



# R-3W2 VOLTAGE INDICATOR

## INSTALLATION GUIDE & OPERATING INSTRUCTIONS

<b>Class 1, Division 2 Hazardous Location</b>		
<b>Indoor</b>	<b>Indoor/Outdoor</b>	<b>Ingress Protection</b>
UL Type 12, 13	UL Type 4X	IP67
<b>Approvals</b>		
UL 508	CSA C22.2 No. 14-13	UL 61010-1 3rd Ed.
CAT III 1000V	CAT IV 600V	CE
CSA C22.2 No. 61010-1-12 3rd Edition		IEC 61010-1-030 1st Ed.

**For technical questions call 1-800-280-9517 and select Option 3 for Technical Support when prompted**

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R-3W2 Voltage Indicators are used to visually notify the presence of both AC & DC voltages (stored energy). This product is intended to be used on Three Phase, 4-wire AC applications. It can also be used in Single Phase, 3-wire AC applications.

## SPECIFICATIONS

AC Operational Voltage Range	AC Single or 3-Phase: 40-600V $3 \sim$ , 50*/60*/400Hz *UL Approval
DC Voltage or Stored Energy Range	30 to 1000V $----$ , (Voltages Line-to-Line or Line-to-Ground)
Maximum Voltage	750V $3 \sim$ or 1000V $----$ @ 1.2 Watts, Operating Ambient Air of 55°C Max.
Detection Thresholds	29V $3 \sim$ , 40V $1 \sim$ , 27V $----$ (typical cut-off)
Temperatures	Operate: -20°C to +55°C (Code T5) Storage: -45°C to +85°C
Terminations	(4) Wires, 8 ft, 18 AWG, 90°C @ 1000V, UL-1452, PVC Insulated w/ Nylon Jacket
Housing	Black Noryl, totally encapsulated including LEDs for environmental protection
O-Ring Seal	Blue VFMQ Fluorosilicone, UL approved material
Indicators	(8) Red Super Bright LEDs



**WARNING** Auxillary device suitable for use in Class I, Division 2 (or Zone 2), Groups A, B, C, D hazardous location, or nonhazardous locations only.

**Class I Groups:** A (acetylene), B (hydrogen), C (ethyl-ether vapors, ethylene or cyclopropane), D (gasoline, hexane, naphtha, benzene, butane, propane, alcohol, acetone, benzol, lacquer solvent vapors, or natural gas).  
**Division 2 :** Ignitable concentrations of gases, vapors, or liquids are not likely present under normal operating conditions.

**Haz Loc Normal Atmospheric Conditions:** a) -25°C to +40°C ambient b) 21% Max. Oxygen concentration per volume c) barometric pressure range of 80 kPa (0.8 bar) to 110 kPa (1.1 bar)



RoHS

Type 4X,  
12, 13

MEASURING EQ.  
IND. CONT. EQ. E256847  
MEASURING EQ. E311256  
HAZLOC E334957

## WIRE IDENTIFICATION



$----$  Direct Current

$\sim$  Alternating Current



Caution



Caution, possibility of electrical shock



**⚠ BE SURE POWER IS SHUT OFF PRIOR TO INSTALLING THIS DEVICE.**

**⚠ CAUTION**

- ALWAYS connect the GRN/YEL (GND) conductor to earth ground.
- Location of device and internal hardware/wiring MUST allow free operation of ON/OFF disconnect mean.
- Means of anti-rotation is required (see knock-out for one or more tab locations).
- The O-ring material is FVMQ fluorosilicone. Please refer to a Chemical Compatibility chart for your application(s).
- Do not operate above 750V  $\sim$  or 1000V  $\text{---}$  @ 55°C ambient or >2000m altitude or >80% RH.
- If this product is used in a manner not herein prescribed, the protection provided may be impaired.
- PESD conductors must be protected over their entire length from damage to conductor insulation that would cause a short circuit or ground fault to occur. Please refer to the protection methods outlined in Paragraphs 29.4.2 and 29.4.4. b) of UL 508A.

**⚠ WARNING**

Explosion Hazard - Do not disconnect equipment while the circuit is live or unless the area is known to be free of ignitable concentrations.

