

Voltage Protection Products



VTi

Voltage Presence Indicator and Tester

VTi are permanently installed devices featuring LED-style indicators. These lights illuminate when hazardous voltage is detected in each phase and ground. They are designed to be a reliable tool for troubleshooting electrical systems, enabling users to measure voltage through high impedance test points without the need to open the panel door.



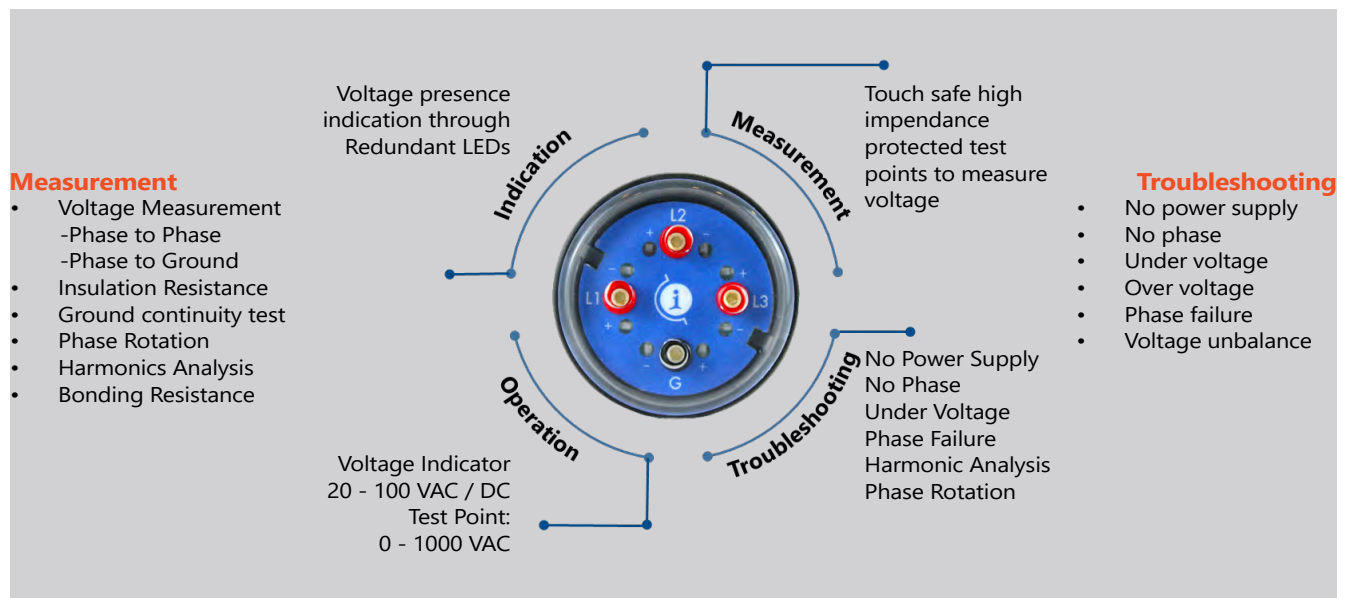
Key features:

- **Voltage Presence Indication:**
Redundant LEDs for clear indication of voltage presence in each phase and ground.
- **Wide Voltage Range:**
Rated up to 1000 VAC/VDC.
- **Compliance:**
UL 61010 compliant.
- **Touch Safe Test Points:**
High-impedance protected test points for safe and accurate voltage measurements.
- **Easy Installation:**
Wired directly to line side or load side via 4 potted lead wire connections.

Voltage Measurement and Troubleshooting

VTi can be used with a digital multimeter to measure voltage, making it a valuable tool in troubleshooting electrical motors. By providing critical information about electrical parameters, the VTi enables users to diagnose power supply issues and systematically identify and address various electrical faults that may affect motor performance.

Common faults such as overheated motors, burnt-out motors, and motor failure to start are all related to voltage, and VTi equips you with the insights needed to address these challenges effectively.



