

## ADAPTIVE TRIP™ FAULTED CIRCUIT INDICATORS



Series 1547B (LED display) and the 1547C (remote fiber optic display) FCIs will indicate fault condition by a flashing light for a specified time interval, as selected from the reset delay table. See ordering information section.

### Inrush Restraint

The inrush restraint function avoids false trips due to cold load pickup, recloser operations, etc. Inrush restraint is provided by a 40-85 seconds delay period after restoration of current.

### Display Options

Fisher Pierce Adaptive Trip FCIs are available with three display options. Series 1547A incorporates a flag-type display, which utilizes black (normal) and orange (fault) positions to allow easy identification of the FCI status. Its rugged, reliable, magnetically latching actuator provides stable indication, significantly reducing the possibility that mechanical shock or vibration will affect the display.

The Adaptive Trip FCI can also be equipped with a light emitting diode (LED) indicator display by specifying the 1547B design. When a fault occurs, the red, 3/8" diameter, high-intensity LED flashes at a rate of one flash every two seconds. A long-life lithium battery cell is used to power the LED display, which is rated for 800 hours of operation.

A remote 10 ft. fiber optic cable display provides isolation for signal transmission of trip and reset operations.

### SCADA Output

For use with supervisory control equipment, load transfer or alarm systems, the Model 1547A-XXXX-A incorporates a SPDT-N.O. latching contact and the model 1547A-XXXX-B incorporates a SPDT-N.C. latching contact.

### System-Wide Adaptability

- Eliminates:
  - Trip Selection Errors
  - Load Studies to Determine FCI Applications
  - Change-Outs Due to Load Growth
- Rate of Change Trip Function
- Coordinates with Current-Limiting Fuses
- Low Current Reset (1 Amp available)
- Inrush Restraint (Standard)
- Flag-Type or High Intensity LED Display
- Remote Fiber Optic Display
- SCADA Output
- Integral Radio Transmitter Option

The Fisher Pierce Adaptive Trip™ Series 1547 Faulted Circuit Indicator (FCI) revolutionizes fault indicator selection, application and operation.

The innovative Adaptive Trip circuitry automatically adjusts for changes in distribution feeder load currents from 1 to 800 amps.

### Trip Operation

The Adaptive Trip FCI indicates a fault condition after sensing a rapid increase of fault current, followed by a loss of load current. This logic circuitry more closely coordinates the Adaptive Trip FCI with distribution system protection devices.

### Reset Operation

Series 1547A (flag-type display) Adaptive Trip FCIs require the restoration of a minimum of load current to reset the indicator following a fault condition.

The minimum reset current must be present for the appropriate time interval for the flag to reset.

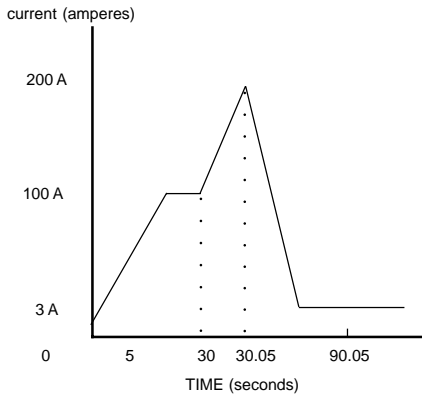
## Trip Criteria

The full criteria for the Adaptive Trip FCI to trip are as follows:

- 1) Range of operation is from the minimum reset current level (1.0-3.0A, depending on the sensor used) 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 100A within a 50ms (3 cycle) time frame.
- 3) Total current (load current + current increase due to the fault) must be 200A or greater to enable the operation of the flag indicator driver to circuit.
- 4) Following the current increase, a loss of line current must take place within 40-60 seconds, confirming that the increase resulted from a fault and not from a sudden load increase.

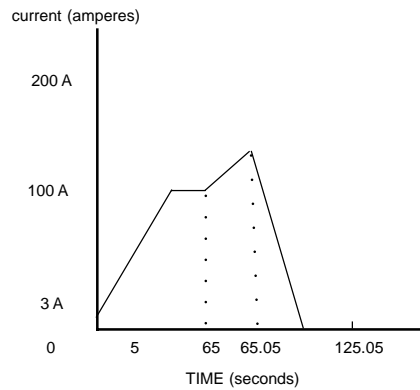
All four of these steps must take place in proper sequence for the Adaptive Trip FCI to show that a fault has occurred.