**⚠ WARNING**

Use of an Overcurrent Protection Device or Fuse is "NOT RECOMMENDED" when installing these devices in safety applications for verifying both voltage presence and voltage absence condition. A blown fuse or a tripped circuit breaker connected in line with this device could potentially lead to a false negative indication of voltage which is otherwise present. This device has been tested as equivalent to overcurrent protection for the application of tap conductor requirements.

**⚠ WARNING**

Cancer - Reproductive Harm. This product can expose you to chemicals which are known to the state of California to cause cancer, birth defects or other reproductive harm. For more information, go to: [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)



## INSTALLATION INSTRUCTIONS

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1. Follow all Local, State, and National Electrical Codes when installing this equipment. Overcurrent protection is not recommended. If device leads are either extended beyond the supplied length or the device installation extends beyond the enclosure where the leads are terminated, overcurrent protection of the supply leads may be required by Local, State or National Electric Codes. The installation of overcurrent protection shall be in accordance with the requirements in the NEC (NFPA 70) or end product standard(s) when used in final installation.
2. To meet UL TYPE 4X, 12 or 13 sealing requirements, mount on a flat surface of an enclosure qualifying for a respective TYPE or NEMA rating or equivalent elevated ambient rating.
3. Locate the unit in visual proximity to the control panel ON/OFF disconnect and within wiring distance to incoming Main Lines and Earth Ground. Verify there is no interference with the free operation of the ON/OFF disconnect mechanism.
4. **For Standard Mount**, refer to knock-out pattern on the following pages and Control Drawing No. 196 for assembly.  
**For Low Profile Mount** with R-3W2-KB kit, refer to knock-out pattern on the following page and Control Drawing No. 198 for assembly.
5. For Delta configured power, connect the 1 bar, 2 bar & 3 bar black wires to L1, L2, & L3 respectively (Fig. 1) on the fused or disconnect side of the 3-Phase line voltage. The Green/Yellow stripe (Grn/Yel) wire **MUST** be connected to Earth Ground. (Fig. 3)
6. Wye configured power with grounded Neutral is connected the same as for Delta in step 5. The Grn/Yel wire **DOES NOT** connect to the neutral but to non-current carrying Earth Ground. **Caution: The neutral will not be monitored for voltage by the Detector, only Phase-to-Phase and Phase-to-Ground voltage will be detected. To include neutral monitoring go to step 7.**
7. Ungrounded or high resistance Wye configured power requires (2) additional units to include all possible voltages the Neutral line introduces. Wire as shown in Figure 2.

1. **Verifying Proper Operation:** First disconnect all equipment that may introduce a hazard and notify personnel before powering the panel!
- 2) **TURN POWER ON.** With normal voltage applied, the L1, L2, and L3 indicator pairs will illuminate at rates according to the applied voltage (See table below).
- 3) **GND Indicator Pair Operation:** For isolated Delta or 3-Phase WYE applications, it is normal for the “GND” indicator pairs not to illuminate unless a phase is lost producing an unbalanced condition. This peculiarity results when the Phase-to-Phase voltages are balanced resulting in no current to a Neutral connection. The R-3W-SR indicators are current driven; therefore, no net current in the R-3W-SR ground line (connected to Neutral) will cause the “GND” indicators to not illuminate. A leakage resistance path from any phase-to-ground from 2-7 Meg ohms producing a corresponding current from 7-67  $\mu$ A in the “GND” wire is adequate for the “GND” indicators to flash..

To complete proper installation, verify grounding of the GND lead-wire. Under normal operation, the power system determines if GND LEDs illuminate.

Proceed to GND verification steps below.

- 1) Apply power to the R-XXX, if the GND LEDs do not illuminate, proceed to step 2.)
- 2) Remove power and re-establish an electrical safe work condition to allow one phase lead-wire to be disconnected from its source by either disconnecting wire or pull a fuse.
- 3) Re-apply power and verify that the GND LEDs now illuminate to insure a proper ground connection.

