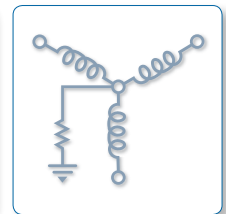
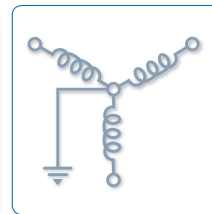
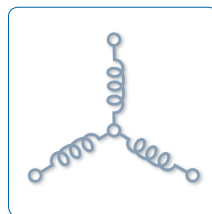
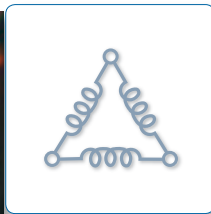




Absence of Voltage Tester (i-AVT)



ABOUT I-GARD

I-Gard's commitment to electrical safety provides both industrial and commercial customers with the products needed to protect their electrical equipment and the people that operate them.

As the only electrical-safety focused company whose product portfolio includes neutral grounding resistors, high-resistance grounding systems and optical arc mitigation, we take pride in our technologies that reduce the frequency and impact of electrical hazards, such as arc flash and ground faults.

For those customers who have purchased from us over the last 30 years, you know us for the quality and robustness of our products, our focus on customer service and technical leadership. We build on this foundation by investing in developing new products in electrical safety education - including EFC scholarship program - by actively participating in the IEEE community programs on technical and electrical safety standard, and working with local universities at discovering new technologies. We remain unrelenting in our goal of improving electrical safety in the workplace.

Our commitment to excellence is validated by long-standing relationships with industry leaders in fields as diverse as petroleum and gas, hospitals, automotive, data centers, food processing, aerospace, water and waste water plants, and telecommunications. We provide our customers with the product and application support required to ensure that their electrical distribution system is safe and reliable.

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IMPORTANT

Each Absence of Voltage Tester and its auxiliary parts, are carefully inspected before being packed in specially designed cartons. Any unit received should be examined immediately upon receipt. If damage or indication of rough handling is apparent, a claim should be filed with the transport company immediately. I-Gard should be notified promptly if replacements for damaged goods are necessary. If units received are not installed immediately they should be stored in their original containers in an area free of dust and moisture.

1. INTRODUCTION

The I-Gard i-AVT is a panel accessory that indicates the presence of hazardous voltage and allows the operator to perform a test to confirm that hazardous voltage is not present. The i-AVT can be used for voltages up to 600VAC.

The i-AVT is comprised of a main control unit and a display unit. The display unit is connected to the control unit via a Cat5 cable. The control unit is mounted in the interior of the panel and has dimensions of 130mm x 130mm x 77mm (5.1" x 5.1" x 3").



Figure 1.0: i-AVT System

2. FEATURES

- Used to provide positive indication that voltage is not present
- Powered directly from 3 phases with supercapacitor technology for offline power
- Supervisory circuitry ensures proper connection of sensors to the system and is continually monitored
- Bright LEDs with clear indication
- Simple to use TEST button
- Small footprint display unit

3. TYPICAL APPLICATION

The i-AVT is typically installed in an electrical panel where its use:

- Supplements zero-energy checks that are traditionally performed by personnel prior to performing work that may expose them to hazardous voltage
- Provides indication that equipment is live

A typical installation system diagram is shown in Figure 3.0 below, where the i-AVT is used to monitor the load side of a disconnect.

