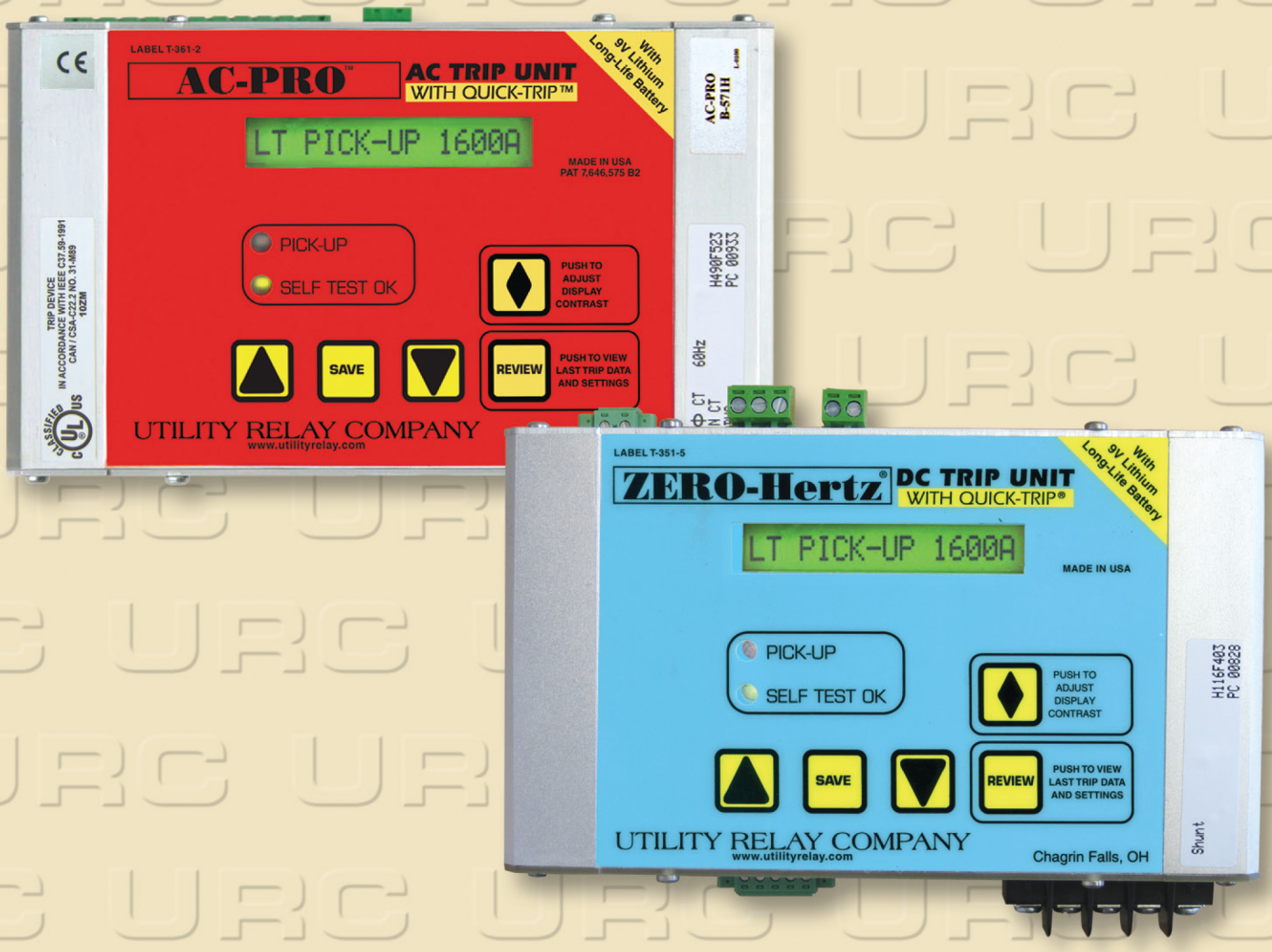
PRODUCT CATALOG



Trip Units, Retrofit Kits and Protective Relays for Switchgear

URC Utility Relay Company

Chagrin Falls, OH 44023
Phone: 888.289.2864
www.utilityrelay.com

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AC-PRO-II™

TRIP UNIT | MICRO-CONTROLLER BASED

DATA SHEET

The Latest Trip Unit Features in a Smaller More Versatile Package

The AC-PRO-II is 55% smaller while including more features than the original AC-PRO.
The AC-PRO-II has the standard trip unit functions of Long Time, Short Time, Instantaneous and Ground Fault.
The AC-PRO-II also includes the following additional features.

- ❏ Neutral Overload
- ❏ Under-voltage alarm/trip
- ❏ Over-voltage alarm/trip
- ❏ Time stamping of events
- ❏ Patented sluggish breaker detection
- ❏ Wave form capture
- ❏ Configurable alarm relay

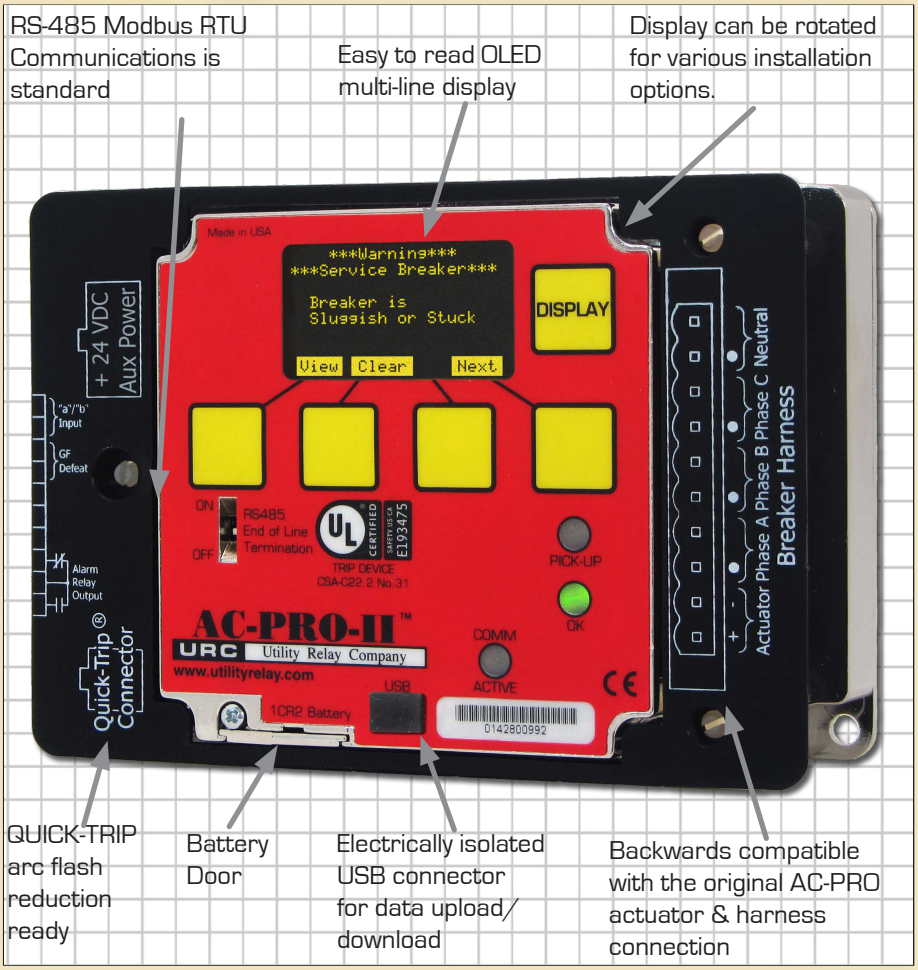
Completely Backwards Compatible
The CTs, Actuators and wiring harness from the original AC-PRO can be used with the AC-PRO-II.

Communications
RS-485 Modbus RTU communications is standard.

Programming
Settings are programmed using the OLED multi-line display and smart buttons that change their function according to the information displayed.
All of the settings are entered using simple parameters, no percentages or multipliers are required.

OLED Multi-Line Display
The easy to read multi-line display provides real time monitoring of 3-phase, neutral and ground fault currents. The display unit can be rotated to allow the trip unit to fit in a variety of different breaker configurations.

Last Trip Data
The trip units retains all of the trip data for that last 8 trip events. This data includes a date and time stamp of each event from the integrated real time clock. The waveforms are also captured for each of the 8 trip events.



USB Port
The front mounted and electrically isolated USB port allows for easy downloading of trip data and protection settings. It can also be used to upload the trip unit settings, making commissioning the trip unit much faster.

Self-Test OK Feature
The green LED indicates that the trip unit is operating properly.
This feature:

- ❏ Continuously monitors the trip unit.
- ❏ Verifies that the actuator is connected.
- ❏ Monitors the software routines.
- ❏ Monitors the micro-controller.

50Hz or 60Hz Operation
The AC-PRO-II is user selectable for 50Hz or 60Hz applications.

Construction

- ❏ Conformaly coated circuit boards
- ❏ Contamination resistant membrane keypad
- ❏ All metal nickel plated enclosure

Warranty
All AC-PRO-II's come with a 2-year limited warranty.

UL CERTIFIED SAFETY

CE

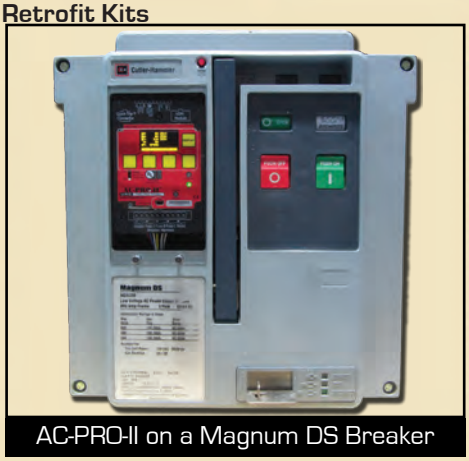
AC-PRO-II™

TRIP UNIT | MICRO-CONTROLLER BASED

DATA SHEET

The Latest Trip Unit Features in a Smaller More Versatile Package

Retrofit Kits



AC-PRO-II on a Magnum DS Breaker

Between the original AC-PRO and AC-PRO-II, approximately 4000 retrofit kits are available. The kits are complete with everything necessary for the retrofit including detailed installation instructions.

Interactive Kit Ordering Guide

Due to the sheer number of kits with various options, an interactive kit ordering guide is available to simplify finding the correct retrofit kit. If desired, orders can be placed 24/7 using the kit ordering guide.

https://urcorders2.azurewebsites.net/KOG

Power Calculations

Whenever voltage and power data is necessary, a VDM (Voltage Divider Module) can be attached to the back of the AC-PRO-II trip unit. With the VDM the following data is available on the display and through RS485 Modbus RTU communications.

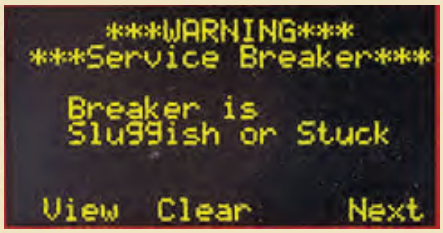
- ❑ Line-Neutral Voltages
- ❑ KW, Phase A, B, C & Total
- ❑ KVA, Phase A, B, C & Total
- ❑ Power Factor
- ❑ KWHr
- ❑ KVAHr

InfoPro-AC

InfoPro-AC is a Graphical User Interface application available for easy interface between a computer and the USB port on the AC-PRO-II. InfoPro-AC will include the following features:

- ❑ AC-PRO-II Settings. (Upload & Download).
- ❑ Waveforms on demand.
- ❑ Current, Voltage & Power readings on demand.
- ❑ Data on the last 8 trips including the waveforms.
- ❑ Trip data, settings and waveforms can be saved for later use.
- ❑ Print Settings Reports, Trip History Reports and Waveforms.

Sluggish Breaker™ Detection to Determine if the Breaker Mechanism Needs Service



The patented Sluggish Breaker operation detection captures the interruption time for a first trip. Later operations are faster because the breaker mechanism was exercised. If the mechanism operating time is excessive, the AC-PRO-II will alarm that breaker maintenance is required.

SAFE-T-TRIP™

The hand-held SAFE-T-TRIP device provides a means for an operator to safely trip a breaker without having to stand directly in front of the switchgear.

SAFE-T-TRIP can also be used in conjunction with Sluggish Breaker Detection to operate the breaker mechanism prior to removing the breaker from the cubicle.

DATA SHEET

AC-PRO-MP™

DIRECT PLUG-IN REPLACEMENT TRIP UNIT | MICRO-CONTROLLER BASED

Fully Programmable
Direct Plug-In Replacement Trip Unit
for Masterpact STR Trip Units

MASTERPACT MP

Direct Replacement Trip Unit

The AC-PRO-MP is a plug-in, direct replacement trip unit for Merlin Gerin & Square D Masterpact MP, IEC or UL rated breakers.

The AC-PRO-MP is user programmed to replace any of the versions of STR-18M, 28D, 38S or 58U trip units.

The AC-PRO-MP has the same protective functions, settings and time-current-curves as the original STR.

Standard Trip Unit Functions

Based on the STR type entered:

- ❑ Long-Time
- ❑ Short-Time
- ❑ Instantaneous
- ❑ Residual Ground Fault
- ❑ Ground Return Ground Fault
- ❑ Instantaneous on Closing (DINF)
- ❑ Over Temperature Trip

Additional Advanced Trip Unit Functions

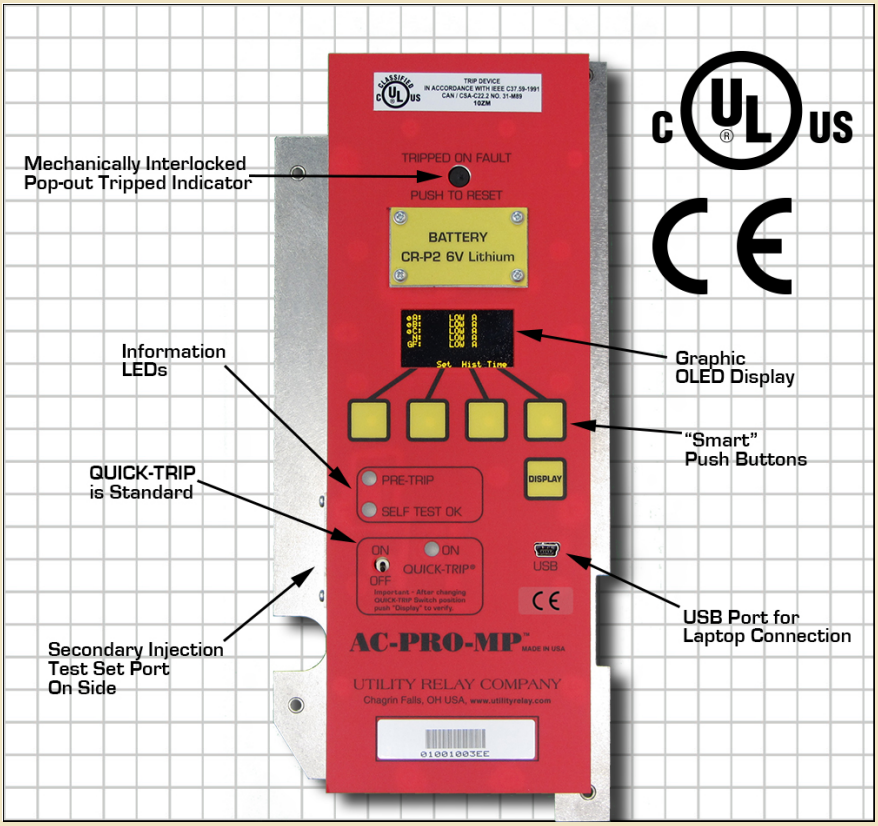
- ❑ **No Rating Plugs**
  No physical rating plug is required. The required rating plug value is a programmed setting.
- ❑ **QUICK-TRIP® Arc Flash Reduction**
  QUICK-TRIP instantaneous & ground fault settings are standard for arc flash reduction.