NFPA 70E 2024 Annex O.2.4 included Voltage test port in Additional Safety-by-Design Methods and recommends voltage measurement through the door using the test port. This method has proven to be effective in reducing the risk associated with arc flash or electric shock hazards.

i-AVT-R

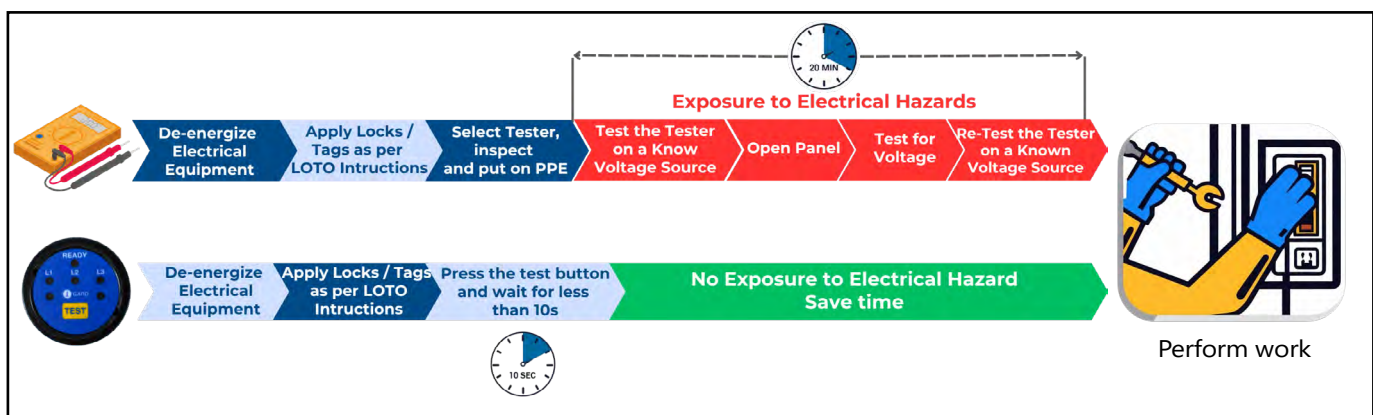
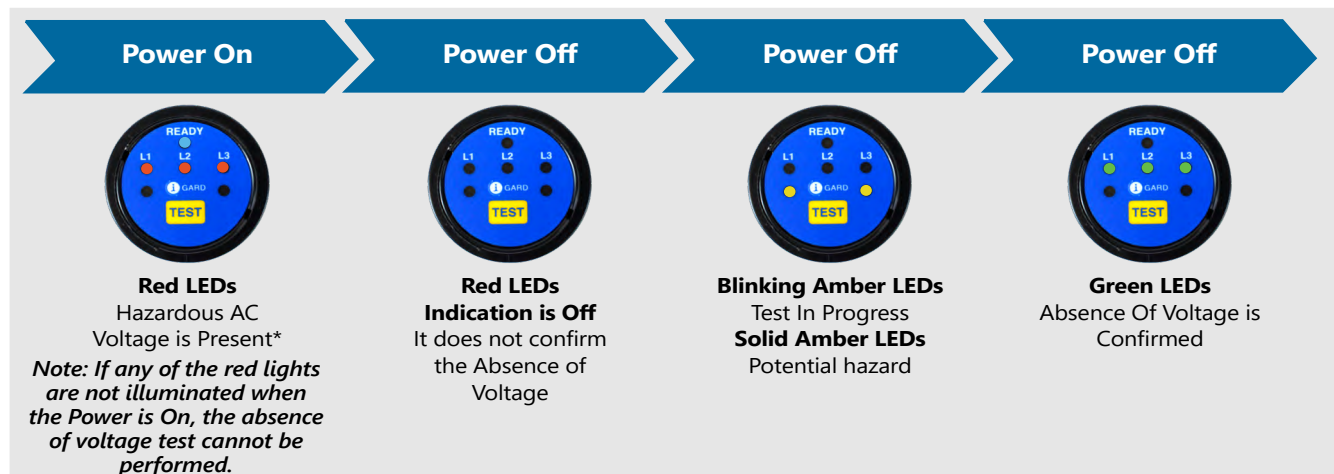
Absence of Voltage Tester

The Absence of Voltage Tester (AVT) is an intuitive, fail-safe tool that enhances electrical safety by verifying de-energization without the need to open equipment doors. It reduces exposure to electrical hazards, ensuring systems are safe for maintenance and repairs, and promotes a safer working environment.



