

Where to Install

The VeriSafe AVT is to be installed at the point in the circuit where you would normally test for voltage. If there is more than one energy source within the enclosure, multiple AVTs will be needed to test each source (each AVT is designed to test one energy source). AVTs can be used to test three-phase, single-phase, and DC sources.

General Information

The VeriSafe AVT is provided with 14 AWG Class K stranded sensor leads. **Ferrules or terminals are recommended for all sensor lead terminations to ensure reliable connections with stranded wire.**

The AVT isolation module has a set of sensor leads for making hardwired connections to each phase and ground. There are no labels distinguishing the leads in each set because it is critical that they are both properly terminated.

Sensor leads for each phase and ground must not be mechanically terminated at the same point for the AVT to function properly (see Figures 1 and 2). For example, if the termination shown in Figure 2 fails and the sensor leads remain in contact with each other (yet no longer in contact with the conductor), the installation test will be defeated for that set of sensor leads which may lead to inaccurate results from the AVT. When installed at separate points, if a sensor lead is not contacting a conductor, the result of the installation test will prevent the AVT from returning a green absence of voltage indication.

NOTE: See VeriSafe AVT Instruction Manual for complete Installation Instructions and Commissioning Checklist

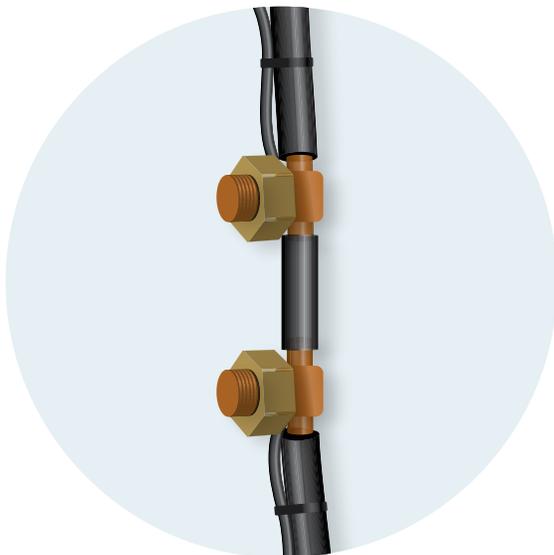


Figure 1 Example of properly terminated sensor leads. Leads are not mechanically connected, and secured to the conductor.



Figure 2 Terminating both sensor leads at the same point may result in inaccurate AVT results.

There is no maximum distance requirement between the sensor leads in a set, however there should not be any circuit elements (ex. circuit breaker, fuse, VFD, switch or similar control devices etc.) installed between each pair of sensor leads (See Figure 3).