  A QUICK-TRIP switch is easily accessible on the face of the AC-PRO-MP.

  Connections for an optional remote QUICK-TRIP switch and indicating light are available.
- ❑ **Security Code**
  A security code system protects against unauthorized changes to the settings.

Information & Alarm Functions are Standard

- ❑ 2 Load monitoring settings with output contacts.
- ❑ Pre-trip alarm contact & LED indicator.
- ❑ Breaker tripped alarm output contact is programmable by type of trip.
- ❑ Trip events are time stamped



Display, LEDs & Push Buttons

- ❑ The OLED display is easy to read in either low or high ambient light conditions.
- ❑ The "Smart" push buttons have actions that are configured based on the displayed information.
- ❑ A "SELF-TEST OK" LED indicates a properly operating trip unit.
- ❑ A pre-trip LED indicates a pending trip.

Connection Ports

- ❑ The test port is used for connection to a secondary injection test set that performs actual phase & ground fault tests not simulated tests.
- ❑ A USB Port allows connection of a laptop computer for information exchange.

SELF-TEST Features

The AC-PRO-MP continuously monitors:

- ❑ The actuator connection
- ❑ Proper execution of the software routines
- ❑ The micro-controller and A/D converters

Last Trip Data

- ❑ The last trip data is provided for over 8 trips and includes the type of trip, phase and ground currents and time and date of each trip.
- ❑ The trip counter provides the number of trips by trip function.

Warranty

2-year limited warranty.

Call Toll Free: 888.289.2864
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URC Utility Relay Company

DATA SHEET

SAFE-T-TRIP™

AC TRIP UNITS | REMOTE TRIP DEVICE

Reduce Arc Flash Risk and Determine if the Breaker Mechanism Needs Service With the SAFE-T-TRIP Device

Remote Breaker Trip

The SAFE-T-TRIP device provides a means for an operator to trip (open) a circuit breaker without standing directly in front of the breaker while it opens. This added distance from the breaker reduces the arc flash risk to the operator.

Compatible URC Trip Units

The SAFE-T-TRIP device is compatible with the following Utility Relay Company trip units:

- ❏ AC-PRO-II
- ❏ RIU (Remote Interface Unit) for the AC-PRO-II
- ❏ AC-PRO-MP
- ❏ AC-PRO-MP-II

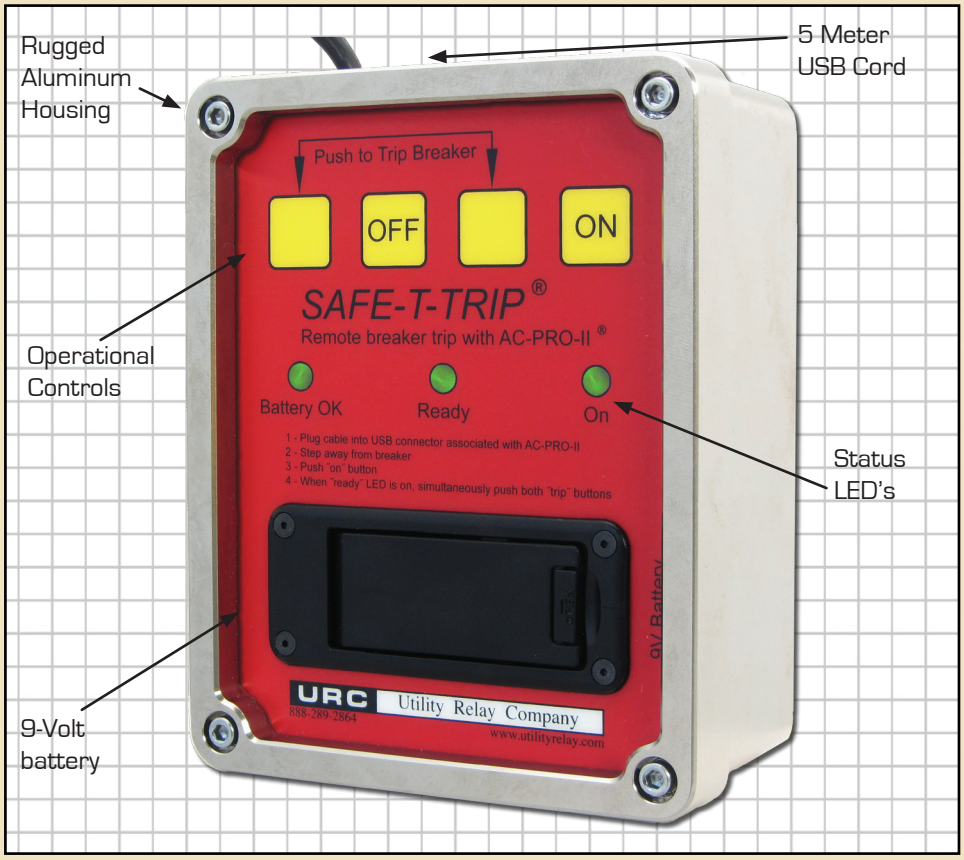
The SAFE-T-TRIP device is a hand held device with a control panel and a 5 meter (16 foot) USB cable attached. The USB cable is plugged into the port on one of the compatible trip units.

USB Communications

The USB cable allows for 2-way communication between the trip unit and the SAFE-T-TRIP device. The power needed to initiate a trip is also provided through the USB cable.
The USB cable is permanently attached to the SAFE-T-TRIP device. No other USB devices are able to initiate a remote trip.

SAFE-T-TRIP Device Power

The SAFE-T-TRIP Device is powered by a 9-volt battery that will power up the trip unit and initiate a trip even if there is no power coming to the trip unit from CTs or an external power source.
The battery is very easy to change using the battery access door on the front of the unit.
There is also a Battery OK LED indicator that notifies the user when the battery is reaching the end of its useful life.



SAFE-T-TRIP Device Operation

The operation of the SAFE-T-TRIP Device is very simple.

- ❏ The operator plugs the USB cable from the SAFE-T-TRIP device into the USB port on a compatible trip unit.
- ❏ After stepping away from the breaker the operator will turn on the SAFE-T-TRIP Device.
- ❏ The SAFE-T-TRIP device will communicate with the compatible unit and make sure it is ready to be force tripped.
- ❏ When everything is ready the "Ready" LED will be on.
- ❏ Once the ready LED is on, the force trip can be initiated by simultaneously pressing the 2 trip buttons.
- ❏ The trip unit will receive the force trip command and will fire the actuator to open the breaker.
- ❏ Once the remote operation of the breaker is complete the operator can unplug the SAFE-T-TRIP device.

Determining if the Breaker Mechanism Needs Service Using the SAFE-T-TRIP

All of the URC trip units that are compatible with the SAFE-T-TRIP device also have the patented Sluggish Breaker™ detection system. Sluggish Breaker detection determines if the breaker mechanism needs service as indicated by slow operation during the first trip. Later operations are faster because the breaker mechanism was exercised.
The SAFE-T-TRIP device can be used to initiate the first trip before racking out a breaker. When the trip unit initiates a breaker trip, it measure the time between triggering the actuator and when each pole interrupts the current. If this time is greater then 33 Milli-Seconds the Sluggish Breaker alarm is set.
If the sluggish Breaker alarm was set, that is an indicator that the breaker mechanism should be serviced.

DATA SHEET

AC-PRO®

AC TRIP UNIT | MICRO-CONTROLLER BASED

State of the art technology for low voltage circuit breaker retrofitting

Standard trip unit functions
- ❑ Long-Time
- ❑ Short-Time
- ❑ Instantaneous
- ❑ Ground Fault
- ❑ Phase Unbalance

All functions are selectable ON/OFF, with the exception of the Long-Time function, during programming.

True RMS
The AC-PRO is true RMS sensing on all functions, including Instantaneous.

Programming
Settings are programmed using the ▲, ▼, and **SAVE** buttons on the front of the trip unit. All settings and last trip data are stored in non-volatile memory.

Security is provided by a **SECURITY KEY**, which must be plugged into the top of the trip unit before any trip settings can be changed.

16-Character LCD
The large backlit display provides continuous 3-phase current metering when the trip unit is in service. Last Trip Data and trip settings can be reviewed at any time by pressing the **REVIEW** key.

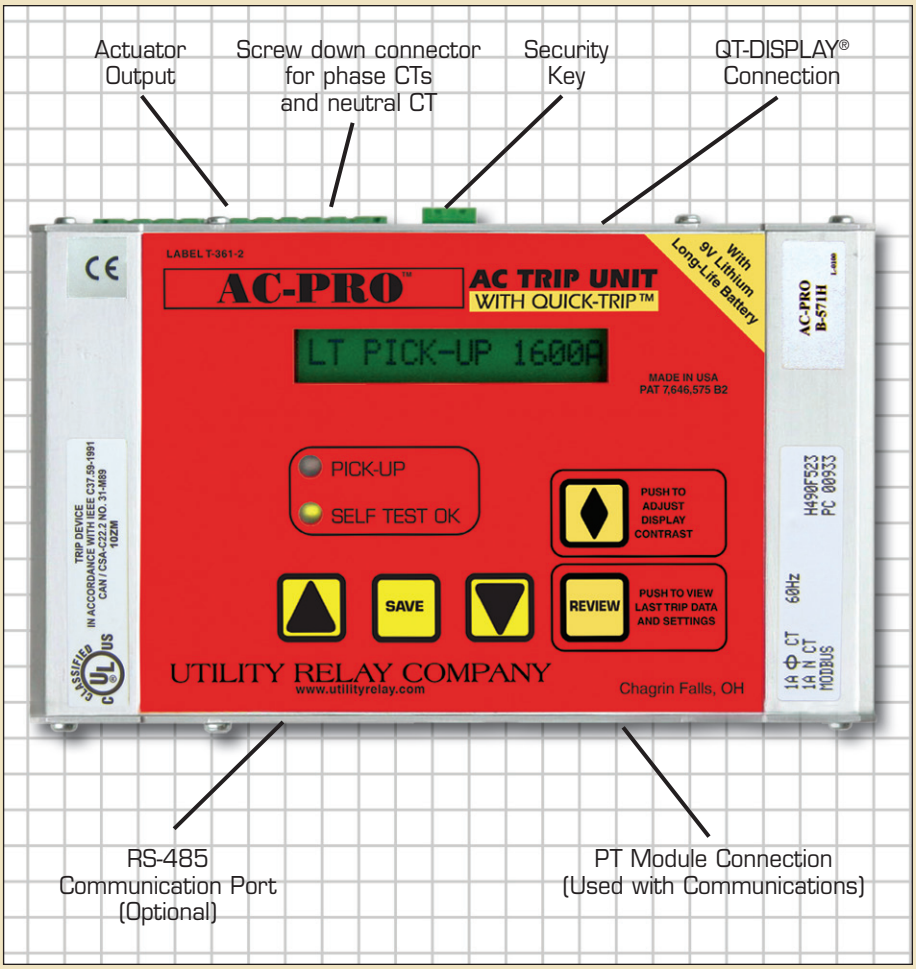
The ◆ button on the front of the trip unit is provided to adjust the LCD's contrast

Last Trip Data
The trip unit retains the data from the most recent trip in non-volatile memory. This information includes the type of trip and the individual phase currents at the time of trip. This information can be reviewed at any time by pressing the **REVIEW** button.

Continually pressing the **REVIEW** button will display a trip counter, which indicates the number of times the trip unit has operated on each function. The present trip unit settings will also be displayed.

Last trip data and the trip counter can be cleared at any time.

PICK-UP Indication
The red LED on the front of the trip unit illuminates when current reaches or exceeds the Long-Time pick-up value.



SELF-TEST OK Feature
The green LED indicates that the trip unit is operating properly. This feature:
- ❑ Continuously monitors the trip unit.
- ❑ Verifies that the actuator is connected.
- ❑ Monitors software routines.
- ❑ Monitors micro-controller.

QUICK-TRIP® Arc Flash Reduction
The QUICK-TRIP system helps reduce the arc flash hazard on downstream equipment for times when personal must work on energized equipment. The QUICK-TRIP system can be turned on and off without opening the cubicle door and features:
- ❑ QT-Instantaneous setting
- ❑ QT-Ground Fault setting
- ❑ Door mounted switch with lockable cover or KIRK Key switch
- ❑ Door mounted QT-DISPLAY® with LCD display

Special Applications
In addition to the standard 60Hz model, the AC-PRO is available in true RMS versions for 50Hz, 40Hz, and 25Hz power systems.

Construction
- ❑ Rugged extruded aluminum housing.
- ❑ Conformally coated circuit boards.
- ❑ Contamination resistant membrane keypad.

Warranty
2-year limited warranty.

CLASSIFIED C UL US

URC Utility Relay Company

DATA SHEET

AC-PRO®

AC TRIP UNIT | MICRO-CONTROLLER BASED

Complete Retrofit Kits

The AC-PRO can be supplied as part of a complete retrofit kit. Kits include all necessary brackets, mounting hardware, wiring, actuator, and installation documentation and instruction manuals.

AC-PRO retrofit Kit for G.E. AK-2-25

Over 1100 different kits available including kits for these breakers:

General Electric
AK AKR AKRT AE AL

Westinghouse
DA DB DBL DK DS DSL

I-T-E
K KA KB KC KD KE
LG LX LK

Siemens / Allis-Chalmers
LA-Blue LA-Gold LA-15
LA-25 LA-50 LA-75
G RL RLX

Federal Pacific/Federal Pioneer
FP FPS FM DMB H1 H2
H3

Sylvania/Unelec
SSPB CN2

Roller Smith
RS BD HD

Secondary Injection Test Set

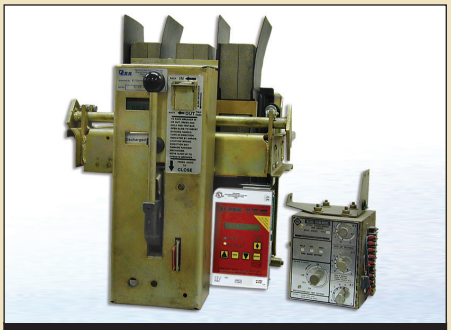
The Model B-291 test set is micro-controller based and designed to test the AC-PRO trip unit.