Key features:

- **Positive Indication:**
Clearly displays presence of voltage, absence of voltage, and phase loss.
- **Operating Voltage Range:**
Up to 600VAC (50/60 Hz)
- **Precise Testing:**
Eight sensor leads ensure precise testing, with line side exclusion for added safety.
- **Supervisory Circuit:**
Guarantees proper functionality before and after voltage measurement.
- **Improved Efficiency:**
Get results within 10s of a button push, quickly confirming a de-energized system and minimizing downtime.
- **USB-C Charging:**
USB-C port for external charging.
- **Compliance with safety standards:**
 - NFPA 70E 2024 Article 120.6 (7) Exception 1
 - CSA Z462:24 Section 4.2.5 (g) Exception 2,
 - Safety integrity level SIL 3 (IEC 61508-1)
 - UL 1436

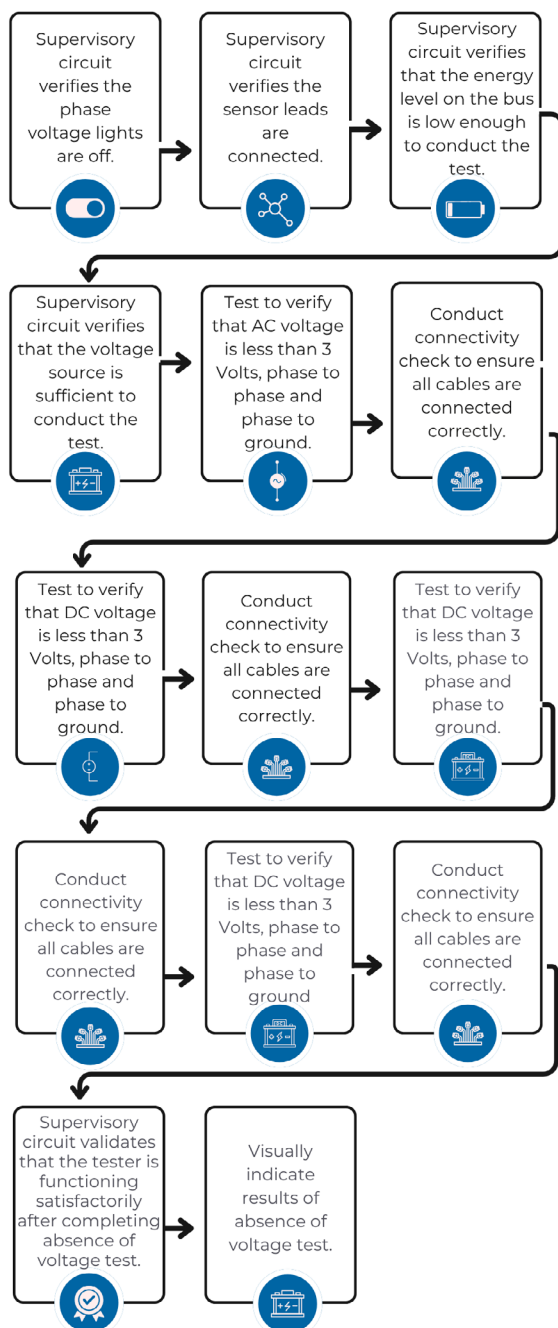


Difference in Manual and Automatic approach

Ensuring there is no voltage is crucial for establishing a safe electrical work environment. Even after de-energizing equipment and following lockout/tagout procedures, workers must treat the equipment as energized until it is confirmed otherwise. The verification process is detailed in NFPA 70E 2024, Article 120.6 (7) Exception 1, and CSA Z462:24, Section 4.2.5 (g) Exception 2. For safety and effectiveness, Section 12 of UL 1436 outlines standards for Absence of Voltage Testers (AVTs), including specific testing procedures and requirements. These standards mandate compliance with Functional Safety IEC 61508 and SIL 3 certification.

Operation of i-AVT

AVTs make safety simple. With just the press of a button, initiate a test sequence. The device automatically self-tests using a known voltage source, checking for direct contact with the circuit for both AC and DC voltage, including phase-to-ground and phase-to-phase. Upon successful testing, three green lights illuminate for five seconds, indicating a safe condition for opening electrical panels. In case of any potential hazard, amber lights signal an unsafe condition.