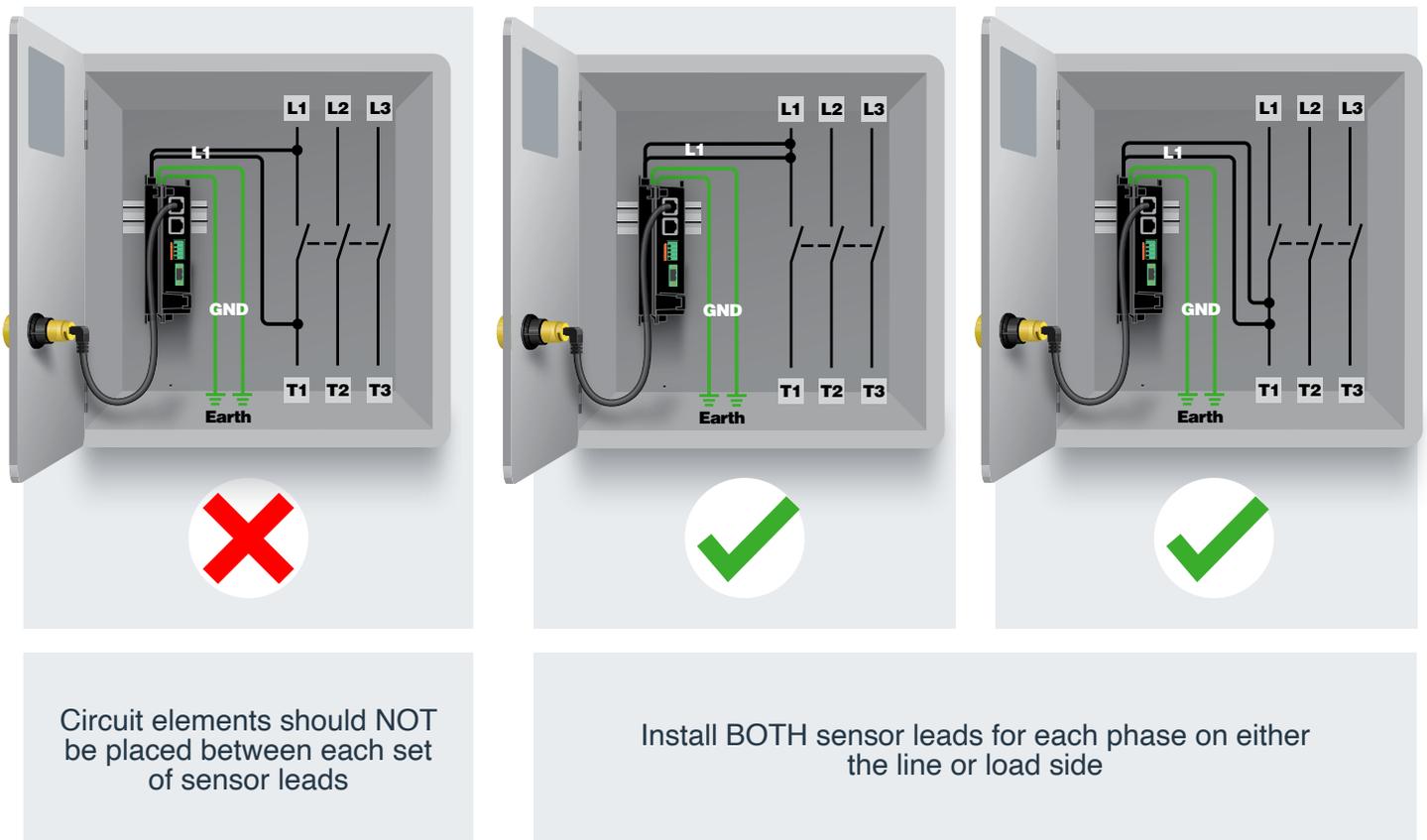


Figure 3 Location of sensor lead pairs

When installing an AVT, care should be taken to ensure that sensor leads used to connect the AVT to the line or bus and to ground shall not be any longer than necessary and shall be routed to avoid sharp edges, pinch points or mechanical damage. The maximum sensor lead length is 10 feet. Extending the sensor leads with a splice beyond this distance may not comply with local installation codes. (NEC Article 240.21(B)(1)(b) Exception allows taps up to 10 feet on a feeder circuit without the need for overcurrent protection.)

Sensor lead terminations should be inspected periodically, like other critical terminations inside an electrical enclosure, to ensure they are tight, and the sensor leads are secure.

Always insulate the sensor lead termination points. A variety of methods can be used to insulate the termination. Some connectors have insulating housings, others have accessories to insulate the connector. Insulating tape or heat shrink can also be used.

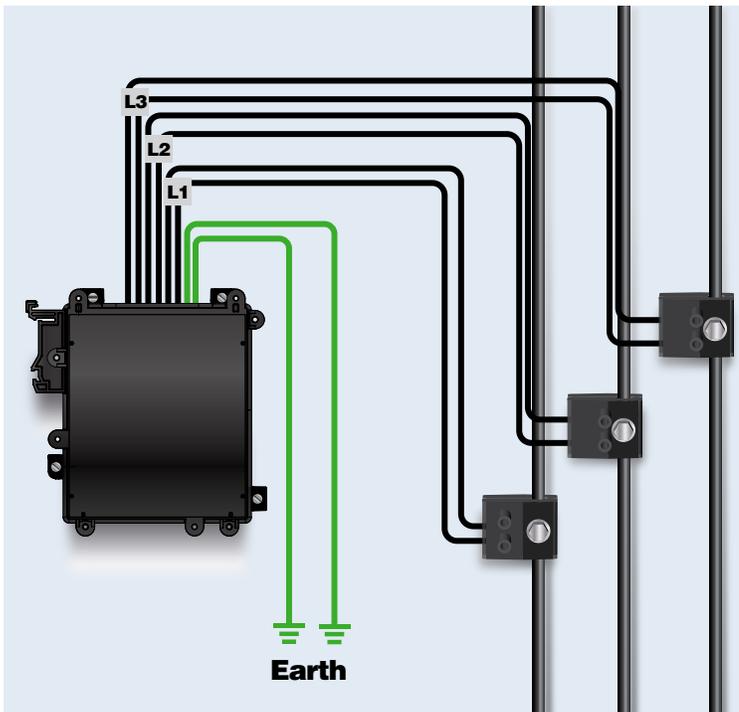
Use approved connection methods and follow local codes and standards when terminating the sensor leads.

