Improve your service restoration time.

Fisher Pierce® Faulted Circuit Indicators (FCIs) for both overhead and underground applications are cost-effective tools to locate faults faster, enabling you to reduce outage duration — and customer complaints. For more than 40 years, Fisher Pierce® has provided utilities with reliable, competitive solutions for fault location. As the need for system information increases, you can always turn to Fisher Pierce® for fault-location solutions.
Quickly locate faulted cable or equipment in overhead and underground distribution systems through 35kV (L–G).

With a complete line of cable-mount and test-point mounted faulted circuit indicators, voltage indicators and phase indicators, Fisher Pierce has the right fault-indication solution to meet your system’s performance needs. Fisher Pierce® fault indicators reduce outage duration by quickly pinpointing the location of faults. As illustrated in the circuit diagram, the fault is located between the last tripped indicator and the first untripped indicator. Once identified, this section can be switched to become the new open point, allowing full service restoration to the rest of the customers during repairs.

### Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefits/Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adaptive Trip Logic</td>
<td>Most flexible and recommended for the majority of applications, less chance for misapplication, can handle load growth.</td>
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<tr>
<td>AccQTrip Logic Circuitry</td>
<td>“Off-the-trip” logic circuit with high/low trip setting selection prevents false tripping due to transient current surges or system overloading.</td>
</tr>
<tr>
<td>Inrush Restraint</td>
<td>More reliable fault detection. Eliminates false tripping due to capacitor inrush and cold load pickup.</td>
</tr>
<tr>
<td>Temporary Fault Detection</td>
<td>Helps locate nuisance temporary faults.</td>
</tr>
<tr>
<td>Highly Visible, LED and Fluorescent Orange Flag Indication Options</td>
<td>Easier viewing in daylight, as well as during outage / storm conditions.</td>
</tr>
<tr>
<td>Multiple Reset Options</td>
<td>Supporting current, voltage and time allows proper FCI choice for any application.</td>
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<tr>
<td>Directional Capability</td>
<td>Allows for fault sensing based on phase relationship for network applications.</td>
</tr>
<tr>
<td>Internal Adjacent Phase Shielding</td>
<td>Prevents electromagnetic interference from adjacent phase conductors.</td>
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</table>

### What is...

**...Inrush Current and Inrush Restraint?**

Circuit inrush is a condition that occurs when a de-energized circuit becomes energized, such as from cold load pickup or recloser operation. The inrush of current is caused by the many loads attached to the circuit. The amount of inrush current depends upon the length of the circuit and circuit loading. Fault indicators without inrush-restraint logic would sense high inrush current and provide a false indication that a fault occurred. For this reason, Fisher Pierce® has developed inrush-restraint logic to mitigate the possibility of false trips due to inrush current.

**...Backfeed and Backfeed Restraint?**

Distribution system capacitors have been identified as a potential source of backfeed trips downstream of the actual faulted location. Field-testing has characterized most backfeeds from this source to have duration of less than 1 cycle. The backfeed-restraint feature applies to the trip algorithm, which ignores any overcurrent with a duration of less than 1.5 cycles. This feature can greatly improve the reliability of the FCI targets during an outage condition. System Consideration: The backfeed-restraint feature is not recommended if the clearing time of the protective device is faster than 2 cycles and the expected fault current magnitude is less than 300 amps.

**...Trip Logic?**

In non-adaptive trip applications, trip logic is the fixed or programmable current level at which the FCI is set to switch the indicator to the "tripped" or "fault" position.

**...Reset Logic?**

Reset logic is the means by which the FCI returns the indicator to the "un-tripped" or "no fault" position.

**...Directional Fault capability?**

After a settling period is satisfied when a feeder is energized, a phase relationship is learned, stored and considered normal power flow. When the trip current is sensed, the phase angle is calculated and compared to the normal phase angle. If the measured relationship is within the normal relationship, the FCI will indicate a valid fault. If the measured relationship is outside the predetermined phase relationship, the FCI will not trip to indicate a fault.
How does Fisher Pierce® Adaptive Trip™ logic work?

Full criteria for the Adaptive Trip™ FCI to trip are as follows:

1. Range of operation is from the minimum reset current level (dependent on model selected) to 800A maximum. Load current within this range must be present for at least 60 seconds to energize the unit to sense a fault condition.
2. When a system disturbance occurs, the line current must increase by a minimum of the preset fault current level (dependent on model selected) within a 50 msec time frame.
3. The total current must be greater than the original load current plus the preset fault current level to enable operation of the indicator.
4. Following the current increase, a loss of line current for 150 msec (duration dependent on model selected), must take place within 40–60 seconds, confirming that the increase resulted from a fault and not from a sudden load increase.

All four of these steps must take place in proper sequence for the Adaptive Trip™ FCI to indicate that a fault has occurred.

Example based on model parameters: Reset Current = 3A; Trip Current = 100A di/dt

**Figure 1**

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**Figure 2**

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**Figure 3**

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**Figure 4**

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**Figure 5**

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### Which Fisher Pierce FCI is recommended for your application?

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**Legend:**
- X: Recommended
- : Not recommended
Fisher Pierce® Series 1548 Overhead FCIs
Reliable fault indication for single-phase overhead applications.

FCIs with Radio Transmitters
Series 1548 radio FCIs can signal faults to handheld receivers, radio receivers and the SmartLink™ Series 5000 cellular remote terminal unit (RTU) systems integrated with SCADA- and web-based reporting systems. Status, alarms and other event notifications can be integrated into SCADA systems, as well as sent to customer-designated personnel via e-mail, pager or text message. Having precise fault information reduces outage duration, improves system reliability and lowers operation costs.

Trip/Reset Tool AT2186-10
Manual trip/reset test for both permanent and temporary fault indication using hotstick-mountable reset tool.

Benefits/Descriptions

<table>
<thead>
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<th>Features</th>
<th>Benefits/Descriptions</th>
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<tr>
<td>Trip Logic</td>
<td>Adaptive or fixed current trip with inrush restraint logic. Adaptive trip logic eliminates the need for trip-rating selection or revision with changing load.</td>
</tr>
<tr>
<td>Fault Indication</td>
<td>Visual indication choices of LED, 5-LED Array, Flag or Strobe Light. Highly viewable 360° indication (Strobe or LED). Radio fault reporting capability also available.</td>
</tr>
<tr>
<td>Mounting</td>
<td>Hotstick mounting with automatic torque limiting.</td>
</tr>
<tr>
<td>Replaceable Lithium Battery</td>
<td>Offers 10-year, maintenance-free service life. (Note that Flag model has non-replaceable battery).</td>
</tr>
<tr>
<td>Supports a Wide Range of Conductors</td>
<td>Mounts on conductors with diameters from 0.14&quot; to 1.20&quot; (3.56mm to 30.48mm).</td>
</tr>
<tr>
<td>Optional Features Available</td>
<td>Options include temporary/permanent fault indication, instantaneous recloser coordination feature and backfeed restraint using a delay-trip scheme (requires protective device to pass two cycles minimum of fault current before closing).</td>
</tr>
</tbody>
</table>
Overhead Faulted Circuit Indicators

Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Voltage</td>
<td>Flag, Strobe Models: 44kV max.</td>
</tr>
<tr>
<td></td>
<td>LED, Radio Models: 69kV max.</td>
</tr>
<tr>
<td>Continuous Withstand Load</td>
<td>1,000A max.</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-40˚ C to 85˚ C</td>
</tr>
<tr>
<td>Reset Time Accuracy</td>
<td>±10% at 23˚ C</td>
</tr>
<tr>
<td>Current Reset</td>
<td>3A or 8A min. (model specific)</td>
</tr>
<tr>
<td>Fixed Trip Current Level</td>
<td>50 to 1,500A</td>
</tr>
<tr>
<td>Adaptive Trip</td>
<td>100 d/dt, 300 d/dt</td>
</tr>
<tr>
<td>Fault Withstand</td>
<td>25kA for 10 cycles (per ANSI/IEEE 495-1986)</td>
</tr>
<tr>
<td>Trip Accuracy</td>
<td>±10% at 23˚ C</td>
</tr>
<tr>
<td>Battery</td>
<td>Replaceable 10-yr. Lithium Cell (flag model non-replaceable)</td>
</tr>
<tr>
<td>Battery Operating Life at 23˚ C</td>
<td>Single Ultra Bright LED &amp; Flag: 3,000 operating hrs. 5 Red LED: 400 operating hrs. Strobe: 120 operating hrs.</td>
</tr>
<tr>
<td>Adaptive Trip</td>
<td>100 d/dt, 300 d/dt</td>
</tr>
<tr>
<td>Fault Withstand</td>
<td>25kA for 10 cycles (per ANSI/IEEE 495-1986)</td>
</tr>
<tr>
<td>Trip Accuracy</td>
<td>±10% at 23˚ C</td>
</tr>
<tr>
<td>Battery</td>
<td>Replaceable 10-yr. Lithium Cell (flag model non-replaceable)</td>
</tr>
<tr>
<td>Battery Operating Life at 23˚ C</td>
<td>Single Ultra Bright LED &amp; Flag: 3,000 operating hrs. 5 Red LED: 400 operating hrs. Strobe: 120 operating hrs.</td>
</tr>
<tr>
<td>Radio with LED</td>
<td>800 operating hrs.</td>
</tr>
<tr>
<td>Temporary Fault Model</td>
<td>1 Amber (temporary fault) LED: 1,500 operating hrs. 4 Red (permanent fault) LED: 400 operating hrs.</td>
</tr>
<tr>
<td>Housing</td>
<td>Semi-conductive UV-stable polycarbonate</td>
</tr>
<tr>
<td>Cable Diameter</td>
<td>0.14” to 1.2” (3.56mm to 30.48mm)</td>
</tr>
<tr>
<td>Certifications</td>
<td>Complies with ANSI/IEEE 495-1986</td>
</tr>
</tbody>
</table>

Mechanical Data

(all dimensions in inches with millimeter equivalents in parentheses)
The following diagram shows how to construct a catalog number for the Series 1548 FCI.

### 1548 H - - - - 3 - - - A -

**Basic Model**
- **F**: Standard offering, reclose dead time of 150 msec, (loss of current > 150 msec), 3A min. load current required for reset, adaptive and fixed inrush trip logic options available.
- **G**: Special application offering for temporary fault detection where reclose recognition time of 32 msec, is required. Recommended for circuits with fast protection settings capable of opening and reclosing in less than 10 cycles. Available with adaptive trip logic only. Requires 8A min. load current required for reset. No current auto reset should be specified.

**Trip/Inrush Logic Options**
- **Adaptive Trip**
  - A: Adaptive trip requires: 30 sec. continuous load current; arming time <1 cycle fault current, loss of current within 60 sec. of fault current
  - B: Same as A with 24 ms ± 20% delay trip (backfeed restraint)
- **Fixed Trip**
  - C: Inrush restraint active for 32 msec. from power up, thereafter, undelayed trip curve ±10% accuracy
  - D: 32 msec. delayed trip ±20%, current trip ±10% accuracy
  - U: Undelayed current trip ±10% accuracy, standard trip

**Reset Time-Delay**
- **LED, Radio, Strobe, or Flag**
  - C: 4-hr. automatic with current reset override (60 sec. after restoration of power)
  - N: 4-hr. automatic
  - Z: 60 seconds after restoration of power, otherwise no automatic reset
  - P: 24-hr. automatic
  - T: Manual reset only, most commonly used with flag model since batteries are not used for indication. Requires tool AT2186-10

**Trip/Current**
- **Adaptive Trip**
  - N: 100A di/dt adaptive trip
  - D: 300A di/dt main feeder applications
- **Fixed Trip**
  - 0.5: 50A
  - 1: 100A
  - 2: 200A
  - 3: 300A
  - 4: 400A
  - 5: 500A
  - 6: 600A
  - 8: 800A
  - 10: 1000A
  - 12: 1200A
  - 15: 1500A
  - *100A at 20A load current to 300A at 600A load current
  - *300A at 20A load current to 400A at 350A load current

**Factory Code**

**Temporary Fault Reset Time**
- **A**: Temporary fault not selected
- **1**: 4 hrs.
- **2**: 8 hrs.
- **3**: 12 hrs.
- **4**: 24 hrs.
- **5**: Manual reset

**Transmitter Phase Encoder**
- **A**: Phase A
- **B**: Phase B
- **C**: Phase C
- **T**: Trip
- **N**: No transmitter available for Options F, T, L of Indicator Options

**Indicator Options**
- **J**: Single ultra-bright LED (standard for applications up to 66 kV max.)
- **L**: 5 ultra-bright LEDs for increased visibility display (standard for applications up to 69 kV max.)
- **X**: Temporary fault indication option 4 red, 1 amber LED (standard for applications up to 69 kV max.)
- **F**: Strobe light (for applications up to 44 kV max.)
- **R**: Radio with single LED (for applications up to 66 kV max.)
- **H**: Flag and LED (non-replaceable battery) (for applications up to 44 kV max.)

NOTE: Availability of selected configuration will be verified at quotation time.
### Fisher Pierce® Series 1547 Adaptive Trip™ FCIs

For single-phase underground or overhead applications.

- **Trip Logic**: Adaptive current trip with inrush restraint logic.
- **Reset Logic**: Automatic reset with return of load current and/or time reset of fault indication. Manual reset also available.
- **Fault Indication**: Visual indication choices of Flag, LED or 10-ft. remote fiber optic display. Integrated radio transmitter with or without LED also available.

### Other Features

- SCADA output available
- Durable Lexan housing
- Sturdy, epoxy-coated sensors
- Mounting kits available to enable view-plate mounting for padmount applications

### Features vs. Benefits/Descriptions

<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits/Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trip Logic</td>
<td>Adaptive current trip with inrush restraint logic.</td>
</tr>
<tr>
<td>Reset Logic</td>
<td>Automatic reset with return of load current and/or time reset of fault indication. Manual reset also available.</td>
</tr>
<tr>
<td>Fault Indication</td>
<td>Visual indication choices of Flag, LED or 10-ft. remote fiber optic display. Integrated radio transmitter with or without LED also available.</td>
</tr>
<tr>
<td>SCADA Output Available</td>
<td>N.O. or N.C. contact enables fault indication alert to be integrated into SCADA systems.</td>
</tr>
<tr>
<td>Durable Lexan Housing and Epoxy-Coated Sensors</td>
<td>Protection from moisture promotes long, maintenance-free service life.</td>
</tr>
<tr>
<td>Mounting Kits Available</td>
<td>Enables view-plate mounting for padmount applications.</td>
</tr>
</tbody>
</table>
Underground/Padmount Faulted Circuit Indicators

Mechanical Data
(all dimensions in inches with millimeter equivalents in parentheses)

Specifications

Operating Speed:
Coordinates with properly applied current-limiting fuses, provided FCI trip-set and trip-release conditions are satisfied

Fault Withstand Capability:
25kA for 10 cycles per ANSI/IEEE 495-1986

Operating Current Range:
Min. reset current to 800A for trip operation

Continuous Current Rating:
800A max.

Submersibility:
Tested to 30 ft.

Reset Function:
Resets to normal indication according to unit selected from Ordering Information
Reset Delay Options

Rated Battery Life:
800 hrs. of operation. Lithium cell, rated for 10-yr. life.
(Series 1547B LED type; Series 1547C fiber optic type)

Continuous Current Adjust:
Adjusts to line current 40–60 sec. after line current exceeds min. reset current

Line Current Adjust:
a) Trip Enable Condition: Occurs whenever line current increases by the rate of 100A (or greater) within 3 cycles
b) Trip Indication: FCI indicates trip only when line current drops 0.5A above min. reset current within 40–60 sec. after trip-set condition occurs

Approx. Shipping Weight:
2.0 lbs.

