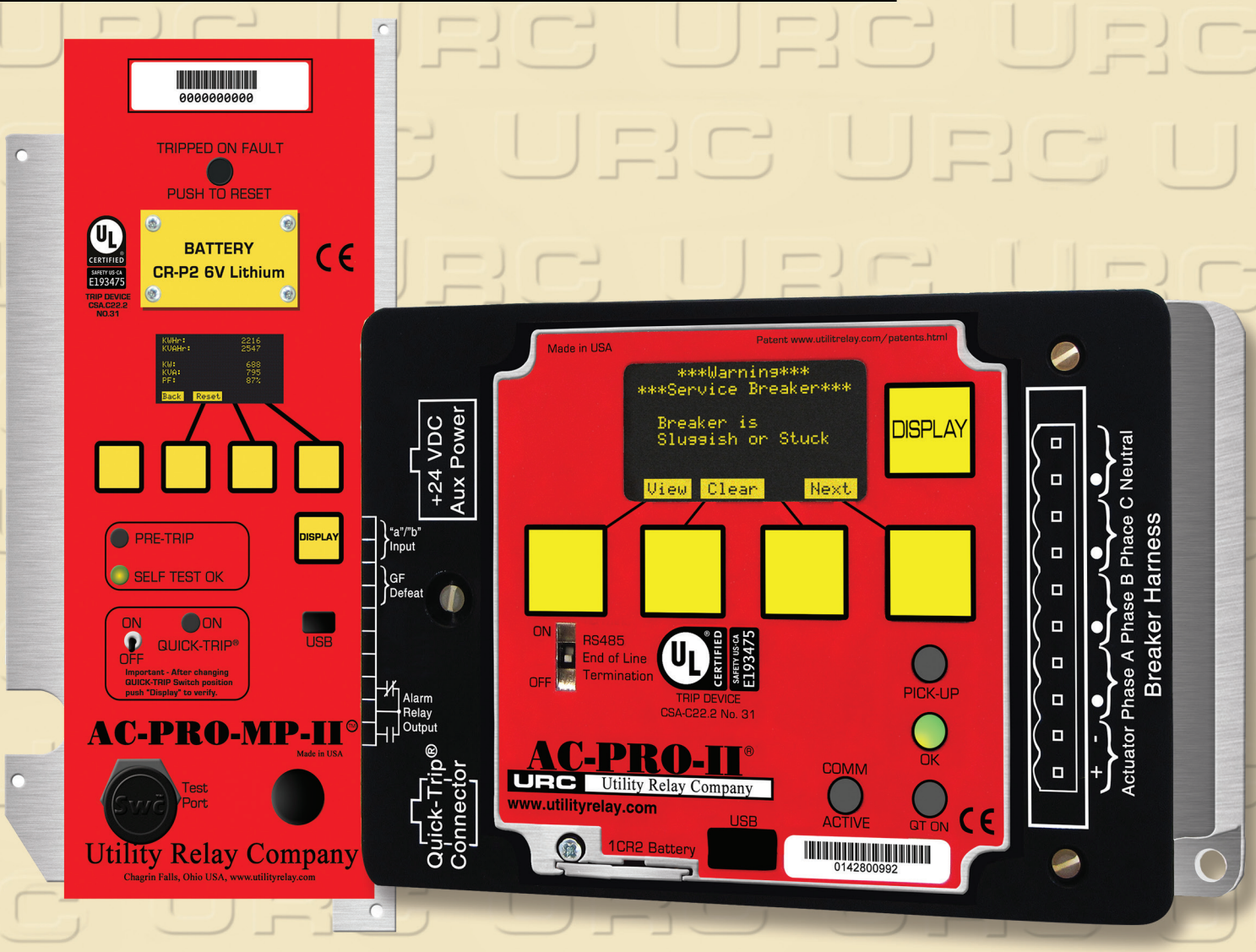
PRODUCT CATALOG



Trip Units and Retrofit Kits for Low Voltage Circuit Breakers

URC Utility Relay Company

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

URC Utility Relay Company

10100 Queens Way • Chagrin Falls, OH 44023
Phone: 888.289.2864
Fax: 440.708.1177
www.utilityrelay.com

Utility Relay Company is a leading manufacturer of micro-controller based, true RMS solid state trip units for AC and DC low voltage circuit breakers. Utility Relay Company's focus is providing high quality, reliable and versatile trip units for low voltage circuit breakers. We couple the trip units with retrofit kits that are designed with ease of installation and reliability in mind.