Common Methods for Terminating VeriSafe AVT Sensor Leads

This section describes some of the common methods used to terminate VeriSafe AVT sensor leads. Other methods or combinations of these methods can be used as long as they comply with the VeriSafe AVT Instruction Manual and local installation codes and standards.

VeriSafe Insulation Piercing Connector

Typical Installation



Considerations

- Single connector is used to terminate two sensor leads, allowing for a smaller connector footprint and faster installation
- Insulation piercing connectors do not compromise the integrity of the conductor
- AVT sensor leads must have ferrules applied at all termination points

SCCR Impact

- No Impact

Limitations

- If extending the sensor leads, the total length of the sensor leads plus the sensor lead extensions must be less than 10ft from the isolation module to the connection point on the power conductor (to comply with NEC tap rule)

VeriSafe Insulation Piercing Connector Kits

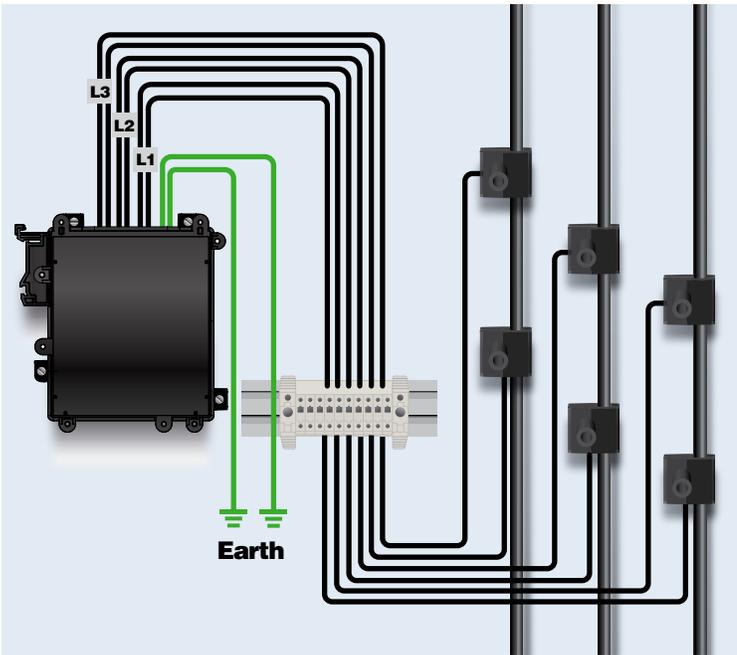
Each kit includes three connectors & ferrules to install one AVT



Common Methods for Terminating VeriSafe AVT Sensor Leads

Insulation Piercing Connector with Terminal Block

Typical Installation



NOTE: This installation method is recommended for run conductors larger than 500 MCM (Panduit IPC connectors are compatible with class K sensor lead wiring and cover AWG 14 to 500 MCM run conductors.)

Sicame Part # TTD0810XF



Covers 3/0 to 750MCM and accepts one 14AWG tap. A terminal block is needed to convert to the sensor lead stranding from class K to a stranding compatible with the Sicame connectors (This Sicame SKU is not compatible with class K wiring of the AVT). Six Sicame connectors are needed to install an AVT (Each Sicame connector only accommodates one 14 AWG tap)

Considerations

- If the AVT sensor leads are not compatible with insulation piercing or insulation displacement connectors, use of a terminal block provides a means of converting the AVT sensor leads to a wire type that is compatible with these connectors.
- Select extension wire that is compatible with the specific insulation piercing connector for the sensor lead extension.
- Ensure that the insulation piercing connector will not compromise the integrity of the conductor.
- **AVT sensor leads must have ferrules applied at all termination points**