The test set features a selectable frequency for testing the 60Hz, 50Hz, 40Hz and 25Hz versions of the AC-PRO.

AC-PRO Direct Replacement

The AC-PRO trip unit is designed to use existing ½ or 1 amp CTs and operate the magnetically latched OEM actuators used with many older style electronic trip units.

Reusing the existing CTs and actuator can greatly reduce material costs and cuts installation time to a fraction of that required for a complete retrofit.



Direct Replacement of a Static-Trip II on a Allis Chalmers LA-600 breaker

Trip Unit Acceptance Testing

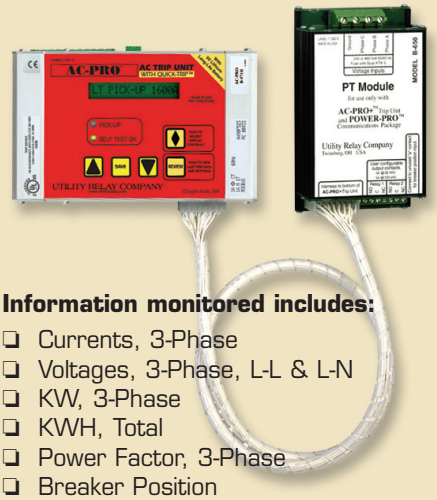
In addition to being UL CLASSIFIED and short circuit tested in accordance with ANSI C37.59, the AC-PRO has been independently tested to, and passed the following:

- ❑ **ANSI/IEEE C37.90.1** – Oscillatory Wave Surge Test.
- ❑ **ANSI/IEEE C37.90.1** – Fast Transient Test.
- ❑ **ANSI/IEEE C37.90.2** – RFI Test.
- ❑ **Capacitive Discharge Test** – 1.5 kA, 80 & 180 µs pulses applied to primary CT inputs superimposed on load current.
- ❑ **Electrostatic Discharge Test** – 8 kV and 15 kV direct air discharge applied to trip unit.
- ❑ **Insulation Test** – 2.2 kVAC, 60 Hz applied for 60 sec.
- ❑ **Environmental Test** – Secondary injection test trip unit at –20, +23 and +65 C. Minimum exposure of eight hours at each temperature.

RS-485 Communications Port

The optional communications port uses the industry standard MODBUS RTU protocol. Multiple trip units can be daisy-chained together using a single shielded twisted pair cable.

Additional components supplied with a communications ready AC-PRO retrofit kit include: PT Module and cable, Communications Cable, cell wiring accessories, mounting brackets and hardware.



Information monitored includes:

- ❑ Currents, 3-Phase
- ❑ Voltages, 3-Phase, L-L & L-N
- ❑ KW, 3-Phase
- ❑ KWH, Total
- ❑ Power Factor, 3-Phase
- ❑ Breaker Position
- ❑ Last Trip Data
- ❑ Trip Counter
- ❑ Alarm Conditions
- ❑ Trip Unit Settings

The AC-PRO also features remote programmability, which allows trip settings to be programmed remotely from a PC. Two addressable form-C contacts are also supplied with the PT module.

With the addition of an **LCI™** (Local Communications Interface), multiple AC-PRO trip units can communicate directly across a local area network.

The LCI Features:

- ❑ 4-line X 20-character display
- ❑ Rugged NEMA 4X enclosure
- ❑ RS-485 Input
- ❑ 10Base-T Ethernet port
- ❑ Programmable IP Address
- ❑ Embedded WEB Pages
- ❑ 2-year Limited Warranty

Call Toll Free: 888.289.2864

For additional information visit our website:
www.utilityrelay.com

URC Utility Relay Company
10100 Queens Way, Chagrin Falls, OH 44023
Phone: 440-708-1000 Fax: 440-708-1177

DATA SHEET

QUICK-TRIP®

ARC FLASH REDUCTION SWITCH

Dramatically reduce arc flash potential for those times when you must work on energized equipment.

A Matter of Personnel Safety

In recent years, more attention has been given to the potential hazard of arc flash energy to electrical personnel working on or near energized electrical equipment. Recent standards have been written, including NFPA 70E-2004 and IEEE 1584, which address these hazards. As a result many companies are adopting strict new PPE requirements and procedures for personnel working in high arc flash potential areas.

Reducing Arc Flash Potential isn't always easy...

Until now, options for reducing arc flash potential during normal maintenance periods in low voltage substations have been limited. A few of those include:

- ❑ De-energizing the substation during maintenance. Not always a feasible option.
- ❑ Lower the available fault current for the substation. May not be an option at all.
- ❑ Shorten the trip time of the upstream breaker during maintenance periods. Now made fast and easy with QUICK-TRIP.

System Components

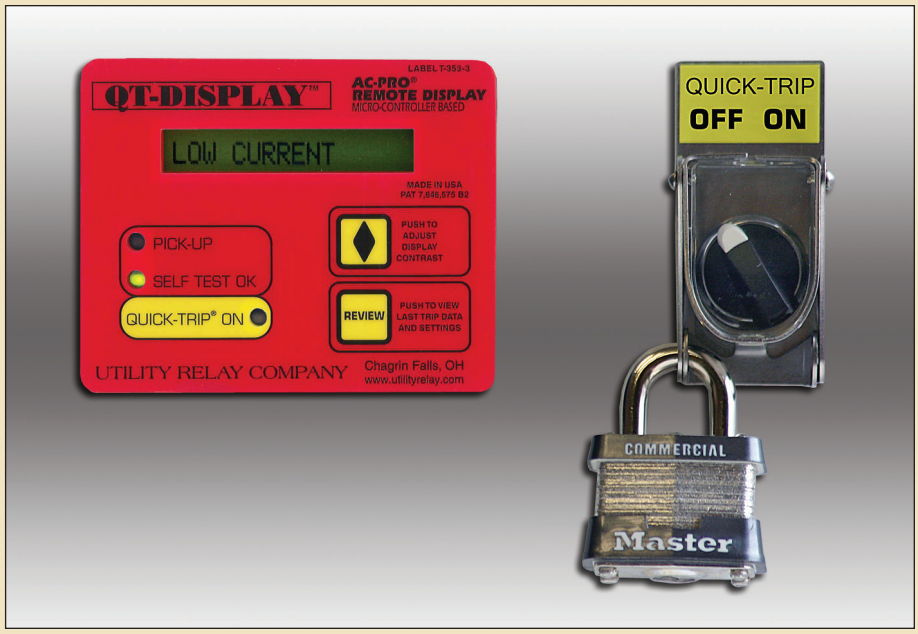
The QUICK-TRIP system consists of the following components:

- ❑ An AC-PRO®* trip unit with QUICK-TRIP capability.
- ❑ A QT-DISPLAY® with QUICK-TRIP capability, mounting hardware and cable.
- ❑ A Padlocking selector switch to turn the QUICK-TRIP feature ON or OFF.

Although all AC-PRO trip units have the Quick Trip capability, the system can only be activated through the selector switch that connects to the QT-DISPLAY. The QT-DISPLAY connects directly to the AC-PRO through a single modular shielded cable.

NOTES:

* *Older AC-PRO trip units can be easily upgraded to include QUICK-TRIP capability. Contact URC for details.*



System Operation and Settings

The QUICK-TRIP system is activated by means of a padlockable selector switch. When enabled, two additional settings are activated in the AC-PRO trip unit to provide enhanced protection:

- ❑ QT Instantaneous
- ❑ QT Ground Fault

These two individually programmable settings are designed to provide faster clearing times in the event of a fault.

Since arc flash potential is directly related to breaker clearing time, the addition of the QUICK-TRIP allows a method to reduce fault-clearing time without opening a cubicle door to reprogram the trip unit.

Reduced breaker clearing time can mean significantly reduced arc flash potentials on downstream electrical equipment.

QT Instantaneous: ranges from 150% to 1200% of the Long-Time Pick-Up setting and is adjustable in 100 amp steps.

QT Ground Fault: ranges from a minimum of 20% to 200% of the CT Rating with a maximum of 1200 amps and is adjustable in 10 amp steps. This setting is also selectable OFF.

This function essentially adds Ground Fault protection to the breaker. Although this function may not be desirable during normal operating conditions, it can provide a critical layer of protection during maintenance periods because many phase-to-phase faults often start as phase-to-ground faults.

System Features

The QUICK-TRIP system is as easy to use as it is to install, with the additional personnel safety features:

- ❑ Installation uses standard punches.
- ❑ Wires in minutes without cutting into existing wiring harness.
- ❑ QT settings are only active when the selector switch is in the ON position (during maintenance).
- ❑ System coordination is preserved when the selector switch is OFF (QUICK-TRIP OFF).
- ❑ Reduction in arc flash incident energy levels may permit lower PPE clothing for maintenance personnel.
- ❑ Padlocking switch can be incorporated into a lock-out tag-out procedure.
- ❑ QUICK-TRIP ON LED confirms operation.
- ❑ SELF-TEST LED verifies trip unit operation.
- ❑ PICK-UP LED indicates overcurrent situations.
- ❑ QUICK-TRIP settings can be reviewed on the external QT-DISPLAY.
- ❑ Last Trip Data and all settings can be reviewed on the QT-DISPLAY.
- ❑ 3-phase currents are displayed continuously on the QT-DISPLAY.
- ❑ The system is fully powered by the trip unit's CTs. No aux power or batteries.
- ❑ Extra contacts on the selector switch are available for external annunciation.

Call Toll Free: 888.289.2864

For additional information visit our website:
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Phone: 440-708-1000 Fax: 440-708-1177

URC Utility Relay Company

QUICK-TRIP®

ARC FLASH REDUCTION SWITCH

Incident Energy of an Arc Flash (Cal/cm2)

The intensity of an arc is based on the following data:

F = Amount of available fault current in kA. (for the range of 15 to 50kA)

D = Distance from the electrode in Inches. (for distances 18 in. and greater)

t = Arc duration in Seconds.

The NFPA 70E provides an equation as one method of determining the amount of incident energy (heat) a person would receive if an arc flash were to occur in a cubic box, such as a circuit breaker cubicle:

$$E_I = 1038.7 \times D^{-1.4738} \times t \times (.0093 \times F^2 - .3453 \times F + 5.9675)$$

E_I = Incident Energy Level (cal/cm2) in a box not larger than 20 inches (much like a circuit breaker cubicle).

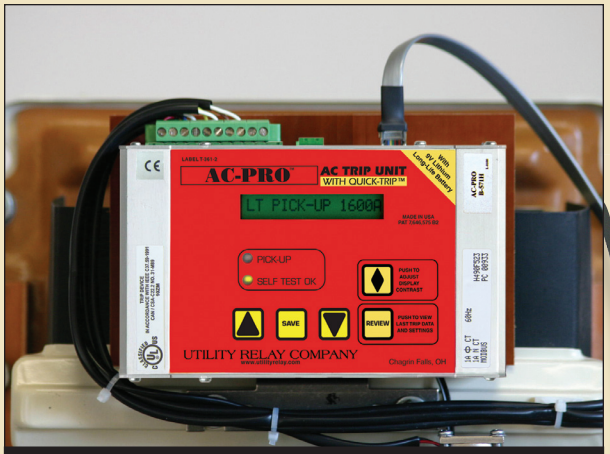
The Incident Energy Level determines the Hazard Risk Category shown in the table below which further determines the PPE requirements for personnel working on the affected electrical equipment.

Incident Energy Level (EI)	Hazard Risk Category
0 to <4 cal/cm2	1
4 to <8 cal/cm2	2
8 to <25 cal/cm2	3
25 to <40 cal/cm2	4
>40 cal/cm2	Dangerous

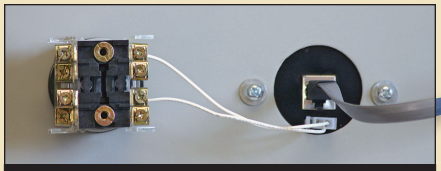
Determining QUICK-TRIP settings

Because normal system coordination may be compromised when QUICK-TRIP is ON, the QT Instantaneous and QT Ground Fault settings must be determined by a qualified engineer to account for in-rush currents and normal running loads to prevent nuisance tripping.

QUICK-TRIP system components stay with the cubicle! Swapping breakers is no problem

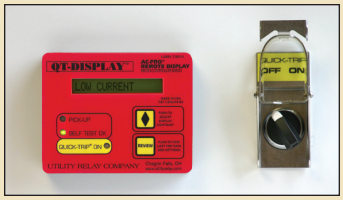


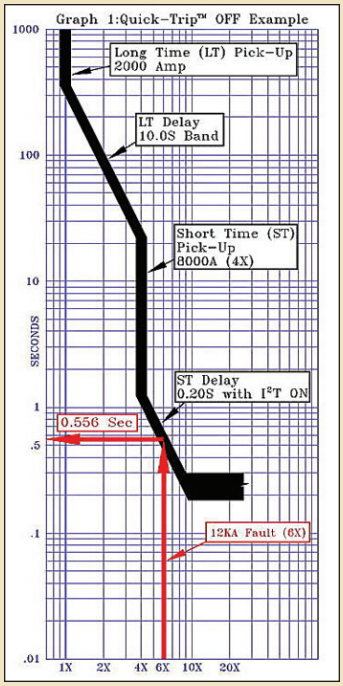
AC-PRO Installed on a G.E. AK-2-25 Breaker



Rear View of QT-DISPLAY® and Selector Switch Installed on Cubicle Door

Pre-assembled quick disconnect cables makes racking breakers in and out a snap





Practical Example

A technician needs to rack out a feeder breaker for maintenance. In so doing, he is the minimum 18" away from any potential arc flash source in the cubicle. As the breaker is being racked out, a 12,000 amp arcing fault occurs inside the cubicle. The 2000A main breaker sees the fault and trips, subsequently clearing the fault in the feeder breaker cubicle.

The two graphs below illustrate the dramatic impact that arc-clearing time has on incident energy levels.