Certifications:
- Complies with ANSI/IEEE 495-1986

Figure A — Indicator with Attached Sensor. Hotstick Mounting.

Figure B — Indicator with Attached Sensor. Tie-Wrap Mounting.

Figure C — Bracket/Surface Mounting.

Figure D — Window/Flush Mounting.

Figure E — Remote Sensor. Tie-Wrap Mounting.

Figure F — Remote Sensor. Hotstick Mounting.
Underground/Padmount Faulted Circuit Indicators

Ordering Information for Fisher Pierce® Series 1547 Adaptive Trip™ FCIs

The following diagram shows how to construct a catalog number for the Series 1547 FCI. Not all combinations are possible; consult factory.

1 5 4 7 [ ] [ ] [ ] [ ] [ ] [ ]

BASIC MODEL
1547A Standard Faulted Circuit Indicator Flag type
1547B Standard Faulted Circuit Indicator LED type
1547C Standard Faulted Circuit Indicator
1547D Integral Radio Transmitter LED type
1547E Integral Radio Transmitter, No LED type

* Consult Factory for other cable lengths
** For special applications

Transmitter Phase Encoding
A Phase A
B Phase B
C Phase C
T Tap

Close Proximity
R Raised zero reference to 7A
N Standard

Lead Length between Sensor and Display
10 10 ft. (standard)
XX Specify length in feet. (30 ft. max.)
N None. Attached indicator sensor units, "M" or "H" sensor termination

SCADA Output
A N.O. (10-ft. lead)
B N.C. (10-ft. lead)
N No SCADA

Reset Current
M* 1.0A (1½" sensor with U-lamination)
L* 1.5A (2½" sensor with U-lamination)
B 2.0A (1½" sensor)
D 3.0A (2½" sensor)

* Equipped with snap-on U-lamination sensor for circuit isolation. Recommended for padmount or underground applications.

Underground Application Note
A solution to problem FCI applications caused by close proximity cable placement and orientation is to set the loss of current operate point at 7A. This raised zero reference point greatly improves the adjacent field immunity of the Adaptive Trip FCI. The option is available only with time delayed reset and closed core U-lam sensor. When ordering, add the suffix "R" to the model number.
A 3" minimum separation between adjacent cables is recommended for installation.
Fisher Pierce® Series 1514/15 Current-Reset FCIs
For single-phase or three-phase underground or overhead applications.

- Trip Logic: Adaptive current trip with inrush restraint logic.
- Reset Logic: Automatic reset with return of load current and/or time reset of fault indication. Manual reset also available.
- Fault Indication: Visual indication choices of Flag, LED or 10-ft. remote fiber optic display. Integrated radio transmitter with or without LED also available.

Other Features
- SCADA output available
- Durable Lexan housing
- Sturdy, epoxy-coated sensors
- Mounting kits available to allow view-plate mounting for padmount applications

<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits/Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trip Logic</td>
<td>Fixed current trip with inrush restraint logic.</td>
</tr>
<tr>
<td>Reset Logic</td>
<td>Automatic time reset with return of load current and/or time reset of fault indication. Manual reset also available.</td>
</tr>
<tr>
<td>Fault Indication</td>
<td>Visual indication choices of Flag, LED or 6-ft. remote fiber optic display. Integrated radio transmitter with LED also available.</td>
</tr>
<tr>
<td>SCADA Output Available</td>
<td>N.O. contact enables fault indication alert to be integrated into SCADA systems.</td>
</tr>
<tr>
<td>Durable Lexan Housing and Epoxy-Coated Sensors</td>
<td>Protection from moisture promotes long, maintenance-free service life.</td>
</tr>
</tbody>
</table>

Specifications
- System Voltage: 29.3 kV max
- Trip Current: Factory preset from 50 to 1,500A
- Trip Current Accuracy: ± 10%
- Trip Response Speed: Coordinates with properly applied current-limiting or expulsion fuses
- Reset Current: Factory preset for 1.2, 1.5, 3.0 and 5.0A
- Fault Withstand Capability: 25 kA for 10 cycles per ANSI/IEEE 495-1986
- Maximum Continuous Load Current: 1,000A
- Operating Temperature: -40°C to 85°C
- Submersibility: Tested to 30 ft.; exceeds ANSI/IEEE 495-1986
- Life Expectancy: 30+ years (flag type)
- Rated Battery Life: 10 years (long-life lithium cell)
- Model 1514B/1515B — 800 hrs. of operation
- Model 1514D — 300 hrs. of operation
- Warranty: 3 years
- Certifications: Complies with ANSI/IEEE 495-1996
Underground/Padmount Faulted Circuit Indicators

Mechanical Data

(all dimensions in inches with millimeter equivalents in parentheses)
Underground/Padmount Faulted Circuit Indicators

### Ordering Information

**Fisher Pierce® Series 1514/15 Current-Reset FCIs**

The following diagram shows how to construct a catalog number for the Series 1514 or 1515 FCI. Not all combinations are possible; consult factory.

NOTE: Availability of selected configuration will be verified at quotation time.

#### Basic Model

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1514</td>
<td>Single-phase (one sensor, one indicator)</td>
</tr>
<tr>
<td>1515</td>
<td>Three-phase (three sensors, one indicator)</td>
</tr>
</tbody>
</table>

Unit requires current in all three phases to reset.

- **1514A** Flag display
- **1514B** LED display (non-replaceable battery)
- **1514C** Remote, 6-ft. fiber optic LED display (requires "M" mounting)
- **1514D** Integral Radio/LED display, requires hotstick mounting
- **1514F** LED/Flag display (non-replaceable battery), inrush restraint only, remote bracket or panel-mount underground or hotstick overhead applications
- **1515A** Flag display and single (N.O.) latching
- **1515B** SCADA output contact
- **1515C** LED Display (non-replaceable battery), inrush restraint only, remote bracket or panel-mount underground or hotstick overhead applications
- **1515D** Flag display with momentary (N.O.) SCADA output

*SCADA Contacts: 3.0A @ 125/250 VAC; 1/10 hp @ 250 VAC, 10-ft. cable length.

#### Indicator Mounting Options

- **B**: Bracket/surface mounting (remote from sensor)
- **P**: Window/flush mounting (remote from sensor)
- **H**: Hotstick mounting, attached indicator/sensor (B and D sensors only, one phase only)
- **M**: Tie-wrap mounting (attached indicator/sensor)

Consult factory for options: Manual reset tool (AT2186)

1. Special Lexan mounting kit (AT2050-1) for Code “P” mounting is available.
2. Special Lexan spacer (F2079) available for small (<1” dia.) conductor overhead installation.

#### Inrush Restraint/Reset Delay Options

- **Flag Display** (1514A, 1514M, 1514S, 1515A, 1515M, 1515W), Manual Reset Override
- **A**: Standard trip curve, 10 to 30-sec. delay after restoration of power
- **X**: Inrush restraint, 60-sec. reset time delay after restoration of power
- **Z**: Inrush restraint, no automatic reset, manual reset only
- **P**: Inrush restraint, 24-hr. reset time delay after restoration of power

- **LED Display** (1514B, 1514C, 1514R, 1515B, 1515C, 1515R), Inrush Restraint
- **W**: 4-hr. reset time delay after fault occurrence
- **C**: Same as W with current reset override upon energization of line
- **N**: Same as W with manual reset override
- **T**: Same as N with current reset override
- **M**: Same as W with manual reset override
- **E**: Same as C with manual reset override

#### Underground Application Note

A solution to problem FCI applications, caused by close proximity cable placement and orientation, is to set the loss of current operate point at 7A. This raised zero reference point greatly improves the adjacent field immunity of the Adaptive Trip FCI. The option is available only with time delayed reset and closed core U-lam sensor. When ordering, add the suffix “R” to the model number. A 3” minimum separation between adjacent cables is recommended for installation.
Fisher Pierce® Series 1541/42/43 Automatic Time Reset FCIs
For single-phase, two-phase or three-phase underground applications.

