VeriSafe

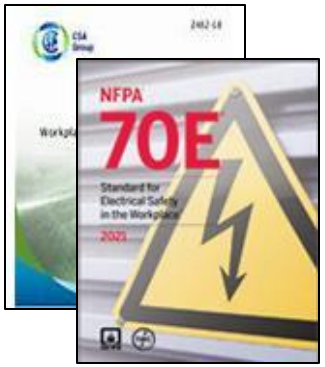
Absence of Voltage Testers

2.0 AVT + Network Module

PANDUIT™

VeriSafe

Absence of Voltage Testers



Verifying a De-Energized Condition

NFPA 70E-2021 120.5 Process for Establishing and Verifying an Electrically Safe Work Condition

CSA Z462-2021 4.2.5 g) Exception 2) & Note 1

(7) Use an adequately rated portable test instrument to test each phase conductor or circuit part to test for the absence of voltage. Test each phase conductor or circuit part both phase-to-phase and phase-to-ground. Before and after each test, determine that the test instrument is operating satisfactorily through verification on any known voltage source.

Exception No. 1 to (7): An adequately rated permanently mounted absence of voltage tester shall be permitted to be used to test for the absence of voltage of the conductors or circuit parts at the work location, provided it meets the all following requirements:

1) It is permanently mounted and installed in accordance with the manufacturer's instructions and tests the conductors and circuit parts at the point of work
2) It is **listed and labeled for the purpose of verifying the absence of voltage**
3) It tests each phase conductor or circuit part both phase-to-phase and phase-to-ground
4) The test device is verified as operating satisfactorily on any known voltage source before and after testing for the absence of voltage

Informational Note No. 2. **For additional information on rating and design requirements for permanently mounted absence of voltage testers, refer to UL 1436**, Outlet Circuit Testers and Other Similar Indicating Devices.

Comparison of Test Methods

PORTABLE TESTERS

MANUAL PROCESS

1. Select Tester & PPE
2. Open Panel
3. Verify Tester
4. Test for Voltage
5. Verify Tester

Exposure to Electrical Hazards

10-20 min

VeriSafe™ Absence of Voltage Testers

AUTOMATIC PROCESS

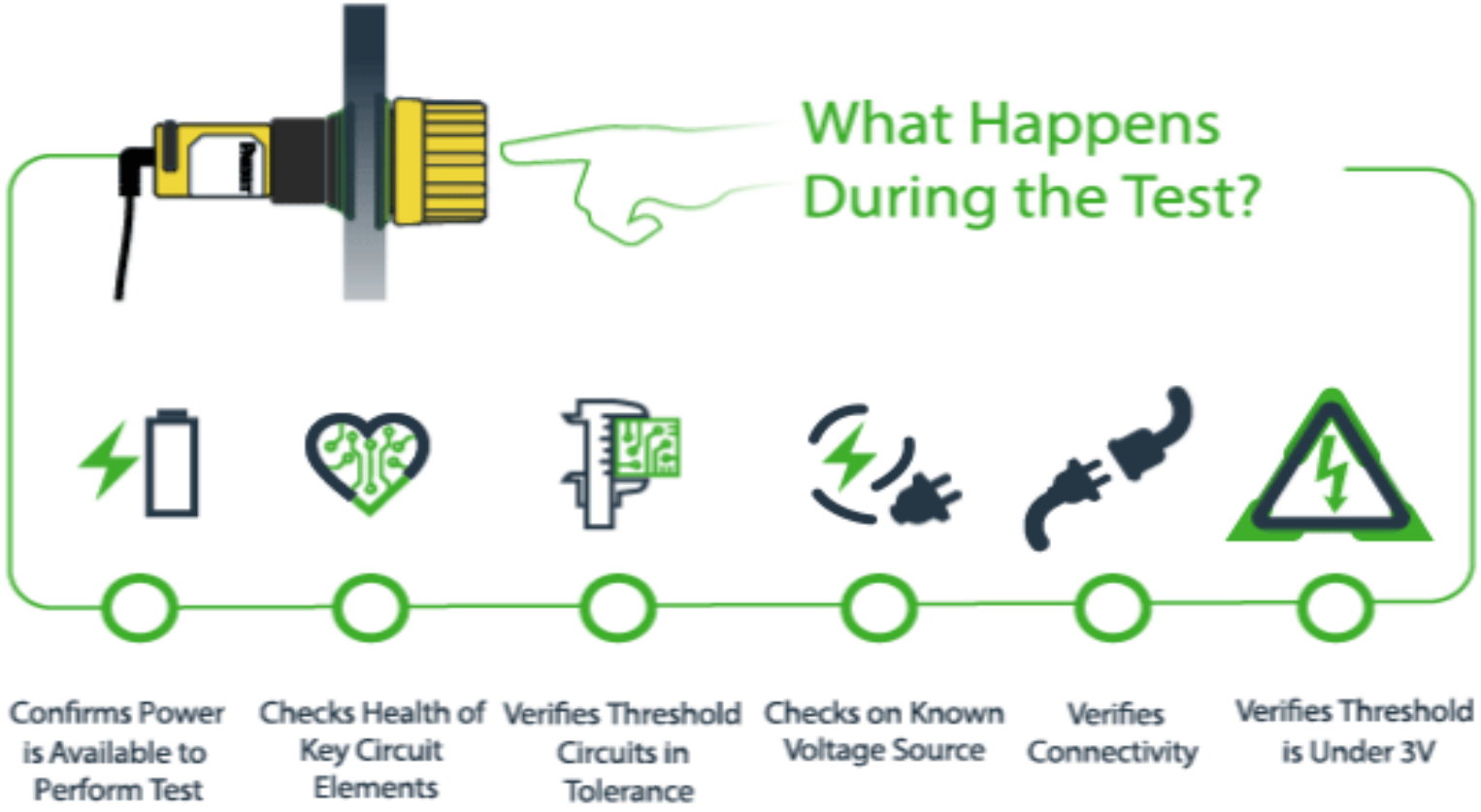
Activate the **VeriSafe™ AVT 2.0**

1. Verify Tester → Verify Installation → Test for Voltage → Verify Installation → Verify Tester → Indicate Result
2. Open Panel

No Exposure to Electrical Hazards

10 seconds

VeriSafe AVT



VeriSafe Absence of Voltage Tester (AVT)

A permanently-mounted tester used to verify a circuit is de-energized prior to opening an electrical enclosure

Instruction Label

System Cable

Indicator Module

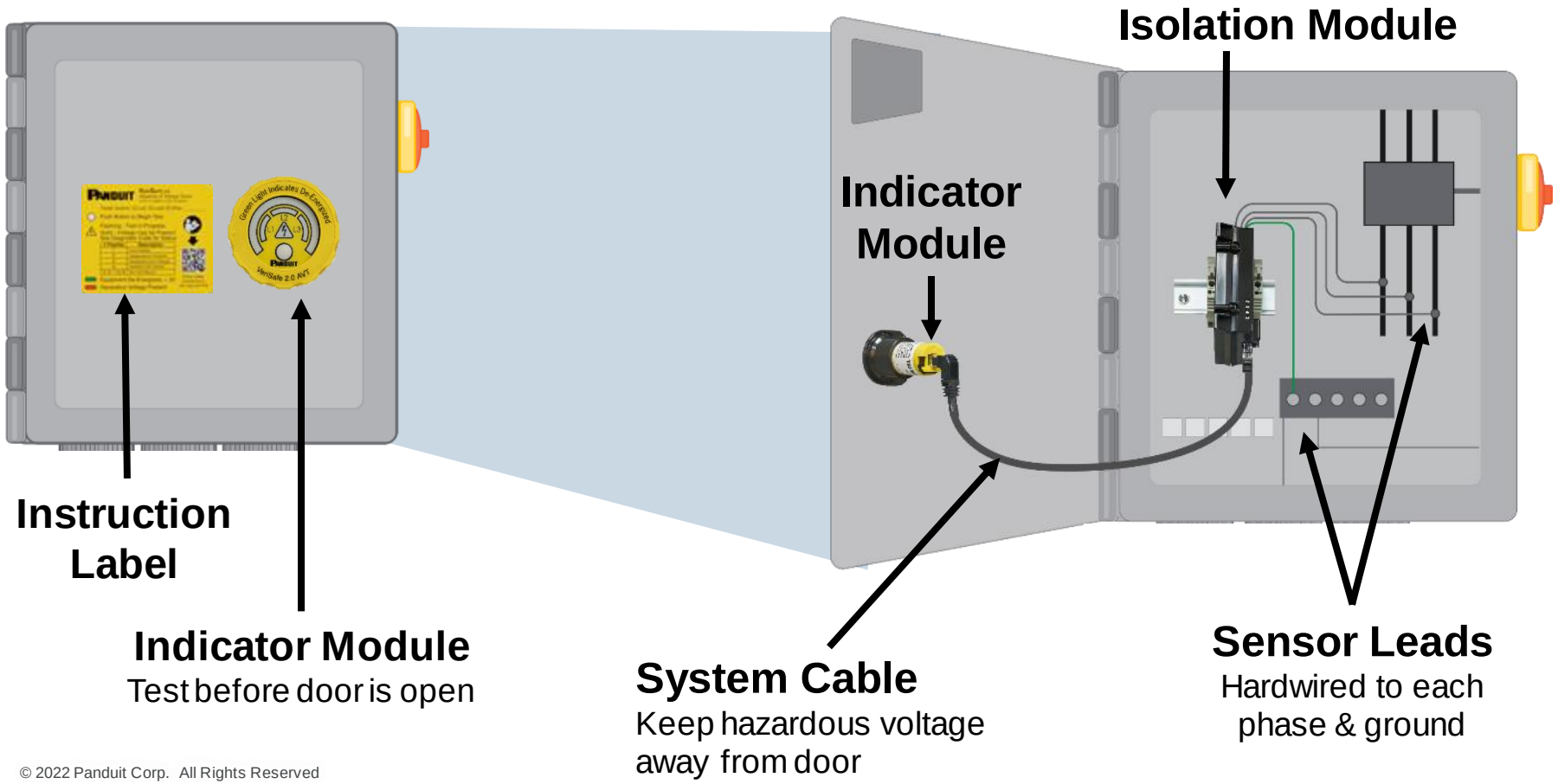
Isolation Module

Red LEDs indicate presence of voltage

Green LED indicates absence of voltage

VeriSafe Absence of Voltage Tester (AVT)

A permanently-mounted tester used to verify a circuit is de-energized prior to opening an electrical enclosure

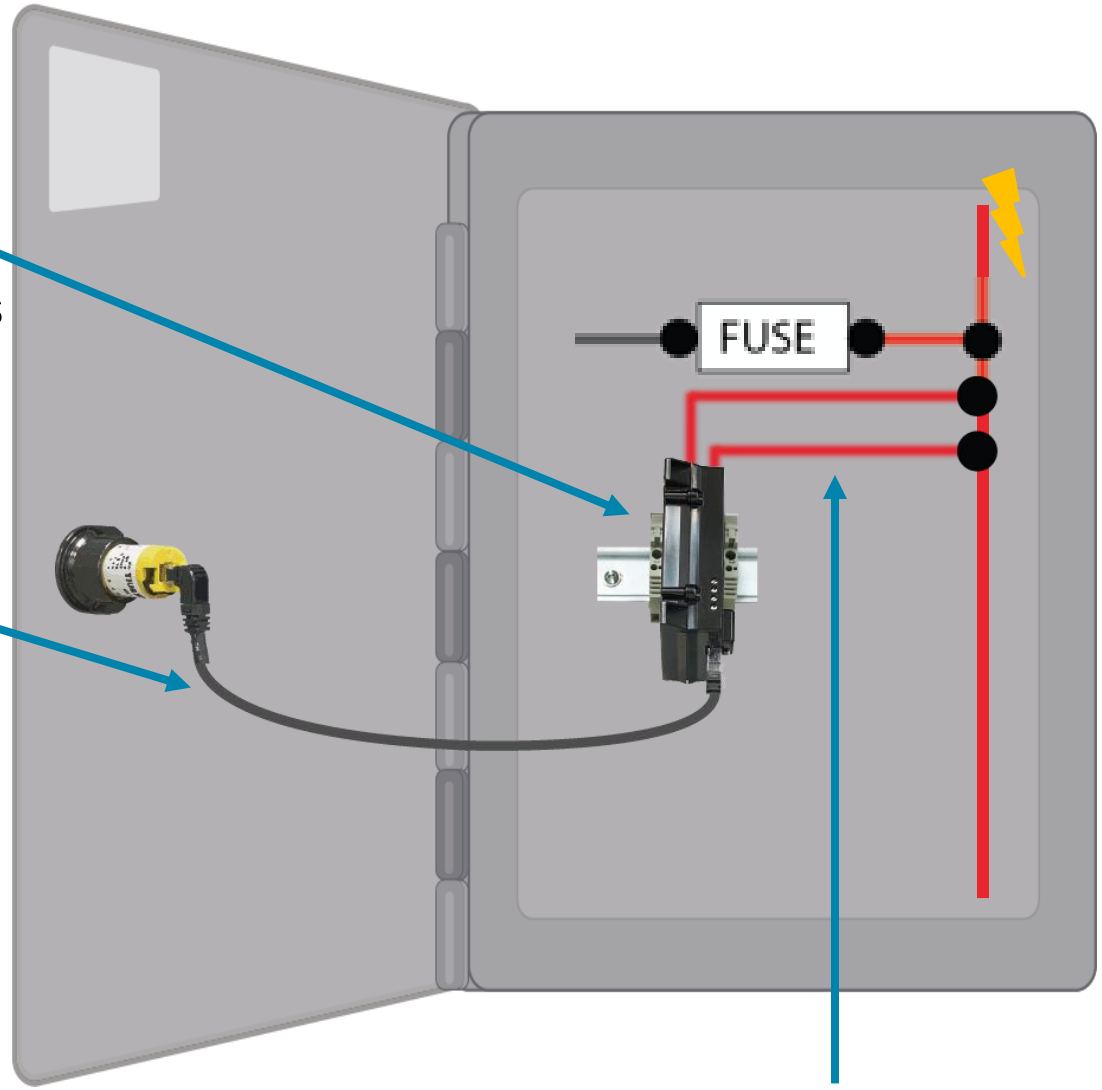


Red LEDs indicate presence of voltage

Green LED indicates absence of voltage

Key AVT Features

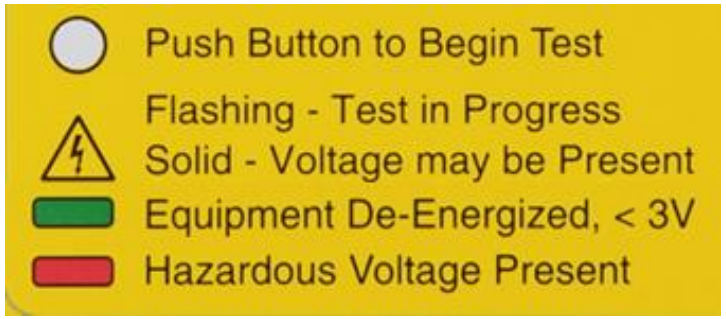
- **Built-In Overcurrent Protection**
  - Directly test the source without concerns over fusing
- **No Hazardous Voltage to Door**
  - Reduces risk of electric shock
- **Installation Verification**
  - Confirms contact with test point
- **Active Indications**
  - Positive feedback when absence of voltage is confirmed

