

VOLTAGE INDICATORS

Illuminate whenever hazardous voltage is present in any individual phase



VOLTAGE INDICATOR FEATURES

- ▶ **Voltage Indicators** are Permanent Electrical Safety Devices (PESDs) that visually represent presence of voltage with flashing or non-flashing redundant LED lights.
- ▶ Typically hardwired to the load side of disconnect, **Voltage Indicators** illuminate whenever hazardous voltage is present in any individual phase.
- ▶ The standard **Voltage Indicator (R-3W)** is a one-size fits-all solution that detects 3-phase AC/DC voltage from 40-600VAC or 30-1000VDC
- ▶ Safely and productively validates zero energy presence and enhances compliance to OSHA & NFPA 70E/CSAZ462, when installed and verified by a qualified electrician and incorporated into the facility's electrical safety procedure.

FOR MORE INFORMATION VISIT PESD.COM OR CALL 1.800.280.9517



RoHS 







OPERATION

Our **Grace PESD® Voltage Indicators** are CAT III & CAT IV rated, and UL 61010-1 listed self-powered permanently installed devices that visually represent presence of voltage with flashing or non-flashing, redundant LED lights. Typically hardwired to the load side of an electrical feeder or a disconnect switch, voltage indicators illuminate whenever hazardous voltage is present in any individual phase.

Voltage Indicators can be easily installed on the door or the flange of an electrical cabinet using a standard 30mm push button hole. Voltage indicators greatly assist task qualified personnel with enhanced productivity and reduced risk while performing mechanical and electrical LOTO tasks. **Grace Voltage Indicators** verify the release of stored electrical energy per Article 120.5(4) of NFPA 70E 2018

TECHNICAL SPECIFICATIONS

			CAT III & IV RATED			
						
COMPONENT CODE	R-3W	R-3W-SR	R-3W2	R-3F2	R-1VL003	R-1VH003
Voltage Indicator	Flashing LEDs	Non-Flashing LEDs	Flashing LEDs	Flashing LEDs	Flashing LEDs	Flashing LEDs
Voltage Type	AC/DC				AC	
Mounting Location	External (door mounted)				Internal (direct bolt-on)	
Voltage to Door Required	Yes			No		
Lead Connections	3 Phase, 4 Wire				Individual Phase	
Storage Temperature Range	-45°C to + 85°C				N/A	
Operational Temperature Range	-20°C to +55°C				N/A	
Operational Voltage Range	40 - 600 VAC 50/60/400Hz, 30 - 1000VDC	35 - 600 VAC 50/60/400Hz, 30 - 1000VDC	40 - 600 VAC 50/60/400Hz, 30 - 1000VDC	20 - 600 VAC 50/60/400Hz, 20 - 1000VDC	2 - 15kV	15 - 43kV
Wiring Specifications	PVC Insulated with Nylon Jacket, 6ft, 18 AWG, 90°C @ 1000 Volts, UL-1452				N/A	
Fiber Optic Length	N/A			Available in: 12", 24", 36", 48", and 72"		N/A
Installation	30mm pushbutton hole				1/2" bolt hole	
Certifications	cUL Listed (#E334957) Type 4X, 12, 13		cUL Listed (#E334957) Type 4X, 12, 13 Class 1 Div 2 Group A, B, C & D, IP67, CE		None	

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Warning: Verify an electrical conductor has been de-energized using an adequately rated test instrument before working on it. Follow appropriate Energy Control (Lockout/Tagout) procedures as per OSHA Subpart S.

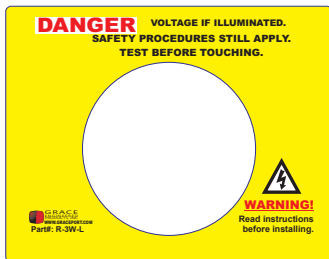
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COMBINATION UNITS

Grace PESD® Combination Units take our voltage indicator and portal PESDs and couple them together with our custom labels. With our voltage indicator and portal connected to the same source, a task qualified worker or a qualified electrician can perform both presence and absence of voltage tests by using either a Non-Contact Voltage Detector (NCVD) pen or an adequately rated portable test instrument. Combination units are available to order with custom procedure labels and NCVD pens.



LABELS



Standard Label
R-3W-L*



Label for Bezel
R-3W-KB-L*

*These labels install around the R-3W Series Voltage Indicators. The labels are not UL approved.

Custom label variations available upon request. Please call 1-800-280-9517 for more information.