**Figure 1**



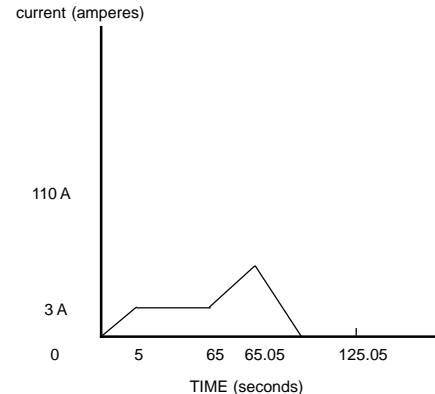
**CONDITIONS 1 AND 4 NOT MET.  
UNIT IN INRUSH RESTRAINT.  
UNIT WILL NOT ENABLE.**

**Figure 2**



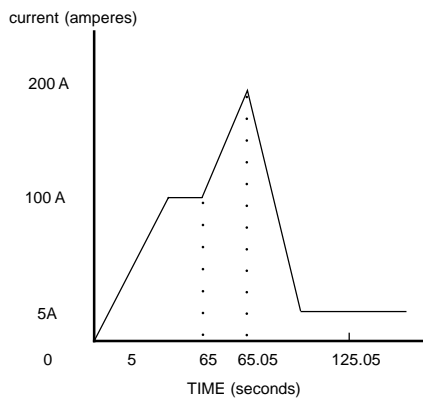
**CONDITION 2 NOT MET.  
di/dt RATE OF CHANGE NOT SATISFIED.  
UNIT WILL NOT ENABLE.**

**Figure 3**



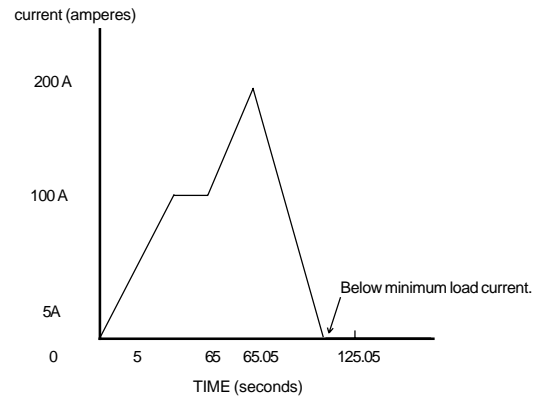
**CONDITION 3 NOT MET.  
TOTAL LINE CURRENT MAGNITUDE NOT MET.  
UNIT WILL NOT ENABLE.**