Mechanical Data
(all dimensions in inches with millimeter equivalents in parentheses)

Three-Phase 1543

<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits/Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trip Logic</td>
<td>Fixed current trip with inrush delay.</td>
</tr>
<tr>
<td>Reset Logic</td>
<td>Automatic time reset of fault indication. Manual reset also available.</td>
</tr>
<tr>
<td>Fault Indication</td>
<td>Visual indication choices of LED with replaceable or non-replaceable battery. Audible alarm fault indication with replaceable battery also available.</td>
</tr>
<tr>
<td>Optional Features</td>
<td>Permanent or removable remote fiber optic display.</td>
</tr>
</tbody>
</table>
Specifications

Fault Registration:
Red, high-intensity LED with choice of hard-wired or fiber optic cable remote mounting or audible intermittent beeper signal

Trip current:
Factory preset to customer specifications within range of 50A and 100A to 1,500A in 100A increments

Trip Current Accuracy:
±10% of trip rating (calibrated using 1” dia. cable for 400A trip or less or 2.0” dia. cable for greater than 400A trip)

Operating Battery Life:
800 hrs. for LED indication, 160 hrs. for audible indication, both with 10-yr. life at 20˚C

Battery:
Long-life lithium cell

Cable Ranges:
0.63” (16mm) to 1.58” (40mm); 1.58” (40mm) to 2.36” (60mm); 2.36” (60mm) to 3.55” (90mm)

Remote Fiber Optic Options:
Permanent or removable (10 ft. standard, 30 ft. max.)

Certifications:
Complies with ANSI/IEEE 495-1986

The following diagram shows how to construct a catalog number for Series 1541/1542/1543 FCIs. Not all combinations are possible; consult factory for ordering assistance.

Indication/Battery Options
H  LED, non-replaceable battery, hotstick mounted
R  Audible alarm indication, replaceable battery, hotstick mounted
A  Audible alarm indication, replaceable battery, hotstick mounted

Display Options
R  Remote LED
T  Integral LED or audible alarm (always selected with code “A” or “H” under Indication/Battery Options)
E  Remote LED, fiber optic cable
F  Remote LED, removable fiber optic cable

Length of Remote LED Cable
N  Not applicable when code “T” is selected under Display Options
10  Remote LED, removable fiber optic cable

Reset Time Delay After Fault Occurrence
A  4-hr. automatic reset time delay
B  2-hr. automatic reset time delay
C  1-hr. automatic reset time delay
Fisher Pierce® Series 1516 Voltage Reset FCIs
For single-phase underground applications.

Mechanical Data
(all dimensions in inches with millimeter equivalents in parentheses)


<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits/Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trip Logic</td>
<td>Fixed current trip with inrush restraint.</td>
</tr>
<tr>
<td>Reset Logic</td>
<td>Automatic reset after restoration of secondary voltage. Manual reset also available.</td>
</tr>
<tr>
<td>Fault Indication</td>
<td>Visual indication choice of Flag only.</td>
</tr>
</tbody>
</table>
Specifications

Trip Current:  
Factory preset from 100 to 1,500A

Trip Current Accuracy:  
±10%

Trip Response Speed:  
Coordinates with properly applied current-limiting fuses

Reset Voltage (factory preset):  
120V Rating: 102V min.  
277V Rating: 235V min.

Max. Reset Response Time:  
60 sec.

Reset Lead Length:  
4 or 6 ft.

Life Expectancy:  
±20 yrs.

Fault Withstand Capability:  
25kA for 10 cycles per ANSI/IEEE 495-1986

Secondary Voltage Surge Withstand Capability:  
Conforms to ANSI/IEEE C62.41

Max. Continuous Load Current:  
1,000A

Operating Temperature:  
-40˚ C to 85˚ C

Submersibility:  
Tested to 20 ft.

Certifications:  
Complies with ANSI/IEEE 495-1986

---

Ordering Information for Fisher Pierce® Series 1516 Voltage-Reset FCl's

The following diagram shows how to construct a catalog number for Series 1516 FCl's. Not all combinations are possible; consult factory for ordering assistance and for information on available mounting kits and brackets.

Indicates field that must be filled in to complete order.

NOTE: Availability of selected configuration will be verified at quotation time.

---

Basic Model
1516 Automatic reset after restoration of secondary voltage

Trip Sensitivity and Outputs
S Standard sensitivity +10% with latching relay
A Standard sensitivity +10% with latching relay and SCADA output contacts (N.O.)

Indicator Mounting Options
B Bracket/surface mounted (remote from sensor)
P Panel/flush mounted (remote from sensor)
M Tie-wrap mounted (attached indicator/sensors)

* P Mounting Kit (2050-1)

Trip Current Setting
1 100A
2 200A
2.5 250A
3 300A
4 400A
5 500A
6 600A
8 800A
10 1000A
12 1200A
15 1500A

Trip Curve/Reset Time
A Standard
B Standard with inrush restraint

Reset Voltage Sensitivity
1 120V nominal (102V minimum reset voltage) for use on 208/120V three-phase and 240/120V single-phase
2 277V nominal (235V minimum reset voltage) for use on 480/277V three-phase

Reset Voltage
6 ft. (standard)
XX Specify length in feet (12 ft. max.)

Max. Cable Diameter
B 1 5/8" and 2 3/16" and 2 5/16"
D 2 3/16"
K 2 5/16"

Sensor Termination
G Sensor attached to indicator, tie-wrap mount
S Terminates with remote lead-connected sensor
H Hotstick clamp attached to sensor (*B" & "D" sensors only)

Lead Length between Sensor and Display
10 10 ft. (standard)
XX Specify length in feet (30 ft. max.)
N None. Attached indicator sensor units, “G” sensor termination
Fisher Pierce® Model 16514AM-45102
SmartNet™ Directional Network FCI
For single-phase underground applications.

Operation
- Max. operational current: 25kA per ANSI 495
- Max. current withstand: 40kA for 10 cycles with no damage
- When the feeder is energized, the unit’s control algorithm initiates a settling period to allow unwanted transients to dampen. After the settling period is satisfied, a phase relationship is learned, stored and considered normal power flow. When the trip current is sensed, the phase angle is compared to the learned phase angle and, if within the pre-determined phase relationship, is considered a valid fault.

Mechanical Data
(all dimensions in inches with millimeter equivalents in parentheses)

<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits/Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trip Logic</td>
<td>Programmable fixed-current trip.</td>
</tr>
<tr>
<td>Reset Logic</td>
<td>Automatic reset of fault indication; manual reset also available.</td>
</tr>
<tr>
<td>Fault Indication</td>
<td>Visual indication choice of LED only.</td>
</tr>
</tbody>
</table>

Ordering Information for Fisher Pierce® Model 16514AM-45102 SmartNet™ Directional Network FCI
To order Fisher Pierce® Model 16514AM-45102 SmartNet™ Directional Network FCIs, please contact the factory.
Fisher Pierce® SmartLink™ Series 5000 Cellular RTU for Fisher Pierce® FCIs

Reliable, cost-effective, two-way communication for fault reporting.

The Fisher Pierce® SmartLink™ Series 5000 integrated cellular Remote Terminal Unit (RTU) provides reliable and cost-effective two-way communication for automated fault reporting from Fisher Pierce® Series 1548 radio FCIs. Electric utility operations personnel can have precise fault alarms and data fed to a variety of applications in seconds, increasing response time and system reliability.

The SmartLink™ Series 5000 RTU uses technology from Telemetric to communicate over the digital or analog cellular data networks, with coverage available to over 98% of the population in North America. No additional radio equipment, license or local cellular account is required. The SmartLink™ Series 5000's intelligent processor provides flexible reporting of permanent and temporary fault conditions. Utilities can access a secure, web-based fault-reporting application or integrate automatic fault reporting into SCADA/EMS systems using optional software from Telemetric.

The secure, web-based application displays device data that can be queried or polled remotely. A variety of user-specified fault alarms can be configured to notify a designated person of a reported event by e-mail, pager or text message.