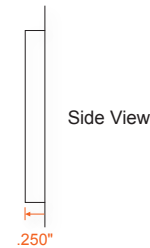
ACCESSORIES



Voltage Indicator with Bezel
Front View



Back View



Side View

Bezel Kit

Bezel and Voltage indicator cannot be purchased separately.

- R-3W Voltage Indicator with Bezel.....R-3W-KB
- R-3W-SR Voltage Indicator with Bezel.....R-3W-SR-KB
- R-3W2 Voltage Indicator with Bezel.....R-3W2-KB

Door mount kit

*Applies to R-3W, R-3W2, R-3W-SR
Voltage Indicator sold separately.*

- Door Mount Kit with 3' cable.....R-3W-DR-C3
- Door Mount Kit with 4' cable.....R-3W-DR-C4
- Door Mount Kit with 6' cable.....R-3W-DR-C6

1 1/2 conduit vertical

*Applies to R-3W, R-3W2, R-3W-SR
Voltage Indicator sold separately.*

- 1 1/2 Conduit vertical with VI nameplate (not shown).....R-3W-NPT150-NP

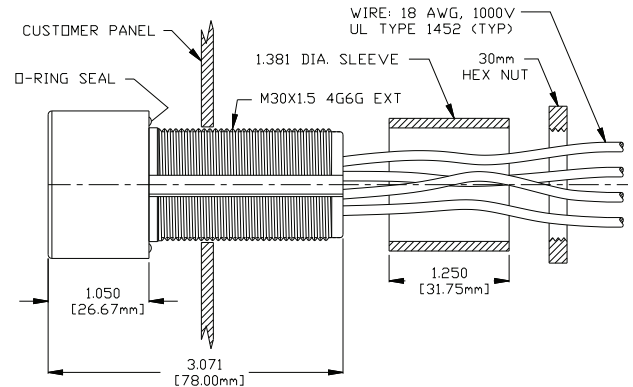
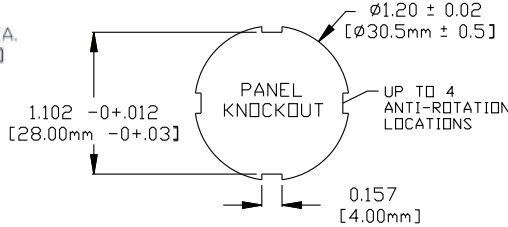
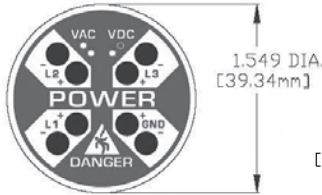
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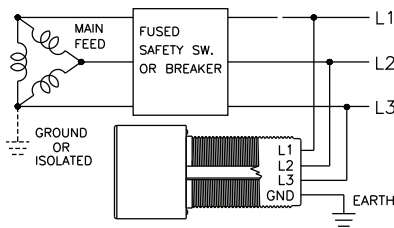
R-3W SERIES DOOR CUTOUT FOR MOUNTING