SCCR Impact

- No Impact

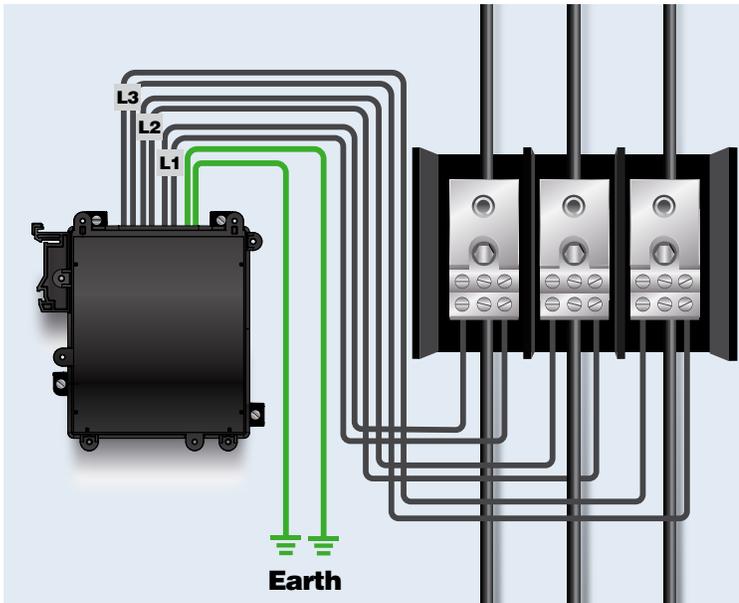
Limitations

- The total length of the sensor leads plus the sensor lead extensions must be less than 10ft from the isolation module to the termination point on the power conductor (to comply with NEC tap rule)
- Must use separate connector for each sensor lead

Common Methods for Terminating VeriSafe AVT Sensor Leads

Power Distribution Block (PDB)

Typical Installation



Considerations

- Ideal for new installations where space for the power distribution block is more likely to be available.
- Select PDBs with ports capable of accepting 14 AWG AVT sensor leads.
- **AVT sensor leads must have ferrules applied at all termination points**

SCCR Impact

- If a power distribution block (PDB) is added for AVT installation and not considered in the SCCR calculations, the PDB will be part of the power circuit and may affect the SCCR (because the run conductor is spliced on either side of the PDB).
- If the power distribution block (PDB) is already present in the circuit and considered in the SCCR calculations, there is no impact to the SCCR rating.

NOTE: The AVT is not part of the power circuit, as it only acts as a sensing/monitoring device and does not carry power.

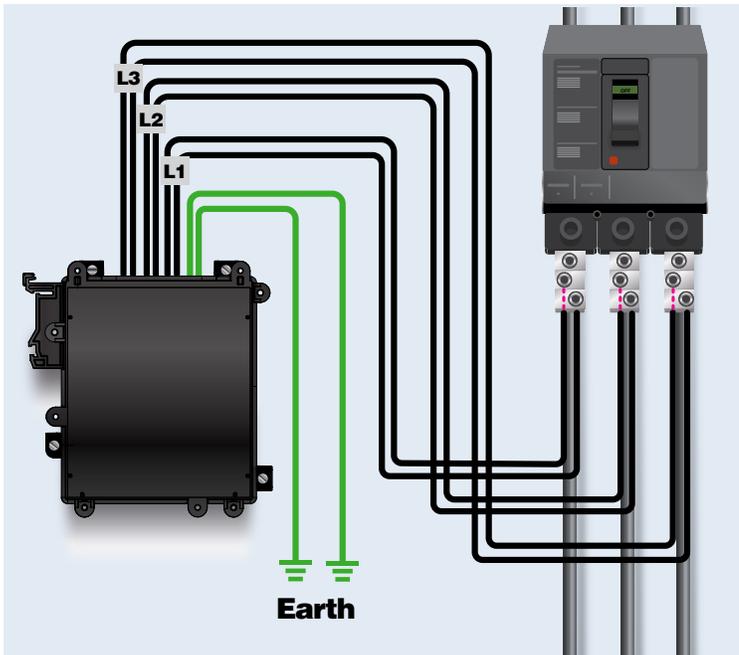
Limitations

- If extending the sensor leads, the total length of the sensor leads plus the sensor lead extensions must be less than 10ft from the isolation module to the connection point on the power conductor (to comply with NEC tap rule)
- Space must be available in panel to install the PDB.
- Sensor leads must not be terminated in the same port.
- For applications that require larger than 2/0 AWG conductors, most power distribution blocks will not have ports sized to accept both the larger conductor and smaller 14AWG AVT sensor leads.