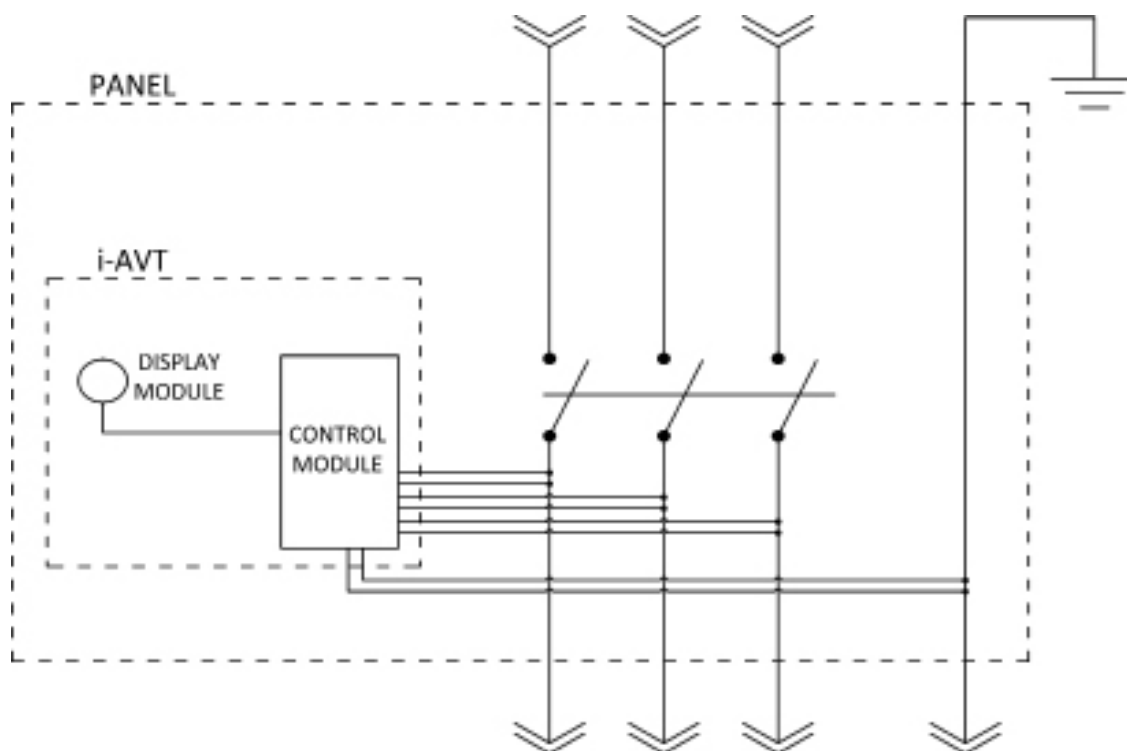


Figure 3.0: Typical i-AVT Installation Drawing

4. PARTS INCLUDED

The i-AVT system includes the following components:

- i-AVT Control Unit complete with sensor leads
- i-AVT Display Unit
- Cat5 cable with connectors
- Mounting tabs
- Instruction sticker