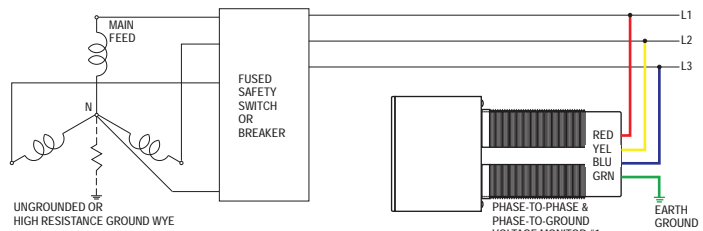
R-3W SERIES WIRING CONFIGURATIONS

AC APPLICATIONS

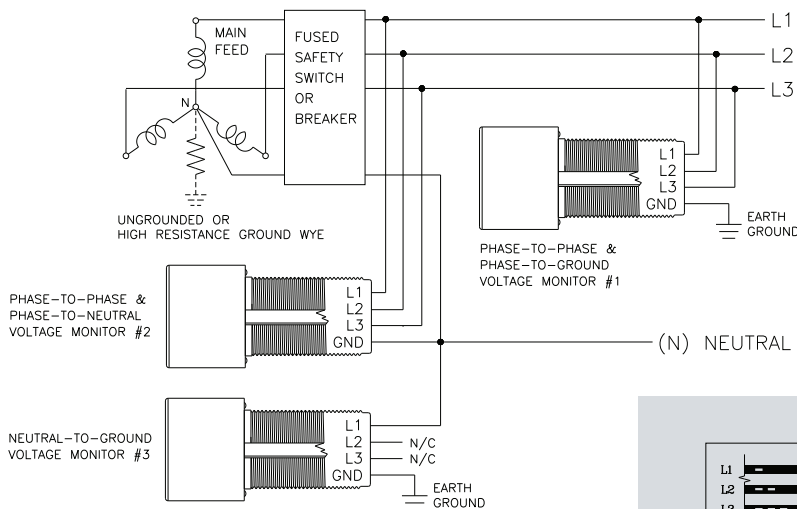
THREE PHASE DELTA, 3W + GND



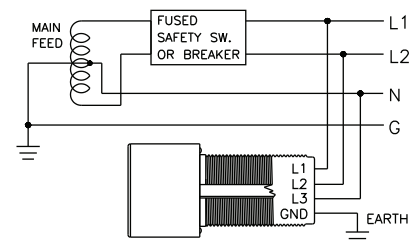
UNGROUNDED OR HIGH RESISTANCE GROUND WYE



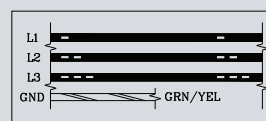
THREE PHASE WYE, 4W + GND



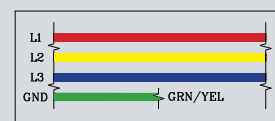
SINGLE PHASE, 3W + GND



WIRE IDENTIFICATION



Applies to R-3W2 and R-3F2



Applies to R-3W and R-3W-SR

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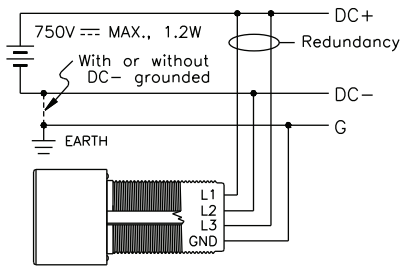
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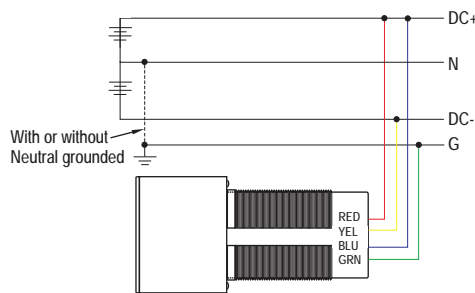
R-3W SERIES WIRING CONFIGURATIONS (CONTINUED)

DC APPLICATIONS

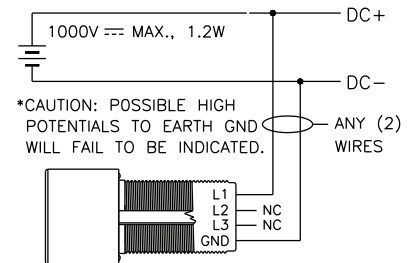
**DC SINGLE SOURCE, 2W + GND
SAFETY APPLICATION**



DC SPLIT SUPPLY 3W + GND



**DC SINGLE SOURCE, 2W ONLY
NON-SAFETY APPLICATION**



Looking for a 5-wire option? Refer to the Flex-Mount Voltage Indicator datasheet for more information.

R-3W SERIES TRUTH TABLE

Condition	L1	L2	L3	GND
Color	Red	Red	Red	Red
Normal: Delta System with Isolated Ground	●	●	●	⊗
Normal with ∅ to Ground Leakage or Short	●	●	●	●
∅ Loss: L2 Open with Isolated Ground	●	⊗	●	⊗
∅ Unbal: Isolated Ground	●	●	●	⊗
Wye system with Grounded N (Not typically recommended for use with 4-Wire. Recommend using 5-Wire where applicable)				
L2 Loss: Wye System with Grounded N*	●	⊗	●	●
∅Unbal: Wye System with Grounded N*	●	●	●	●

On (illuminated)=● Off=⊗ Phase=∅ *Grounded N= N (Neutral) directly grounded or with resistance ground

TRUSTED INDICATION.

MORE PLACES.

MOTOR DISCONNECTS · SAFETY SWITCHES

BREAKER PANELS · GENERATORS AND MORE






IP67

CAT III & IV Rated

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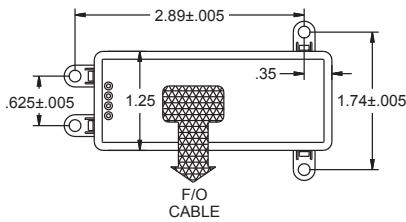
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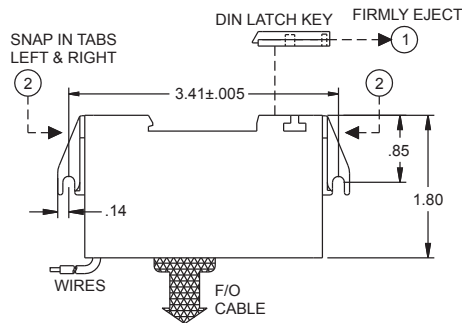
R-3F2 MOUNTING DETAILS

Note: Vertical or side mount requires snap-in installation of respective mounting tabs (hardware included).