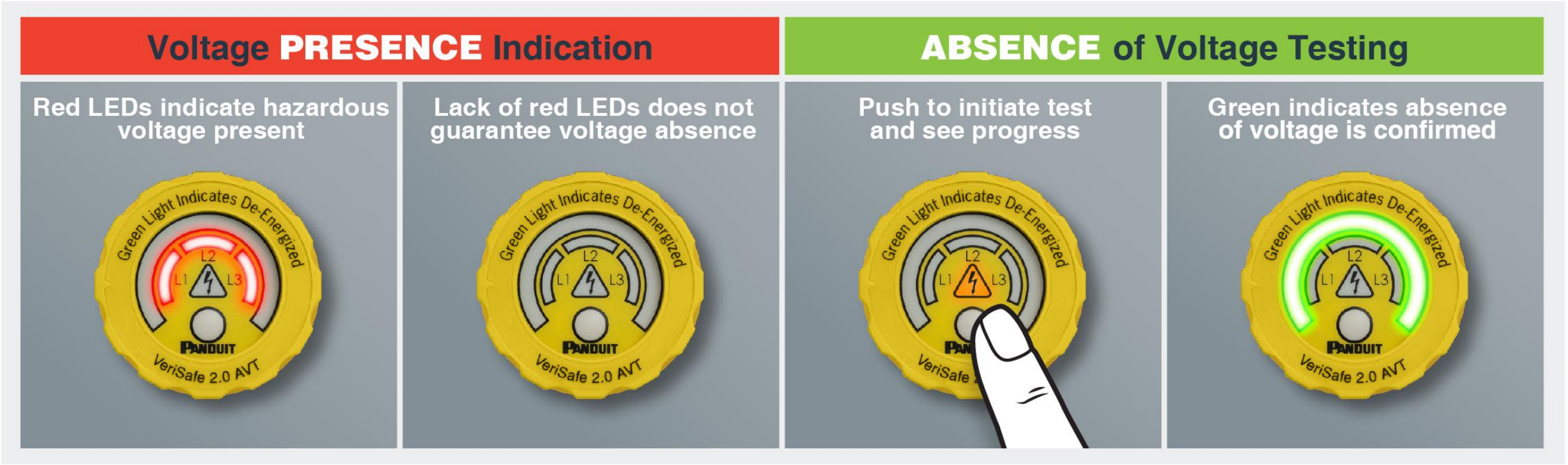


Verify absence of voltage BEFORE door is opened

Two leads per phase allow installation to be verified

VeriSafe AVT Indications





Diagnostic Codes

PANDUIT

VERISAFE 2.0
Absence of Voltage Tester
CAT III (1000V), CAT IV (600V)

Tester location: ☐ Line ☐ Load ☐ Other _____

Push Button to Begin Test

Flashing - Test in Progress

Solid - Voltage may be Present
See Diagnostic Code for Status:

# Flashes	Description
1	Check Battery
2	Voltage above Threshold
3	Temperature Out of Range
4	Installation Not Verified
5, 6, 7 or 8	See User Manual

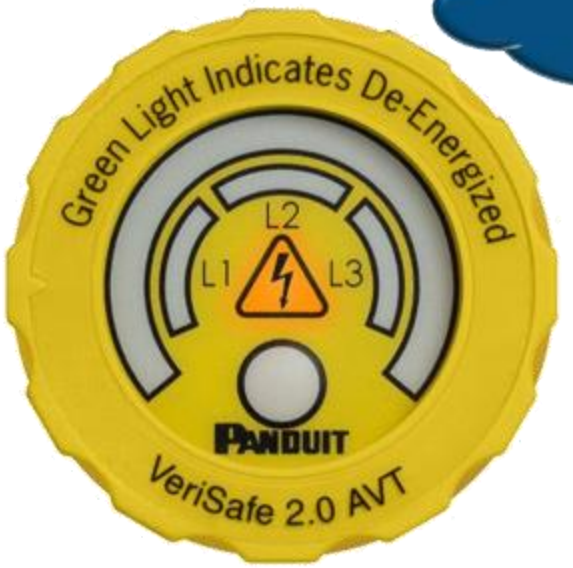
Equipment De-Energized, < 3V

Hazardous Voltage Present

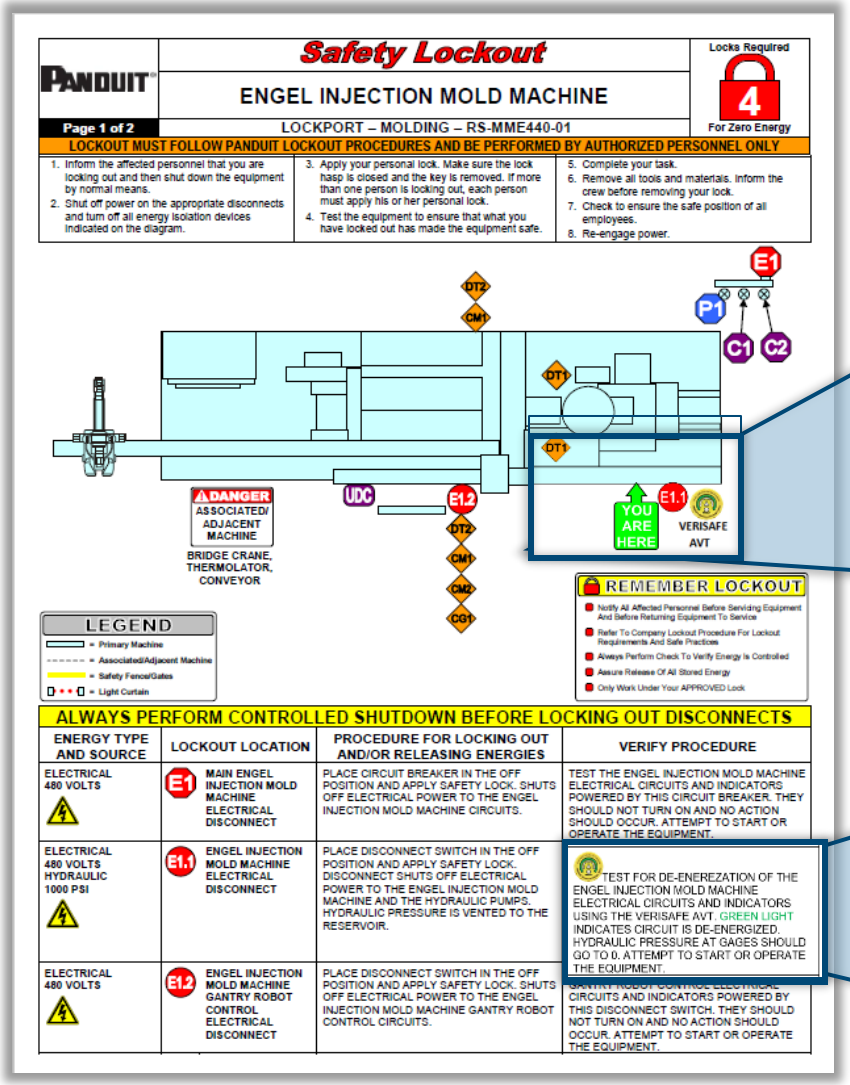
Follow safety procedures & use required PPE

Which test criteria were not met?

How do I know when to replace the battery?



VeriSafe AVT & Lockout/Tagout



Safety Lockout

PANDUIT

ENGEL INJECTION MOLD MACHINE

Page 1 of 2 | LOCKPORT – MOLDING – RS-MME440-01

Locks Required: 4 For Zero Energy

LOCKOUT MUST FOLLOW PANDUIT LOCKOUT PROCEDURES AND BE PERFORMED BY AUTHORIZED PERSONNEL ONLY

1. Inform the affected personnel that you are locking out and then shut down the equipment by normal means.
2. Shut off power on the appropriate disconnects and turn off all energy isolation devices indicated on the diagram.
3. Apply your personal lock. Make sure the lock hasp is closed and the key is removed. If more than one person is locking out, each person must apply his or her personal lock.
4. Test the equipment to ensure that what you have locked out has made the equipment safe.
5. Complete your task.
6. Remove all tools and materials. Inform the crew before removing your lock.
7. Check to ensure the safe position of all employees.
8. Re-engage power.

DANGER ASSOCIATED/ ADJACENT MACHINE

BRIDGE CRANE, THERMOLATOR, CONVEYOR

YOU ARE HERE E1.1 VERISAFE AVT

REMEMBER LOCKOUT

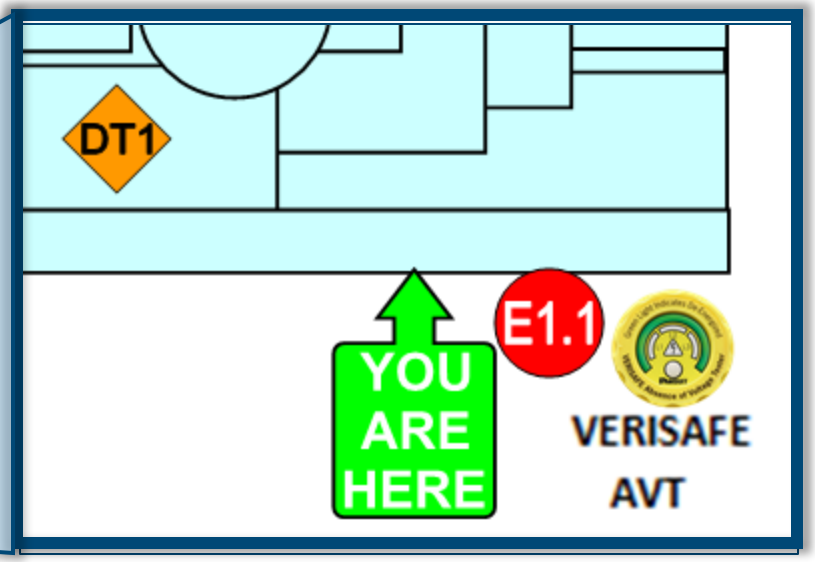
- Notify All Affected Personnel Before Servicing Equipment And Before Returning Equipment To Service
- Refer To Company Lockout Procedure For Lockout Requirements And Safe Practices
- Always Perform Check To Verify Energy Is Controlled
- Assure Release Of All Stored Energy
- Only Work Under Your APPROVED Lock

LEGEND

- Primary Machine
- Associated/Adjacent Machine
- Safety Fence/Gates
- Light Curtain

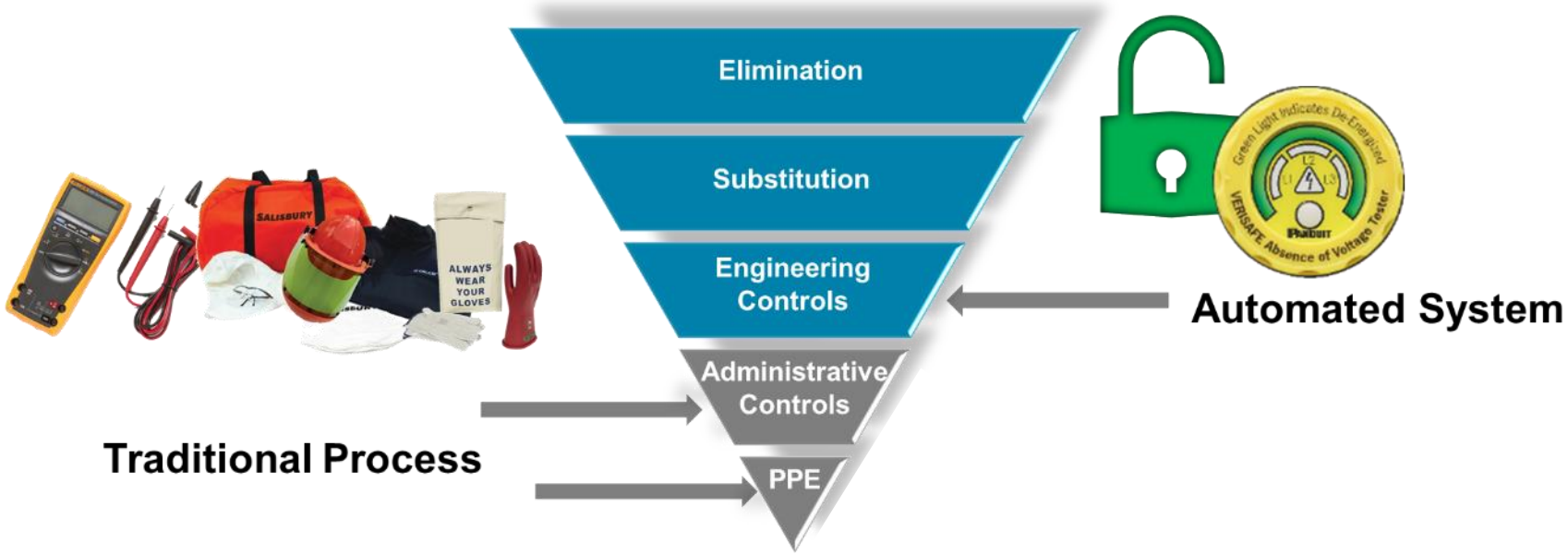
ALWAYS PERFORM CONTROLLED SHUTDOWN BEFORE LOCKING OUT DISCONNECTS

ENERGY TYPE AND SOURCE	LOCKOUT LOCATION	PROCEDURE FOR LOCKING OUT AND/OR RELEASING ENERGIES	VERIFY PROCEDURE
ELECTRICAL 480 VOLTS	E1 MAIN ENGEL INJECTION MOLD MACHINE ELECTRICAL DISCONNECT	PLACE CIRCUIT BREAKER IN THE OFF POSITION AND APPLY SAFETY LOCK. SHUTS OFF ELECTRICAL POWER TO THE ENGEL INJECTION MOLD MACHINE CIRCUITS.	TEST THE ENGEL INJECTION MOLD MACHINE ELECTRICAL CIRCUITS AND INDICATORS POWERED BY THIS CIRCUIT BREAKER. THEY SHOULD NOT TURN ON AND NO ACTION SHOULD OCCUR. ATTEMPT TO START OR OPERATE THE EQUIPMENT.
ELECTRICAL 480 VOLTS HYDRAULIC 1000 PSI	E1.1 ENGEL INJECTION MOLD MACHINE ELECTRICAL DISCONNECT	PLACE DISCONNECT SWITCH IN THE OFF POSITION AND APPLY SAFETY LOCK. DISCONNECT SHUTS OFF ELECTRICAL POWER TO THE ENGEL INJECTION MOLD MACHINE AND THE HYDRAULIC PUMPS. HYDRAULIC PRESSURE IS VENTED TO THE RESERVOIR.	TEST FOR DE-ENEREZATION OF THE ENGEL INJECTION MOLD MACHINE ELECTRICAL CIRCUITS AND INDICATORS USING THE VERISAFE AVT. GREEN LIGHT INDICATES CIRCUIT IS DE-ENERGIZED. HYDRAULIC PRESSURE AT GAGES SHOULD GO TO 0. ATTEMPT TO START OR OPERATE THE EQUIPMENT.
ELECTRICAL 480 VOLTS	E1.2 ENGEL INJECTION MOLD MACHINE GANTRY ROBOT CONTROL ELECTRICAL DISCONNECT	PLACE DISCONNECT SWITCH IN THE OFF POSITION AND APPLY SAFETY LOCK. SHUTS OFF ELECTRICAL POWER TO THE ENGEL INJECTION MOLD MACHINE GANTRY ROBOT CONTROL CIRCUITS.	GANTRY ROBOT CONTROL ELECTRICAL CIRCUITS AND INDICATORS POWERED BY THIS DISCONNECT SWITCH. THEY SHOULD NOT TURN ON AND NO ACTION SHOULD OCCUR. ATTEMPT TO START OR OPERATE THE EQUIPMENT.