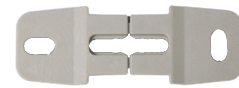


Figure 4.0: Mounting Tabs



Figure 4.1: i-AVT Control Unit



Figure 4.2: i-AVT Display



Figure 4.3: Cat5 Cable

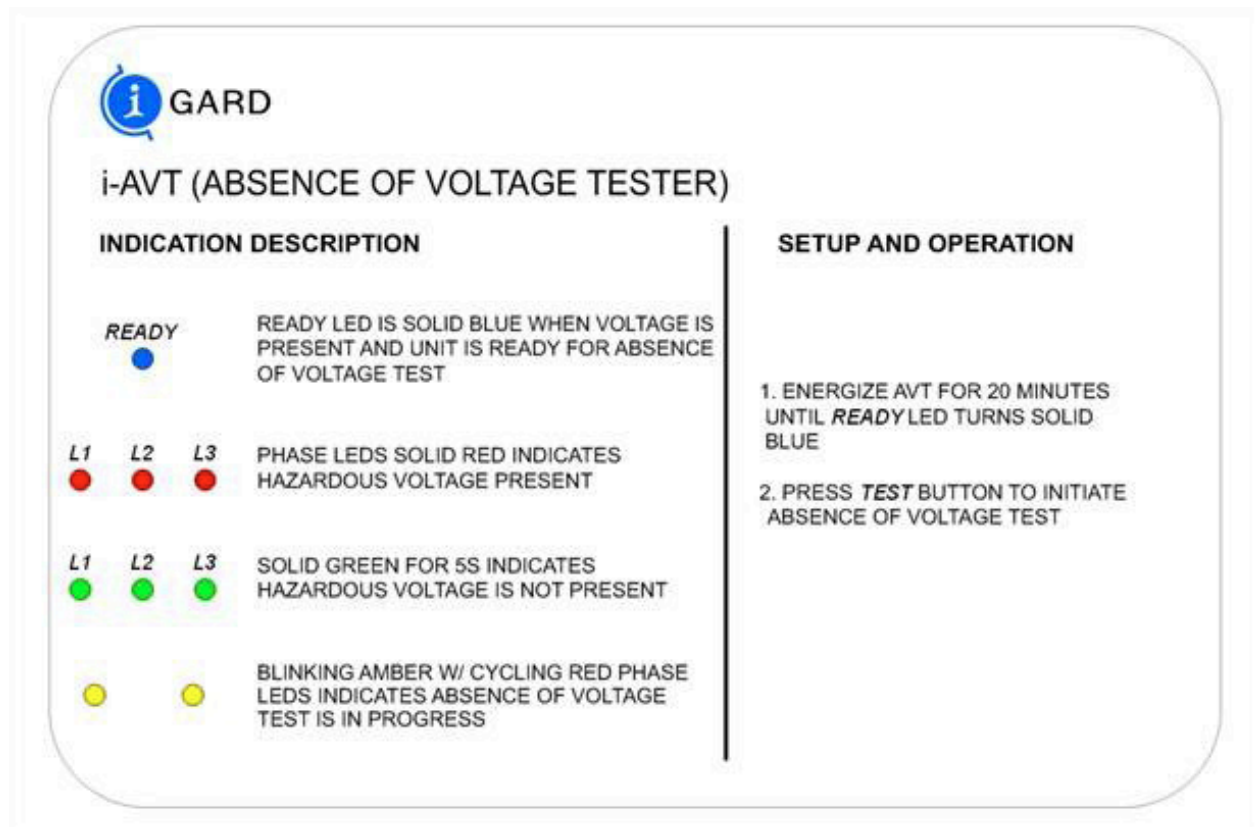


Figure 4.4: i-AVT Instruction Sticker

5. OPERATION

The i-AVT Control Unit includes sensor leads to monitor the bus. Two leads are provided for each phase as well as two leads for ground. This is to provide a monitoring loop that confirms that the sensor leads maintain contact with the bus. An absence of voltage test will not pass if the sensors lose contact with the bus.

The control power for the i-AVT electronics comes from the bus itself. The i-AVT makes use of the supercapacitor technology to power its electronic while offline. When the i-AVT is initially commissioned, the bus should remain energized for 20 minutes or until the blue LED is solid blue before de-energizing again to perform an absence of voltage test in order to ensure that the super-capacitor is fully charged.

When the i-AVT is charged and the bus is energized the three phase LEDs are solid red to indicate that voltage is present.

The phase LED's and READY LED turn off when there is a lack of voltage on the phases; an absence of voltage test must be performed to give positive confirmation that no hazardous voltage is present. The TEST button is pressed to perform an absence of voltage test. A pass is indicated by the phase LEDs turning green for 5 seconds.

A test can only be performed when the phase LEDs are off and when the sensor leads maintain contact with the bus.

6. INDICATION STATUSES

The i-AVT monitors the panel and gives indication of its status. Figure 6.0 below describes the meaning of the indication statuses that the display unit will give.