Indicator Flash Rates (L1, L2, L3, GND)							
$3 \sim$ Line-to-Line (VAC)	<29	30	120	240	480	600	750
Flashes/Sec (typical)	0	1.3	4.2	5.8	7.3	8.0	8.8
$---$ Or Stored Energy (VDC)	<27	.0	48	110	300	600	1000
Flashes/Sec (Typical)	0	1.6	2.5	4.5	6.9	8.8	9.1



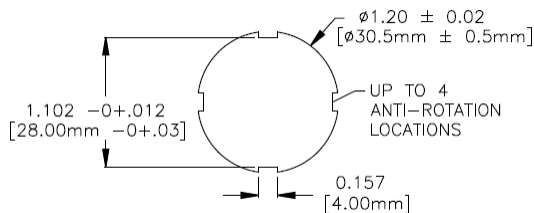
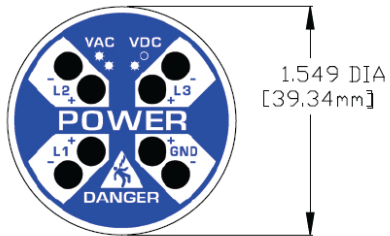
- 4) Complete installation by removing power and reconnecting the phase lead-wire or fuse and reapply power and re-verify that L1, L2, & L3 LEDs illuminate.

## MAINTENANCE

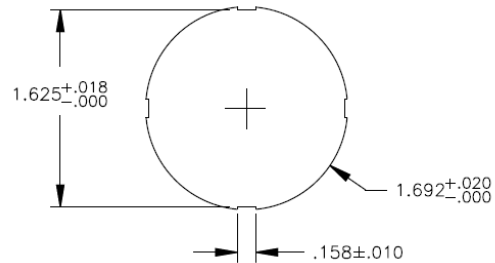
- 1) For O-Ring inspection, follow the respective Control drawing directions on the following pages.
- 2) For Cleaning the front black label or the information sticker, use only clean water and a soft cloth.

**⚠ WARNING** BEFORE OPENING A PANEL, TURN POWER OFF! (Steps 1-8 must first verify proper operation of indicators.) SAFETY PROCEDURES STILL APPLY: Before working on an electrical conductor, verify zero electrical energy with proper voltage testing instrument and the proper procedure as per NFPA 70E Article 120.5.

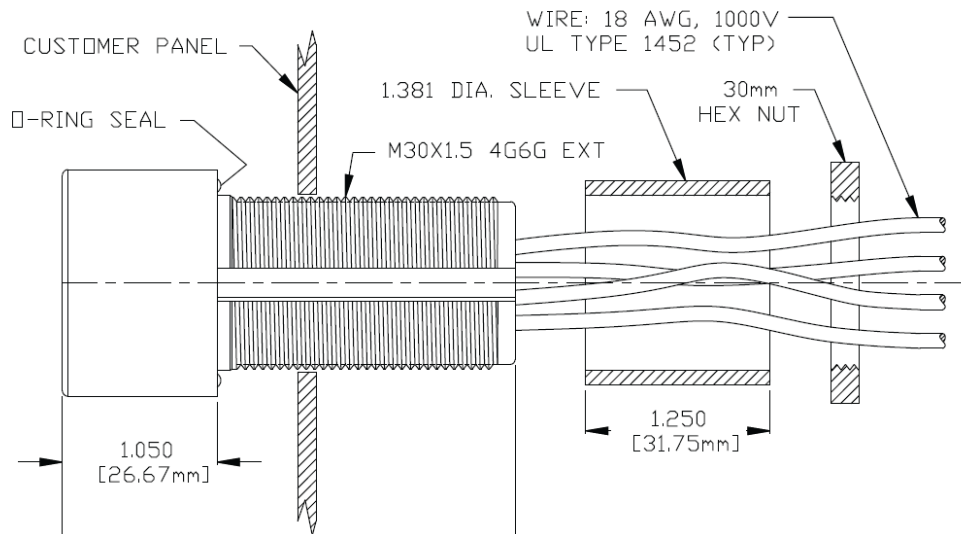
**⚠ WARNING** COUPER L'ALIMENTATION AVANT D'OUVRIR UN PANNEAU a (Les étapes 1 à 8 servent tout d'abord à vérifier le bon fonctionnement des indicateurs.) LES CONSIGNES DE SÉCURITÉ SONT TOUJOURS APPLICABLES : avant de travailler sur un conducteur électrique, vérifier que l'énergie électrique est nulle à l'aide d'un instrument de détection de tension convenable et la procédure appropriée selon NFPA 70E Article 120.5.