UL 1436 guideline for Absence of Voltage Tester

As per UL 1436, an absence of voltage tester is defined as: A permanently-mounted test device that is used to verify that a circuit is de-energized prior to opening an electrical enclosure that contains energized electrical conductors or circuit paths

1. An AVT shall be provided with the means for the user to initiate the test for absence of voltage.
2. An AVT shall provide the user with a visual indicator to confirm the absence of voltage after the absence of voltage test has been performed. The visual indication shall be green.
3. The AVT supervisory circuit has incorporated a secondary power source and shall have no internal failure that would affect performance.
4. The AVT shall incorporate a supervisory test circuit to verify that the tester is functioning properly before and after the AVT performs voltage measurements.
5. The AVT visual indicator shall only illuminate green when all phase-to-phase and phase-to-ground voltages measure less than 3VAC or 3VDC.
6. The AVT visual indicators shall not illuminate green unless the phase and ground leads are in direct contact with the circuit conductors being tested.
7. The AVT visual indicator shall not illuminate green if a phase lead is connected to ground or the ground lead is connected to a phase conductor.
8. The visual indicator shall not illuminate green unless the secondary power source is operational
9. The AVT shall comply with the Standard for Functional Safety IEC 61508 and achieve a SIL 3 rating.61508 and SIL 3 certification.

i-AVT Plus

A two-in-one voltage safety solution

The i-AVT Plus – a versatile two-in-one voltage safety solution – is the ultimate tool for electricians and engineers working with electrical systems. It combines the capabilities of a Voltage Test Portal (VTi) for measuring voltage and troubleshooting electrical issues on energized systems with an approved Absence of Voltage Tester (AVT) for safely performing absence of voltage tests on de-energized systems. Stay secure and work smarter with the versatile i-AVT Plus.



Key features:

- **Dual Functionality:**
Offers both absence of voltage testing and voltage presence testing for comprehensive electrical safety.
- **Voltage Test Port:**
Integrated test port streamlines testing processes and enhances troubleshooting.
- **UL508A Certified**
- **Known Voltage Source:**
Equipped with a known voltage source for reliable and accurate testing.
- **Secure Housing:**
NEMA 4X enclosure ensures protection against dust and water.

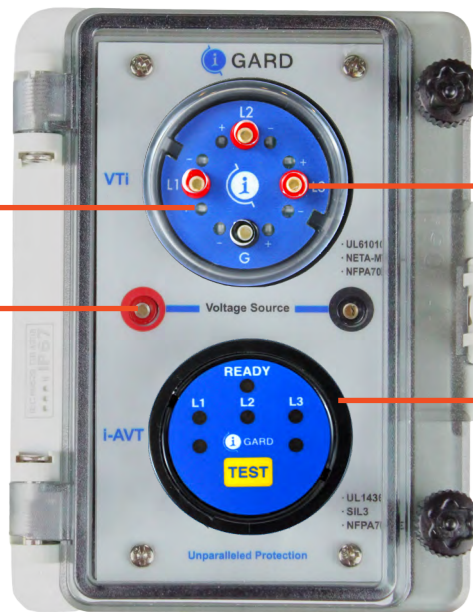


Voltage Indicator tested to UL 61010

Indicates the presence of voltage

Known Voltage Source

Known voltage source for qualified personnel to verify the proper functioning of their portable test instruments.



Voltage Tester in compliance with NFPA 70B and NETA-MTS 19 standards.

Measure voltage and conduct test measurements through designated test ports while keeping the electrical cabinet door closed.

Absence of Voltage Tester tested to UL 1436, SIL 3 standards, in compliance with NFPA 70E and CSA Z462:24

Indicates the absence of voltage.

Selecting the right product

Value to users

In everyday facility maintenance there is both, the need to verify an electrical safe work condition as defined by NFPA70E and CSA Z462:24, by verifying the absence of voltage on current carrying conductors and circuit parts and the need to be able to safely measure voltage and troubleshoot typical load issues such as phase loss, under-voltage, phase rotation and only the i-AVT Plus empowers qualified personnel to meet both needs in a single product.