Common Methods for Terminating VeriSafe AVT Sensor Leads

Multi-tap Lugs

Typical Installation



Considerations

- This method is compatible with multi-tap lugs on the line or load side of a component (load side shown).
- It may be possible to terminate one sensor lead on the load side lug of a disconnect and the other sensor lead on the upstream lug of the next component in the circuit. If this method is used, there must not be any circuit elements installed between the AVT sensor leads. (Fig. A)
- Lugs must be rated to accept multiple wires and compatible with the 14 AWG AVT sensor leads
- Multi-tap lugs can be added or changed on some electrical disconnects
- **AVT sensor leads must have ferrules applied at all termination points**

SCCR Impact

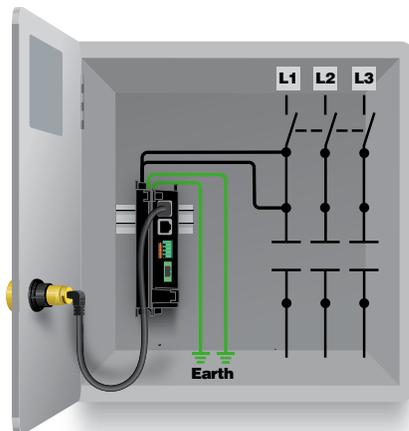
- Changing or adding a lug may impact SCCR
- If the lugs are already present in the circuit and considered in the SCCR calculations, there is no impact to the SCCR rating.

NOTE: The AVT is not part of the power circuit, as it only acts as a sensing/monitoring device and does not carry power.

Limitations

- If extending the sensor leads, the total length of the sensor leads plus the sensor lead extensions must be less than 10ft from the isolation module to the connection point on the power conductor (to comply with NEC tap rule)
- AVT sensor leads must not be terminated in the same port.
- Lugs must be compatible with the electrical disconnect.

Fig. A

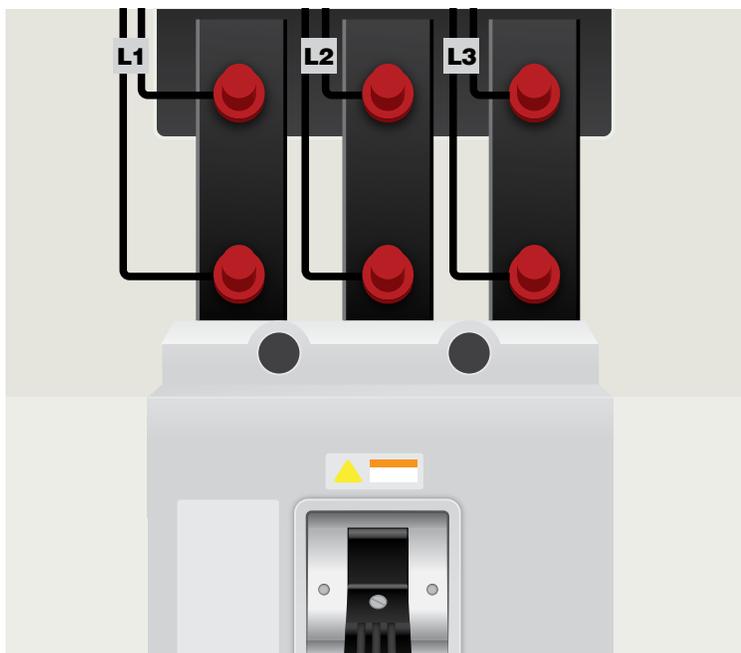
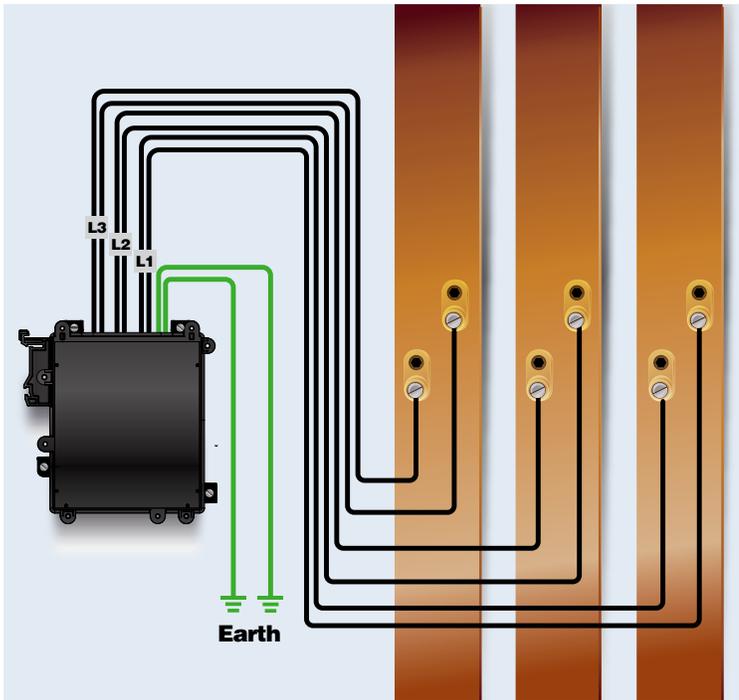