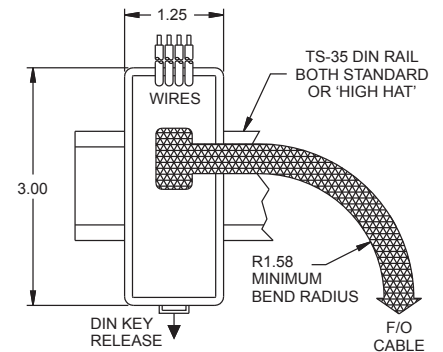
VERTICAL MOUNT



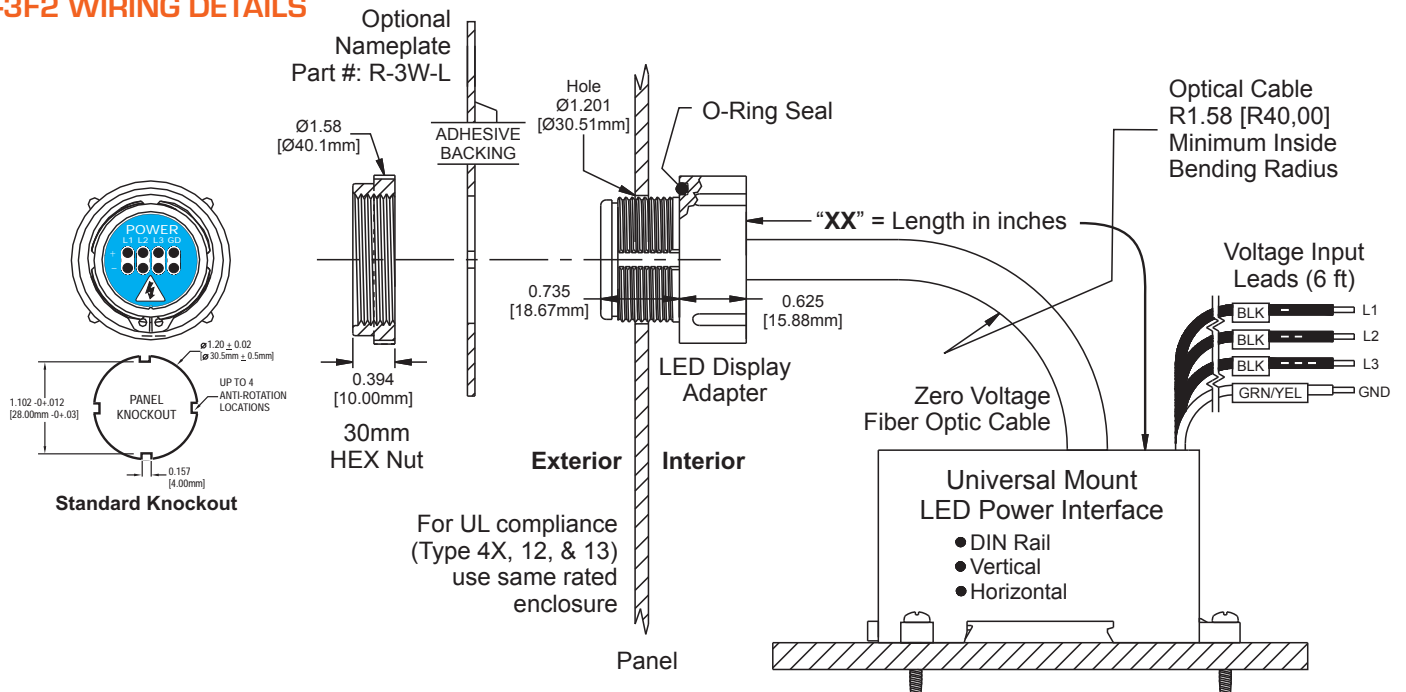
SIDE MOUNT



DIN RAIL MOUNT



R-3F2 WIRING DETAILS



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R-1V SERIES MEDIUM VOLTAGE INDICATOR