Test for de-energization of the Engel injection mold machine using the VeriSafe AVT. Green light indicates circuit is de-energized. Hydraulic pressure at Gages should go to 0. Attempt to start or operate the equipment.

VeriSafe AVT
Benefits



Improved Safety & Risk Reduction

Increased Productivity

Simplified Process

Reliable Results

Flexible Applications

Coming Soon!

VeriSafe 2.0 AVT + Network Module

VeriSafe 2.0 AVT

New in 2022!

All existing VeriSafe AVT features, plus…

- Network connectivity
- Flexible power options
- Expanded ratings
- Optimized configurations
- Initiate the test from multiple locations

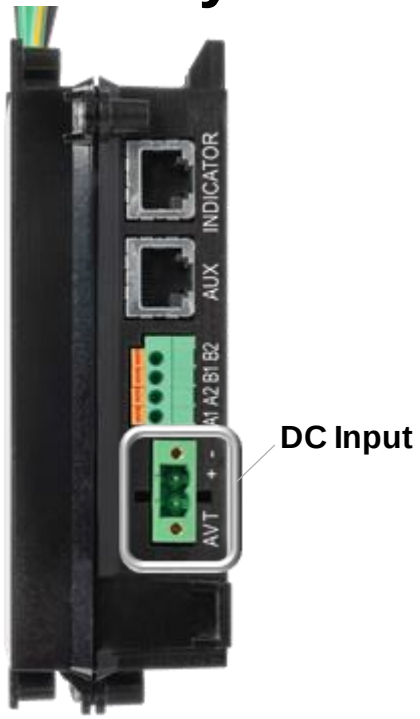
VS2-AVT-_ _-_-_ _

Power for the Absence of Voltage Test

Battery

- 3.6 V industrial lithium battery
- Replace without opening the enclosure

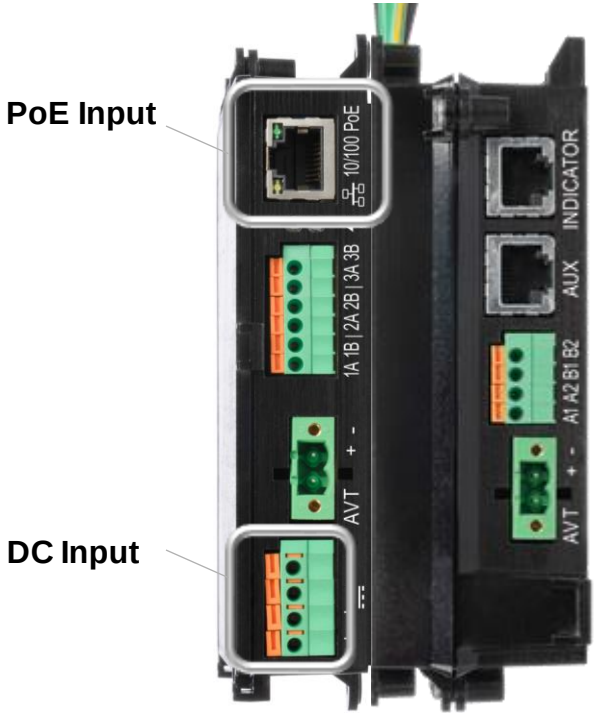
Auxiliary DC



2.0 AVT Isolation Module

- 12-24 VDC
- Must be available when main is de-energized

Network Module



Network Module **2.0 AVT Isolation Module**

- Network module provides power & communication to the AVT
- **Auxiliary DC or PoE** must be available when main is de-energized
  - 12-24 VDC
  - 10/100 PoE, IEEE 802.3af Type 1 Class III PoE topology

Indicator Module

- Battery-free option when space savings is crucial
- Select faceplate optimized for your power system
- Option for two indicators

Three-phase **DC/Single-Phase**

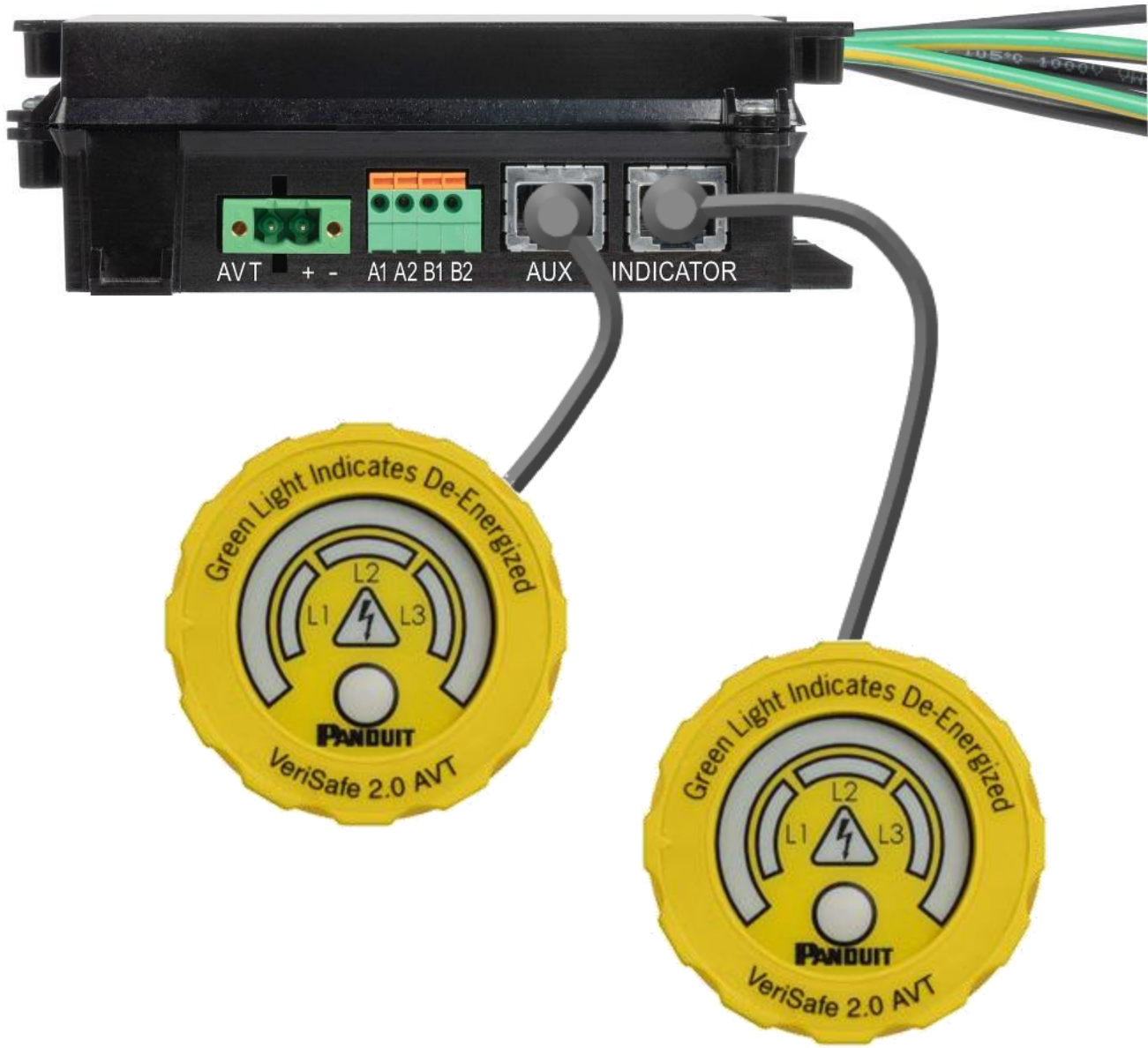
Indicator Faceplates

Battery-Powered Indicator

Battery-Free Indicator

Two Indicator Modules
(optional)

- 2.0 AVT has two keyed jacks for local indicators
  - Keyed jacks to avoid confusion with network port
- Initiate test from either location, results displayed at both indicators



Feature		VeriSafe 1.0 AVT	VeriSafe 2.0 AVT
MAXIMUM VOLTAGE (NOMINAL)		600 V	**1000 V**
OVERVOLTAGE CATEGORY	CAT III	600 V	**1000 V**
	CAT IV	300 V	**600 V**
VOLTAGE PRESENCE INDICATORS (RED LEDS)		AC only	**AC & DC**
POWER FOR AVT TEST (YELLOW & GREEN LEDS)		3.6 V Battery	**3.6 V Battery**
		-	**12-24V DC**
		-	**PoE***
INTEGRATION		SOLID STATE CONTACTS Absence of Voltage (SIL 3)	**SOLID STATE CONTACTS** **Absence of Voltage (SIL 3)**
		-	**Voltage Presence***
		-	**NETWORK*** **EtherNet/IP Modbus TCP**
VOLTAGE REPORTING		-	**Measured Values***
DEDICATED DC/SINGLE-PHASE SKUS		-	✓
NUMBER OF INDICATORS		1	**2**
OPERATING TEMPERATURE		-25 – 60 C	**-25 – 60 C**
HAZARDOUS LOCATIONS		Class 1 Division II (Separate SKU)	**Class 1 Division II** **Class 2 Division II** **ATEX Zone 2 and 22 / IECEx**
CONNECTIVITY TEST		Open Lead Detection	**Open Lead Detection**
ABSENCE OF VOLTAGE THRESHOLD		1.5 – 2.9 V	**2.7 - 2.9 V**

* Requires Network Module, **VS2-NET**

VeriSafe

Absence of Voltage Testers

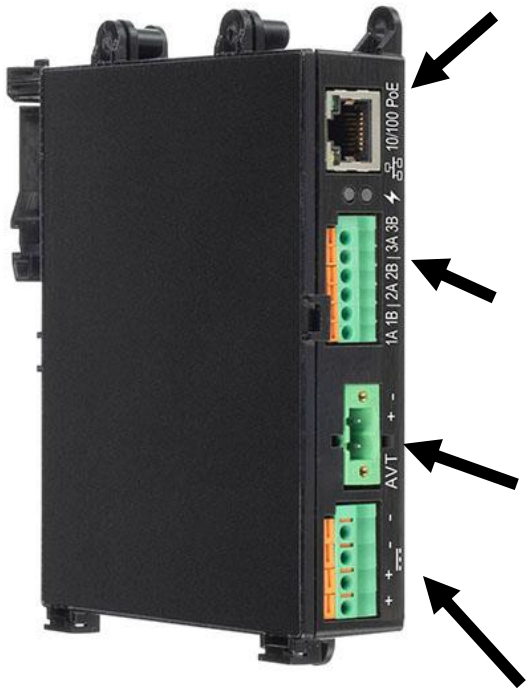
What's Different?

The next-generation VeriSafe AVT has an enhanced set of features and will be compatible with additional applications.

The 2.0 AVT uses new technology for the connectivity test and voltage threshold measurement, making it more robust for many applications.

VeriSafe Network Module

For use with 2.0 AVT



Network/PoE Connection
- Live Voltage Monitoring
- Test Result Log
- Temperature
- Connection Status
- Battery Voltage

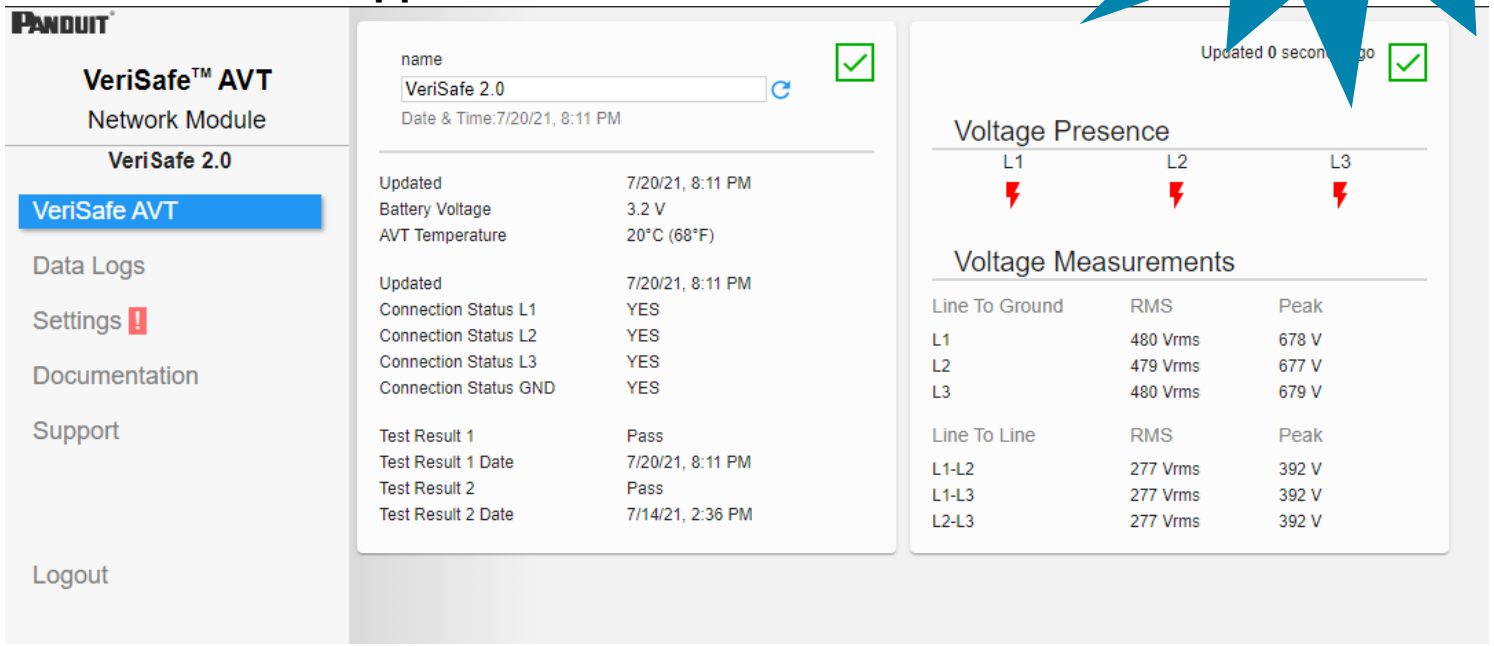
Voltage Presence
- Status for each phase
  (not part of safety function)

Connect to AVT
- Power
- Communication

DC Power Input

New in 2022!

