected and there is measurable current flow, it is possible that the OVP has been damaged from excessive current. The OVP can be more comprehensively checked using a multimeter that has a resistance checking function. 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 OVP so that it is isolated.
2. Connect the positive conductor of the multimeter to the OVP positive (+) terminal, which is the same as the OVP housing, and the negative (-) lead to the OVP 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 OVP may be failed or damaged from excessive current.

If any field test results are inconclusive, or an OVP appears failed, contact Dairyland.

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NOTES:

1. APPLIES TO ALL OVP MODELS
2. BOLTED TERMINAL AND HARDWARE PROVIDED WITH OVP
3. ATTACH CONDUCTOR TO TERMINAL AFTER CUTTING CONDUCTOR TO SHORTEST ALLOWABLE LENGTH
4. STANDARD CONDUCTOR LENGTH: "L" = 12" (305mm) #4 AWG. (25mm SQUARED)
5. FOR OVP-2/1, 2/2, 3/1, 4/1 & 4/2: "Y" = 5.35" (136mm)
6. FOR OVP-3/3, 4/4: "Y" = 6.18" (157mm)

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