Your Requirement	VTi	i-AVT-R	i-AVT Plus
Visual Indication of the Presence of Voltage	✓	✓	✓
Voltage Measurement and troubleshoot electrical issues	✓	✗	✓
Visual Indication of the Absence of Voltage	✗	✓	✓
Built-in secondary power source	✗	✓	✓
Known voltage source to verify the proper functioning of their portable test instrument.	✗	✗	✓
UL listed and labeled for verifying the absence of voltage (UL 1436)	✗	✓	✓
Meets the requirements to verify the absence of voltage described in NFPA 70E 2024 120.6(7) Exception 1 and CSA Z462:24, Section 4.2.5 (g) Exception 2	✗	✓	✓



The voltage protection range of products is typically applied at 600V AC, however there are applications for DC voltages and medium voltage AC up to 15kV.

For the AC versions of the i-AVT and i-AVT-R there is the option to add a voltage divider between the bus and the AVT control unit to extend the voltage operating range from 600V to 15kV.

This allows the i-AVT to be used at medium voltage applications while the connection between the control module and the AVT-DU remains the IX cable carrying less than 5V.

There are three dedicated DC version of the i-AVT that operates at 250VDC, 1000VDC and 2500VDC.

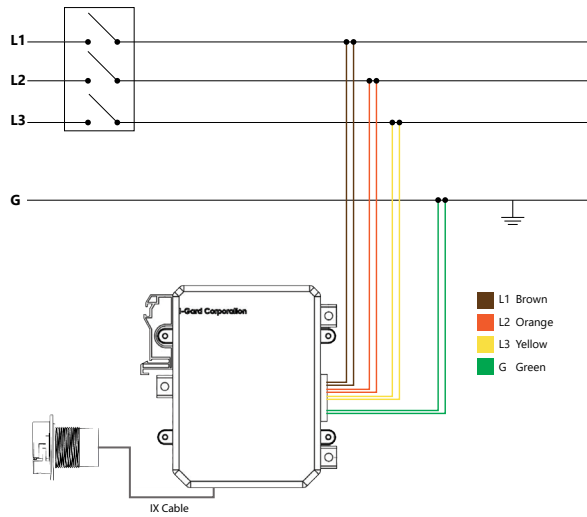
250V DC is often used for crane controls and DC drives; 1000V DC and 2500V DC can be found in solar array collector boxes and EV charging power distribution units.

The i-AVT Plus, as a combination product is available from 600VAC to 15kVAC as well as 250VDC, 1000VDC and 2500VDC.

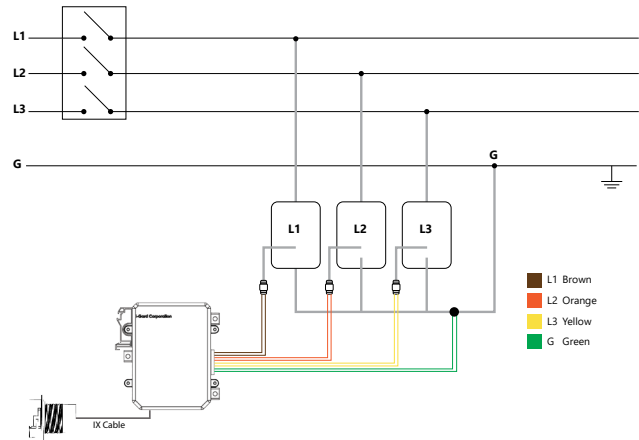


System Voltage	i-AVT Plus	i-AVT-R	i-AVT-DC
600V AC	i-AVT Plus	i-AVT-R	
1000V AC	i-AVT Plus10	i-AVT-R10	
3.3kV AC	i-AVT Plus33	i-AVT-R33	
5kV AC	i-AVT Plus50	i-AVT-R50	
6.6kV AC	i-AVTPlus66	i-AVT-R66	
11kV AC	i-AVTPlus110	i-AVT-R110	
15kV AC	i-AVT Plus150	i-AVT-R150	
250V DC	i-AVT Plus-DC250		i-AVT-DC250
1000V DC	i-AVT Plus-DC1000		i-AVT-DC1000
2500V DC	i-AVT Plus-DC2500		i-AVT-DC2500
3000V DC	i-AVT Plus-DC3000		i-AVT-DC3000