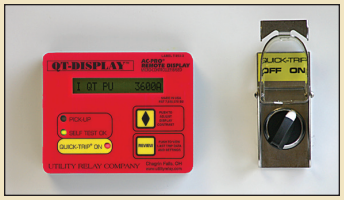
Given that: **F = 12kA** and **D = 18 in.**

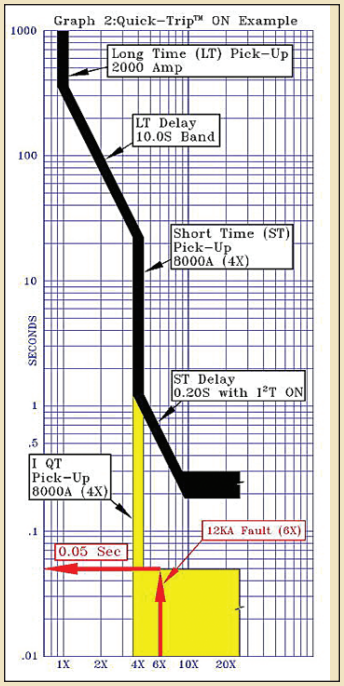
Graph 1:
QUICK-TRIP: **OFF** shows the trip time characteristics of the main breaker.

- ❑ The AC-PRO® will cause the main breaker to clear the 12kA fault in .556 seconds (based on a Short-Time Delay of .20 seconds with I2t ON). The resulting arc duration will be: **t = .556**
- ❑ The resulting incident energy is: E_I **= 25.8022**
- ❑ The Hazard Risk Category is: **4**

Graph 2:
QUICK-TRIP: **ON** shows the trip time characteristics of the main breaker.

- ❑ The AC-PRO will now cause the main breaker to clear the 12kA fault .05 seconds (based on the Instantaneous QT or I QT Pick-Up setting of 8000 amps). The resulting arc duration will be: **t = .05**
- ❑ The resulting incident energy is: E_I **= 2.3203**
- ❑ Hazard Risk Category reduced to: **1**



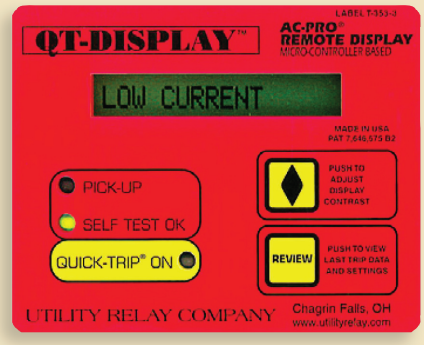


DATA SHEET

QUICK-TRIP®

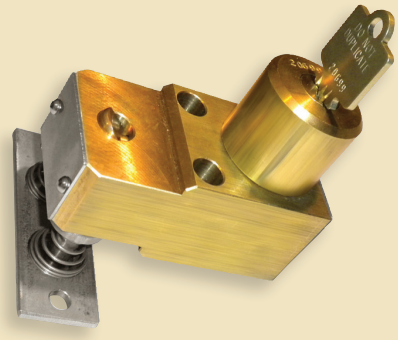
COMBINED WITH KIRK® INTERLOCK

Combine KIRK® Interlock System with QUICK-TRIP Arc Flash Reduction

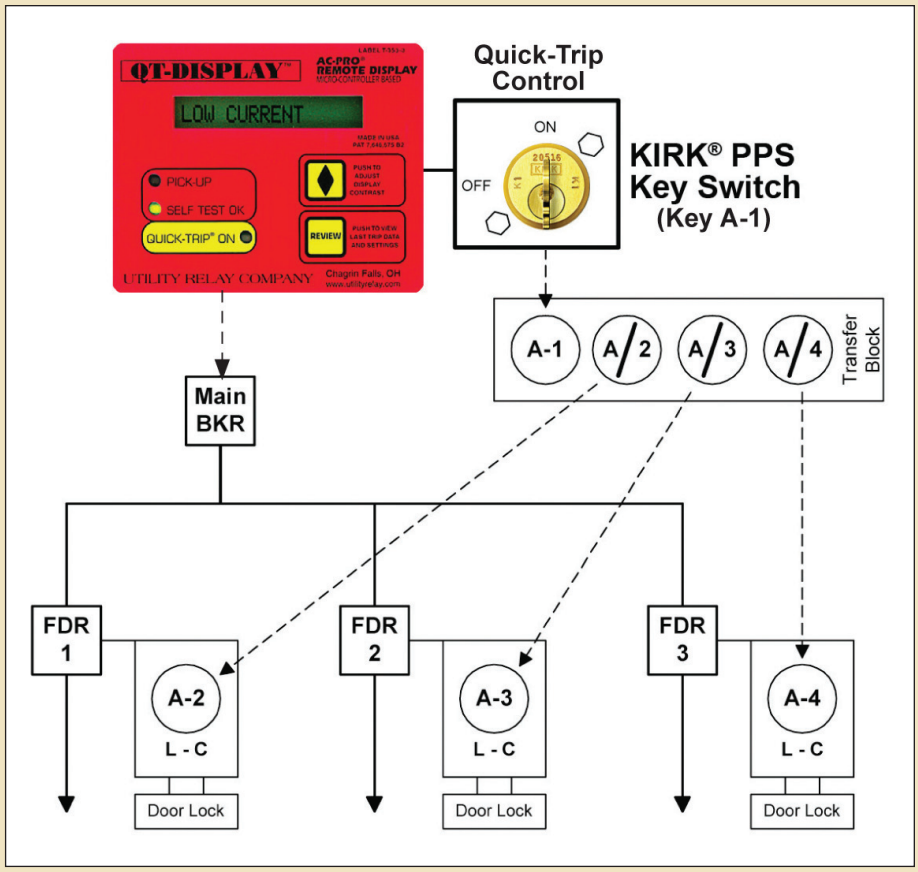


QUICK-TRIP Arc Flash Reduction

Kirk Key Type PPS Switch



Kirk Key Type DC Door Lock
Other Door Style Interlocks Available



To activate QUICK-TRIP before racking a feeder breaker in or out:

1. Turn QUICK-TRIP to the ON position at the main breaker by turning and releasing key A1.
2. Insert key A1 in transfer interlock to release keys A2, A3 and A4. Key A1 is now trapped.
3. Use keys A2, A3 and A4 to unlock the three feeder compartment door interlocks.
4. Keys A2, A3 and A4 are trapped in the door interlock when t he compartment door is opened.
5. Rack the feeder breaker in or out.
6. Reverse sequence to turn the QUICK-TRIP to the OFF position at the main breaker.

Personnel safety is improved by assuring the use of QUICK-TRIP during maintenance

KIRK
Since 1932

Kirk Key Interlock Company
211 Wetmore Ave. S.E. Massillon, OH 44646
Phone: 330.833.8223 1.800.438.2442
Fax: 330.833.1528

www.kirkkey.com

Call Toll Free: 888.289.2864

For additional information visit our website:
www.utilityrelay.com

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URC Utility Relay Company

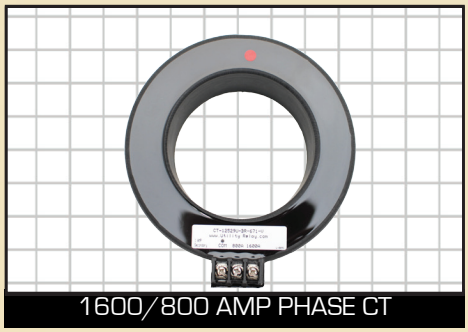
DATA SHEET

AC-PRO CTs

AC-PRO FAMILY | CURRENT TRANSFORMERS

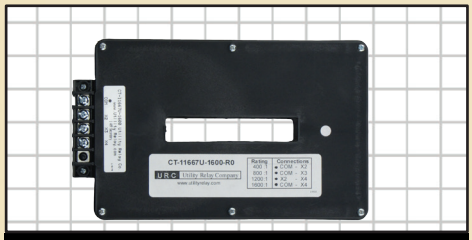
All CTs are specifically designed for use with the AC-PRO family of trip units.

Phase CTs



1600/800 AMP PHASE CT

- ❏ Primary ratings available range from 100A up to 6000A.
- ❏ Each Utility Relay CT is tapped for added versatility.
- ❏ The standard secondary rating is 1.0A.



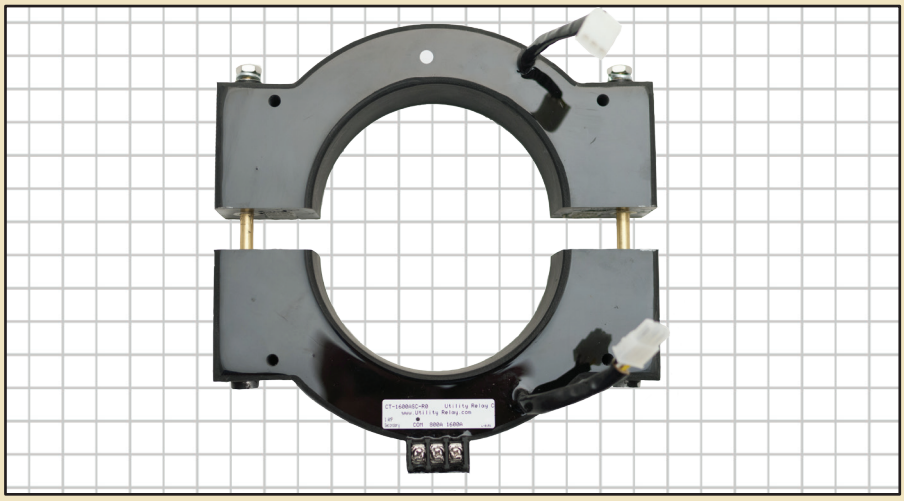
DS 416, 1600/1200/800/400 AMP PHASE CT

CT Turns Counter Testing

Utility Relay Company manufactures many of our CTs at our Chagrin Falls, Ohio facility. Each CT is ratio and polarity tested several times during production.

Whether made at our facility or custom made for us by out suppliers, URC completely controls the design and performance of each CT.

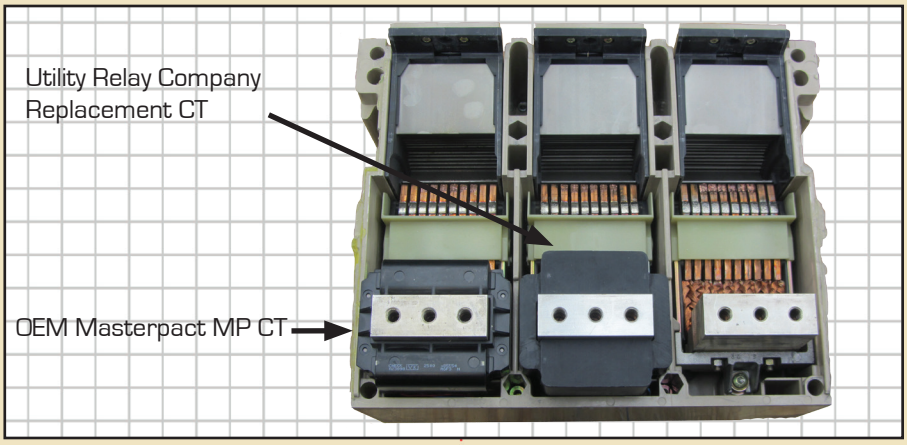
Split Core Neutral CTs



Utility Relay Company manufacturers split core CTs for use as neutral CTs in 4 wire systems. The split cores make it very easy to install the CT on existing bus or cable. Each split core has phenolic plates with punch outs to match standard sizes/shapes of cable or bus-work.

- ❏ URC split core CTs are designed for use as neutral CTs only
- ❏ Each split core is dual tapped at full and half with a standard 1.0A secondary.
- ❏ The split core CTs are available from 225A to 4000A

Masterpact MP Replacement CTs



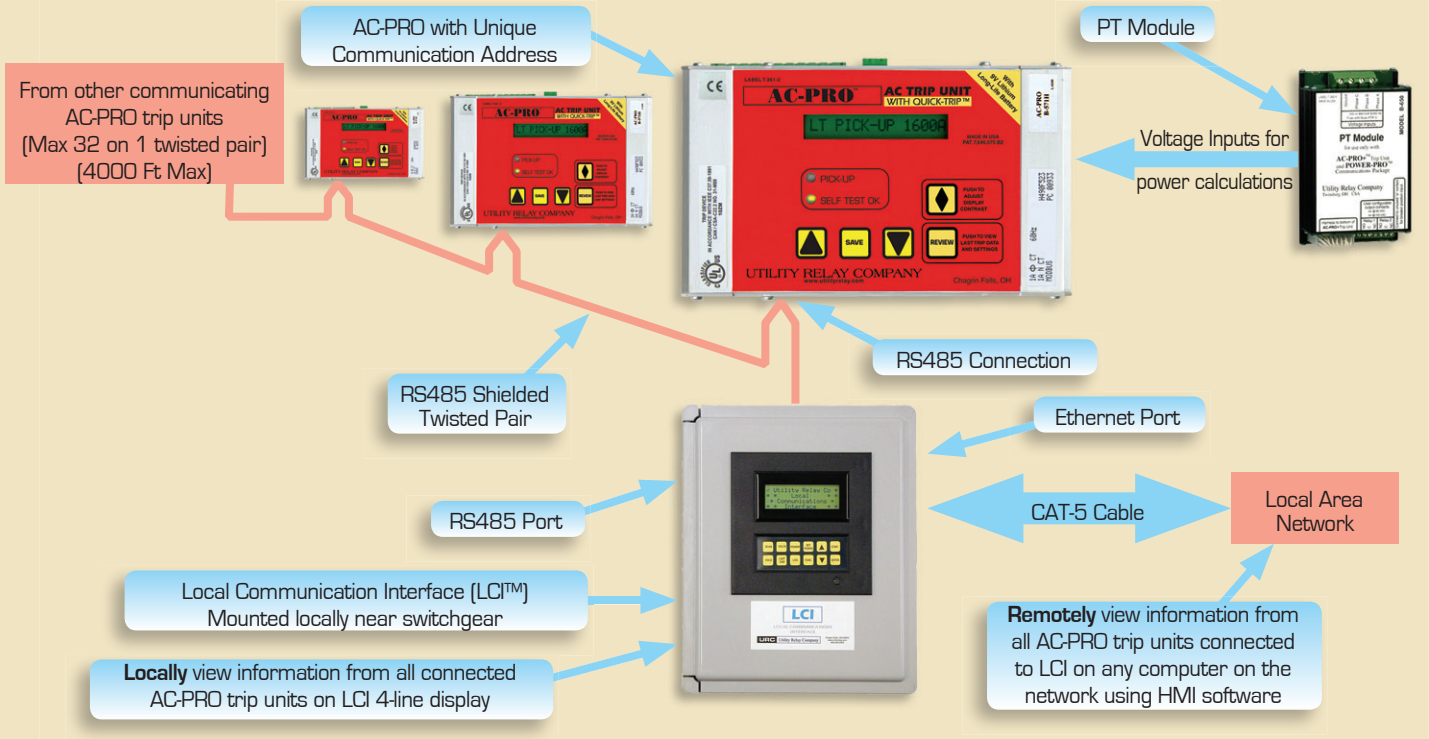
Replacement CTs are available for use with the AC-PRO-MP trip units on Square D & Merlin Gerin Masterpact MP breakers. The replacement CTs have the exact form, fit and function of the original CTs and allows the life of Masterpact breakers to be extended.