Patty Clayman
Sales & Marketing Manager
Phone: 440.708.1000 x106
Email: pclayman@utilityrelay.com

Clarence Smith
Customer Service
Phone: 440.708.1000 x122
Email: csmith@utilityrelay.com

Interactive Kit Ordering Guide (KOG)
Due to the sheer number of kits with multiple options, an interactive Kit Ordering Guide is available to simplify the process of finding the correct retrofit kit for a circuit breaker.
Orders can be placed 24/7 using the Kit Ordering Guide.
Visit **UtilityRelay.com** to try the KOG out for yourself.

REV 2.22.17

URC Utility Relay Company

RETROFIT KITS

COMPLETE PROTECTION RETROFIT KITS FOR LOW-VOLTAGE CIRCUIT BREAKERS

Pre-Engineered Kits
Our retrofit kits are pre-engineered with functionality and ease of installation as the priorities.

Kits Are Complete
Our retrofit kits are complete and include a detailed installation manual and all the required components including current transformers, actuator, copper details, brackets, hardware and wiring harness. Depending on the circuit breaker, OEM components can be re-used.

Trip Units 100% Tested
Each AC-PRO or AC-PRO-II trip unit is calibrated, burned in at elevated temperature and final tested. A trip unit test report is included.

Thousands of Kits Available
Kits are available for the following manufacturers' breakers:

- General Electric
- Westinghouse / Cutler Hammer / Eaton
- ITE / ABB
- Siemens / Allis-Chalmers
- Federal Pacific / Federal Pioneer
- Sylvania / Unelec
- Roller Smith
- Square D / Merlin Gerin / Schneider and more

Kit Ordering Guide (KOG)
Due to the sheer number of available kits and multiple options, an interactive **K**it **O**rdering **G**uide is available to simplify the process of finding the correct kit for a circuit breaker. The **KOG** can be accessed 24/7 for availability and pricing and orders can also be placed using the **KOG** if desired.

Availability
Small orders for most kits can be shipped within one to two days after the order is placed.

If a retrofit kit for a particular breaker is not listed in the KOG, please call us. A kit design may be in process or we can investigate the possibility of designing a kit.

REV 3.16.17

ISO 9001 2008

NETA CORPORATE ALLIANCE PARTNER

URC Utility Relay Company

AC-PRO-II®

MICRO-CONTROLLER BASED TRIP UNIT

The AC-PRO-II® is 55% smaller & includes more features than its predecessor. In addition to standard functions of Long-Time, Short-Time, Instantaneous and Ground Fault
The AC-PRO-II® includes:

- ❑ 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

RS485 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 required).

OLED Multi-Line Display

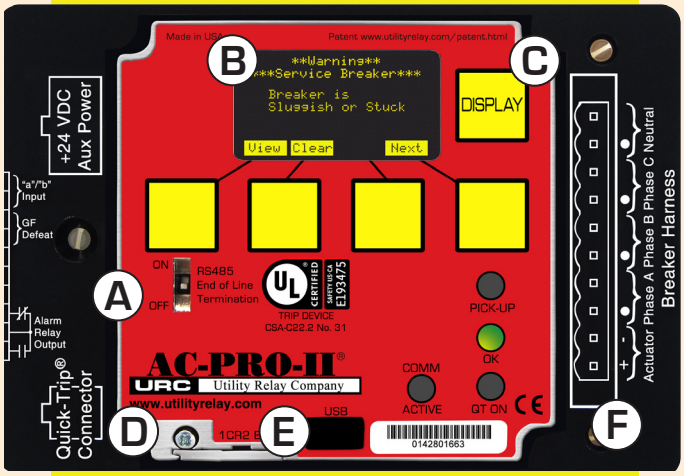
The easy to read multi-line display provides real time monitoring of 3-phase, neutral, and ground fault currents. The display portion can be rotated to allow the trip unit to fit in a variety of different breaker configurations.