**Figure 4**



**CONDITION 4 NOT MET.  
TOTAL LOSS OF LOAD CURRENT NOT MET.  
UNITENABLED, TRIP NOT ACTIVATED.**

**Figure 5**

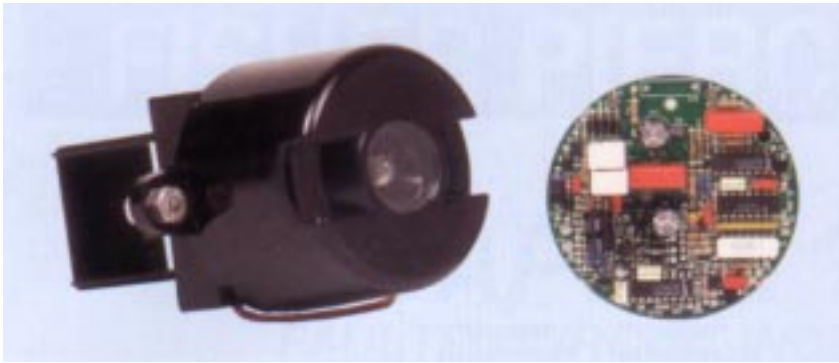


**ALL FOUR CONDITIONS SATISFIED.  
NORMAL TRIP INDICATION.  
UNIT ENABLED AND TRIPPED.**

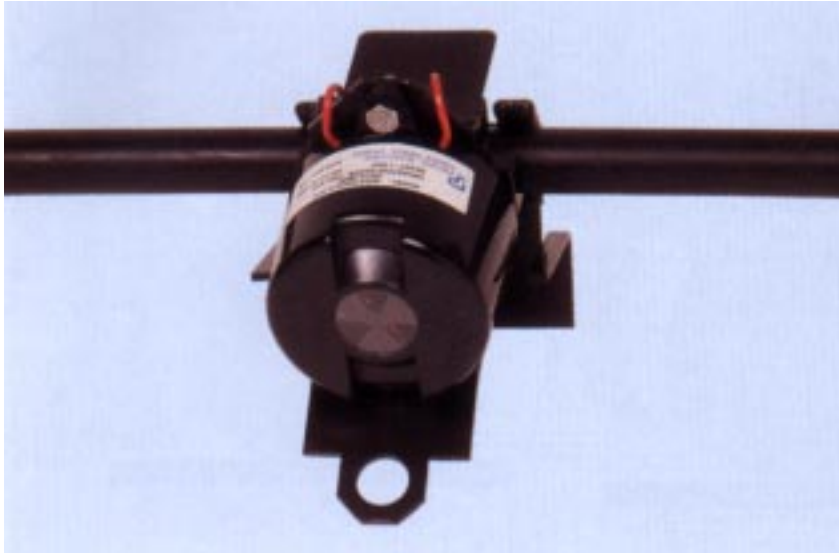
Note: Curves shown are not to scale.

## Underground Application Note

A solution to problem faulted circuit indicator applications, caused by close proximity cable placement and orientation, is to set the loss of current operate point at 7 amperes. 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.**



Indicator with LED display. The sophisticated Adaptive Trip circuit design (patent pending) allows universal application where 1-800A of expected load current is present.



Underground or overhead Adaptive Trip indicator with flag-type display, and attached hotstick mounted sensor.



Underground Adaptive Trip indicator with flag-type display and attached tie-wrap mounted sensor.

### Rugged and Versatile

The Adaptive Trip FCI is manufactured using many of the time-proven mechanical components from the established Fisher Pierce Series 1514 design. Durable Lexan housings and sturdy epoxy-coated sensors ensure long service life. Configurations are available for overhead and underground applications. Optional mounting kits are available to allow view-plate mounting for padmount applications.

## Specifications

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

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

**Operating Current Range:** The FCI will operate from minimum reset current to 800 amperes for trip operation. The maximum continuous current rating for the DCI is 800 amperes

**Reset Function:**  
Series 1547: Resets to normal indication according to unit selected from Ordering Information, Table 3 (Reset Delay) shown on page 4

**Reset Current Level:**  
1 5/8" sensor with U-lamination: 1.0A  
2 3/16" sensor with U-lamination 1.5A  
1 5/8" sensor w/o U-lamination 2.0A  
2 3/16" sensor w/o U-lamination 3.0A

### Operating Temperature:

Sensor: -50°C to +90°C  
Indicator: -40°C to +85°C

**Submersibility:** Tested to 30 feet

**Life Expectancy:** (1547A series flag-type) 20+ years

**Rated Battery Life:** 800 hours of operation.  
Lithium cell, rated for 10 year life.  
(1547B series LED-type; 1547C series fiber optic type)

**Line Current Adjust:** The FCI adjusts to line current 40-60 seconds after the line current exceeds minimum reset current

### Trip Operation

- a) **Trip Enable Condition:** Occurs whenever line current increases by the rate of 100 amperes (or greater) within 3 cycles
- b) **Trip Indication:** The FCI will indicate trip only when the line current drops 1/2 amperes above minimum reset current within 40-60 seconds after the trip-set condition occurs

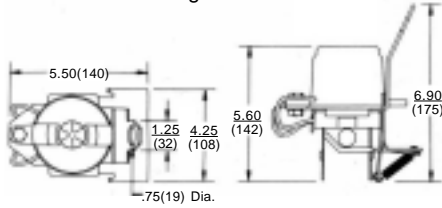
**Approx. Shipping Weight:** 2.0 lbs

# MECHANICAL DATA

(All dimensions in inches with millimeter equivalents in parentheses)

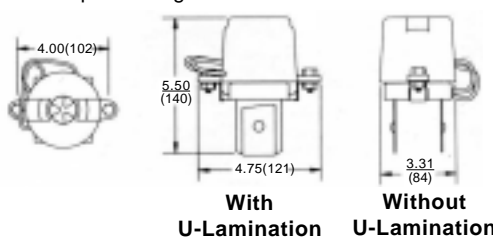
**Figure A**

Indicator with Attached Sensor.  
Hotstick Mounting.



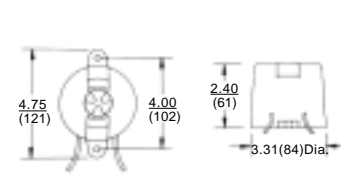
**Figure B**

Indicator with Attached Sensor.  
Tie Wrap Mounting.