If you have any questions about our CTs please contact us.

DATA SHEET

AC-PRO® COMMUNICATION

WITH STANDARD **MODBUS RTU** PROTOCOL



AC-PRO Communication Overview

AC-PRO trip units with the communication option have an RS485 port and use the industry standard Modbus RTU protocol.

Up to 32 trip units can be connected on one twisted pair. Each AC-PRO is programmed with a unique address. Data can be requested from the trip units and commands can be sent to the trip units from the HMI system.

A locally installed Local Communication Interface (LCI) can be used to view the data from each AC-PRO trip unit.

A host PC running a HMI application collects information from the communicating AC-PRO trip units. The Modbus driver in the HMI interrogates each trip unit individually and reports that information to the HMI application on a continual basis.

Commands sent from HMI system to any AC-PRO through communication

- ❑ New settings
- ❑ Clear last trip data, trip log & KWH
- ❑ Clear trip alarm
- ❑ Force trip breaker (if enabled in trip unit)
- ❑ Energize 2 user defined auxiliary relays

PT Module Function

- ❑ Provides voltage information for power calculations in the AC-PRO trip unit
- ❑ Allows the AC-PRO trip unit to communicate when there is less than 10% breaker current or when the breaker is open

LCI Function

- ❑ Provides local access to data from all connected AC-PRO trip units
- ❑ Provides an Ethernet port

Information available from each AC-PRO through communication links

- ❑ Currents, 3-Phase & Ground Fault
- ❑ Voltages, 3-Phase L-L & L-N
- ❑ KW, KVA & KWH
- ❑ Protective settings
- ❑ Alarm status
- ❑ Last trip data including currents
- ❑ Trip log
- ❑ Breaker open or closed status

System Requirements

Provided by URC

- ❑ AC-PRO retrofit kit with communication option and PT module
- ❑ LCI (or a 3rd party Modbus TCP to RTU converter)

Provided by Others

- ❑ Shielded twisted pair for RS485 connection
- ❑ CAT 5 cable for LAN connection
- ❑ HMI software

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URC Utility Relay Company

DATA SHEET

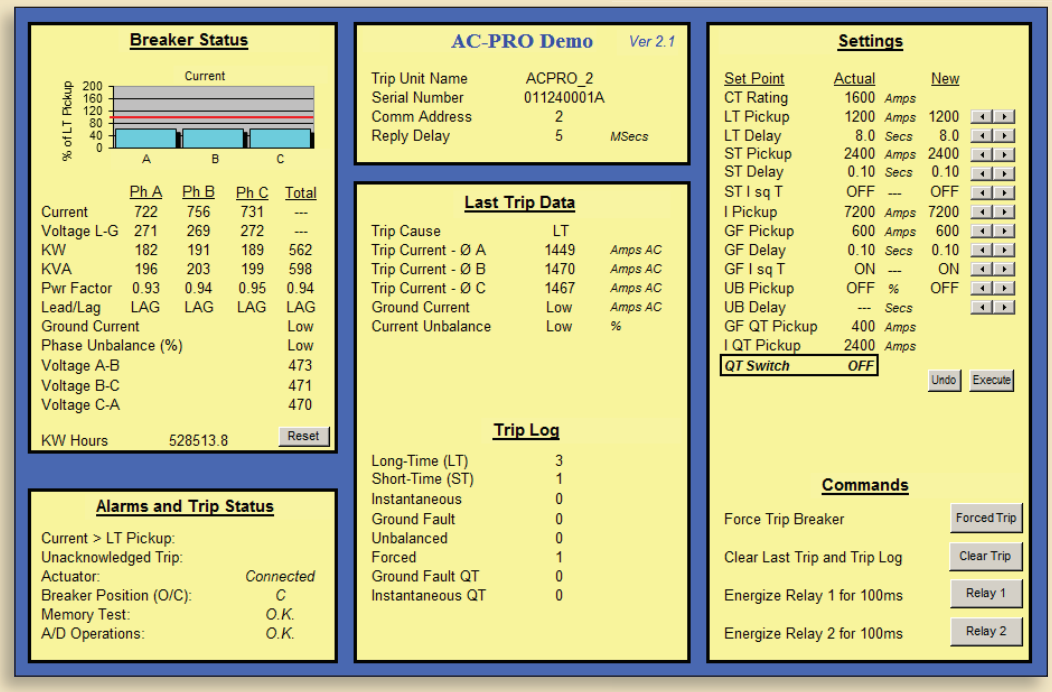
AC-PRO® COMMUNICATION

WITH STANDARD **MODBUS RTU** PROTOCOL

AC-PRO Compatibility with HMI Software

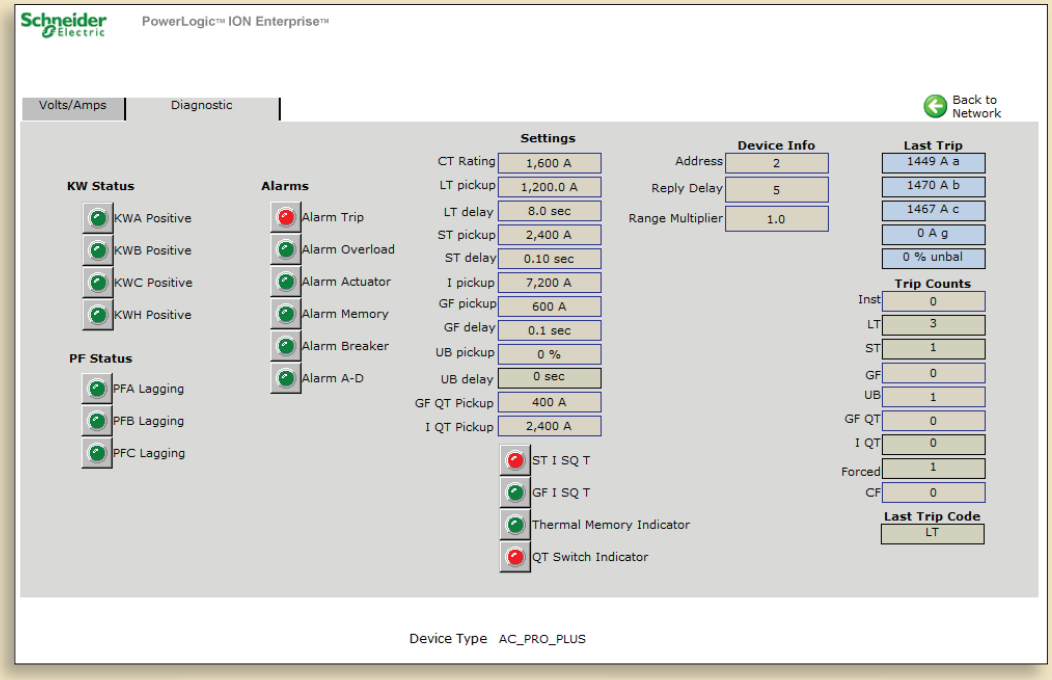
AC-PRO can be integrated into various industry-standard HMI systems that have a Modbus RTU driver.
A few examples are:

- ❑ Schneider Electric ION Enterprise™ ❑ Schneider Electric SMS-3000™ ❑ Wonderware' s INTOUCH™
- ❑ Power Measurements PEGASYS™ ❑ Siemens WinPM™



Screen shot of a simple Excel spread sheet set up to demonstrate the communication capability of the AC-PRO trip unit

Using KEPServerEX OPC/DDE



Schneider Electric's PowerLogic™ ION Enterprise™ driver for AC-PRO simplifies integration into their HMI system

ION-Enterprise™ screen shot with voltage, current, energy and power

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URC Utility Relay Company

DATA SHEET

LCI™

SUBSTATION MONITOR | LOCAL COMMUNICATION INTERFACE

Substation Monitoring and Network Connectivity

Application Overview

The LCI is a substation monitor that continuously monitors up to 32 **AC-PRO®** and/or **ZERO-Hertz™** trip units connected to its RS-485 port. Information from the trip units is displayed on the LCI's front panel.

Features

- ❏ 4-Line X 20-Character Display
- ❏ Rugged NEMA 4X Enclosure
- ❏ RS-485 Port
- ❏ Support up to 32 trip units simultaneously
- ❏ 10Base-T Ethernet Port
- ❏ Programmable IP Address
- ❏ WEB Enabled
- ❏ 2-year limited warranty

Local Substation Metering

Pressing the **SCAN** button on the front panel will cause the LCI to display the current from each trip unit sequentially according to each trip unit's COMM Address (1 thru 32).

Easy Access to Information

When the current of a particular trip unit of interest is being displayed, the **HOLD** button can be pressed which will cause the LCI to continuously display the current from that trip unit only. Additional information from that trip unit can be displayed by pressing the **VOLTS, POWER, LAST TRIP, LOG,** or **SET POINTS** buttons.

Built-In Ethernet Port

The built-in ethernet port allows easy connection to a corporate intranet (LAN). Once connected to the LAN, all of the trip units connected to the LCI's RS-485 port will be addressable across the LAN using standard MODBUS protocol. This allows easy integration to most graphical HMI software packages containing a MODBUS driver.

Web Enabled

Critical up-to-the-second data can be viewed on the corporate intranet by simply entering the LCI's unique IP Address into a web browser. This provides a snapshot of data to quickly identify Overload and Alarm conditions that may exist.

LCI™

SUBSTATION MONITOR | LOCAL COMMUNICATION INTERFACE

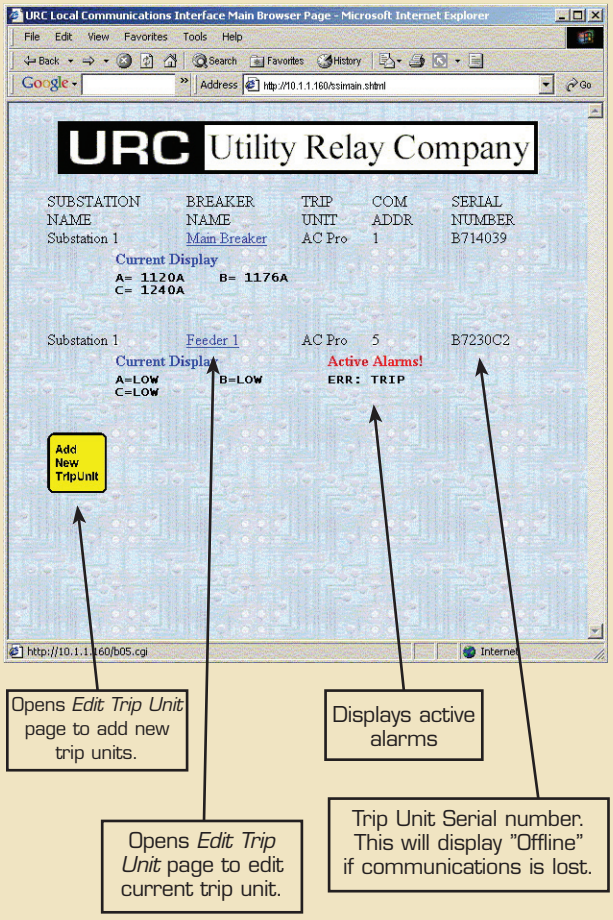
Web Monitoring

Once connected to a corporate intranet, the LCI is accessible. An instant status check on your substation can be obtained by entering the LCI's unique IP Address in a web browser. The LCI's **Main Page** will appear and provide a "snapshot" of information. This information can be updated by pressing the "Refresh" button on the browser.

Main Page Information Includes:

- ❏ Substation Name
- ❏ Individual Breaker Names, COM Addresses and Serial Numbers
- ❏ Current Display of all connected Trip Units
- ❏ Active Alarms
- ❏ Ability to Add new Trip Units to the System

Main Page



Edit Trip Unit Page

This page can be accessed in two ways: 1.) by clicking on the "Add New Trip Unit" button on the Main Page, or 2.) by clicking on a specific "Breaker Name"

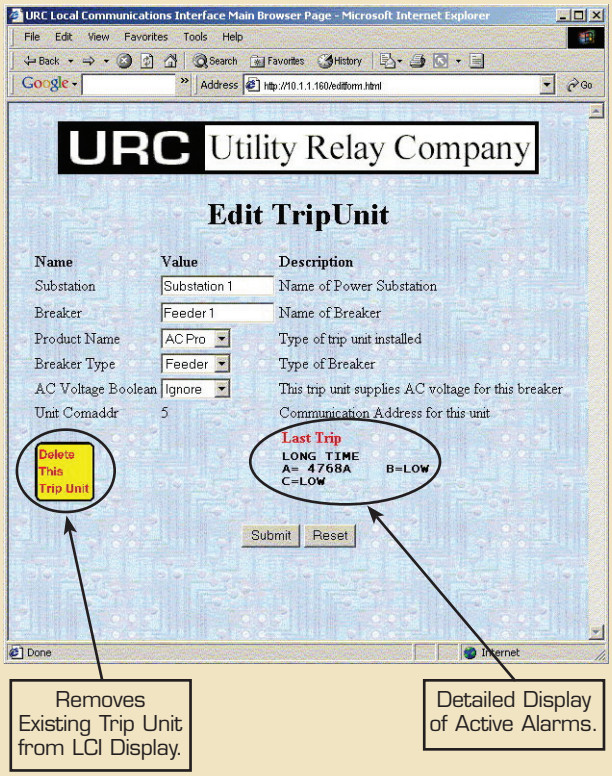
Adding New Trip Units

Clicking on the "Add New Trip Unit" button on the Main Page will cause the Edit Trip Unit Page to appear. By default, the next available (unused) COM Address appears. The COM Address can be changed and the appropriate Breaker Name and Substation Name can be entered. This will cause the new trip unit's information to appear on the LCI's 4 X 20 character display

Editing Existing Trip Units

Clicking on a specific "Breaker Name" on the Main Page will also cause the **Edit Trip Unit Page** to appear. Trip Unit information can now be edited, the trip unit can be deleted (data no longer available on the LCI's 4 X 20 character display), and any active alarms can be viewed.

Edit Trip Unit Page



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DATA SHEET

ZERO-HERTZ™

DC TRIP UNIT | MICRO-CONTROLLER BASED

The Premier Multifunction DC Protective Relay

Standard Trip Unit Functions
- ❑ Long-Time
- ❑ Short-Time
- ❑ Instantaneous
- ❑ Ground Fault
- ❑ Reverse Current

All functions, except for Long Time, are selectable ON/OFF during programming.

Programming
Settings are programmed using the ▲, ▼, and **SAVE** buttons on the front of the trip unit. All settings and last trip data are stored in non-volatile memory.