Last Trip Data

The trip units retain all of the trip data for the last 8 trip events. This data includes the time and date, trip type, currents & waveforms of each event.

USB Port

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



A RS485 MODBUS RTU COMMUNICATIONS IS STANDARD

B EASY TO READ OLED MULTI-LINE DISPLAY

C DISPLAY CAN BE ROTATED FOR VARIOUS INSTALLATION OPTIONS

D QUICK-TRIP® ARC FLASH REDUCTION READY

E ELECTRICALLY ISOLATED USB CONNECTOR

F BACKWARDS COMPATIBLE WITH THE ORIGINAL AC-PRO® ACTUATOR & HARNESS CONNECTION

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

50 Hz or 60 Hz Operation

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

Construction

- ❑ Conformal 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.

REV 3.6.17

888.289.2864 | UTILITYRELAY.COM | URCSALES@UTILITYRELAY.COM

ISO 9001 2008

NETA CORPORATE ALLIANCE PARTNER

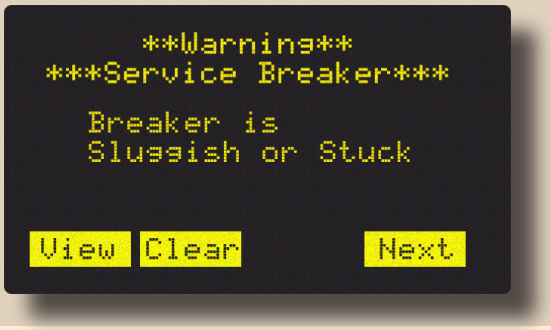
Voltage, Power, and Energy Data

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

- ❑ Voltages
- ❑ KW
- ❑ KVA
- ❑ KWHr & KVAHr
- ❑ Power Factor

Sluggish Breaker® Detection

The patented Sluggish Breaker® detection captures the mechanism time of every trip including the “first trip” and determines if a breaker mechanism is in need of service. Capturing the mechanism time of the first operation is crucial since later operations are faster because the breaker mechanism was exercised. If a mechanism’s operating time is excessive, the AC-PRO-II® will alarm, indicating maintenance is required.



QUICK-TRIP®

The AC-PRO-II® is a manually controlled QUICK-TRIP® arc flash reduction system. When turned on it can reduce trip times, and when turned off allows selective coordination between circuit breakers.
A QT2-Switch or QT-Display-II™ is required to control the QUICK-TRIP® operation.

SAFE-T-TRIP®

The handheld SAFE-T-TRIP® device allows an operator to safely trip a breaker without standing directly in front of the switchgear. When needed, the SAFE-T-TRIP® plugs into the USB port on the front of the AC-PRO-II®, or QT-Display-II™.

SAFE-T-TRIP® helps capture the “first trip” for Sluggish Breaker® detection by tripping the breaker prior to removing the breaker from the cubicle.

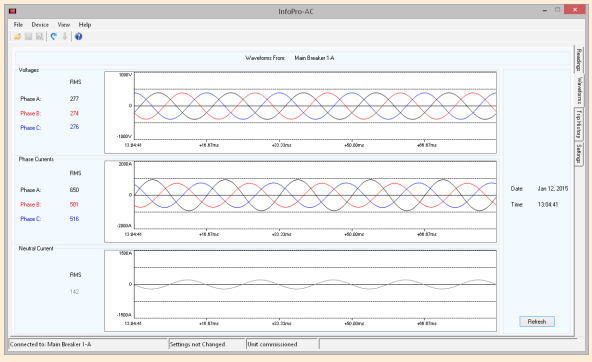
InfoPro-AC Software

The InfoPro-AC is a graphical user interface application available free of charge for easy interface between a computer and the AC-PRO-II®.

The computer connects to the USB connector on the front of the AC-PRO-II.

InfoPro-AC includes 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
- ❑ Save Trip data, settings, and waveforms for later use



ISO 9001 2008
NETA CORPORATE ALLIANCE PARTNER

URC Utility Relay Company

QUICK-TRIP®

ARC FLASH REDUCTION SYSTEM FOR AC-PRO-II® TRIP UNITS

Can dramatically reduce arc flash potential for times when work must be performed on energized equipment.