On-board Web Application

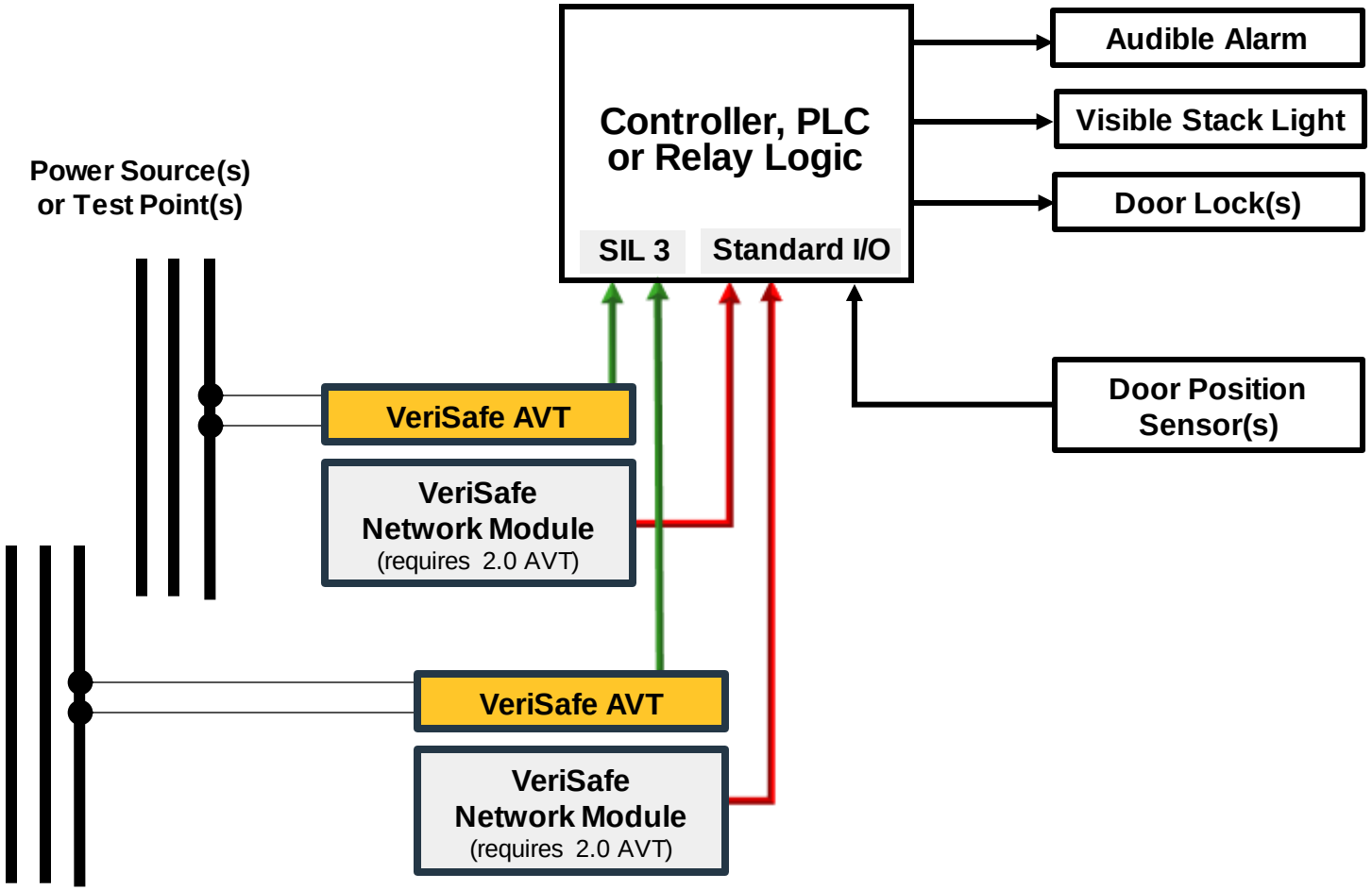


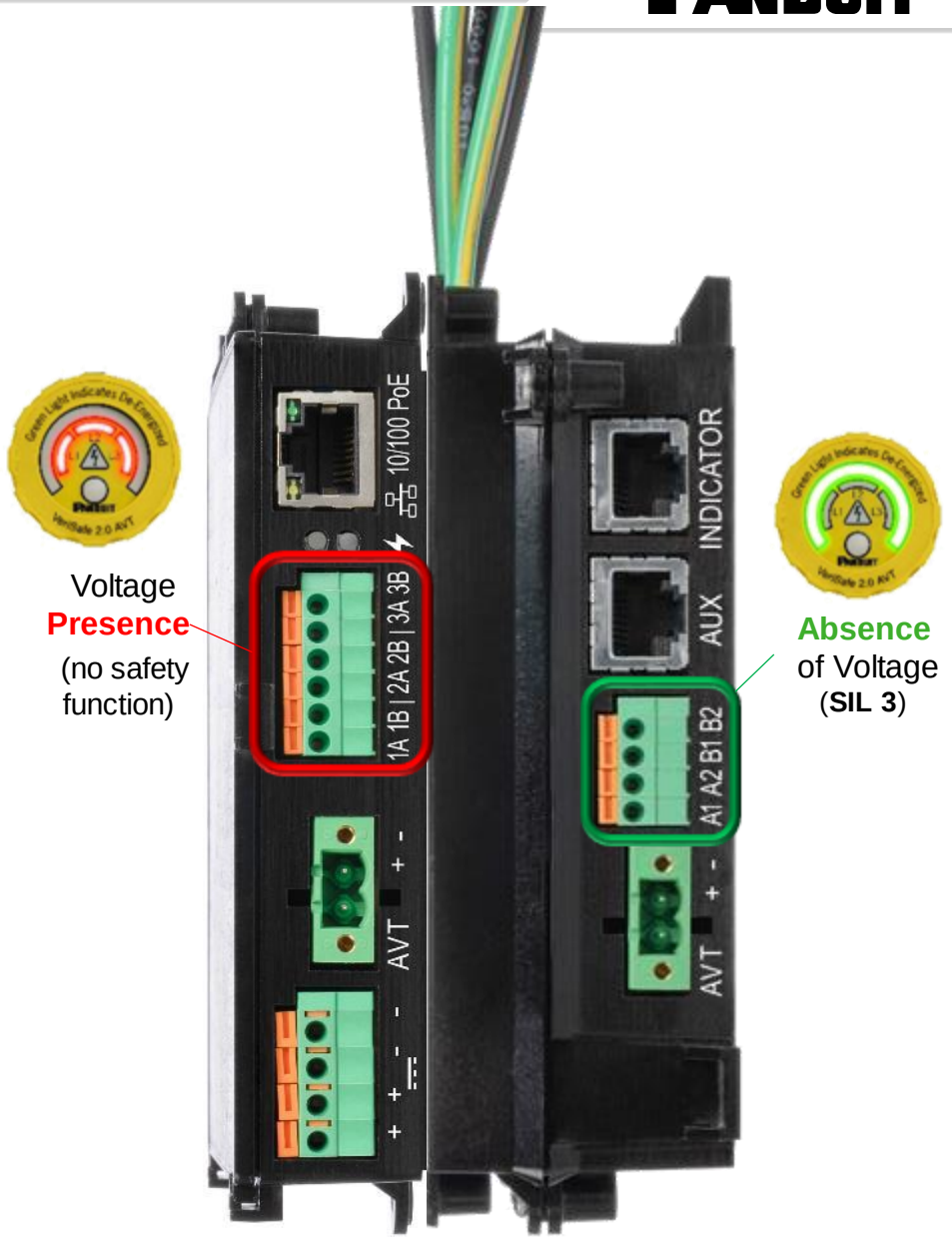
EtherNet/IP®

Modbus

Rockwell Automation
- Custom Add On Profile
- Automatic Diagnostics Ready

AVT Integration

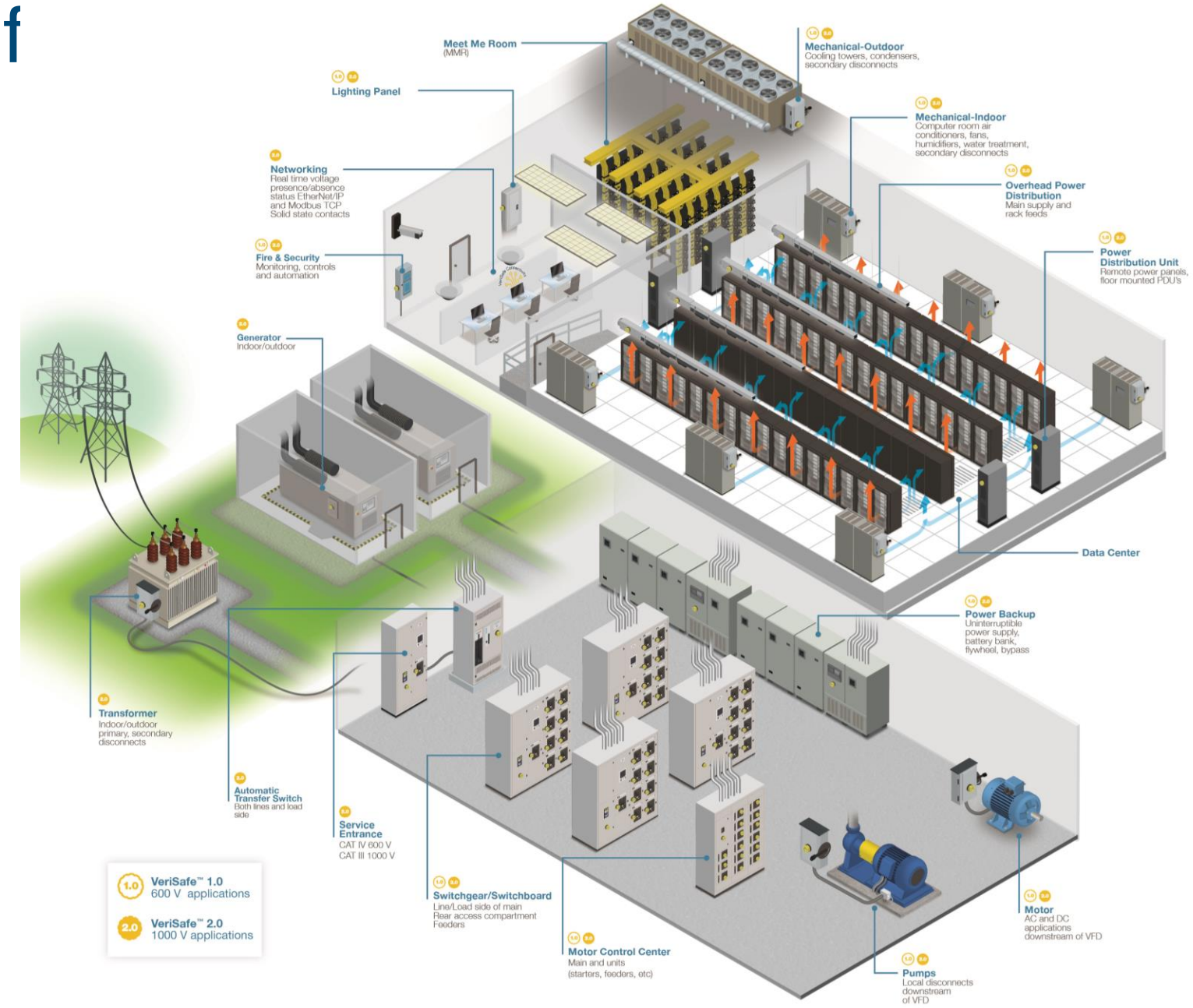




Applications

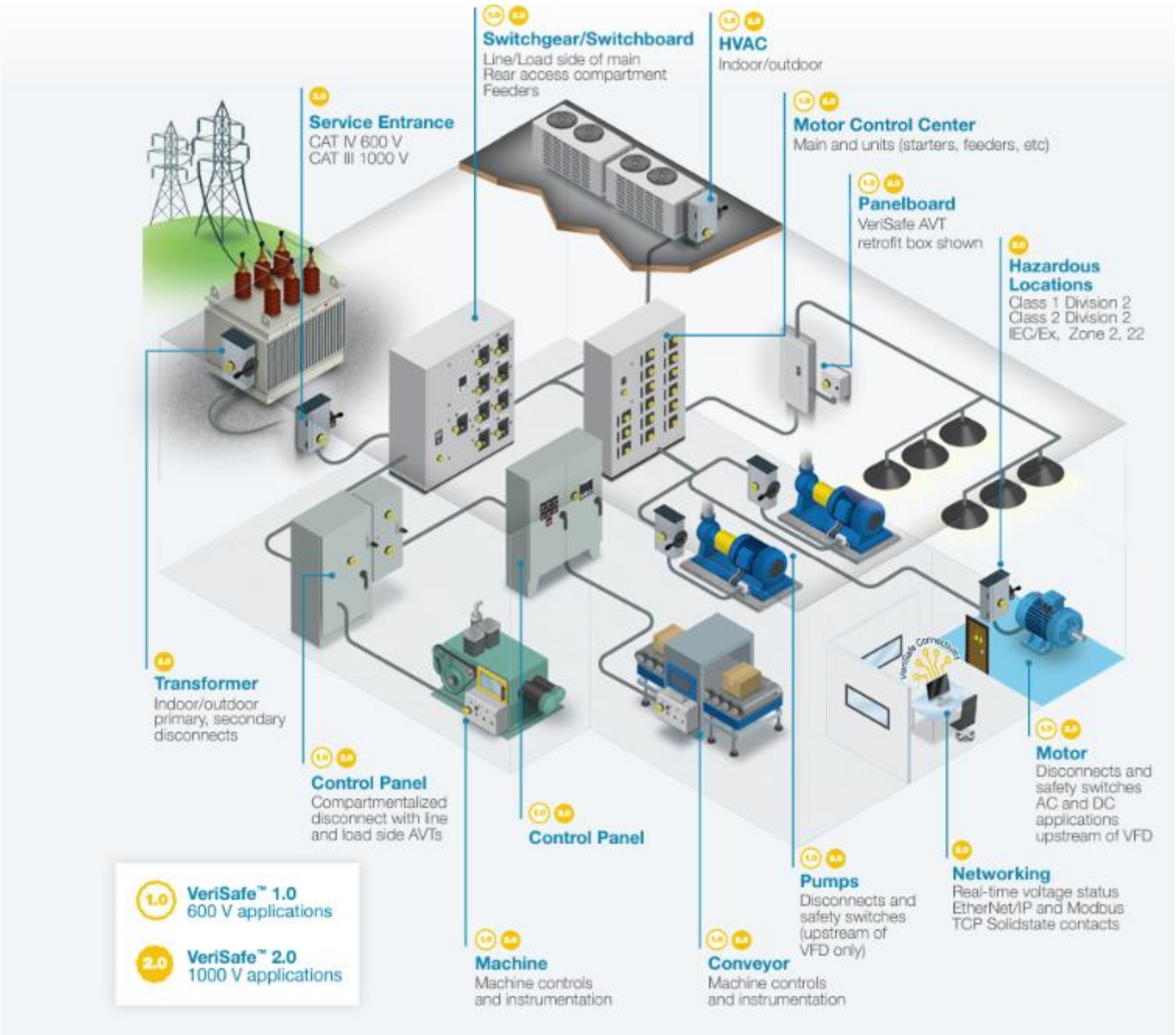
VeriSafe Absence of Voltage Testers

Data Center Applications



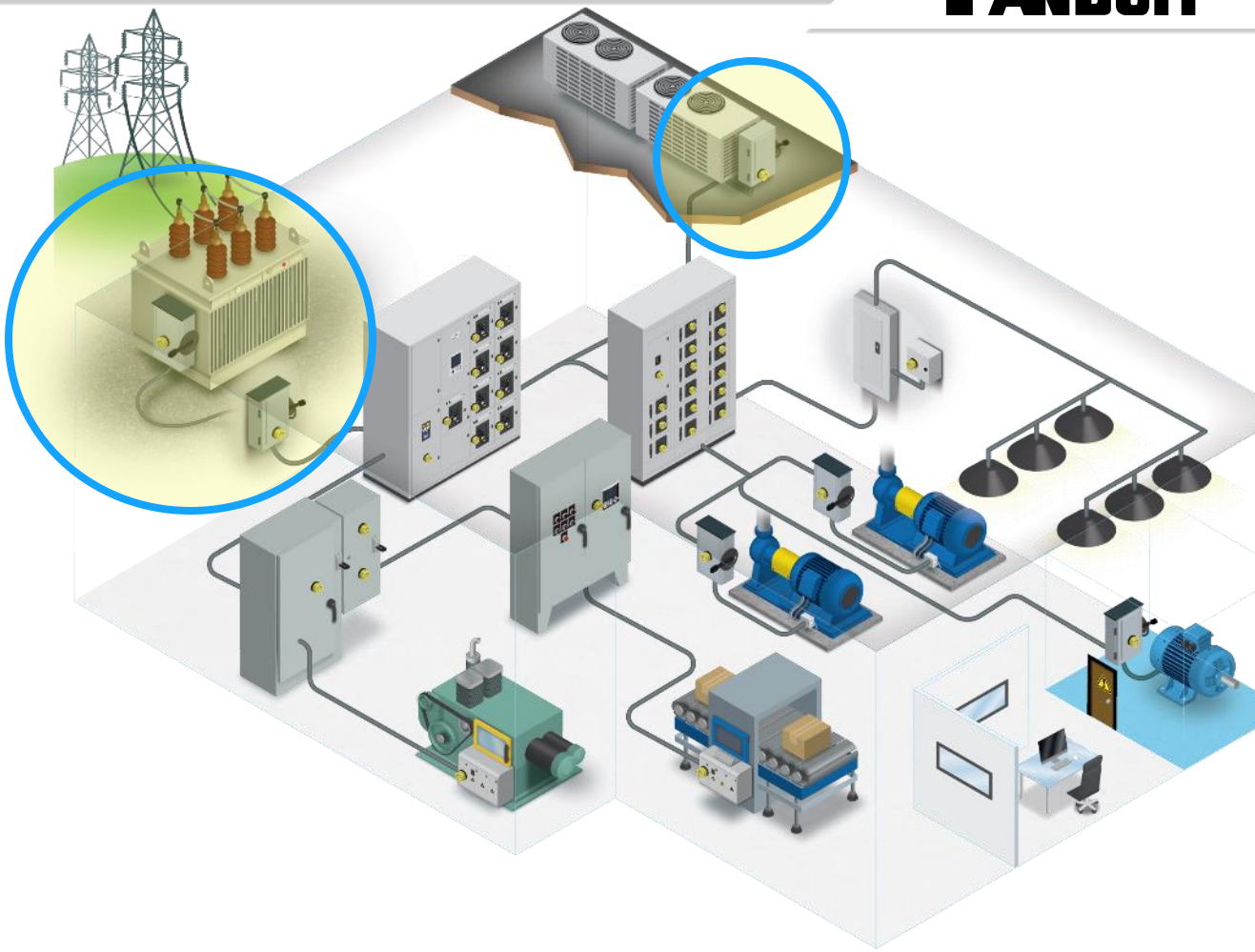