<table>
<thead>
<tr>
<th>Features</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Uses local RF signal</td>
<td>Reports fault alarms from up to four Series 1548 radio FCIs (A, B, C phase + tap), located up to 100 feet away</td>
</tr>
<tr>
<td>Immediate Reporting of Alarm Conditions</td>
<td>Provides instant notification of: Permanent fault on any phase, phase status; fault-cleared status by phase; overvoltage or undervoltage setpoints on control power phase; and low battery alarm.</td>
</tr>
<tr>
<td>Immediate or Off-Peak Reporting of Momentary Fault Data</td>
<td>User-configurable to receive instant notification of momentary fault data or wait for lower-cost off-peak hours.</td>
</tr>
<tr>
<td>Nationwide GPRS Support</td>
<td>Communicates over cellular data networks via Cingular Wireless and affiliated roaming partners with a variety of application data plans, with coverage available to more than 98% of the North American population.</td>
</tr>
<tr>
<td>RTU Status-Point Querying</td>
<td>Available at any time through the web-based application or by SCADA/EMS using optional Telemetric™ SCADA-Xchange™ software.</td>
</tr>
<tr>
<td>RTU Battery-Status Check and Low-Battery Alarms</td>
<td>Sent automatically to ensure continuous, reliable operation.</td>
</tr>
</tbody>
</table>
How Radio FCIs help locate and report faults.

Helps crews locate faults easily when fault indicators are not directly visible.

SmartLink™ 5000

Cell Tower

No Utility Communication Infrastructure Required

1548 FCI In Field Location

1560-1 Handheld Receiver

1560-2, -3, -4 Fixed-Mount Receiver

Utility Control Room

Designed for distribution RTU/SCADA overhead systems
Specifications

Fault Indicator Receiver
- Operating Frequency: 312 MHz
- Receiver Range: 100 ft. min. typical
- Receiver Sensitivity Adjustment: Selectable via local configuration or web application to max. range of local RF radio (low gain, high gain)
- Certification: Complies with FCC part 15 emissions

Cellular Radio Technology
- Dual-band, dual-mode supporting GSM/GPRS 850/1900 MHz; nationwide GPRS support via Cingular Wireless and affiliated roaming partners with a variety of application data plans
- Transmit Power: 0.6 to 1.2W
  - External mounted antenna, flexible dual-band (850/1900) cellular, SMA(F) connector
  - Fault receiver antenna (312 MHz RF system, BNC connector)

Measurement Points List - Calls & Polling
- Permanent fault status indication from radio FCI
- Control Power Voltage Measurements: Undervoltage/Overvoltage Value Alarm
- Control Power Status (Outage)
- Battery Status
- Temporary Fault Data
- Time Scheduled Calls
- Alarm Calls (permanent fault, clearing, phase status, low battery)
- Polling of all status and analog points

Intelligent Web Server
- Data is secure and password protected
- Server authentication using 128-bit encryption key validation
- E-mail, text message or pager notification options

Local Serial Port
- RS-232 communications port for local configuration. Windows-based configuration software included with RTU

Front-Panel LED Indicators
- Qty. | Color | Label (Indication)
  - 1 | Green | Cellular Communication Present
  - 1 | Green | Processor OK
  - 4 | Red | Fault Received (A, B, C and Tap)
  - 1 | Tri-Color | Radio Signal Strength Indicator

Electrical/Environmental
- Operating Voltage: 95 – 135 VAC, 60Hz
  - @ 1.2/50 µs surge
  - FMF style Slo-Blo® fuse, barrel-mounted
- Operating temperature range: -40˚C to 70˚C

Battery Backup
- Standard: Lead Acid, rechargeable 12V
  - (3 to 5 yrs. expected service life)
- Carryover Time: 4-hr. typical, 3-hr. min.
- Recharge Time after 3–4-hr. Carryover: 6 hrs. typical
- Accessibility: Front-panel replaceable.
  - Status message sent weekly or by request.

Enclosure
- Lexan enclosure for meter socket mounting
- NEMA 3R Rating
- Security latch for meter seal or 3⁄8" hasp padlock
Fisher Pierce® Series 1650
Receivers for FCIs
Drive-By FCI Status.

Ordering Information for Fisher Pierce® SmartLink™ 5000 Cellular RTU and Radio Receivers

<table>
<thead>
<tr>
<th>CAT. NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>3175B0126G1</td>
<td>SmartLink™ 5000 Cellular RTU (includes battery back-up and antennas)</td>
</tr>
<tr>
<td>1560-1</td>
<td>Handheld Receiver with audible and LED indicator</td>
</tr>
<tr>
<td>1560-2</td>
<td>RTU/SCADA Radio Receiver with 3 dry contact outputs for Phase A, B and C (includes mounting bracket)</td>
</tr>
<tr>
<td>1560-3</td>
<td>RTU/SCADA Radio Receiver with 1 dry contact output for Phase A, B or C (includes mounting bracket)</td>
</tr>
<tr>
<td>1560-4</td>
<td>RTU/SCADA Radio Receiver with 4 dry contact outputs for Phase A, B, C and tap (includes mounting bracket)</td>
</tr>
</tbody>
</table>

Specifications

Handheld Receiver

- Frequency: 312 MHz
- Range: 100 ft. max.
- Power: 9V battery
- Complies with FCC Part 15 emissions

Fixed-Mount Receiver

- Frequency: 312 MHz
- Range: 100 ft. max.
- Power: 9–12 VDC, 20mA external
- Complies with FCC Part 15 emissions
Fisher Pierce® TPM Series Test Point Fault Indicators
Mount directly to any IEEE 386 standard capacitive test point.

Fisher Pierce® Test Point Mounted Fault Indicators consist of a solid-state current sensor connected to a faulted-circuit display, providing a clear visual means for quickly locating faulted cables and equipment on underground distribution systems. Designs incorporate advanced circuit logic and monitoring system protection operation to prevent the indicator from tripping unless an overcurrent condition is followed by a loss of system voltage. Trip and reset operations are automatic, and for versatility and convenience, the same indicator may be used for 5KV thru 35KV applications.

**Features**

<table>
<thead>
<tr>
<th><strong>Features</strong></th>
<th><strong>Benefits/Descriptions</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>AccQTrip™ Logic Circuitry</td>
<td>Prevents false indications in voltage-reset units due to inrush currents, cold load pickup and overloading.</td>
</tr>
<tr>
<td>High/Low Trip-Setting Selection</td>
<td>Requires no minimum load current and no load surveys.</td>
</tr>
<tr>
<td>Internal Magnetic Shielding</td>
<td>Prevents adjacent phase effects.</td>
</tr>
<tr>
<td>1 msec. Trip Response</td>
<td>Coordinates with current-limiting fuses, as well as other protection devices.</td>
</tr>
<tr>
<td>Magnetically Latched Flag</td>
<td>Prevents flag indication from changing state due to shock or vibration.</td>
</tr>
<tr>
<td>Test Point Mounting</td>
<td>Mounts directly to 200 and 600 amp elbows, splices and other cable accessories equipped with IEEE 386 standard capacitive test points from Fisher Pierce™ and other manufacturers.</td>
</tr>
<tr>
<td>Built-In Pulling Eye</td>
<td>Enables safe, easy hotstick installation and removal from test points.</td>
</tr>
<tr>
<td>Durable Construction</td>
<td>Enclosed in a rugged, yet lightweight and compact, sealed, impact- and corrosion-resistant Lexan housing with EPDM molded-rubber test point mounting boot.</td>
</tr>
</tbody>
</table>

**Basic Operation**

A faulted circuit produces an associated magnetic field, which closes a reed switch in the indicator, resulting in a tripped display. Trip response occurs in .001 seconds (1 msec.), allowing the fault indicator to properly coordinate with all types of circuit-protection schemes, including current-limiting fuses. To eliminate confusing false trips, voltage-reset indicators are equipped with inrush, backfeed, overload and cold-load pick-up restraint circuitry. Current sensors feature internal shielding to prevent inadvertent tripping when located in close proximity to adjacent phases, such as in junction-mounted applications.
Test Point Fault Indicators

Faulted-Circuit Operation

11 Fault Indicator is connected to the system and powers up. At 5kV, this takes 3 minutes for the test point mounted unit and 6 minutes for the overhead type unit. At higher voltages, power-up time is shorter.