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

Reducing Arc Flash Potential Isn't Always Easy

Until now, options for reducing potential arc flash during normal maintenance 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 Options & Components

The AC-PRO-II® QUICK-TRIP® system can be implemented using the following options & components:

Option 1

- An AC-PRO-II® trip unit
  and
- A QT-DISPLAY-II™ (coming soon), mounting hardware, and cable

Option 2

- An AC-PRO-II® trip unit
  and
- A QT2-Switch, mounting hardware, and cable

QT-Display-II™ (coming soon)

QT2-Switch

QT-Display-II™ Features (preliminary pre-release information)

- ❑ Integral QUICK-TRIP® switch (lockable) and LED
- ❑ Extends ALL AC-PRO-II® information to the cubicle door
- ❑ OLED display for easy viewing
- ❑ Smart buttons for navigating screens & information
- ❑ Includes "QUICK-TRIP® ON" LED, "SELF-TEST" LED, "PICK-UP" LED, COMM LED, & Trip Occurred LED
- ❑ Ethernet and RS-485 communications
- ❑ 2 alarm relays
- ❑ USB Port for: InfoPro-AC® Software and SAFE-T-TRIP®
- ❑ Remote QUICK-TRIP® switch and remote QUICK-TRIP® indication terminals
- ❑ Versatile control power inputs accepts: 120VAC, 125VDC, 24VDC
- ❑ QUICK-TRIP® settings are only active when the switch is in the ON position (during maintenance)

REV 3.6.17

888.289.2864 | UTILITYRELAY.COM | URCSALES@UTILITYRELAY.COM

ISO 9001 2008

NETA CORPORATE ALLIANCE PARTNER

System Operation and Settings

The QUICK-TRIP® system is activated by a padlockable switch. When enabled, two additional settings are activated in the AC-PRO-II® 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 reduced fault-clearing time without opening the 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 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 due to many phase-to-phase faults often starting as phase-to-ground faults.

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 50 kA)
- D = Distance from the electrode in inches (for distances 18 in and greater)
- t = Arc duration in seconds

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)

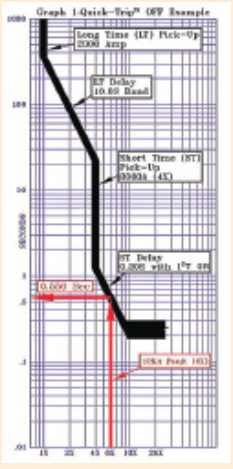
The Incident Energy Level determines the hazard risk category shown in the table to the right which further determines the PPE requirements for personnel working on the affected electrical equipment.

INCIDENT ENERGY LEVEL (E_I)	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

Practical Example

A technician needs to rack out a feeder breaker for maintenance. He or she is the minimum 18” away from any potential arc fash 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, clearing the fault in the feeder breaker cubicle. The two graphs illustrate the dramatic impact that the arc-clearing time has on the incident energy levels. Given that **F = 12kA and D = 18 in.**

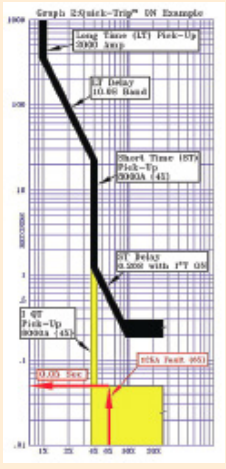
QUICK-TRIP Off



Graph 1: QUICK-TRIP® is 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 .2 seconds with I^2T ON). The resulting arc duration will be t = .556
- ❑ The resulting incident energy is E_I= 25.8022
- ❑ **The hazard risk category is a 4**

QUICK-TRIP On



Graph 2: QUICK-TRIP® is ON & shows the trip time characteristics of the main breaker

- ❑ The AC-PRO® will now cause the main breaker to clear the 12kA fault in .05 seconds (based on the QT-Instantaneous PICK-UP setting of 8000 amps). The resulting arc duration will be t = .05
- ❑ The resulting incident energy is E_I = 2.3203
- ❑ **The hazard risk category is a 1**

URC Utility Relay Company

AC-PRO®

MICRO-CONTROLLER BASED TRIP UNIT

A universal trip unit for low voltage circuit breaker retrofitting.