VeriSafe Absence of Voltage Testers

Industrial Applications

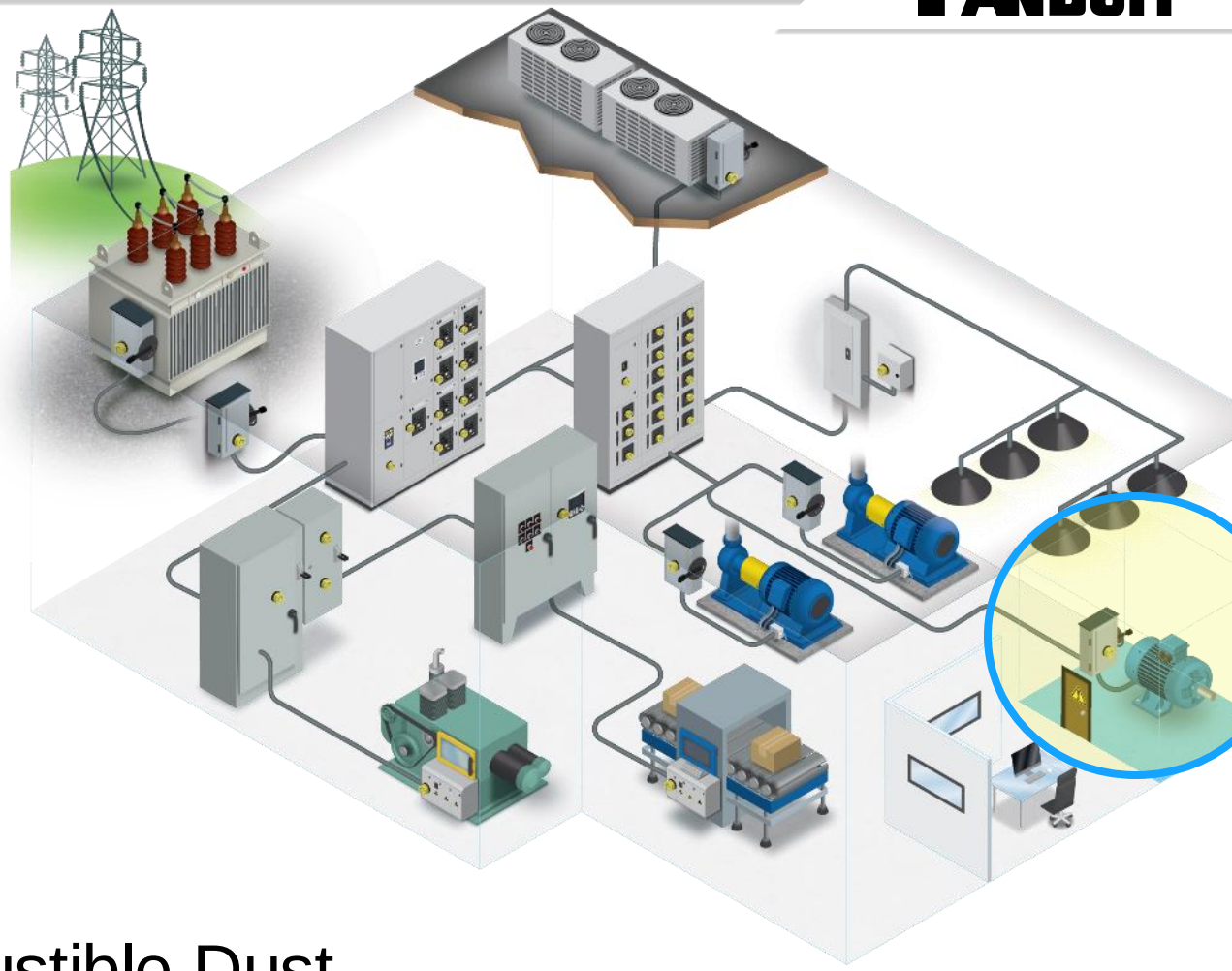


Outdoor Applications

- Increased temperature range and UV resistance
- Higher voltage/overvoltage ratings
- 2.0 AVT outdoor applications
  - Service entrance
  - Outdoor switching
  - Rooftop HVAC



Hazardous Locations



Flammable Gases/Vapors

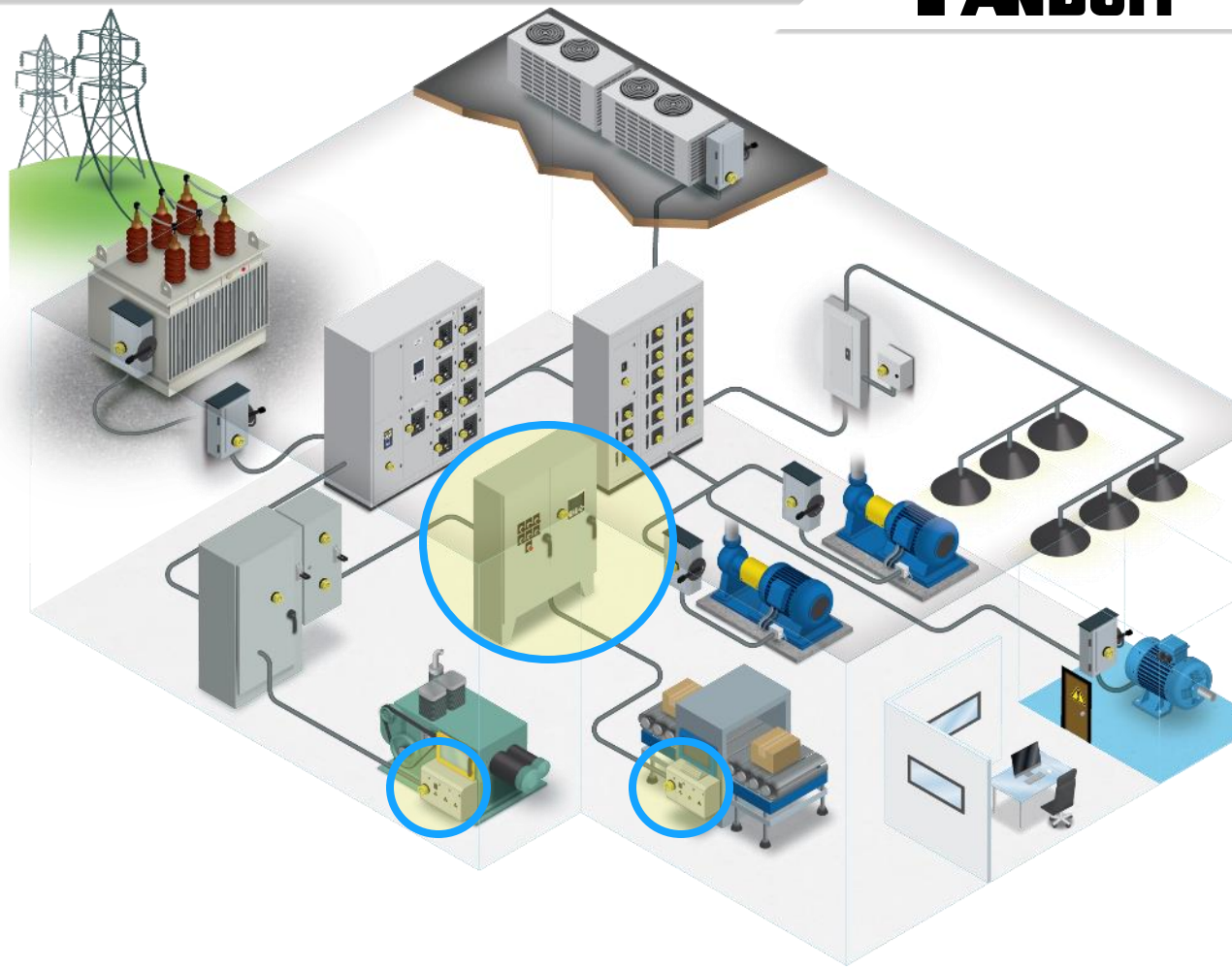
- Class I Division 2
- Class I Zone 2
- ATEX/IECEx Zone 2