Security is provided by a **SECURITY KEY**, which must be plugged in to the top of the trip unit before any trip settings can be changed.

16-Character LCD
The large backlit display provides continuous current metering when the trip unit is in service. Last Trip Data and trip settings can be reviewed at any time by pressing the **REVIEW** key.

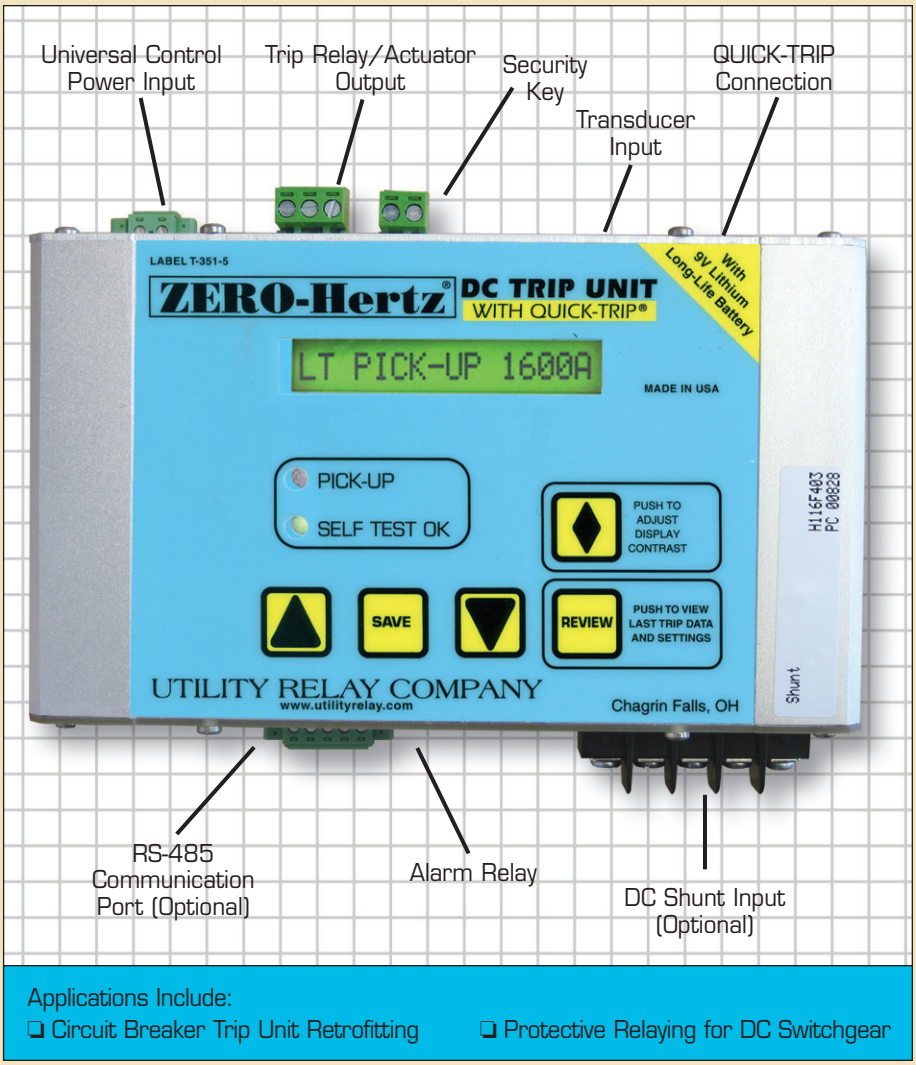
The ◆ button on the front of the trip unit is provided to adjust the LCD's contrast.

Last Trip Data
The trip unit retains the data from the most recent trip in EEPROM memory. This information includes the type of trip and current at the time of trip. This information can be reviewed at any time by pressing the **REVIEW** button.

Continually pressing the **REVIEW** button will display a trip counter, which indicates the number of times the trip unit has operated on each function. The present trip unit settings will also be displayed.

Last trip data and the trip counter can be cleared at any time.

PICK-UP Indication
The red LED on the front of the trip unit illuminates when current reaches or exceeds the Long-Time pick-up value.



Applications Include:
- ❑ Circuit Breaker Trip Unit Retrofitting
- ❑ Protective Relaying for DC Switchgear

SELF-TEST OK Feature
The green LED indicates that the trip unit is operating properly. This feature:
- ❑ Continuously monitors the trip unit.
- ❑ Verifies that an actuator or trip relay is connected.
- ❑ Verifies proper transducer connection when using transducers.
- ❑ Monitors software routines.
- ❑ Monitors micro-controller and A/D converter.

Flexible Control Power Input
Universal control power input accepts:
AC volts: 75-265
DC volts: 90-340

QUICK-TRIP® Arc Flash Reduction
The QUICK-TRIP system helps reduce the arc flash hazard on downstream equipment for times when personal must work on energized equipment. The QUICK-TRIP system can be turned on and off without opening the cubicle door and features:
- ❑ QT-Instantaneous setting
- ❑ QT-Ground Fault setting
- ❑ Door mounted switch with lockable cover.

Alarm Relay
User Configurable
Form C relay
Rating: 5A 30VDC
5A 125VAC

DATA SHEET

ZERO-HERTZ™

DC TRIP UNIT | MICRO-CONTROLLER BASED

Transducers
The transducers provide the signal input for the ZERO-Hertz trip unit. They are mounted directly on the bus of the breaker and must be calibrated after installation.

The calibration procedure involves injecting a known test current in each individual pole of the breaker and adjusting the transducer's gain. Calibration is complete when the appropriate current is displayed on the trip unit's LCD ammeter.

Calibration can be performed using either a **DC or AC high-current test set.** (Note: If testing with an AC high-current test, specify 50-Hz or 60 Hz when ordering).

DC Shunt Input (Optional)
This allows signal input to the ZERO-Hertz directly from a DC shunt. The shunt input is used instead of the transducers.

Terminals are available for connection directly to either a 50mV or 100mV shunt mounted in the switchgear. In this application the trip unit is typically also mounted in the switchgear as a panel relay and the ZERO-Hertz trip output is wired in the breaker's trip circuit.

Maximum recommended operating system voltage: 1000VDC
DC bus isolation: 3750 VDC for 60 sec.

No calibration is required when using the optional Shunt Input.

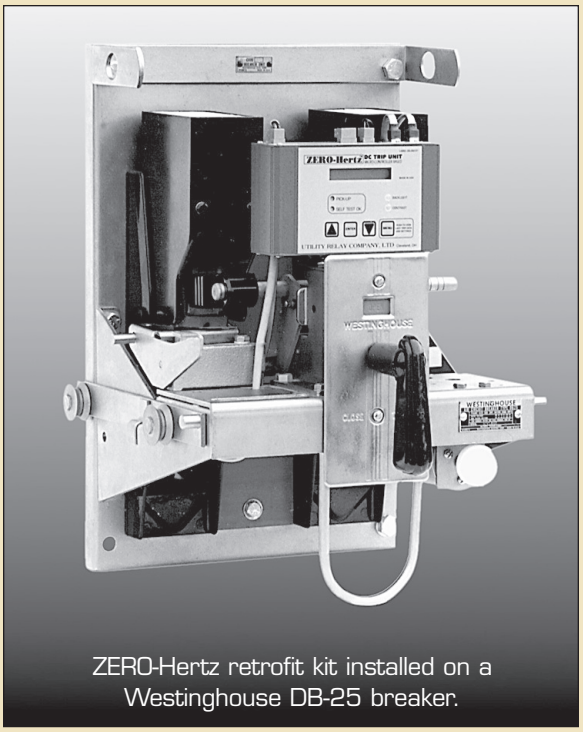
Retrofit Kits
The ZERO-Hertz is provided as a complete retrofit kit, including all necessary mounting hardware and documentation. Complete kits are available from stock for the following breaker types:

General Electric
AK AKR AL
MC-5 MC-6

Westinghouse
DB DBL DMD
DR-150

I-T-E
K-line FB FBK
KA KB KC

Federal Pioneer
H2 H3



ZERO-Hertz retrofit kit installed on a Westinghouse DB-25 breaker.

RS-485 Communications Port
The optional communications port uses the industry standard MODBUS RTU protocol. Multiple trip units can be daisy-chained together using a single twisted pair wire.

Information monitored includes:
- ❑ DC current
- ❑ Last trip data
- ❑ Trip counter
- ❑ Alarm conditions
- ❑ Trip unit settings

With the addition of an LCI™ (Local Communications Interface), multiple ZERO-Hertz trip units can communicate directly across a local area network.

The LCI Features:
- ❑ 4-line X 20-character display
- ❑ Rugged NEMA 4X enclosure
- ❑ RS-485 Input
- ❑ 10Base-T Ethernet port
- ❑ Programmable IP Address
- ❑ Embedded WEB Pages
- ❑ 2-Year Limited Warranty

Secondary Injection Test Set
The Model B-290 test set is designed to test both the transducer input and shunt input version of the ZERO-Hertz.

The test set can quickly test Pick-Up settings and multiple test points and trip times on the time current curve.

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DATA SHEET

AC-PRO-1A™

DIRECT REPLACEMENT TRIP UNIT | MICRO-CONTROLLER BASED

Fully Programmable
Direct Replacement Trip Unit

Compatibility
Both the AC-PRO-1A and the AC-PRO-1/2A are True RMS trip units designed to replace a variety of older style electronic trip devices.

The new trip units will operate with the existing OEM 1 amp or 1/2 amp CTs and magnetically latched actuators from a variety of manufacturers. A new wiring harness is provided for easy installation.

PN: AC-PRO-1A replaces:

A-C	LimiTrip™
A-C	Model-1A™
A-C	Static-Trip II™
Joslyn™	Opti-Trip I™
Carriere™	FB600E™

PN: AC-PRO-1/2A replaces:

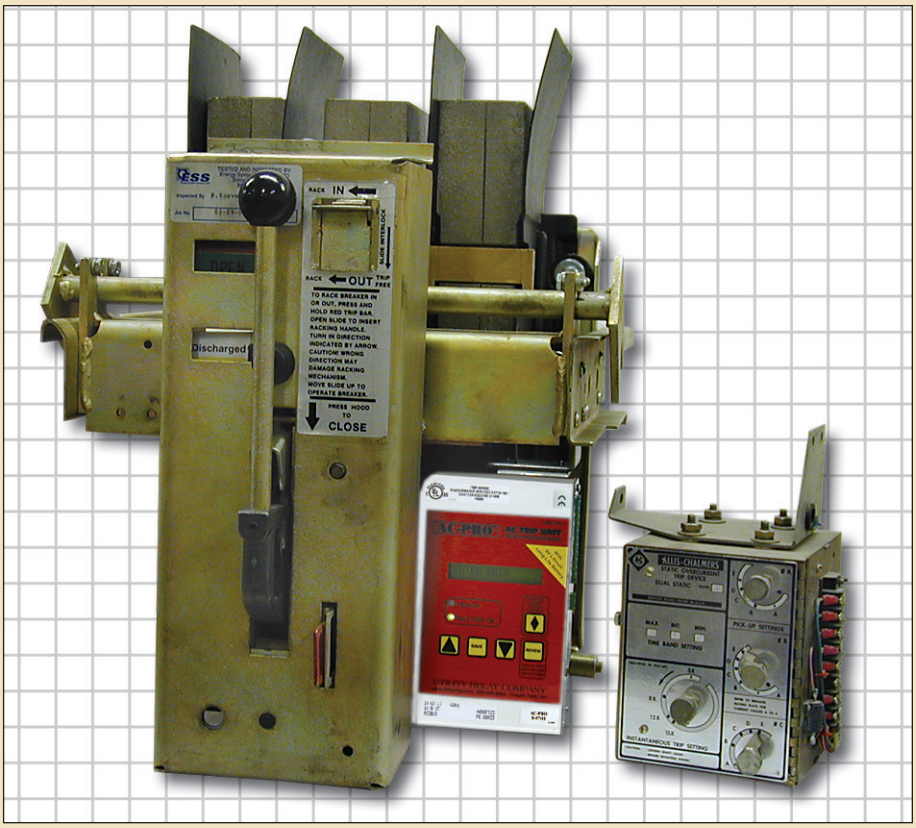
Siemens™	Static-Trip III™
Joslyn™	Opti-Trip II™

Standard Trip Unit Functions
- ❑ Long-Time
- ❑ Short-Time
- ❑ Instantaneous
- ❑ Ground Fault
- ❑ Phase Unbalanced

Unneeded functions can be defeated.

16-Character LCD
The large backlit display provides continuous 3-phase current metering when the relay is in service and displays Last Trip Data.

SELF-TEST Features
The green "SELF-TEST OK" LED indicates that the trip unit is operating properly. This feature:
- ❑ Continuously monitors the trip unit.
- ❑ Verifies actuator connection.
- ❑ Monitors software routines.
- ❑ Monitors micro-controller.



Programming
The AC-PRO-1A and AC-PRO-1/2A are easily programmed to operate on any frame size air circuit breaker with any continuous amp rating.

Settings are programmed using the ▲,▼ and **SAVE** buttons on the front of the trip unit. All settings and Last Trip Data are stored in non-volatile memory.

Security is provided by a **Security Key,** which prohibits unauthorized tampering with the settings.

Last Trip Data
Last Trip Data, including a trip counter and the individual phase currents at the time of trip, can be reviewed at any time by pressing the **REVIEW** key.

QUICK-TRIP® Arc Flash Reduction
The QUICK-TRIP system helps reduce the arc flash hazard on downstream equipment for times when personal must work on energized equipment. The QUICK-TRIP system can be turned on and off without opening the cubicle door and features:
- ❑ QT-Instantaneous setting
- ❑ QT-Ground Fault setting
- ❑ Door mounted switch with lockable cover or KIRK Key switch
- ❑ Door mounted QT-DISPLAY with LCD display

Warranty
2-year limited warranty.

Call Toll Free: 888.289.2864
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URC Utility Relay Company

DATA SHEET

AC-PRO-ECS/SST™

DIRECT REPLACEMENT TRIP UNIT | MICRO-CONTROLLER BASED

Fully Programmable Replacement Trip Unit for G.E. Type-ECS™ and Type-SST™

Compatibility

The AC-PRO-ECS/SST is a True RMS trip unit designed to directly replace obsolete trip devices originally supplied on older style *GE™* AKR-4x and AKR-5x air circuit breakers. These trip devices include:

- ❑ *Type-ECS™*
- ❑ *Type-SST™*

The AC-PRO-ECS/SST mounts directly in place of the OEM trip device and mates with the existing breaker's wiring harness. Since the existing CTs and actuator remain in place, installation only takes about 15 minutes.

Standard Trip Unit Functions

- ❑ Long-Time
- ❑ Short-Time
- ❑ Instantaneous
- ❑ Ground Fault
- ❑ Phase Unbalanced

Unneeded functions can be defeated.