12 Fault current is detected. Fault Indicator is armed after 1 msec. Fault Indicator display shows Normal.

13 Breaker/recloser locks out and voltage drops.

14 Voltage is lost. A 30-second time window allows for the protective device to clear the fault and reclose. Indicator changes state.

Inrush-Restraint Operation

11 Fault Indicator is connected to the system and powers up. At 5kV, this takes 3 minutes for the test point mounted unit and 6 minutes for the overhead type unit. At higher voltages, power-up time is shorter.

11–12 Upline recloser/breaker operation due to fault on another phase. After 100 msec, Fault Indicator is disabled because no fault current is detected.

13 Recloser closes back. Voltage is back to normal. Unfaulted phases see inrush. No change in the Fault Indicator display.

Overloading Operation

11 Fault Indicator is connected to the system and powers up. At 5kV, this takes 3 minutes for the test point mounted unit and 6 minutes for the overhead type unit. At higher voltages, power-up time is shorter.

12 Device downstream from Fault Indicator switches, creating an overload. Fault Indicator is armed after 1msec. Fault Indicator display shows Normal.

13 Overload condition over. Fault Indicator does not change state.

14 After 30 seconds, Fault Indicator goes back to initialized state.
### Specifications for TPM Voltage Operated, Time Reset, LED Display: Model TPMVOL

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Voltage</td>
<td>4.16-60kV (L-L)</td>
</tr>
<tr>
<td>Nominal Trip Ratings</td>
<td>Low, 400 Amp; High, 800 Amp</td>
</tr>
<tr>
<td>Trip Response Time</td>
<td>1mS</td>
</tr>
<tr>
<td>Fault Clearing Time</td>
<td>.001 – 30 Seconds Subsequent to Arming</td>
</tr>
<tr>
<td>Maximum Surge Level</td>
<td>25kA 10 Cycles 60 Hz</td>
</tr>
<tr>
<td>Effect of Adjacent Phase</td>
<td>Internal Shielding Prevents Adjacent Phase Effects</td>
</tr>
<tr>
<td>Inrush/Backfeed Restraint</td>
<td>100mS (Disable Delay)</td>
</tr>
<tr>
<td>Load Current Requirements</td>
<td>None</td>
</tr>
<tr>
<td>Power Up Requirement</td>
<td>3 Minutes @ 5kV</td>
</tr>
<tr>
<td>Display Type</td>
<td>Flashing Super Bright LED</td>
</tr>
<tr>
<td>Flash Rate</td>
<td>30 Flashes per Minute</td>
</tr>
<tr>
<td>LED Display Time</td>
<td>4 Hour – Standard</td>
</tr>
<tr>
<td>Reset Time</td>
<td>4 Hour – Standard (longer times available upon request)</td>
</tr>
<tr>
<td>Power Source</td>
<td>3.6 Volt Lithionyl Chloride Battery</td>
</tr>
<tr>
<td>Battery Capacity</td>
<td>2.4 Ah</td>
</tr>
<tr>
<td>Battery Operating Life</td>
<td>1200 Flash Hours Minimum</td>
</tr>
<tr>
<td>Battery Storage Life</td>
<td>15-30 Years</td>
</tr>
<tr>
<td>Temperature Range</td>
<td>-40º C to 85º C</td>
</tr>
<tr>
<td>Housing Material</td>
<td>Mounting Boot – EPDM Conductive Rubber Housing Body – UV Stabilized Polycarbonate Polymer</td>
</tr>
<tr>
<td>Weight</td>
<td>258 Grams</td>
</tr>
<tr>
<td>Certifications</td>
<td>Complies with ANSI/IEEE 495-1986</td>
</tr>
</tbody>
</table>

1. Prevents false trips due to short time interruptions without loss of voltage.
2. Inrush restraint is standard on voltage reset models. It is not available on the time reset models.
3. Battery powers LED and it is active only when LED is ON. Lithionyl Chloride batteries provide accurate indication throughout the entire temperature range.
# Test Point Fault Indicators

## Mechanical Data

(all dimensions in inches with millimeter equivalents in parentheses)

![Diagram of test point fault indicators]

### Ordering Information

For Fisher Pierce® TPM Series Test Point Fault Indicators

<table>
<thead>
<tr>
<th>CAT. NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPMTL-[_]</td>
<td>Time Reset with LED Display (auto-resets to normal after 4 hrs.; may also be manually reset using an FTT test tool)</td>
</tr>
<tr>
<td>TPMVF-[_]</td>
<td>Voltage Reset with Flag Display (auto-resets to normal after system voltage restoration; reset requires 5kV min. voltage with time required for reset proportional to system voltage)</td>
</tr>
<tr>
<td>TPMVL-[_]</td>
<td>Voltage Reset with LED Display (auto-resets to normal after system voltage restoration; reset requires 5kV min. voltage with time required for reset proportional to system voltage)</td>
</tr>
<tr>
<td>TPMVOL-[_]</td>
<td>Voltage Operated, Time Reset, LED Display (auto-resets after 4 hrs.; longer time resets available upon request)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAT. NO. SUFFIX</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>-LT</td>
<td>For 200A. All fused taps use LOW trip rating. For URD applications, use LOW trip rating.</td>
</tr>
<tr>
<td>-HT</td>
<td>For 600A. For URD applications, use HIGH trip rating.</td>
</tr>
</tbody>
</table>

**NOTE:** For overhead bulk feeder applications, use HIGH or LOW trip ratings (whichever is greater than the minimum pickup setting of the related protection device).

AccQTrip™ and AccQClamp™ are trademarks of Quality Indications, Inc.
Fisher Pierce® UCM Series Underground Clamp Type Fault Indicators

Locate faulted cables and equipment on underground distribution systems.

Self-powered Fisher Pierce® UCM Series Underground Clamp Type Fault Indicators consist of a solid-state current sensor connected to a faulted circuit display. Units are designed for direct installation to an underground power cable using a spring-loaded, over-center toggle clamp mounting provision. The clamp accommodates cables ranging from .4” to 2.2” diameter and includes retainer pads to prevent slip and twist. The clamp positions the cable conductor at a constant distance from the current sensor, maintaining indicator trip accuracy over the entire range of cable sizes. Designs feature compact, shielded and sealed, corrosion-resistant construction. The indicator is enclosed in a durable, impact-resistant Lexan® housing and includes a built-in pulling eye for easy hotstick installation and removal from the cable.

Basic Operation

A faulted circuit produces an associated magnetic field, which closes a reed switch in the indicator, resulting in a tripped display. Trip response occurs in .001 seconds, allowing the fault indicator to properly coordinate with all types of circuit protection schemes including current-limiting fuses. Series VCM fault indicators are constructed with an internally shielded current sensor that prevents inadvertent tripping when located in close proximity to adjacent phases, such as junction-mounted applications.

<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits/Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>AccQClamp™ Mounting Provision</td>
<td>Universal one-size-fits-all design automatically adjusts.</td>
</tr>
<tr>
<td>High/Low Trip Setting Selection</td>
<td>No minimum load current requirement and no load surveys needed.</td>
</tr>
<tr>
<td>Trip Response of .001 Seconds</td>
<td>Coordinates with current-limiting fuses, as well as other protection devices.</td>
</tr>
<tr>
<td>Internal Magnetic Shielding</td>
<td>Prevents adjacent phase effects.</td>
</tr>
</tbody>
</table>

TYPICAL INSTALLATION

Install Fault Indicator in Area Shown

As shown, proper installation of VCM cable mounted fault indicators requires routing cable neutral wires to prevent the ground return from affecting trip accuracy. Similar procedures should be followed for tape, wire, LC or other types of shielded cable constructions.