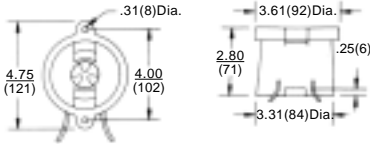
**Figure C**

Bracket/Surface Mounting.



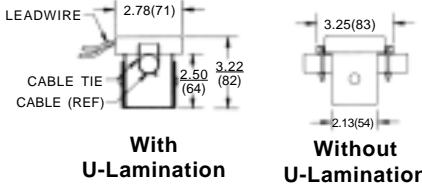
**Figure D**

Window/Flush Mounting.



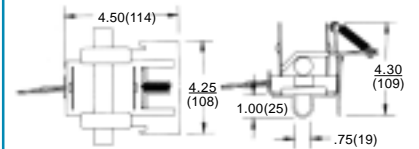
**Figure E**

Remote Sensor. Tie Wrap Mounting.



**Figure F**

Remote Sensor. Hotstick Mounting.



# ORDERING INFORMATION

To order a Series 1547 Adaptive Trip FCI, specify code letter or number for each of the following. Not all combinations are available, consult factory. The following is an example of a correctly specified unit.

**1547A** - **P** **Z** **S** **M** - **A** - **N** - **R** - **A**

① (1) (2) (3) (4) (5) (6) (7) (8) (9)

Code	Current Sensor Style
1547A	Standard Faulted Circuit Indicator Flag type
1547B	Standard Faulted Circuit Indicator LED type
1547C	Standard Faulted Circuit Indicator. 10ft Remote Fiber Optic cable display.*
1547D**	Integral radio transmitter LED type
1547E	Integral radio transmitter No LED type**

\* Consult factory. \*\* For special application  
\*\*\* Overhead application.

Code	Reset Delay
<b>Flag Type with Manual Reset</b>	
P	24 hours reset time delay after power restoration
W	4 hours reset time delay after power restoration
Z	60 seconds reset time delay after power restoration
R	Manual reset only
<b>LED or Remote Fiber Optic Type</b>	
C	4 hours reset with current override
E	4 hours reset with current and manual reset override
M	4 hours reset with manual reset
N	4 hours reset with manual trip and manual reset
T	4 hours reset time delay with current override. Manual trip and manual reset override
W	4 hours reset. Time delay only
<b>1547D/1547E Radio FCI (Manual trip, manual reset)</b>	
J	4 hour reset with current override
K	4 hour time delay reset
Z	60 second delay only

Code	Reset Current
M*	1.0A (1-5/8" sensor with U-lamination)
L*	1.5A (2-3/16" sensor with U-lamination)
B	2.0A (1-5/8" sensor)
D	3.0A (2-3/16" sensor)

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

Code	SCADA Output
A	N.O. (10' lead)
B	N.C. (10' lead)
N	No SCADA

Code	Lead Length Between Sensor and Display
10	10 ft. standard
XX	XX ft. option. 30 ft. max.
N	None. Attached indicator sensor units, "M" or "H" sensor termination

Code	Close Proximity
R	Raised zero reference to 7 amps
N	Standard

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

Code	Indicator Mounting Options
B	Bracket/Surface Mount. See Mechanical Data Fig. C
P <sub>(1)</sub>	Window/Flush Mount. See Mechanical Data Fig. D
M	Tie Wrap Mount. See Mechanical Data Fig. B
H <sub>(2)</sub>	Hot Stick Mount With Clamp. See Mechanical Data Fig. A

P<sub>(1)</sub> and H<sub>(2)</sub> - See Series 1547A and 1547B Options.

NOTE: Series 1547 Fault Indicators are tested to ANSI-IEEE 495-1986

Specifications are subject to change.

Code	Sensor Mounting
S	Remote tie wrap. See mechanical data Fig. E
G	Integral tie wrap. See mechanical data Fig. B
H	Remote hot stick. See mechanical data Fig. F
T	Integral hot stick. See mechanical data Fig. A

### Consult Factory for Series 1547A and 1547B Options:

**Mechanical** (for both LED and flag indicators)  
P<sub>(1)</sub> - Window mounting kit (AT2050-1)  
- Bracket mounting kits (N1767-1, -2, -3)  
- Reset tool (AT2186)

**TRIP**  
- Manual trip override (LED) (overhead application only)



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