16-Character LCD

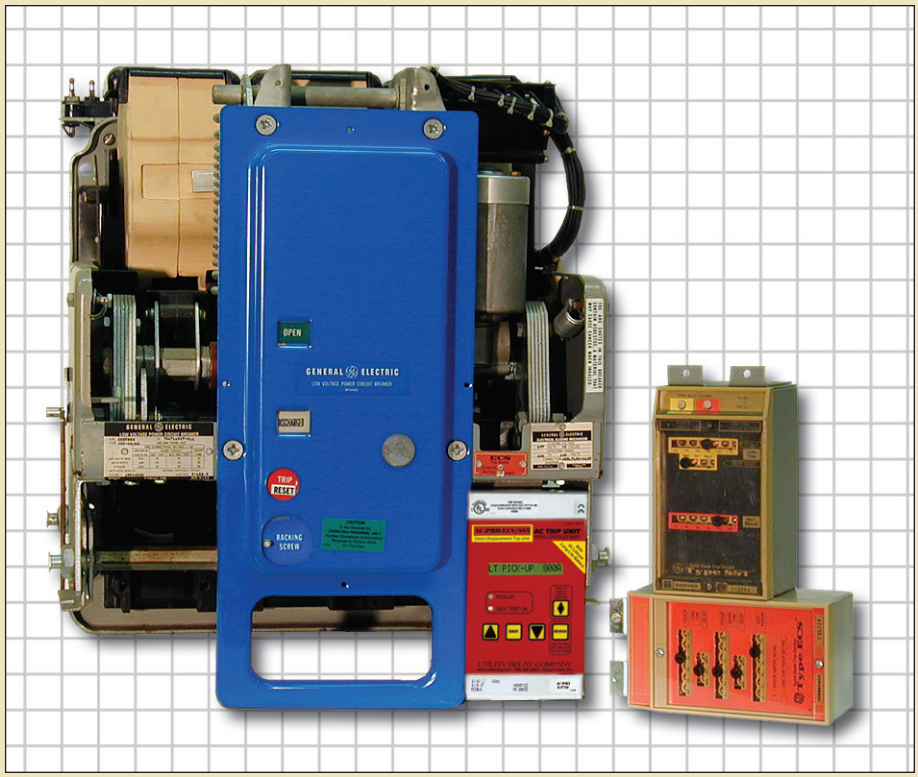
The large backlit display provides continuous 3-phase current metering when the relay is in service.

PICK-UP and SELF-TEST LEDs

The Red LED on the front of the trip unit illuminates when current reaches or exceeds the Long-time pick-up value.

The Green LED indicates that the trip unit is operating properly. This feature:

- ❑ Continuously monitors the trip unit.
- ❑ Verifies that the actuator is connected.
- ❑ Monitors software routines.
- ❑ Monitors micro-controller.



Programming

The AC-PRO-ECS/SST is easily programmed in the field to operate on any frame size AKR-Circuit Breaker with any continuous amp rating.

Settings are programmed using the ▲,▼ and **SAVE** buttons on the front of the trip unit. All settings and last trip data are stored in non-volatile memory.

Security is provided by a **SECURITY KEY**, which prohibits unauthorized tampering with the settings.

Last Trip Data

Last Trip Data, including a trip counter and the individual phase currents at the time of trip, can be reviewed at any time by pressing the **REVIEW** key.

QUICK-TRIP® Arc Flash Reduction

The QUICK-TRIP system helps reduce the arc flash hazard on downstream equipment for times when personal must work on energized equipment. The QUICK-TRIP system can be turned on and off without opening the cubicle door and features:

- ❑ QT-Instantaneous setting
- ❑ QT-Ground Fault setting
- ❑ Door mounted switch with lockable cover or KIRK Key switch
- ❑ Door mounted QT-DISPLAY® with LCD display

Warranty

2-year limited warranty.

Call Toll Free: 888.289.2864

For additional information visit our website:
www.utilityrelay.com

10100 Queens Way, Chagrin Falls, OH 44023
Phone: 440-708-1000 Fax: 440-708-1177

URC Utility Relay Company

DATA SHEET

AC-PRO-VST™

DIRECT REPLACEMENT TRIP UNIT | MICRO-CONTROLLER BASED

Fully Programmable Replacement Trip Unit for G.E. VersaTrip™ in PowerBreak™

Compatibility
The AC-PRO-VST is designed to directly replace obsolete *VersaTrip™* trip units in older style GE *PowerBreaker™* insulated case circuit breakers.

The AC-PRO-VST mounts directly in place of the *VersaTrip™* and mates with the existing *PowerBreak™* wiring harness.

Standard Trip Unit Functions
- ❑ Long Time
- ❑ Short Time
- ❑ Instantaneous
- ❑ Ground Fault
- ❑ Phase Unbalance

Unneeded functions can be defeated.

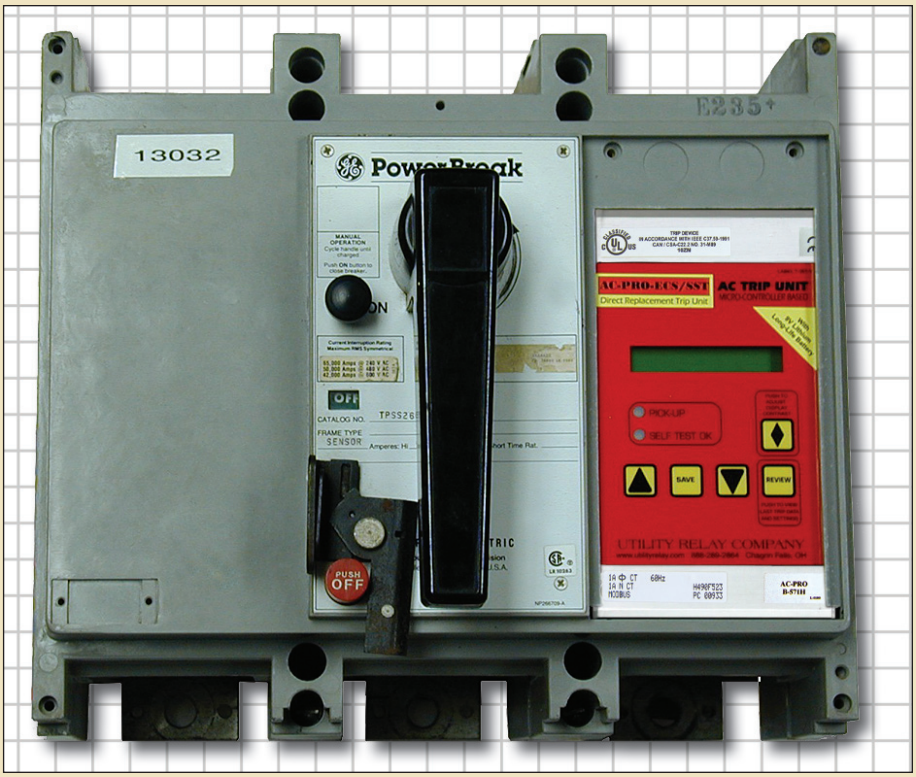
16-character LCD
The large backlit display provides continuous 3-phase current metering when the relay is in service. Last Trip Data (including a trip counter) and trip settings can be reviewed at any time by pressing the **REVIEW** key.

True RMS
The AC-PRO® is true RMS sensing on all functions, including Instantaneous.

Programming
The AC-PRO-VST is fully programmable and can be easily configured in the field.

Settings are programmed using the ▲,▼ and **SAVE** buttons on the front of the trip unit. All settings are stored in non-volatile memory.

Settings can be reviewed at any time by pressing the **REVIEW** key.



SELF-TEST Feature
The green "SELF-TEST OK" LED indicates that the trip unit is operating properly. This feature:
- ❑ Continuously monitors the trip unit.
- ❑ Verifies actuator connection.
- ❑ Monitors software routines.
- ❑ Monitors micro-controller.

Ordering Guide

PN: AC-PRO-VST-250V
fits: TPSS2602... thru TPSS5616
THSS2602... thru THSS5616

PN: AC-PRO-VST-250H
fits: TPSS6606... thru TPSS6616
THSS6606... thru THSS6616

PN: AC-PRO-VST-500H
fits: TPSS6620... thru TPSS9640
THSS6620... thru THSS9640

Warranty
2-year limited warranty.

Call Toll Free: 888.289.2864
For additional information visit our website:
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URC Utility Relay Company

DATA SHEET

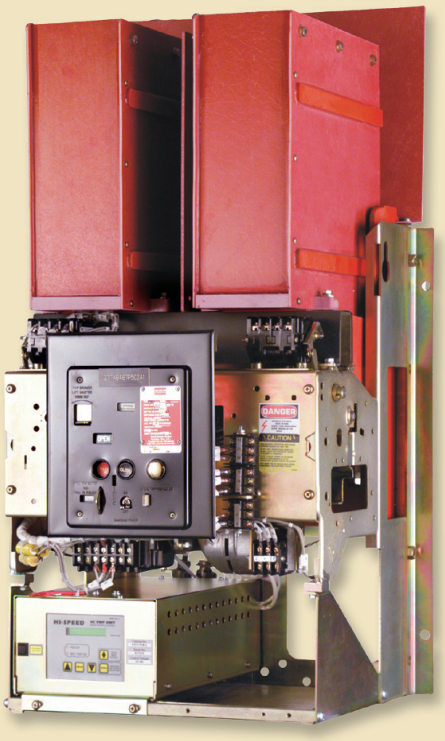
HI-SPEED™

DC TRIP UNIT | MICRO-CONTROLLER BASED

HI-SPEED Trip Unit for FBK Circuit Breakers with Rate-of-Rise Capability.

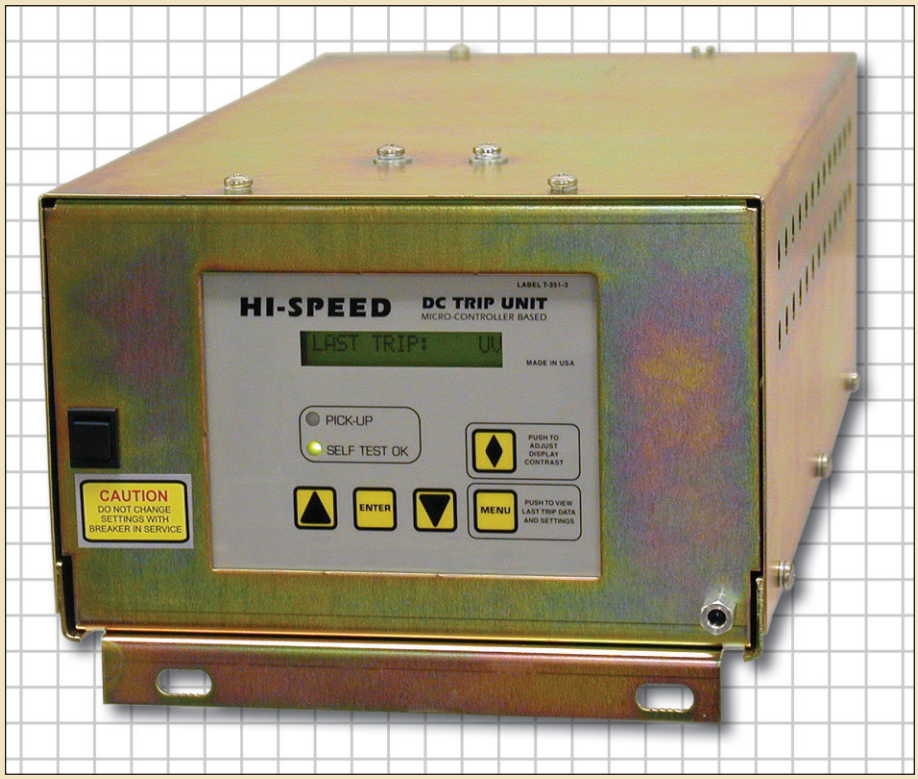
Application Overview
The HI-SPEED is the OEM trip unit installed on newly manufactured FBK circuit breakers.

The HI-SPEED is the new standard for DC circuit protection for traction power and other applications requiring true HI-SPEED operation and Rate-of-Rise (dI/dT) protection.



HI-SPEED DC Trip Unit shown on a 2-pole, 4000amp FBK circuit breaker.

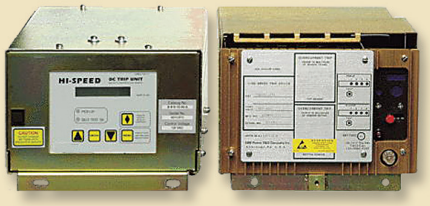
HI-SPEED Features Include:
- ❑ Bi-directional current sensing
- ❑ HI-SPEED Fault Protection
- ❑ Rate-of-Rise Protection
- ❑ 16-Character DC Ammeter
- ❑ All Setting in Amps and Seconds
- ❑ Displays Last-Trip-Data
- ❑ Momentary Alarm Relay
- ❑ Supervisory (Remote) Trip Option
- ❑ Lockout Relay Option
- ❑ 2-Pole Application Optional



Programming
Settings are programmed using the ▲, ▼ and **ENTER** buttons on the front of the trip unit. All settings and Last Trip Data are stored in non-volatile memory.

Last Trip Data and trip unit settings can be reviewed at any time by pressing the **MENU** button.

Direct Replacement for ABB Trip Unit
The HI-SPEED is available as a direct replacement for the original ABB trip unit. The HI-SPEED provides the following advantages:
- ❑ Trip unit is micro-controller based.
- ❑ Plugs directly into existing wiring harness on older FBK breakers.
- ❑ Operates the original OEM trip coil.
- ❑ Offers extended range of settings.
- ❑ Trip capacitor is a solid-dielectric type which cannot leak.
- ❑ Cool operation reduces trip unit overheating.
- ❑ Easier to test.
- ❑ Trip Unit is readily available.



HI-SPEED is available as an upgrade for original ABB trip unit.