Combustible Dust

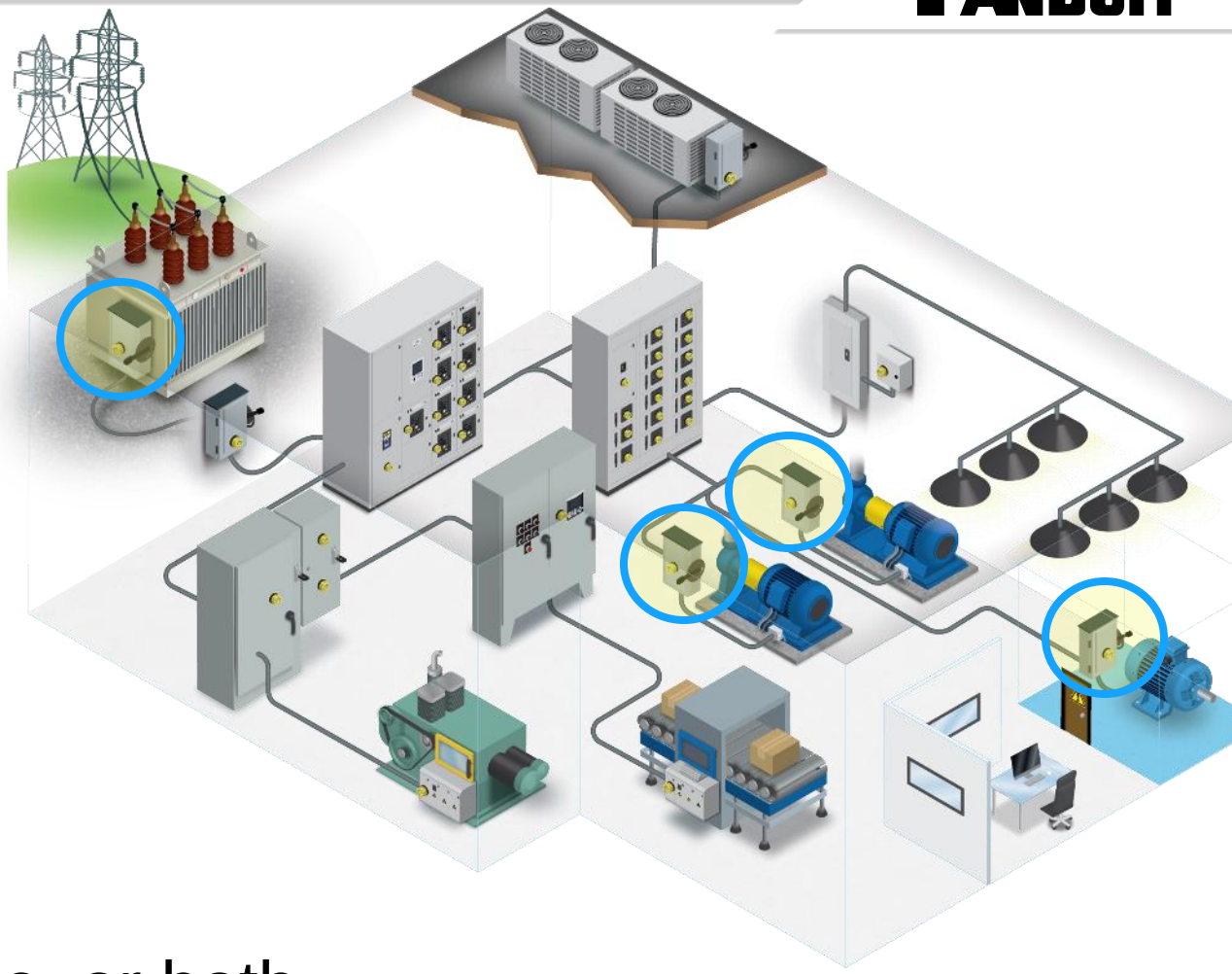
- Class II Division 2
- Class II Zone 2
- ATEX/IECEx Zone 22

Control Panels, On Machine, Automation Panels

- Increased productivity for electricians, mechanical maintenance, and operators
- Retrofit or install at OEM
- Optional: integrate AVT with control systems
  - Prevent access to an enclosure or manufacturing area
  - Increase productivity

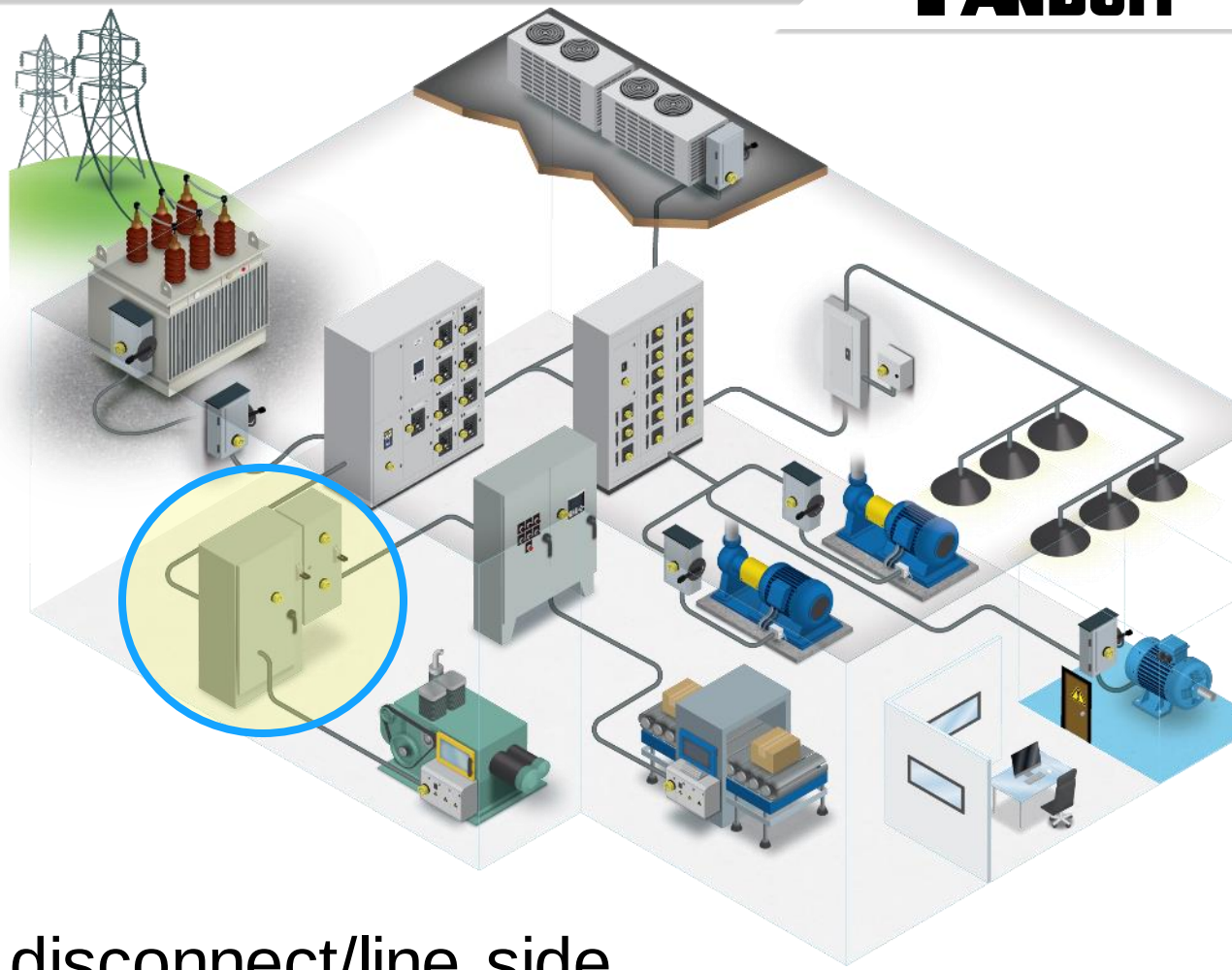


Disconnect Switch



- Install AVT on the line side, load side, or both
  - Line side – allows switch to be maintained
  - Load side – allows work to be performed downstream (motors, pumps)

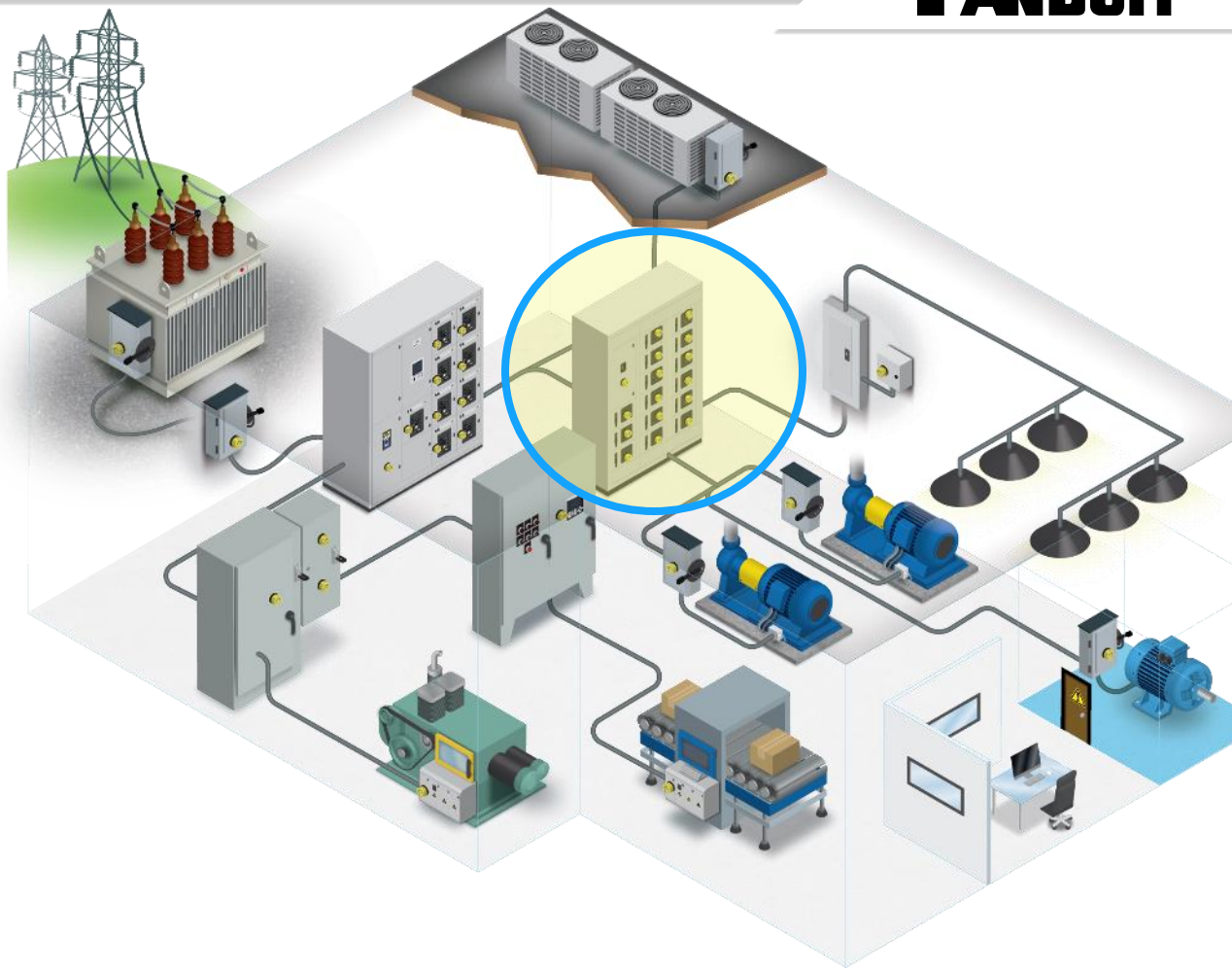
External Disconnect on Control Panel



- Use AVT to test load side of external disconnect/line side of main control panel
  - No access to live parts when main control panel is open

Motor Control Centers

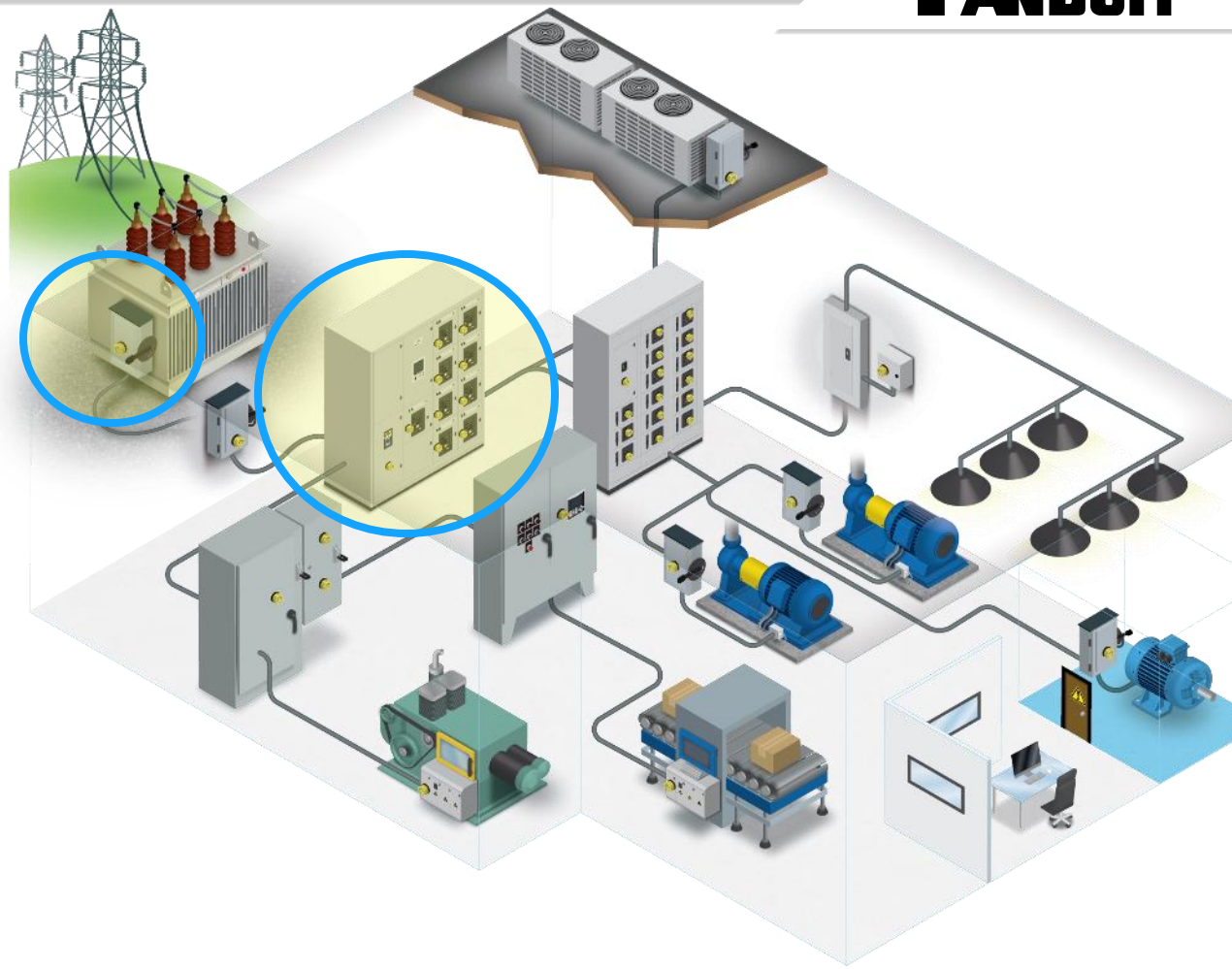
- Incoming compartments
  - Main lug only
  - Line side of main
  - Load side of main
- Individual units
  - Starters
  - Feeders
  - Drives
- Factory installed or retrofit