VeriSafe AVT installation with one of the sensor leads terminated on the load side lug of the disconnect and the other sensor lead terminated on the line side lug of the next component in the circuit

Common Methods for Terminating VeriSafe AVT Sensor Leads

Busbars

Typical Installation



AVT Sensor Lead terminated under insulation on busbar

Considerations

- Sensor leads may be terminated using barrel post lugs, ring terminals, bolted connections or other similar methods
- Carefully route and secure sensor leads
- Consult manufacturer before making modifications to busbars
- **AVT sensor leads must have ferrules (or terminals) applied at all termination points**

SCCR Impact

- No Impact

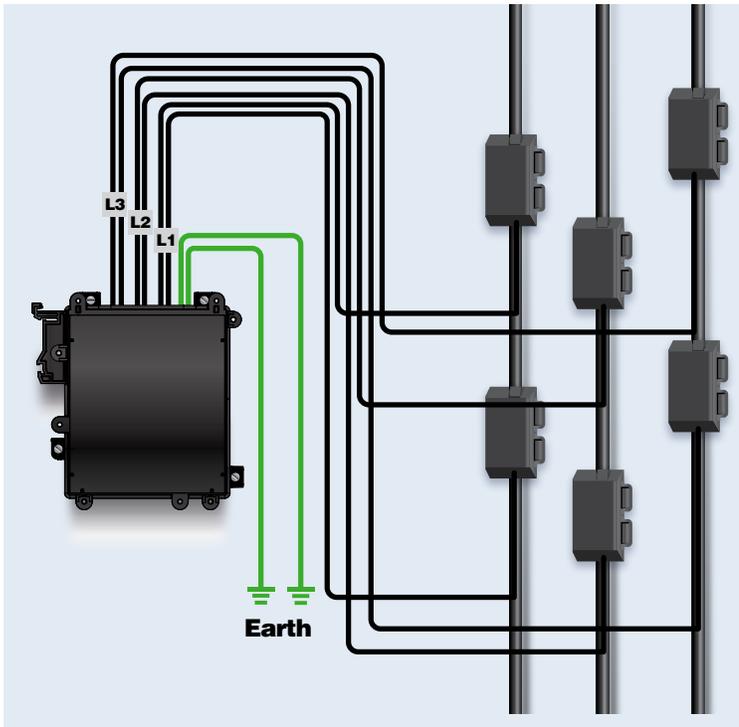
Limitations

- If extending the sensor leads, the total length of the sensor leads plus the sensor lead extensions must be less than 10ft from the isolation module to the connection point on the power conductor (to comply with NEC tap rule)
- Sensor leads must not be terminated under the same screw.

Common Methods for Terminating VeriSafe AVT Sensor Leads

Split Bolt Connectors

Typical Installation



Considerations

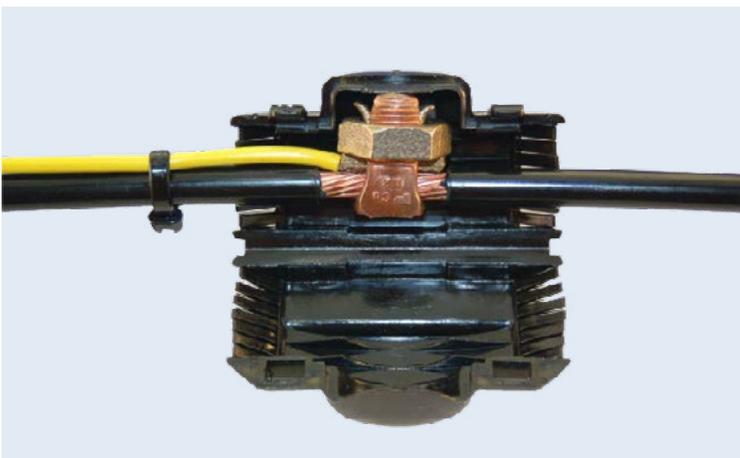
- Connections must be insulated
- AVT sensor leads must have ferrules applied at all termination points