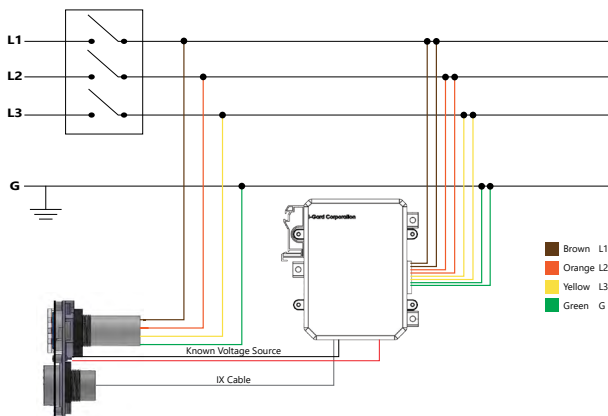
**Schematic for i-AVT-R
Up to 600 VAC**



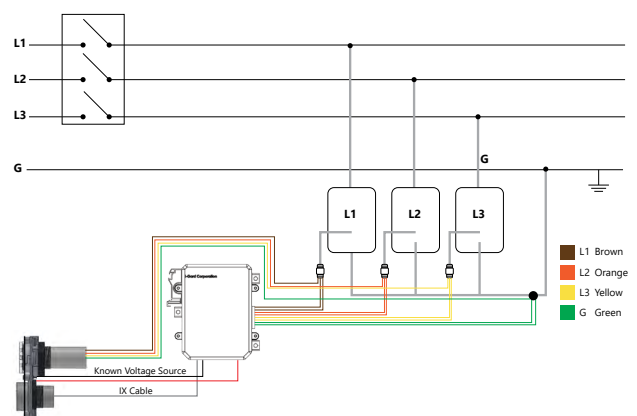
**Schematic for i-AVT-R MV
From 3.3 kVAC to 15kVAC**



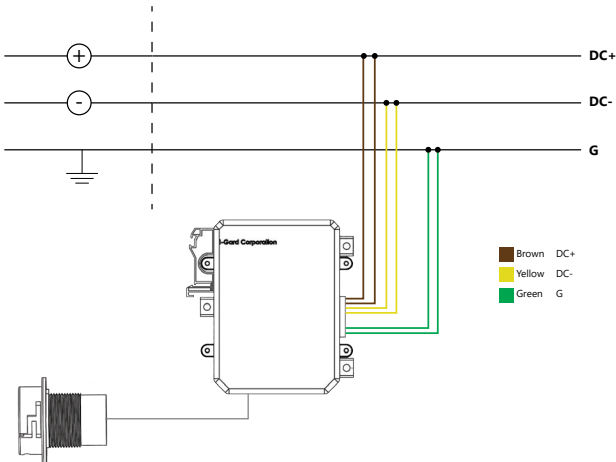
**Schematic for i-AVT-Plus
Up to 600 VAC**



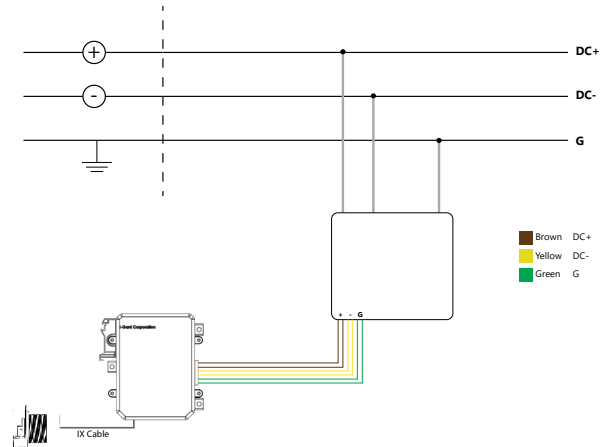
**Schematic for i-AVT-Plus MV
From 3.3 kVAC to 15kVAC**



**Schematic for i-AVT-DC
Up to 250 VDC**



**Schematic for i-AVT-DC MV
From 1000 VDC to 3000 VDC**





1 i-AVT Plus 15 (15 kV)