Learn More

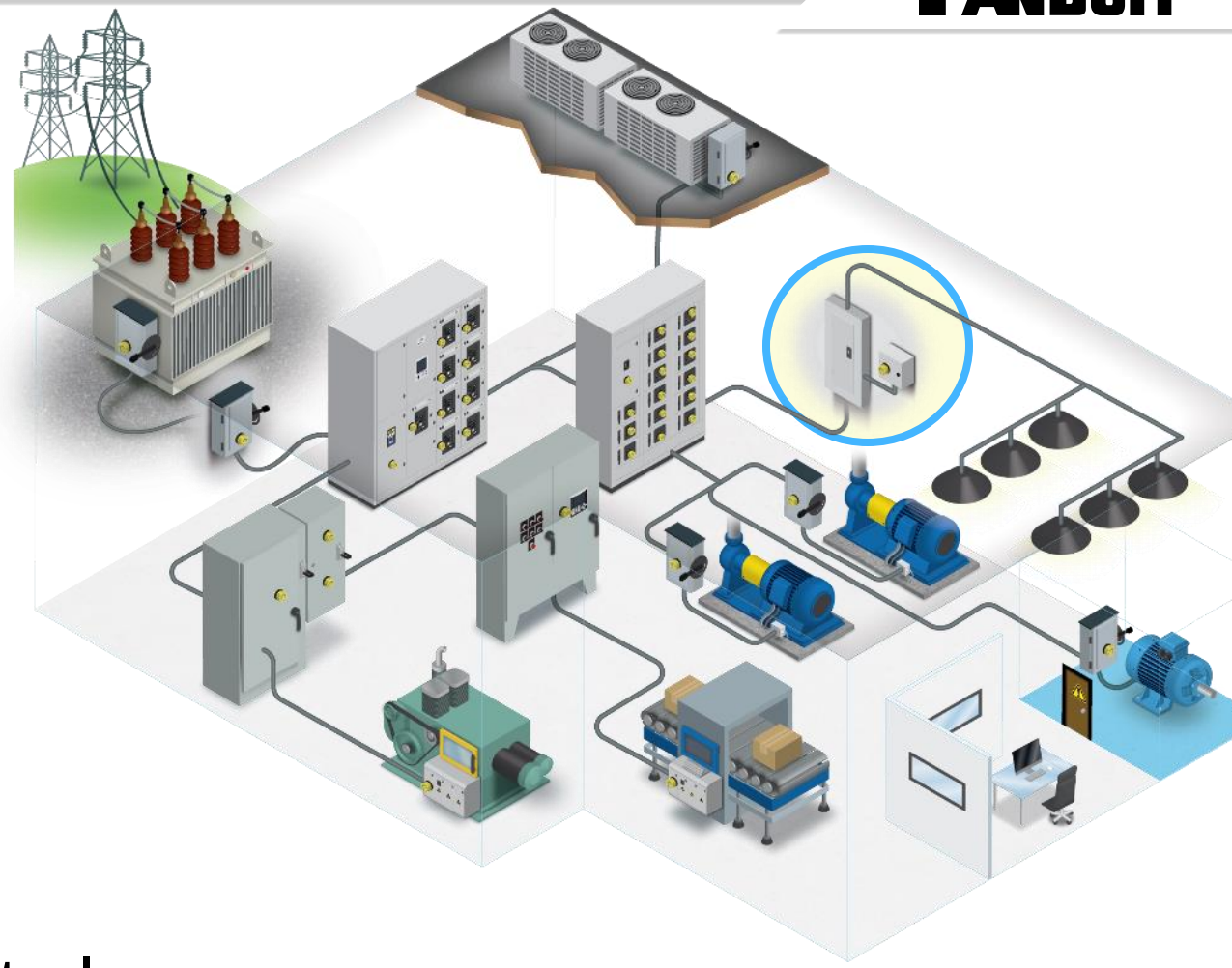
Power Distribution Equipment

- Switchgear, switchboards, power distribution panels, transformers
- Mitigate exposure to high incident energy
  - Line side of main
  - Secondary side of a transformer
- Test to ensure feeders are fully open



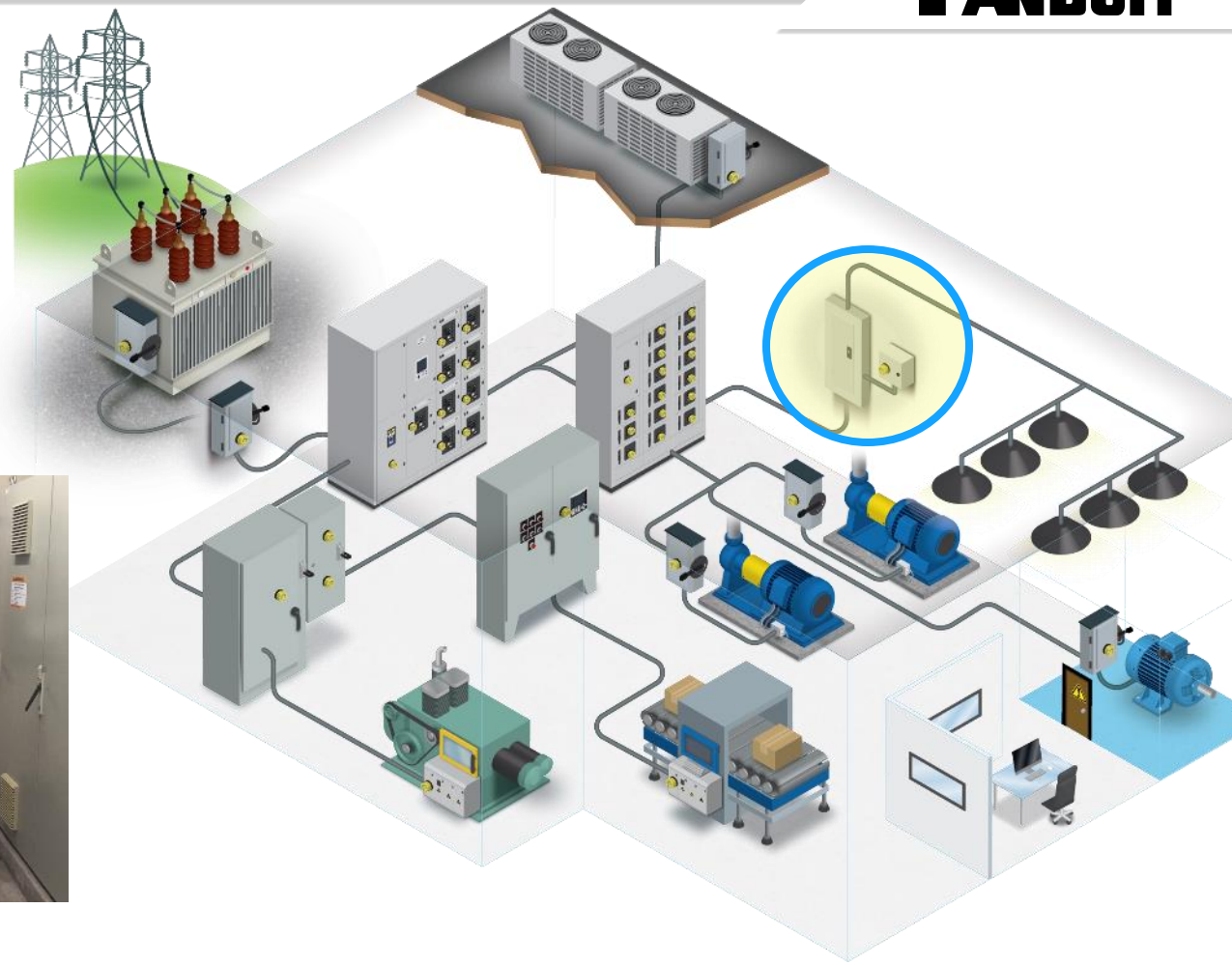
DC & Single-Phase Applications

- Optimized isolation module and indicator faceplate available
  - VS2-AVT-1P-_-_ _



- Ideal for 120V control power, lighting panels, DC applications

Retrofit Option



Utilize an adjacent enclosure

- Limited panel space
- Unable to modify main enclosure door

Two Indicator Modules

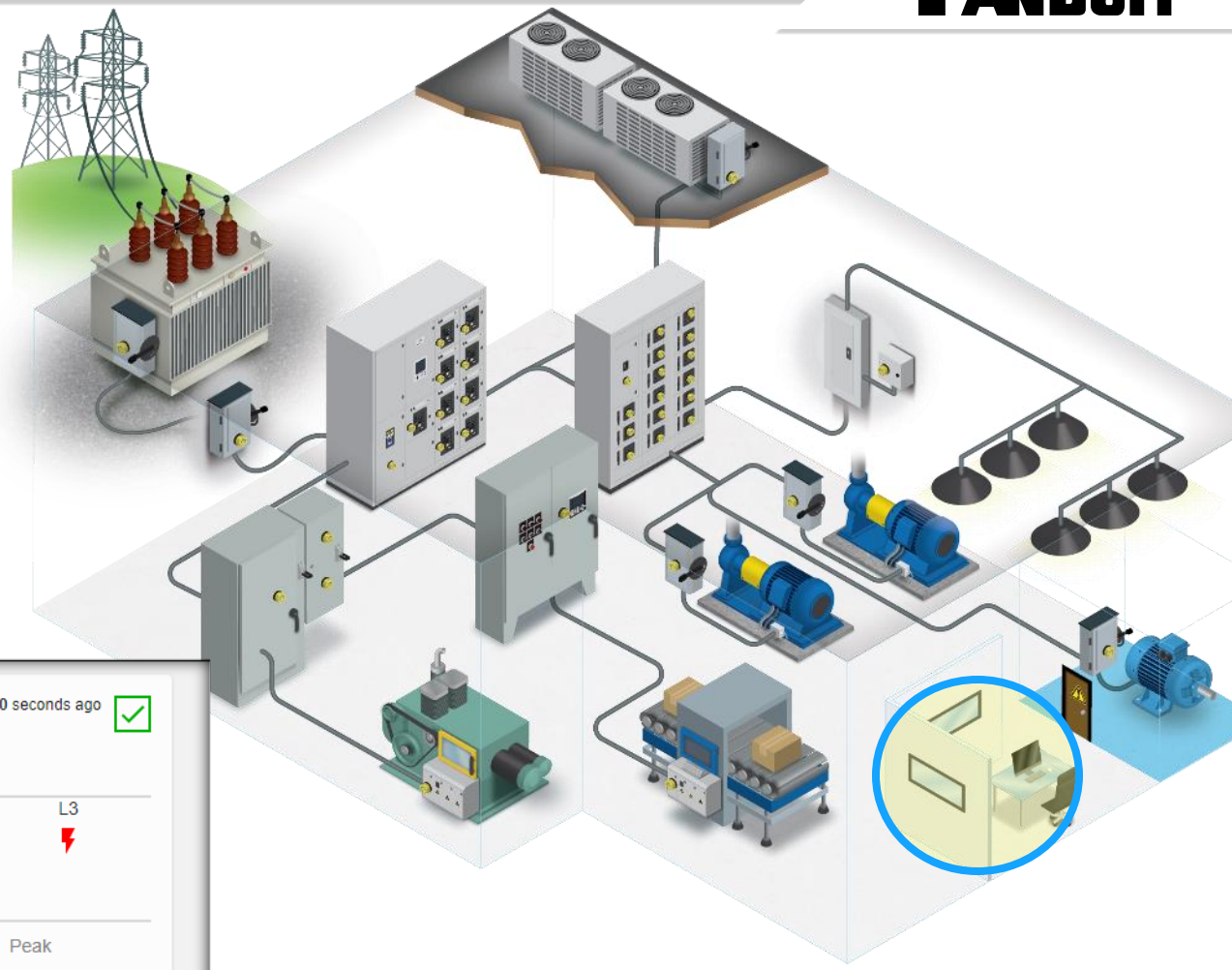
Primary Indicator Module

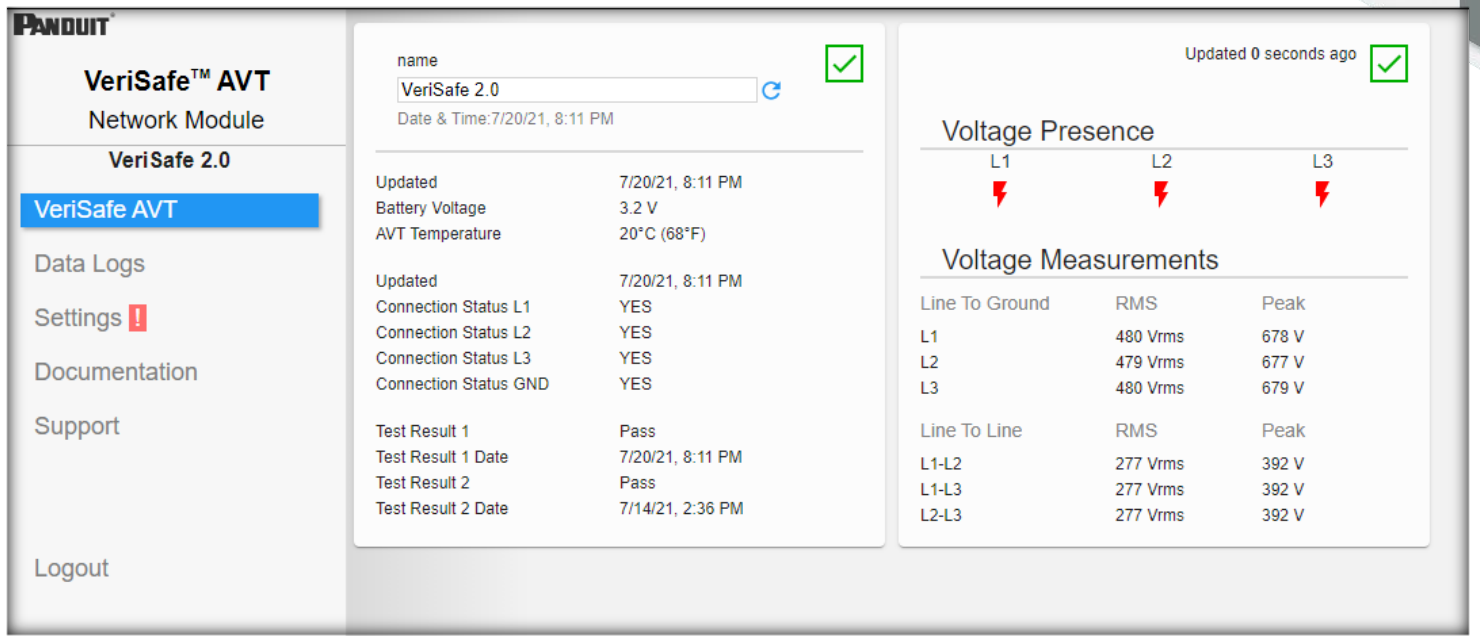
Auxiliary Indicator Module

Network Applications

*Requires Network Module VS2-NET

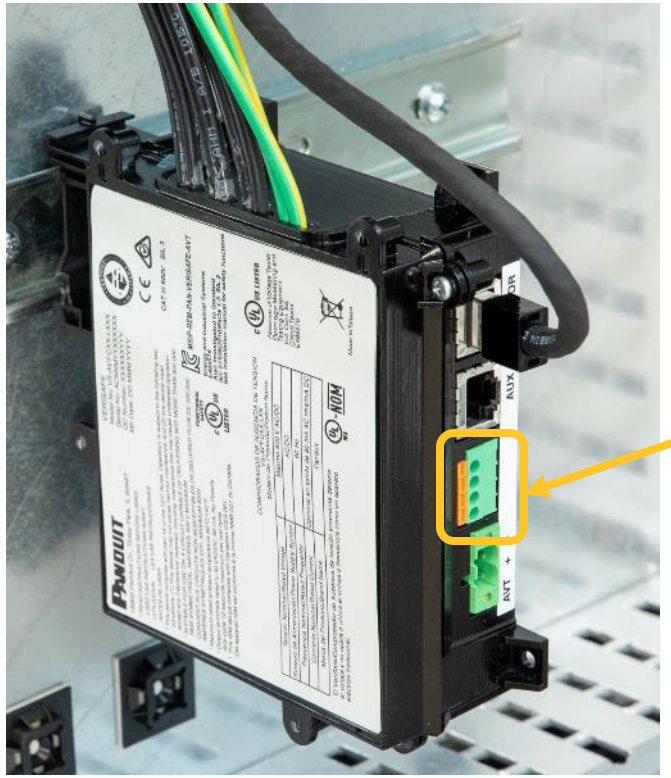
- Monitor and troubleshoot with real-time voltage status
- View test results and data logs





System Integration
Outputs (SIL 3)

- Timestamp
- Access control



Contacts close when the absence of voltage is verified

Combine the AVT with an electronic lock for an added layer of protection.