For pricing and information contact:
Utility Relay Company

Call Toll Free: 888.289.2864

For additional information visit our website:
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DATA SHEET

SLUGGISH BREAKER® DETECTION

AC-PRO-II® & AC-PRO-MP® TRIP UNITS

Patented method for documenting the condition of the breaker mechanism

SLUGGISH BREAKER DETECTION

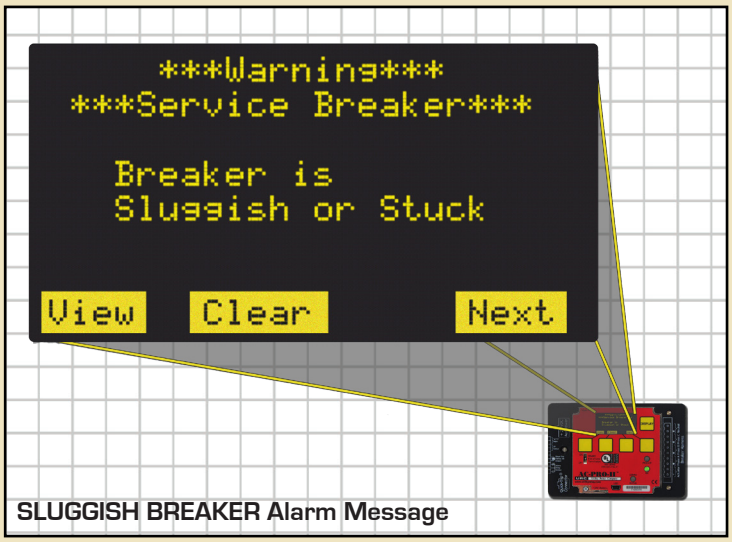
The patented Sluggish Breaker Detection feature captures the breaker clearing time when a trip occurs that was initiated by the trip unit. If the breaker clearing time is in excess of the Sluggish Breaker clearing time setting an alarm message will appear, and if programmed, the alarm relay will operate.

When the trip unit sends a trip pulse to the breaker actuator, the Sluggish Breaker timer starts. The trip unit determines the breaker clearing time by one of two methods:

Zero Current Method:
The trip unit will record the breaker clearing time by monitoring the current values. The Sluggish Breaker timer stops when the current is zero. The AC-PRO-II and AC-PRO-MP support this method.

Breaker Contact Method:
The trip unit will record the breaker clearing time based on the change in state of the auxiliary breaker contact that is wired into the trip unit. This method allows the clearing time to be recorded even if current was not flowing at the time of the trip. The Sluggish Breaker timer stops when the contact changes state. The AC-PRO-II supports this method.

NOTE: A user setting in the AC-PRO-II determines which method will be used.

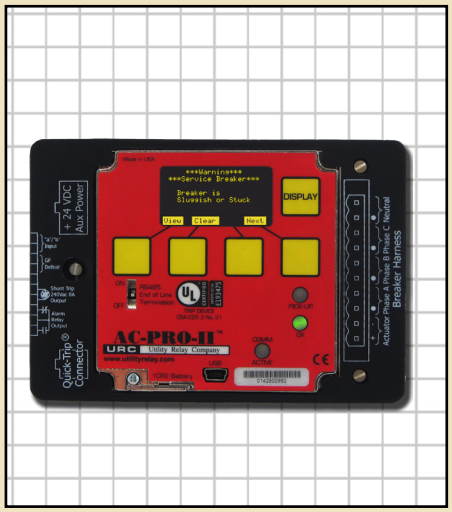


SLUGGISH BREAKER Alarm Message

- Patented Sluggish Breaker® Detection is included as part of the firmware of the newer trip units from URC
- Measures the breakers opening speed on every trip operation including the critical first operation
- Provides before and after values for the breaker service test report
- For AC-PRO-II, the Sluggish Breaker threshold is user programmable from 20-80 milliseconds
- For AC-PRO-MP, the Sluggish Breaker threshold is fixed at 33 milliseconds

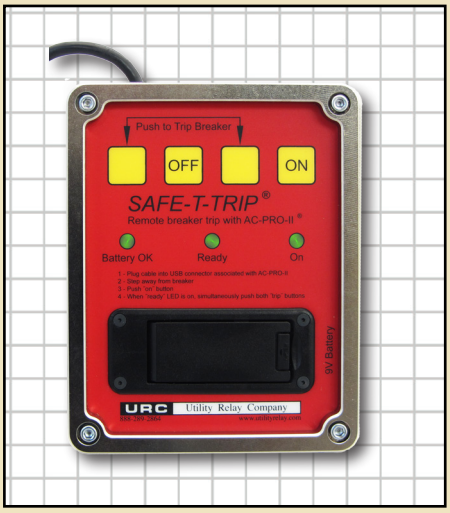
Compatible URC Products

The following products are compatible with the Sluggish Breaker detection system.



AC-PRO-II®
The AC-PRO-II is a state of the art, micro-controller based trip unit for use on three phase, 600 Volt class, AC circuit breakers on 50 Hertz or 60 Hertz systems

AC-PRO-MP®
The AC-PRO-MP is a plug-in, direct replacement trip unit for Merlin Gerin & Square D Masterpact MP, IEC or UL rated breakers.



SAFE-T-TRIP®
The hand-held SAFE-T-TRIP device provides a means for an operator to safely trip a breaker without having to stand directly in front of the switchgear.

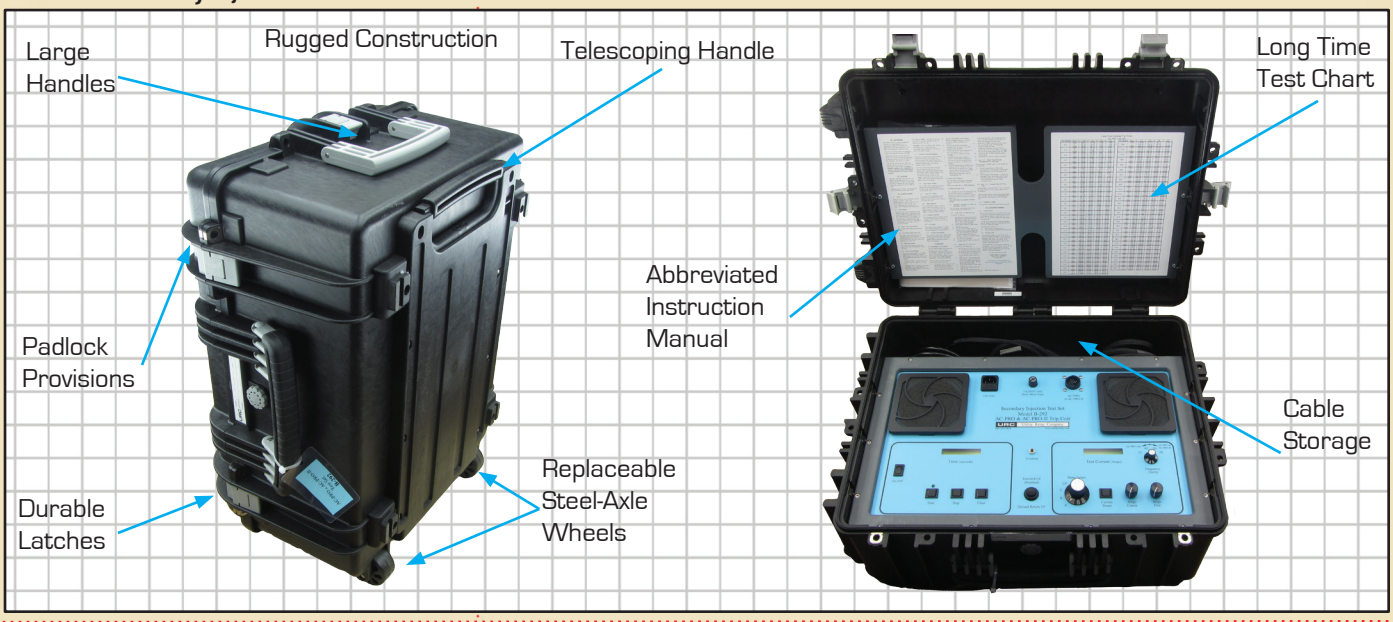
TEST SET

AC-PRO-II | SECONDARY INJECTION

DATA SHEET

Secondary Injection Test Set for AC-PRO-II & AC-PRO trip units.

B-292 Secondary Injection Test Set



The Model B-292 Secondary Injection Test Set is a single-phase test set specifically designed for testing the operation of the AC-PRO and AC-PRO-II micro-controller based trip units manufactured by Utility Relay Co.

The test set can test pick-up and time delays of the various protection functions by driving current into the trip unit on the secondary side of the CT circuit.

The test set will test 60, 50, 40 or 25 Hertz AC-PRO trip units. (The AC-PRO-II can be set for either 50 Hertz or 60 Hertz).

The test set will test the AC-PRO or AC-PRO-II trip system with the exception of the CTs and associated wiring harness.

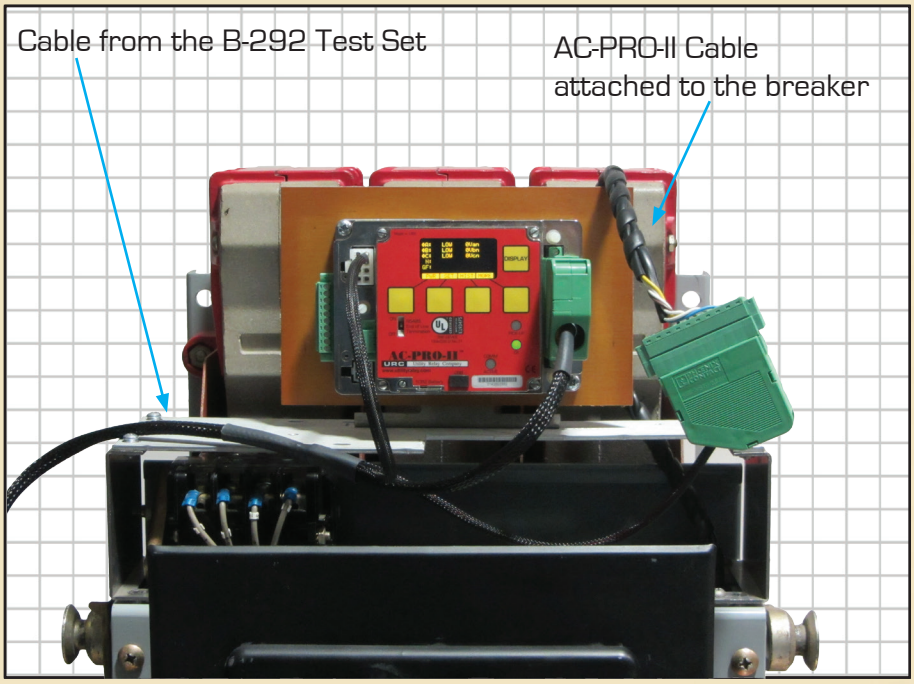
For complete details, see the B-292 Instruction Manual at:
http://www.utilityrelay.com/PDFs/Product%20Manuals/I-AC2-PRO-TS.pdf

Important Note:
Secondary injection testing is not a substitute for primary injection testing that should be performed for any circuit breaker retrofit

Specifications

Dimensions: 24.7" L X 11.7" W X 11.5" D
267mm L X 475mm W X 292mm D
Weight: 40 lbs (18.1 kg)
Power Requirement: 120V, 3A
Current Output: Single-phase, 0 -13A. Frequency: 25, 40, 50 or 60 Hertz.
Current Display: 0.01 Amp Resolution
Time Display: 0.01 Second Resolution
Case Information: IP67 Waterproof and Dustproof, Chemical Resistant, Impact-resistant Construction, Copolymer Polypropylene Compound.

Testing the AC-PRO-II on a Breaker



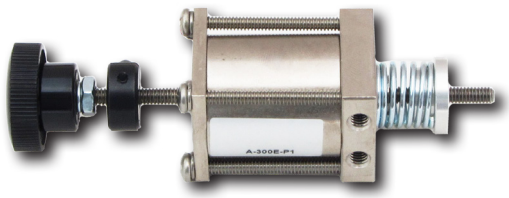
ACTUATORS

Actuators for use in Utility Relay Company Retrofit Kits for Low Voltage Breakers

Utility Relay Company (URC) manufactures actuators for use with our AC-PRO and ZERO-Hertz series of retrofit kits. Each actuator is built and tested at our Chagrin Falls, Ohio facility. URC manufactures many types and variations of actuators for use on different breakers but they fall into two general categories; manual-reset and auto-reset. The type of actuator supplied with a kit is specified at the time of order.

Manual-Reset Actuators

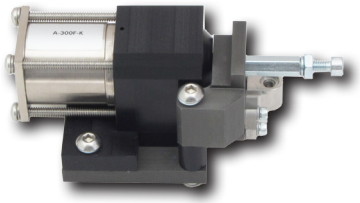
For most breakers, URC offers the option of a manual-reset actuator. After a trip event, the manual-reset actuator stays in the trip position and keeps the breaker trip free. This requires a person to go to the breaker, open the cubicle door, pull or push on a knob to reset the actuator and then ideally review the last trip data saved in the trip unit. After the overload/fault condition is addressed and the actuator is reset, the breaker can be closed. The advantage is that human intervention is required before the breaker is closed again. The disadvantage is that the person resetting the actuator must wear the appropriate PPE.



Example of a
Manual-Reset Actuator

Mechanical Auto-Reset Actuators

For most breakers, URC offers the option of a mechanical auto-reset actuator. The mechanical auto-reset actuator includes a linkage system that connects to the breaker mechanism and resets the actuator as the breaker opens. The advantage is that no one has to open the cubicle door to reset the actuator before the breaker can be closed again after the overload/fault condition is addressed.



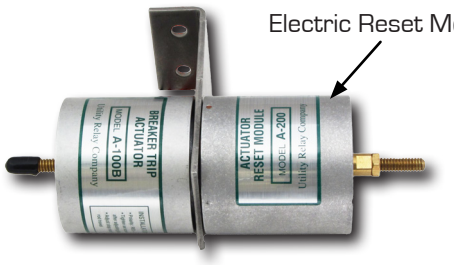
Example of a
Mechanical Auto-Reset Actuator

OEM Actuators

One of the three actuator types on this sheet is included with each complete retrofit kit sold by Utility Relay Company. In addition, URC trip units can sometimes use existing OEM actuators. If you are interested in one of those applications please contact URC for more information.

Electric Auto-Reset Actuators

For some breakers, URC offers the option of an electric auto-reset actuator. The electric auto-reset system does not use linkages to reset the actuator. It includes a reset module that uses the breaker line side voltage to energize a reset coil in the module that resets the actuator after a trip event. The line side voltage taps are protected with current limiting fuses. The electronic circuit in the reset module energizes the reset coil for approximately one electrical cycle after the actuator reaches its end of travel. The advantage is that no one has to open the cubicle door to reset the actuator before the breaker can be closed again after the overload/fault condition is addressed.



Example of an
Electric Auto-Reset Actuator

Why is an Actuator Needed?

The AC-PRO or ZERO-Hertz trip units need a way to convert the electrical trip signal into a mechanical force that is used to trip the breaker. The actuator provides this force through stored energy in a spring. This energy is stored in the spring by:

- The manual resetting operation for the manual-reset actuator.
- The breaker linkage for the mechanical auto-reset actuator.
- The breaker line side voltage for the electrical auto-reset actuator.

Once reset, the actuator is held in the reset position by the magnetic force from a permanent magnet. When the trip unit applies the trip signal to a coil inside the actuator, the magnetic force is counteracted and the spring is released, pushing out a plunger and tripping the breaker.

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