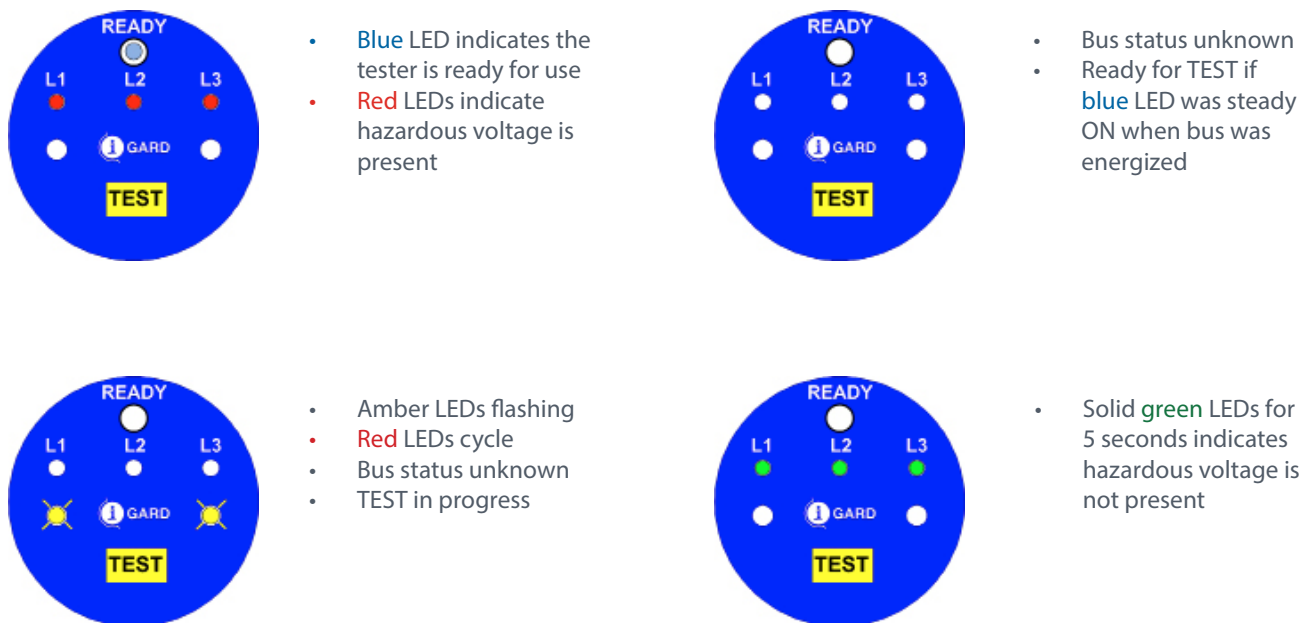


Figure 6.0 : i-AVT Indication Statuses

7. INSTALLATION

- 7.1. Locate and mount the Control Unit inside the panel being monitored. Use mounting tabs (refer to figure 9.0 below)
- 7.2. Snap mounting tabs onto undersides of the Control Unit. Locate mounting holes and affix unit per Figure 9.0
- 7.3. Locate cutout hole for Display Unit on the exterior of one of the enclosure covers. The hole should be 1.315 inches diameter
- 7.4. Place Display Unit through the cutout onto the exterior of the enclosure cover with the washer between the Display Unit flange and the enclosure.
- 7.5. Fix the Display Unit in place by tightening the lock-nut on the reverse side.
- 7.6. Connect the Control Unit and Display Unit using the Cat5 cable provided.
- 7.7. Terminate the ground leads from the Control Unit to the grounding of the panel. Two ground sensor leads are provided: terminate each of the leads to a different location on ground.
- 7.8. Terminate the phase leads from the Control Unit to the bus being monitored:
 - 7.8.1. Two sensor leads for each phase are provided: brown (L1), orange (L2) and yellow (L3).
 - 7.8.2. Terminate the two brown sensor leads to the L1 phase, landing each lead at different locations on the phase.
 - 7.8.3. Terminate the two orange sensor leads to the L2 phase, landing each lead at different locations on the phase.
 - 7.8.4. Terminate the two yellow sensor leads to the L3 phase, landing each lead at different locations on the phase.
- 7.9. Energize the bus. Keep the bus energized for 20 minutes or until the base LED on the Display Unit remain solid blue before de-energizing the bus to perform an absence of voltage TEST.