Do not install indicator directly over the concentric neutral to avoid misindication (Fig. 4).
Underground Clamp Type Fault Indicators

Specifications

Specifications for UCM Time-Reset, LED Display: Model UCMTL

- **Power Source**: 3.6 Volt Lithium Thyonil Chloride Battery
- **Battery Capacity**: 2.4 Ah
- **Battery Operating Life**: 1200 Flash Hours Minimum
- **Battery Storage Life**: 15-20 Years
- **Temperature Range**: -40º C to +85º C
- **Housing Material**: Mounting Boot – EPDM Conductive Rubber; Housing Body – UV Stabilized Polycarbonate Polymer
- **Weight**: 258 Grams
- **Certification**: Complies with ANSI/IEEE 495-1986

**NOTES:**

1) Battery powers LED and it is active only when LED is ON. Lithium Thyonil Chloride batteries provide accurate indication throughout the entire temperature range.

### Specifications for UCM Time-Reset, LED Display: Model UCMTL

- **Nominal Voltage**: 4.16-60kV (L-L)
- **Nominal Trip Ratings**: Low: 400 Amp; High, 800 Amp
- **Trip Response Time**: 1mS
- **Maximum Surge Level**: 25kA 10 Cycles 60 Hz
- **Effect of Adjacent Phase**: Internal Shielding Prevents Adjacent Phase Effects
- **Display Type**: Flashing Super Bright LED
- **Flash Rate**: 30 Flashes per Minute
- **Reset Time**: 4 Hour - Standard

<table>
<thead>
<tr>
<th>CAT. NO. PREFIX</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>UCMTL</td>
<td>Time Reset with LED Display (Indicator auto-resets to normal after a four hour time duration. Indicator may also be manually reset using an FTT test tool.)</td>
</tr>
</tbody>
</table>

**Ordering Information**

For Fisher Pierce® UCM Series Underground Clamp Type Fault Indicators

<table>
<thead>
<tr>
<th>CAT. NO. SUFFIX</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>LT</td>
<td>All fused taps use LOW trip rating. For 200 amp circuits, URD applications, use LOW trip rating. For 600 amp circuits, URD Applications, use high trip rating.</td>
</tr>
<tr>
<td>HT</td>
<td></td>
</tr>
</tbody>
</table>

Note: For overhead bulk feeder applications, use HIGH or LOW trip ratings (whichever is greater than the minimum pickup setting of the related protection device).

AccuQtrip™ and AccuQClamp™ are trademarks of Quality Indications, Inc.
Fisher Pierce® Series OLM Overhead Line Fault Indicators
Locate faulted circuits and equipment on overhead distribution systems.

Self-powered Fisher Pierce® Series OLM Overhead Line Fault Indicators consist of a solid-state current sensor connected to a faulted circuit display. Advanced circuit logic monitors system protection operation and prevents indicator tripping unless an overcurrent condition is followed by a loss of system voltage. Trip and reset operations are automatic, and the same indicator may be used for 5kV thru 35kV line-to-ground applications. These compact, sealed and corrosion-resistant units are designed for direct installation to an overhead line using a spring-loaded, over-center toggle clamp. Equipped with retainer pads to prevent slip and twist, the clamp positions the conductor at a constant distance from the current sensor, maintaining trip accuracy over the entire conductor diameter range of .4" to 2.2".

Basic Operation
A faulted circuit produces a magnetic field, which closes a reed switch in the indicator and causes a tripped display. A trip response time of .001 seconds enables the indicator to properly coordinate with all circuit-protection schemes, including current-limiting fuses. To eliminate confusing false trips, indicators feature inrush, overload and cold-load pick-up restraint circuitry as standard. Internal shielding of current sensors prevents inadvertent tripping when in close proximity to adjacent phases.

<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits/Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>AccQTrip™ Logic Circuitry</td>
<td>In voltage reset units prevents false indications due to inrush currents, cold load pickup and overloading.</td>
</tr>
<tr>
<td>AccQClamp™ Mounting Provision</td>
<td>Universal one-size-fits-all design automatically adjusts.</td>
</tr>
<tr>
<td>High/Low Trip Setting Selection</td>
<td>No minimum load current requirement and no load surveys needed.</td>
</tr>
<tr>
<td>Trip Response of .001 Seconds</td>
<td>Coordinates with current-limiting fuses, as well as other protection devices.</td>
</tr>
<tr>
<td>Internal Magnetic Shielding</td>
<td>Prevents adjacent phase effects.</td>
</tr>
<tr>
<td>Magnetically Latched Flag Indication</td>
<td>Flag indication will not change states due to shock or vibration.</td>
</tr>
<tr>
<td>Lightweight Enclosure</td>
<td>Compact and sealed</td>
</tr>
</tbody>
</table>

Time/current Curve for OLMVF, VL, VOL, TL

Tribe Point VS. Cable Diameter

---

www.tnb.com
800.326.5282 • 8155 T&B Boulevard Memphis TN 38125

Thomas & Betts

PS-PC-PP-1008
Overhead Line Fault Indicators

Specifications

Specifications for OLM Voltage Operated, Time Reset, LED Display: Model OLMVOL

Nominal Voltage
4.16-60kV (L-L)

Nominal Trip Ratings
Low, 400 Amp; High, 800 Amp

Trip Response Time
1ms

Fault Clearing Time
.001 – 30 Seconds Subsequent to Arming

Maximum Surge Level
25kA 10 Cycles 60 Hz

Effect of Adjacent Phase
Internal Shielding Prevents Adjacent Phase Effects

Inrush/Backfeed Restraint
10mS (Disable Delay)

Load Current Requirements
None

Power Up Requirement
6 Minutes @ 5kV

Display Type
Flashing Super Bright LED

Flash Rate
30 Flashes per Minute

LED Display Time
4 Hour – Standard

Reset Time
4 Hour – Standard (longer times available upon request)

Power Source
3.6 Volt Lithium Tionyl Chloride Battery

Battery Capacity
2.4 Ah

Battery Operating Life
1200 Flash Hours Minimum

Battery Storage Life
15-30 Years

Temperature Range
-40º C to 85º C

Housing Material
Mounting Boot – EPDM Conductive Rubber Housing Body – UV Stabilized Polycarbonate Polymer

Weight
258 Grams

Specifications for OLM Voltage Reset, Flag Display: Model OLMVF

Nominal Voltage
4.16-60kV (L-L)

Nominal Trip Ratings
Low, 400 Amp; High, 800 Amp

Trip Response Time
1ms

Fault-Clearing Time
.001 – 30 Seconds Subsequent to Arming

Maximum Surge Level
25kA 10 Cycles 60 Hz

Effect of Adjacent Phase
Internal Shielding Prevents Adjacent Phase Effects

Inrush Restraint Response
100mS (Disable Delay)

Load Current Requirements
None

Display Type
Mechanical Flag

Voltage Reset Time
4 Hour – Standard

Minimum Reset Voltage
5kV (Beginning Initializing Sequence)

Power Source
Volt Test Point Powered

Temperature Range
-40º C to 85º C

Housing Material
Mounting Boot – EPDM Conductive Rubber Housing Body – UV Stabilized Polycarbonate Polymer

Weight
258 Grams

Specifications for OLM Time Reset, LED Display: Model OLMTL

Nominal Voltage
4.16-60kV (L-L)

Nominal Trip Ratings
Low, 400 Amp; High, 800 Amp

Trip Response Time
1ms

Max Surge Level
25kA 10 Cycles 60 Hz

Effect of Adjacent Phase
Internal Shielding Prevents Adjacent Phase Effects

Power Up Requirement
None

Display Type
Flashing Super Bright LED

Flash Rate
30 Flashes per Minute

Reset Time
4 Hour – Standard

Power Source
3.6 Volt Lithium Tionyl Chloride Battery

Battery Capacity
2.4 Ah

Battery Operating Life
1200 Flash Hours Minimum

Battery Storage Life
15-20 Years

Temperature Range
-40º C to 85º C

Housing Material
Mounting Boot – EPDM Conductive Rubber Housing Body – UV Stabilized Polycarbonate Polymer