2 i-AVT-R

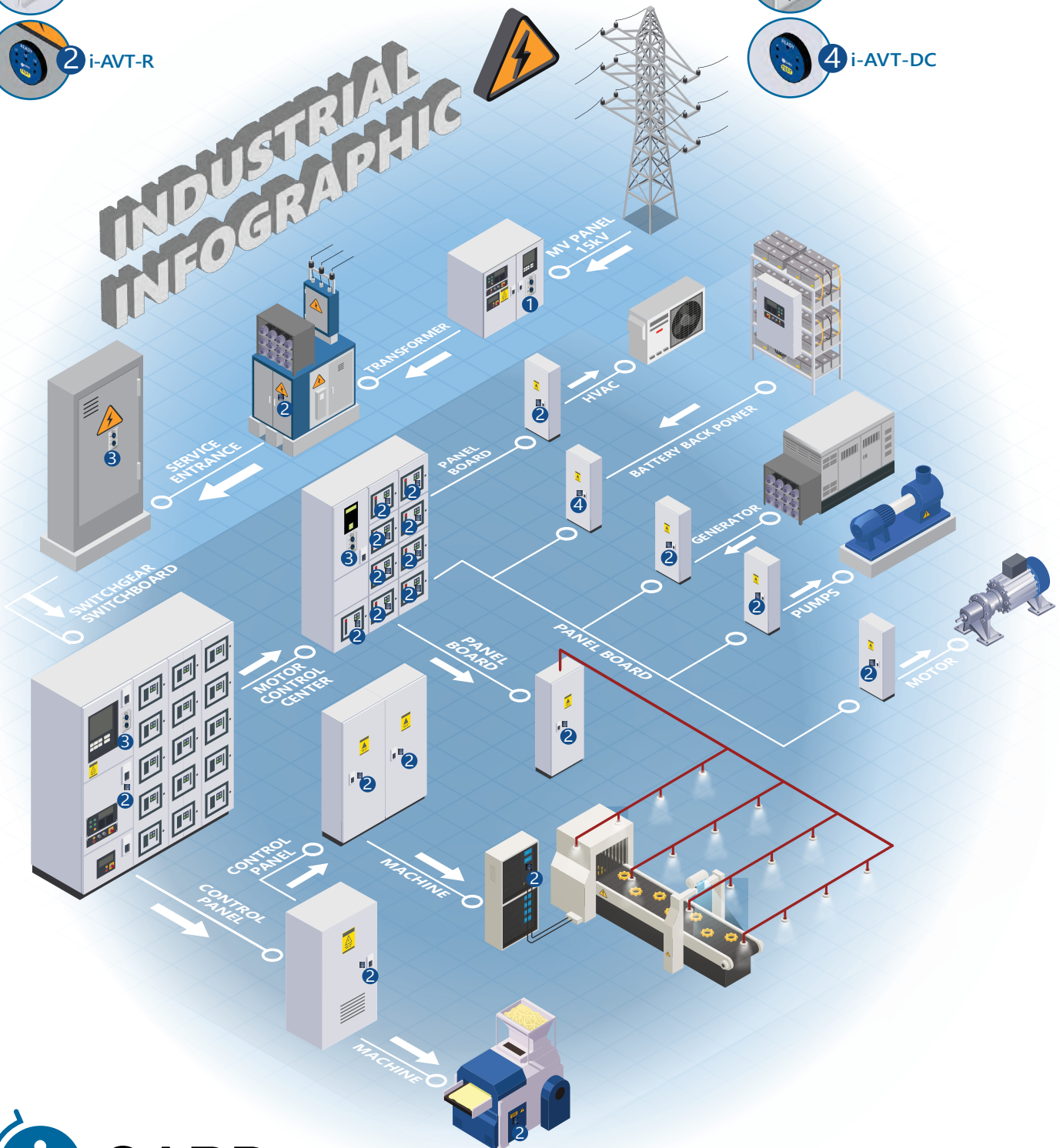


3 i-AVT Plus



4 i-AVT-DC

INDUSTRIAL INFOGRAPHIC



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May 2025

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