8. TECHNICAL SPECIFICATIONS

Operating Voltage Range	3 to 600 VAC (50/60Hz)
Operating Temperature	-40°C to 70°C (-40°F to 158°F)
Storage Temperature	-45°C to 85°C (-49°F to 185°F)
Altitude Range	Up to 5000m



9. CONFORMITY OF STANDARDS

UL 1436: 2016 Ed.6	Standard For Outlet Circuit Testers And Similar Indicating Devices
CSA C22.2#160: 2015 Ed.3	Voltage and Polarity Testers
IEC 61326-3-1 Ed1.0 (2008-01)	Electrical Equipment For Measurement, Control And Laboratory Use - EMC Requirements - Part 3-1: Immunity Requirements For Safety-Related Systems And For Equipment Intended To Perform Safety-Related Functions (Functional Safety) - General Industrial Applications
FCC 47CFR 15: 2013 Subpart B Class A	Radio Frequency Devices. Subpart B Unintentional Radiators
ISED ICES-003 issue 6, January 2016 (updated April 2019)	Information Technology Equipment (including Digital Apparatus) – Limits and Methods of Measurement Amend 2
ANSI C63.4: 2009	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz. Radiated Emission Test. AC Mains Conducted Emissions Test
CISPR 16	Specification For Radio Disturbance And Immunity Measuring Apparatus And Methods. Radiated Emission Test. AC Mains Conducted Emissions Test
IEC 61000-4-2	Test Standard for Electrostatic Discharge (ESD) Immunity
IEC 61000-4-3	Electromagnetic Compatibility (EMC) - Part 4-3 : Testing and Measurement Techniques - Radiated, Radio-Frequency, Electromagnetic Field Immunity Test
IEC 61000-4-4	Electromagnetic Compatibility (EMC) - Part 4-4: Testing and Measurement Techniques - Electrical Fast Transient/Burst Immunity Test
IEC 61000-4-5	Electromagnetic Compatibility (EMC)- Part 4-5: Testing and Measurement Techniques - Surge Immunity Test
IEC 61000-4-6	Electromagnetic compatibility (EMC) - Part 4-6: Testing and Measurement Techniques - Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields
IEC 61000-4-11	Electromagnetic compatibility (EMC) - Part 4-11: Testing and Measurement Technique - Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests for Equipment with input current up to 16 A per phase
UL 746C: 2018 Ed.7	Standard For Polymeric Materials - Use In Electrical Equipment Evaluations
IEC 61508-01 SIL 3	Standard for Functional Safety of Electrical/Electronic/Programmable Electronic Safety-Related Systems – Part 1: General Requirements Safety Integrity Level 3- SIL 3
UL 61010-1: 2010 Ed.3	Safety Requirements For Electrical Equipment For Measurement, Control, And Laboratory Use – Part 1: General Requirements
UL 61010-2-030	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 2-030: Particular Requirements for Equipment Having Testing or Measuring Circuits