Weight
258 Grams

Specifications

1. Prevents false trips due to short time interruptions without loss of voltage.

2. Inrush restraint is standard on voltage reset models. It is not available on the time reset models.

3. Battery powers LED and it is active only when LED is ON. Lithium Tionyl Chloride batteries provide accurate indication throughout the entire temperature range.
Test Point Voltage Indicator

Ordering Information for Fisher Pierce® Series OLM Overhead Line Fault Indicators

<table>
<thead>
<tr>
<th>CAT. NO. PREFIX</th>
<th>DESCRIPTION</th>
<th>RESET OPERATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>OLMTL</td>
<td>Time Reset with LED Display</td>
<td>Indicator auto-resets to normal after a four hour time duration. Indicator may also be manually reset using an FTT test tool.</td>
</tr>
<tr>
<td>OLMLVF</td>
<td>Voltage Reset with Flag Display</td>
<td>Indicator auto-resets to normal after system voltage restoration. Reset requires 5kV minimum voltage to operate. Reset operation time is proportional to system voltage.</td>
</tr>
<tr>
<td>OLMVL</td>
<td>Voltage Reset with LED Display</td>
<td>Example: at 15kV, reset occurs 30 seconds after system voltage restoration.</td>
</tr>
<tr>
<td>OLMLMVOL</td>
<td>Voltage Operated, Time Reset, LED Display</td>
<td>Indicator auto-resets after a four hour time duration. Longer time resets are available upon request.</td>
</tr>
</tbody>
</table>

Accessories for Series TPM, VCM and OLM Fault Indicators

**FTT (Field Test Tool)**
Permits field testing and reset of fault indicators and provides assurance that the indicator is properly functioning. The test tool is lightweight, portable and incorporates a built-in magnet which operates the indicator trip and reset functions. The unit is equipped with provisions for hotstick handling and operation.

**FO-Cable06**
Remote Fiber Optic Indicator for Underground Fault Indicators with LED Display can be extended to the outside of enclosures and/or vaults for ease of access and fault location. All the hardware for mounting the remote end of the cable to the enclosure is included. The display has a large reflective bolt to enhance visibility.

Ordering Information for Fisher Pierce® Fault Indicator Accessories

<table>
<thead>
<tr>
<th>CAT. NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTT</td>
<td>Field Test Tool, overall dimensions 2” wide x 3” high x 5/8” deep</td>
</tr>
<tr>
<td>FO-CABLE06</td>
<td>Remote Fiber Optic Indicator for UFI</td>
</tr>
</tbody>
</table>
V2 Voltage Indicator

Easy way to visually determine the energized status of underground distribution circuits.

The V2 Voltage Indicator consists of a self-powered voltage sensor connected to a neon light that flashes when energized. Simply plug it into any IEEE 836 standard capacitive test point to determine the energized status of underground distribution circuits. Because the flash rate is proportional to the phase-to-phase system voltage, as indicated in the chart, one V2 model supports a wide range of applications – from 5 to 35kV.

Mechanical Data

(all dimensions in inches with millimeter equivalents in parentheses)

<table>
<thead>
<tr>
<th>VOLTAGE</th>
<th>FLASH RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>5kV</td>
<td>20</td>
</tr>
<tr>
<td>10kV</td>
<td>40</td>
</tr>
<tr>
<td>15kV</td>
<td>70</td>
</tr>
<tr>
<td>20kV</td>
<td>100</td>
</tr>
<tr>
<td>25kV</td>
<td>140</td>
</tr>
<tr>
<td>30kV</td>
<td>160</td>
</tr>
<tr>
<td>35kV</td>
<td>180</td>
</tr>
</tbody>
</table>

V2-TB Test Box for easy field testing of V2 Voltage Indicators.

If the V2 Neon Voltage Indicator indicates a power failure in an underground distribution circuit, you’ll want to ensure that it’s actually the circuit that’s failed and not the V2 itself. For fast, simple assurance, field test the V2 with the compact, portable V2-TB Voltage Indicator Test Box, powered by replaceable C batteries.

<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits/Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wide Application Range</td>
<td>Single model supports applications from 5kV to 35kV.</td>
</tr>
<tr>
<td>Easy to Read</td>
<td>Flash rate per minute indicates system voltage (see chart below).</td>
</tr>
<tr>
<td>IEEE 386 Test Interface</td>
<td>Mounts to 200 and 600 amp elbows, splices and other cable accessory components equipped with IEEE 386 capacitive test points from Fisher Pierce® or other manufacturers.</td>
</tr>
<tr>
<td>Rugged Construction</td>
<td>Molded EPDM-rubber housing for shielded, sealed and corrosion-resistant construction.</td>
</tr>
<tr>
<td>Built-In Pulling Eye</td>
<td>Enables safe, easy hotstick installation and removal from test point.</td>
</tr>
<tr>
<td>20-Year Neon Bulb</td>
<td>Yields long, maintenance-free service life.</td>
</tr>
<tr>
<td>Testable with V2-TB</td>
<td>Easily tested for confirmation of proper operation with the V2-TB voltage indicator test box.</td>
</tr>
</tbody>
</table>

Ordering Information

for Fisher Pierce® V2 Voltage Indicator — Test Point Mounted

<table>
<thead>
<tr>
<th>CAT. NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>V2</td>
<td>Voltage Indicator with Neon Display</td>
</tr>
<tr>
<td>V2-TB</td>
<td>Voltage Indicator Test Box</td>
</tr>
</tbody>
</table>
PD35 Voltage and Phasing Indicator

Safely determine the correct phasing and energized status of single- and three-phase underground distribution circuits from 5kV to 35kV.

Designed for hotstick operation, the PD35 Voltage and Phasing Indicator eliminates direct exposure to high voltage while using established indirect test methods for capacitance-coupled, cable connection test points. Its advanced, low-impedance, solid-state circuitry provides accurate and reliable readings with sensitivity as low as 1.5kV phase to ground.

<table>
<thead>
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<th>Benefits/Descriptions</th>
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</thead>
<tbody>
<tr>
<td>IEEE 386 Test Interface</td>
<td>Designed for use on 200 and 600 amp elbows, splices and other cable accessory components equipped with IEEE 386 capacitive test points from Fisher Pierce® or other manufacturers.</td>
</tr>
<tr>
<td>Universal End Fittings</td>
<td>Enable convenient mounting to existing hotsticks.</td>
</tr>
<tr>
<td>Rugged Construction</td>
<td>Housed in an impact-resistant case to withstand field conditions.</td>
</tr>
<tr>
<td>LED Indicator Lights</td>
<td>Easy to read test results.</td>
</tr>
<tr>
<td>Lightweight and Battery-Powered</td>
<td>Highly portable for field use and powered by a standard, replaceable 9V battery</td>
</tr>
</tbody>
</table>
How to Use the PD 35 Voltage and Phasing Indicator

1. Attach the metered probe to a hotstick and connect the BLACK ground lead.

2. Switch the meter to the ON position. The red LED power light will illuminate, indicating that battery voltage is sufficient. All other LED indicators will momentarily light, showing that the meter is operating properly.

3. To test for voltage, touch the metered probe to the test point on the cable connection. The amber PHASE 1 LED will illuminate, showing that the high-voltage circuit is energized.

4. To test for proper phasing, attach the non-metered probe to an additional hotstick and connect the RED phase lead from the metered probe to the non-metered probe. Touch one probe to the test point on one of the cable connections. Touch the other probe to the test point on the other cable connection.
   • The amber PHASE 1 and PHASE 2 LEDs will illuminate, showing that each of the high-voltage circuits are energized.
   • If the circuits are IN PHASE, the green LED will illuminate.
   • If the circuits are OUT of PHASE, the red LED will illuminate.

Ordering Information for Fisher Pierce® PD35 Voltage and Phasing Indicator

<table>
<thead>
<tr>
<th>CAT. NO.</th>
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</tr>
</thead>
<tbody>
<tr>
<td>PD-35</td>
<td>Voltage &amp; Phasing Indicator</td>
</tr>
</tbody>
</table>