SCCR Impact

- No Impact

Limitations

- If extending the sensor leads, the total length of the sensor leads plus the sensor lead extensions must be less than 10ft from the isolation module to the connection point on the power conductor (to comply with NEC tap rule)

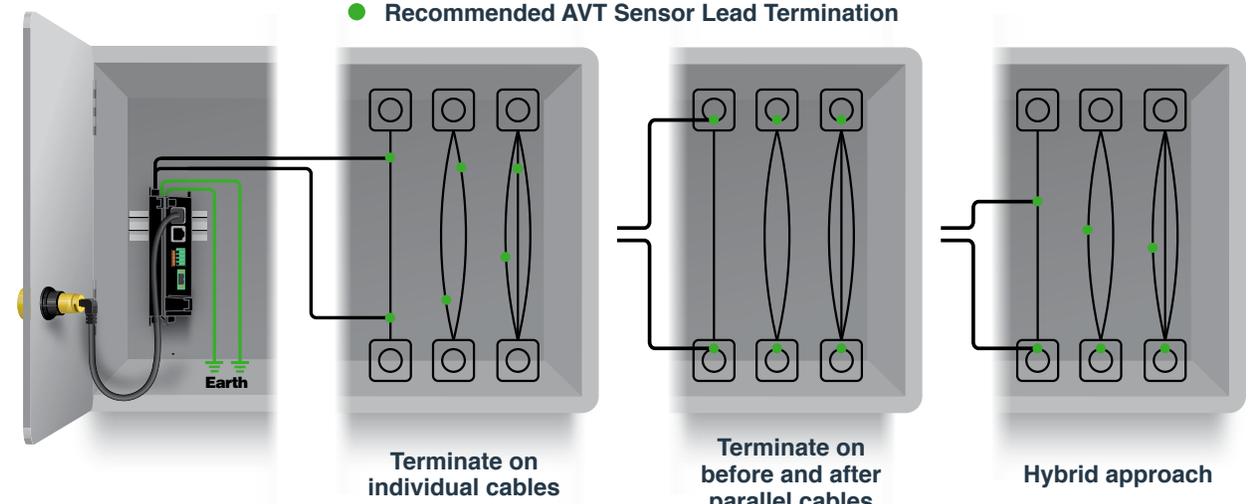


Common Methods for Terminating VeriSafe AVT Sensor Leads

Other Examples

Parallel Conductor Run

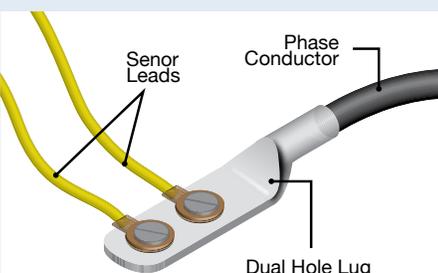
● Recommended AVT Sensor Lead Termination



Terminate on individual cables
Terminate on before and after parallel cables
Hybrid approach

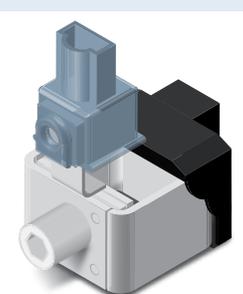
Some applications may use multiple cables per phase. In these cases, it is recommended to install each sensor lead on a separate cable for redundancy. The diagram provides additional guidance regarding recommended terminations for parallel conductors.

Dual Hole Lugs



- Connect sensor leads with ring terminals.
- Each AVT sensor lead must be terminated at a separate point.
- Panduit product series dual hole lug.

Siemens Control Tap #3VA91430JH12



- Compatible with one bolt connection yet allows for two separate "ports" separated by a set screw.
- Sensor leads are not mechanically connected.
- AVT sensor leads must have ferrules applied.

Rockwell Terminal Adapters #1494U-ALT31



- Terminal adapters may be used on line or load side of the Rockwell 194U disconnects from 30-600A.
- An acceptable method for terminating one of the AVT sensor leads. Note terminal adapters are sold in packages of 2.