10. DIMENSIONAL DRAWINGS

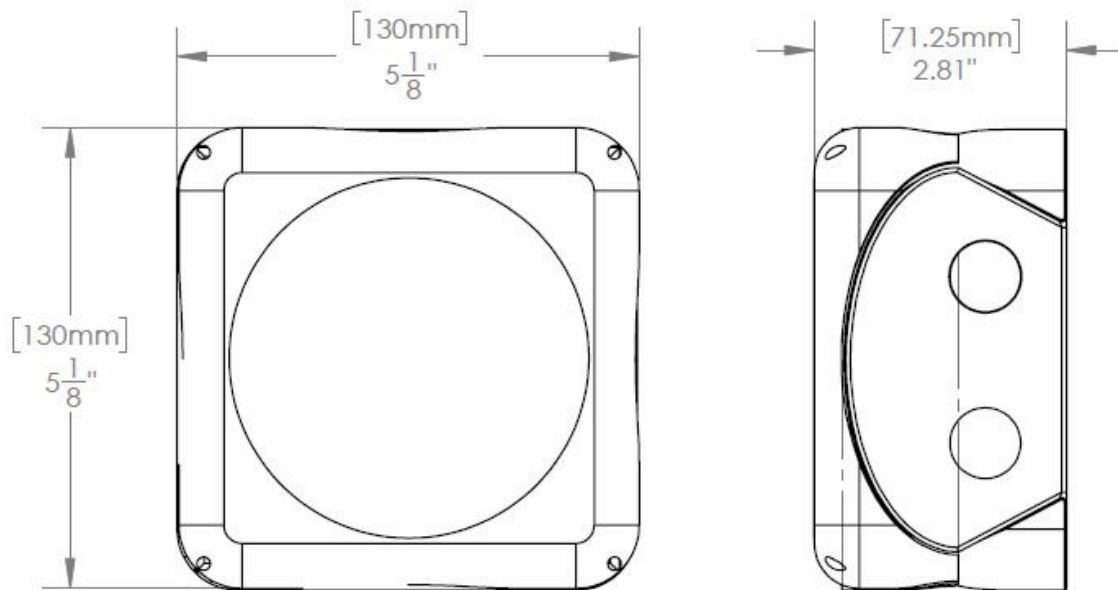


Figure 10.0 : i-AVT Control Unit Dimensional Drawings (units in mm and inches)

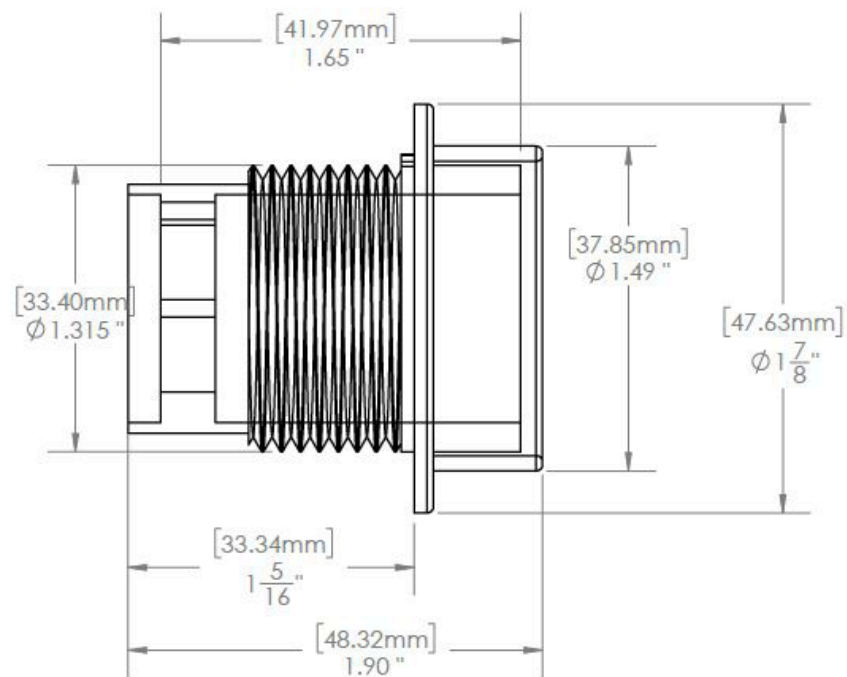


Figure 10.1: i-AVT Display Unit Dimensional Drawings (units in mm and inches)

NOTES



Designed & Manufactured
in Canada



C-EU20-EM-i-AVT
MANUAL 2021

Phone: 905-673-1553
Toll Free: 1-888-737-4787

Fax: 905-673-8472
e-mail: support@i-gard.com



www.i-gard.com