**Standard Knockout**

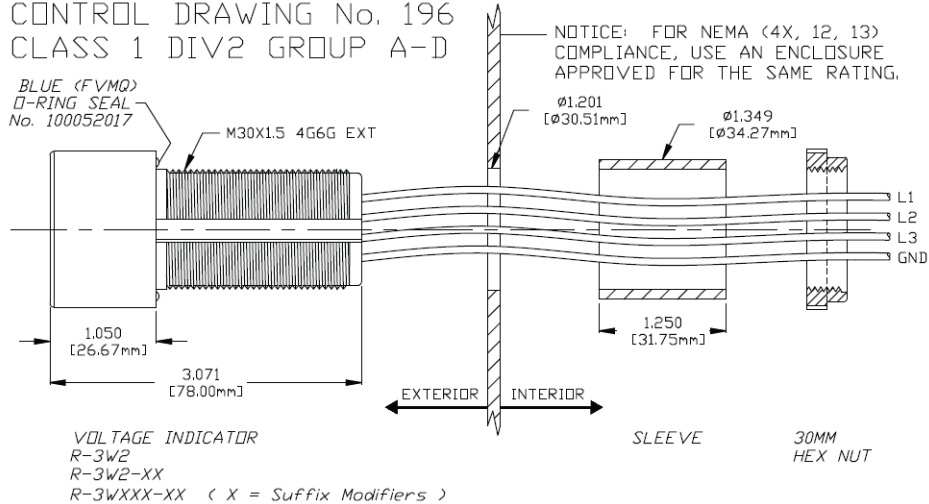


**Low Profile Knockout**





CONTROL DRAWING No. 196  
CLASS 1 DIV2 GROUP A-D



Installation Notes:

1. The mounting surface must be clean and smooth. Tighten the Hex nut until the head of the R-3W2 seats against the mounting surface so the O-ring is fully compressed. Do not overtighten.

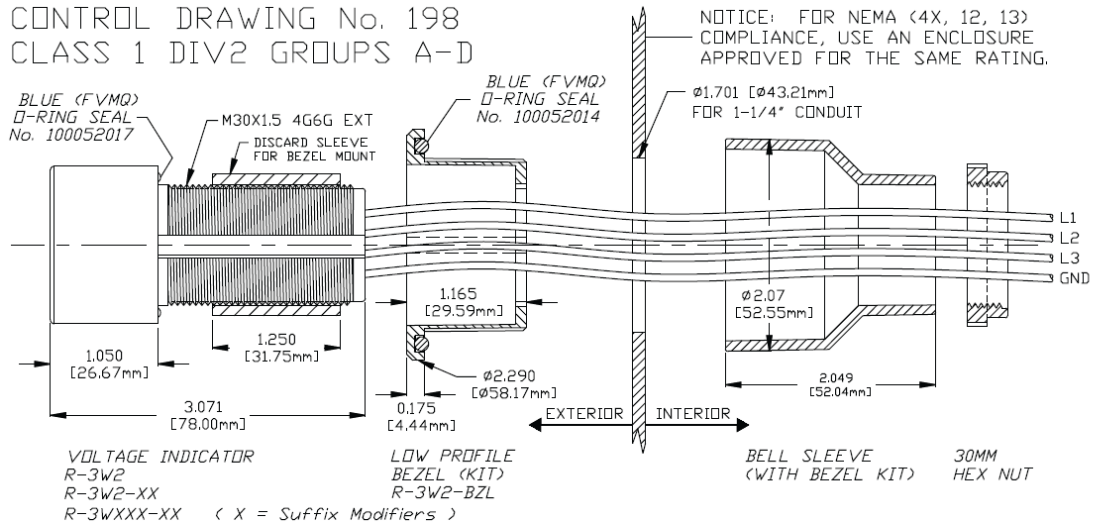
Uninstalling for Inspection:

- ⚠ WARNING: EXPLOSION HAZARD. DO NOT UNINSTALL DEVICE UNLESS POWER HAS BEEN DISCONNECTED OR THE AREA IS KNOWN TO BE FREE OF IGNITIBLE CONCENTRATIONS OF FLAMMABLE GASES OR VAPORS.
- ⚠ WARNING: EXPOSURE TO SOME CHEMICALS MAY DEGRADE THE SEALING PROPERTIES OF THE FLUOROSILICONE (FVMQ) O-RING SEAL.
  1. Periodic inspection of the O-ring seal is recommended. Replace O-ring if any degradation is found.
  2. For replacement O-ring, use part number 100052017.
- ⚠ WARNING: SUBSTITUTION OF O-RING No. 100052017 MAY VOID SUITABILITY FOR DIV 2.





CONTROL DRAWING No. 198  
CLASS 1 DIV2 GROUPS A-D



Installation Notes:

1. The mounting surface must be clean and smooth. Tighten the Hex nut until the outside ledge of the Bezel seats against the mounting surface so the O-ring is fully compressed. Do not overtighten.

Uninstalling for Inspection:

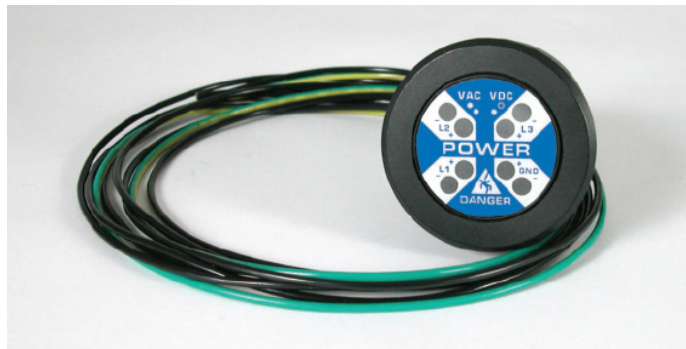
- ⚠ WARNING: EXPLOSION HAZARD. DO NOT UNINSTALL DEVICE UNLESS POWER HAS BEEN DISCONNECTED OR THE AREA IS KNOWN TO BE FREE OF IGNITIBLE CONCENTRATIONS OF FLAMMABLE GASES OR VAPORS.
- ⚠ WARNING: EXPOSURE TO SOME CHEMICALS MAY DEGRADE THE SEALING PROPERTIES OF THE BLUE FLUOROSILICONE (FVMQ) O-RING SEALS.
  1. Periodic inspection of the (2) O-ring seals is recommended. Replace the O-ring(s) if any degradation is found.
  2. For replacement of the R-3W2 O-ring, use part number 100052017. For replacement of the Bezel O-ring, use part number 100052014.
- ⚠ WARNING: USING O-RING SUBSTITUTION PARTS MAY VOID SUITABILITY FOR DIV 2.

### Standard Mount



R-3W2

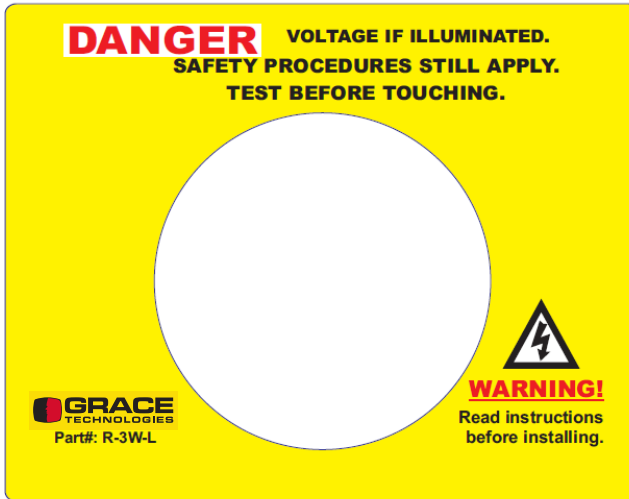
### Bezel Mount



R-3W2 & R-3W2-BZL



**Many other variations available upon request.  
Please call 1-800-280-9517 or visit [www.pesd.com](http://www.pesd.com)**



**R-3W-L•**



**R-3W-NP-F•**

\*These labels install around the R-3W with no affect on its UL certification. The lables are not UL approved.



SS-R3W2-IG-EN 2306