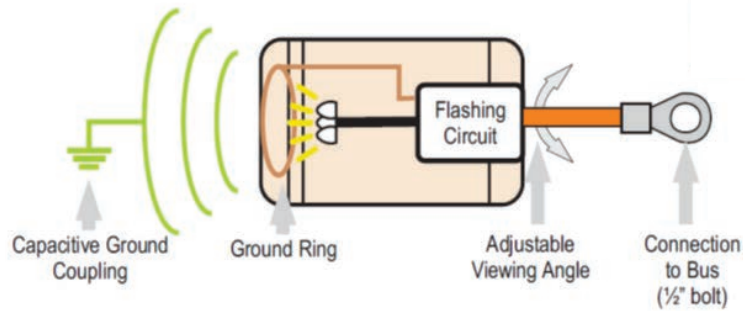
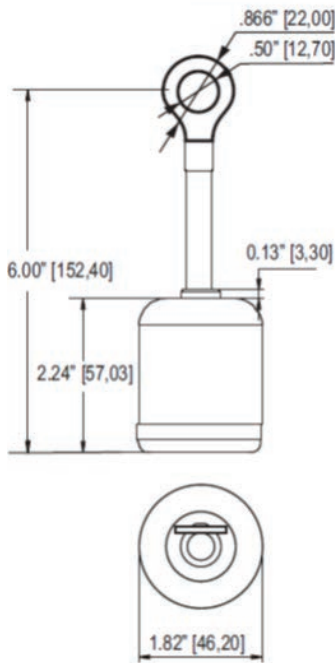
Medium V

voltage inside a MV cabinet. The indicator directly bolts on to the main busbar using a ½” ring style connector and uses capacitive coupling between the device and ground for completing

indicator’s LED is determined by the line voltage, distance to the adjoining phases, and distance of the ground plane. Flash rates of the indicators are optimized to alert at least once in every 3 seconds.*

Disclaimer: It is recommended that an installed medium voltage indicator flashes at least 20 times per minute. If the flash rate is less than 20 times per minute, do not use the product in this application.

R-1V SERIES MEDIUM VOLTAGE INDICATOR DETAILS



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FREQUENTLY ASKED QUESTIONS

Q: How do I know if the PESD is working?

A: Once PESDs are installed and verified by a qualified electrician and documented in the drawings and safety procedures, a task qualified person can identify the status of the device functionality from outside the cabinet. For example, if ANY of the LEDs are "ON" in a voltage indicator after throwing the disconnect switch to "OFF" this triggers additional tests and verification of the deenergized state by a qualified electrician.

Q: What is CAT III & CAT IV rating and why is it important for PESDs?

A: The CAT III & IV ratings defines the overvoltage installation categories that applies to low voltage systems of <1000Volts test equipment as defined in IEC 1010 and UL61010-1 standards. The rating of our voltage indicators allows their use as permanently mounted test equipment used in fixed installations such as switchgear, MCCs, bus and feeder in industrial plants and low voltage connections made to utility power.

Q: Do the R-3W series voltage indicators have internal short circuit protection?

A: Yes, the voltage indicator is protected by high impedance circuitry and recognized components that limit the power to 1.2watts @ 750 Volts AC. The following chart gives the phase to ground short circuit currents.

Voltage Indicator included Fault Current (PHASE-TO-GROUND SHORT)

3- Phase Line-To-Line (VAC)	30	120	240	480	750
0 OHM Phase-To-Ground Current (µA)	28	108	219	455	730

Q: Do PESDs satisfy the NEC feeder tap rule?

A: Yes, the PESDs have a built-in high impedance between the feeder line connecting leads and the circuitry, hence it satisfies the NEC 10ft feeder tap rule without overcurrent protection.

Q: Why the GND LEDs are "ON" in my delta connected system with isolated ground?

A: On a balanced 3 Phase, Delta Configuration, the GND light will be off. If it is on, it is either because of an unbalanced system or voltage on the GND. Test the system to ensure balance, as little as 11% voltage unbalance will start to turn on the LEDs and will be fully illuminated by 15%. (Percentage is calculated by $(AV-UV)/AV$ where AV=Average Voltage and UV=Unbalanced Voltage. Check to ensure no voltage on ground. At as little as 15V, the GND lights will start to come on.)

Q: Do I need over current protection fuses with my voltage indicator?

A: Most voltage indicators installed are not fused because it created additional failure points. Some codes or company regulations will require fusing and the indicators will function without any problem.

Q: Do PESDs have an output relay to connect to my PLC or an alarm circuit?

A: No, PESDs do not have an output relay or auxiliary contacts. These devices are meant for verifying the presence and absence of voltage at the connected source only.

indicators?

A: Fiber optic voltage indicators are ideal for use in the dead front electrical cabinets or in cabinets where the voltage leads are not allowed to the door.