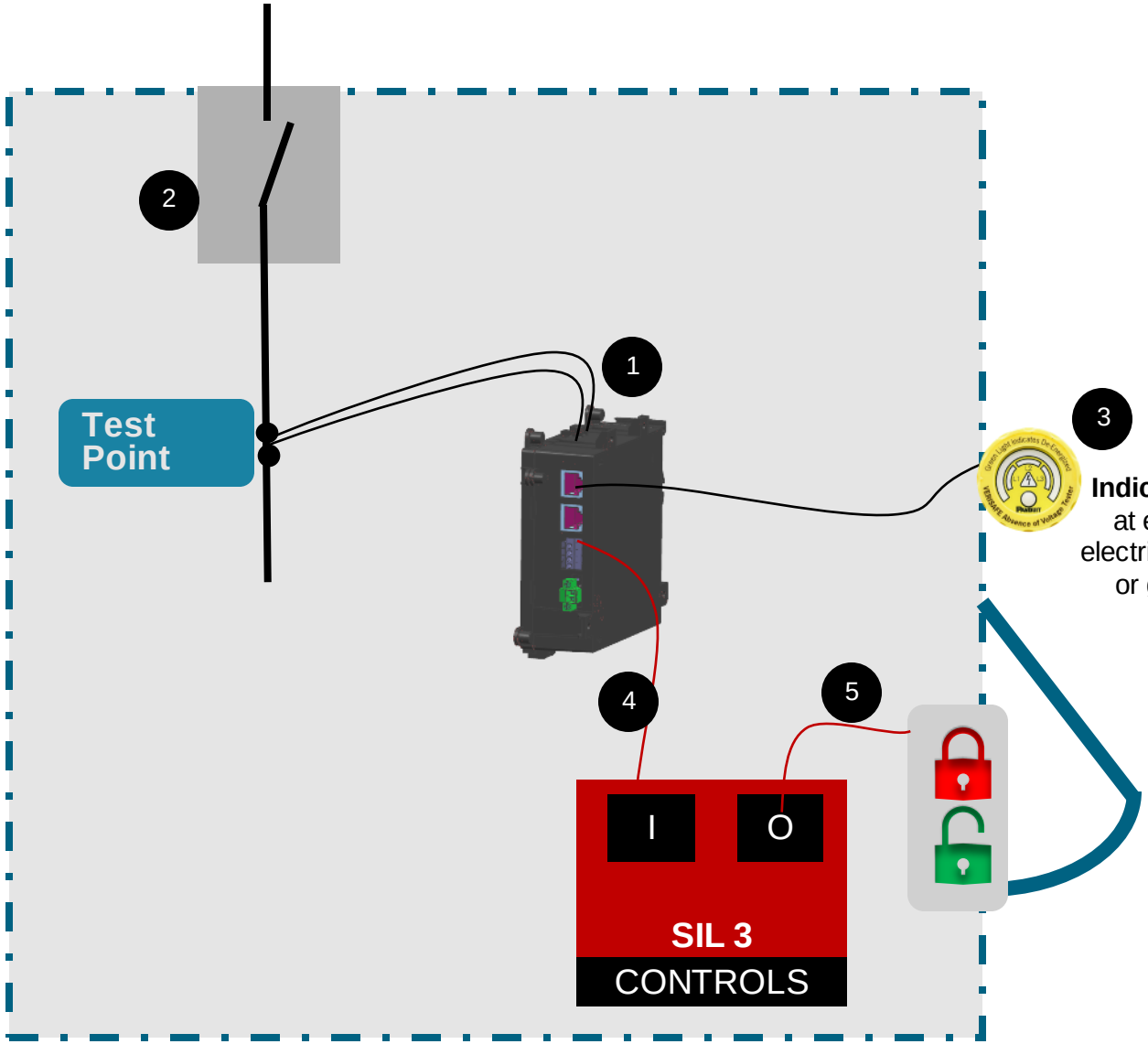
Absence of Voltage Tester

Access Control Kit

Includes keyed mechanical override for troubleshooting

Access Control
AVT + Lock

1. VeriSafe 2.0 AVT
2. Power is isolated/locked out
3. Operator initiates absence of voltage test by pushing test button.
4. AVT outputs change state when absence of voltage is confirmed (part of safety function)
5. Controller releases lock when output contacts close, allowing Operator to enter enclosure or gated area.



Power Monitoring
AVT + Network Module (contacts)

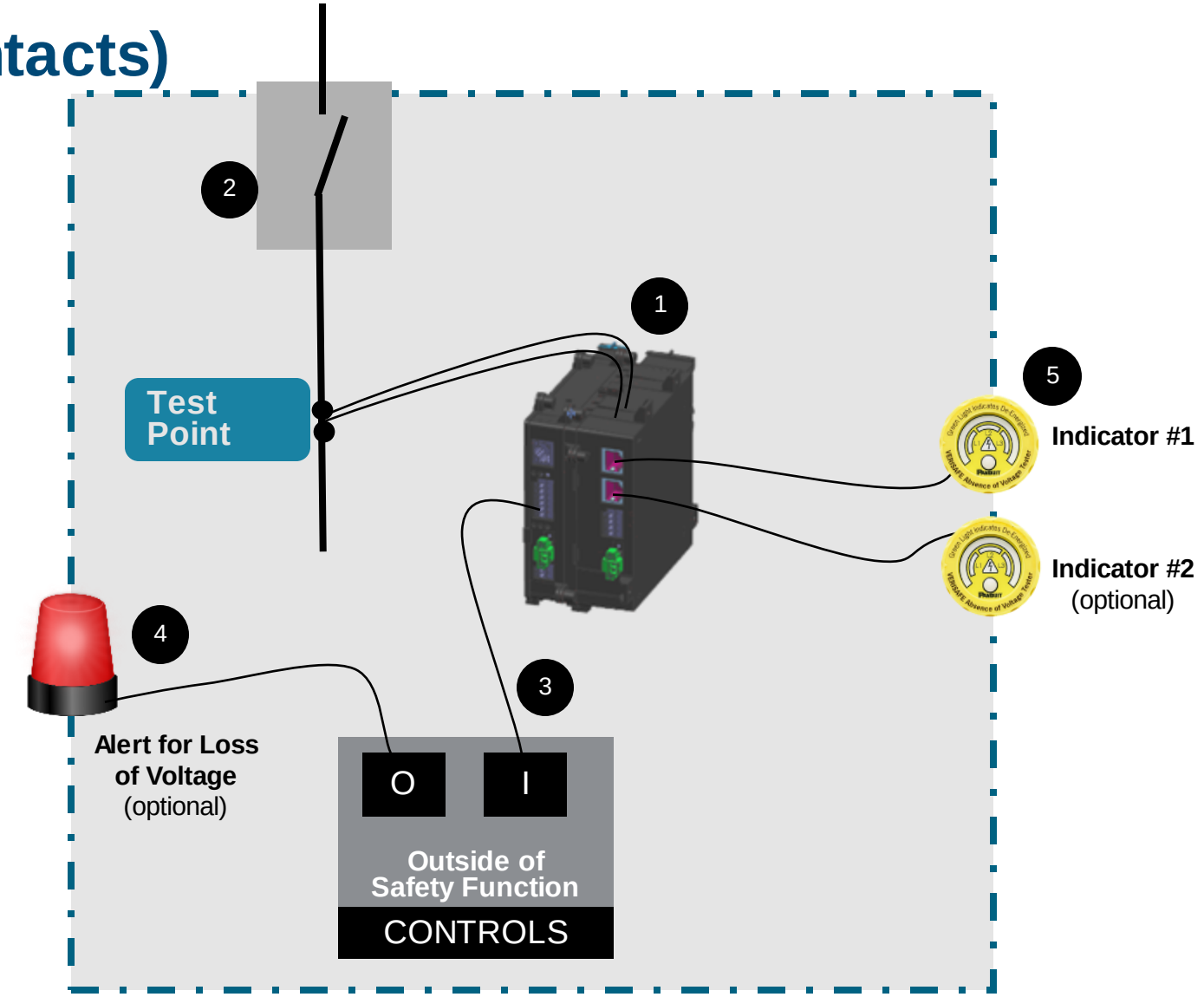
1. VeriSafe 2.0 AVT + Network Module

2. Loss of voltage in one or more phase
   - Power is isolated/locked out
   - Voltage drop
   - Blown fuse(s)

3. Solid state contact(s) change state when voltage presence drops below threshold (~47V ac or ~60V dc).

4. Change in contact status triggers an action (ex. Notification logged/sent, stack light is activated, timer is activated, HMI signal etc.) to alert Operator to test (optional).

5. Operator can initiate absence of voltage test by pushing test button at either location at any time.



Requires **VeriSafe 2.0 AVT + Network Module**.
Maximum voltage 1kV AC or DC.
Option for one or two AVT Indicator Modules

Power Monitoring
AVT + Network Module (wired Ethernet)

1. VeriSafe 2.0 AVT with Network Module + Network Connection
2. Network module monitors voltage levels at test point.
3. Anomaly detected (loss of voltage, loss of connection, temperature threshold, etc.)
4. Send signal to trigger alert (activate stack light, sound alarm, send notification, etc.)

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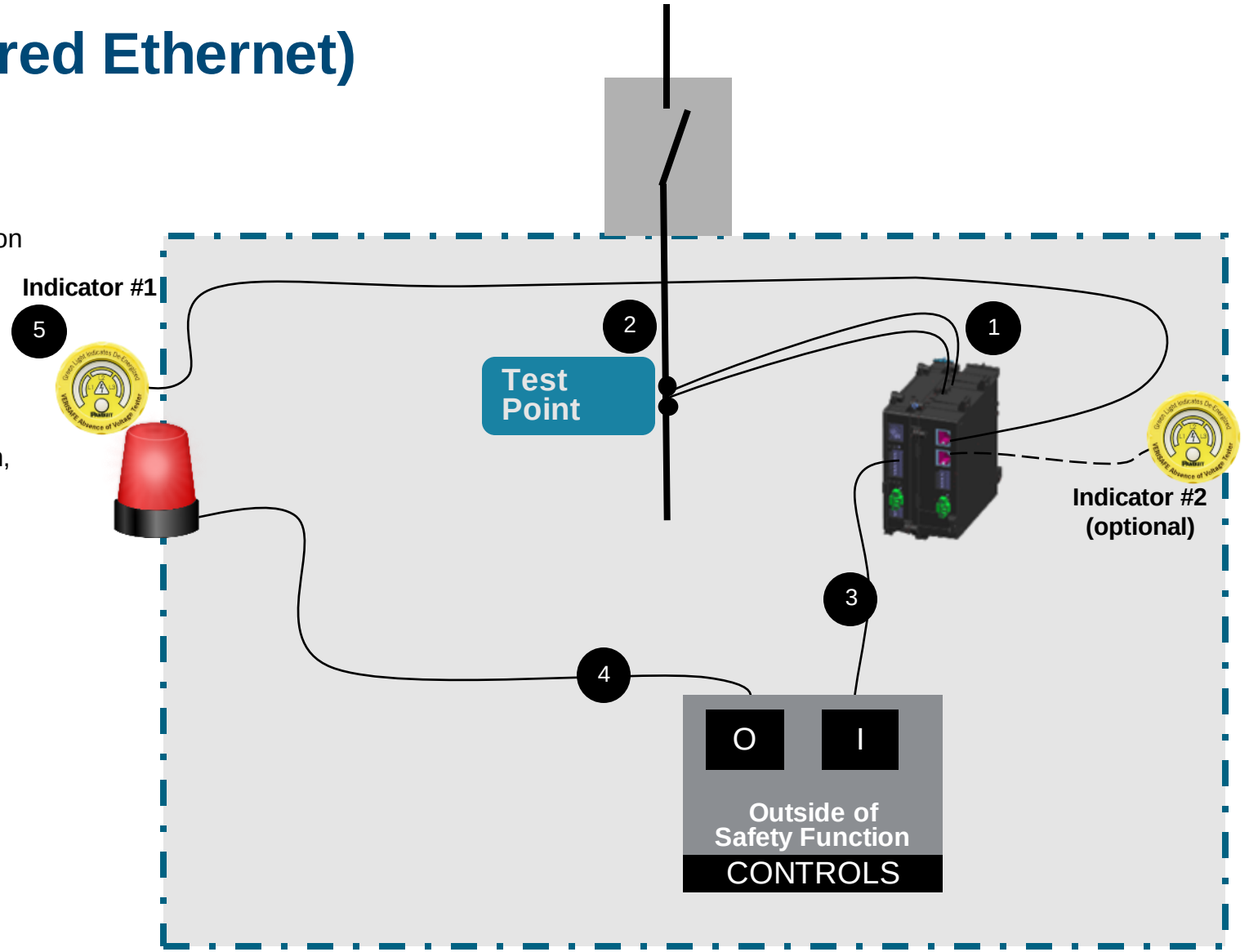
5. Operator initiates absence of voltage test by pushing test button.
   Test can be initiated at either indicator.
   Result will be shown simultaneously on both indicators

Requires **VeriSafe 2.0 AVT + Network Module + Network Connection**
Maximum voltage 1kV AC or DC.
Option for one or two AVT Indicator Modules



Product Test
Stored Energy

1. VeriSafe AVT installed on test cables to monitor voltage at product under test*.
2. Power is isolated/locked out.
3. Network module monitors voltage levels at product/cables.
4. When voltage reaches ~3V activate stack light. This is a signal to Production Associate the system is ready to test.
5. Production Associate initiates absence of voltage test by pushing AVT test button.
6. When absence of voltage is confirmed, gate unlocks, and Production Associate can safely enter and remove cables from Product.

Requires **VeriSafe 2.0 AVT + Network Module**. Maximum voltage 1kV AC or DC.

* AVT should be installed as close to product under test as possible