Standard trip unit functions:

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

All functions, except for long time, are selectable On/Off during programming **(No rating plugs required)**.

True RMS

The AC-PRO® is true RMS sensing on all functions, including instantaneous. In addition to the standard 60Hz model, the AC-PRO® is available in true RMS versions for 50Hz, 40Hz, & 25Hz power systems.

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 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.

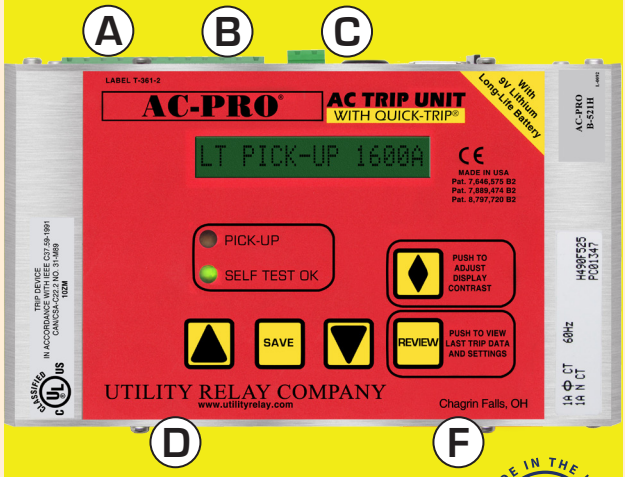
Last Trip Data

The AC-PRO® retains the data from the most recent trip in non-volatile memory. This information includes the type of trip and current at the time of the 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.

Warranty

2-Year limited warranty.



A ACTUATOR OUTPUT

B SCREW DOWN CONNECTOR FOR PHASE CTS & NEUTRAL CT

C SECURITY KEY

D RS485 COMMUNICATION PORT (OPTIONAL)

E PT MODULE CONNECTION (USED WITH COMMUNICATIONS)

MADE IN THE USA

"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.

QUICK-TRIP® Feature

The QUICK-TRIP® system helps reduce the arc flash hazard on downstream equipment for times when personnel 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 clover
- ❑ Door mounted QT-DISPLAY® with LCD display

"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 is connected
- ❑ Monitors software routines
- ❑ Monitors micro-controller and A/D converter

Construction

- ❑ Rugged extruded aluminum housing
- ❑ Conformal coated circuit boards
- ❑ Contamination resistant membrane keypad

REV 3.6.17

888.289.2864 | UTILITYRELAY.COM | URCSALES@UTILITYRELAY.COM

ISO 9001 2008

NETA CORPORATE ALLIANCE PARTNER

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. Thousands of different kits are available including kits for the following breakers:

- ❑ General Electric - AK, AKR, AKRT, AE, AL
- ❑ Westinghouse - DA, DB, DBL, DK, DS, DSL
- ❑ ITE - K, KA, KB, KC, KD, KE, LG, LX, LK
- ❑ Siemens/Allis-Chalmers - LA-15, LA-25, LA-50, LA-75, G, RL, RLX
- ❑ Federal Pacific/Federal Pioneer - FP, FPS, FM, DMB, H1, H2, H3

Trip Unit Acceptance Testing

In addition to being UL classified and short circuit tested in accordance with ANSI C37.59 on many breakers, 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 us pulses applied to primary CT inputs superimposed on load current
- ❑ **Electrostatic Discharge Test** - 8 kV & 15 kV direct air discharge applied to trip unit
- ❑ **Insulation Test** - 2.2 kVAC, 60 Hz applied for 60 seconds
- ❑ **Environmental Test** - Secondary injection test trip unit at -20, +23, & +60 C. Minimum exposure of eight hours at each temperature

RS485 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 over communications includes:

- ❑ Currents, 3-Phase
- ❑ Voltages, 3-Phase, L-L & L-N
- ❑ KW, 3-Phase
- ❑ KWH, Total
- ❑ Power Factor, 3-Phase
- ❑ Breaker Position
- ❑ 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.

Secondary Injection Test Set

The Model B-292 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®.

URC Utility Relay Company

QUICK-TRIP®

ARC FLASH REDUCTION SYSTEM FOR AC-PRO TRIP UNITS

Can dramatically reduce arc flash potential for times when work must be performed on energized equipment.

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

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:

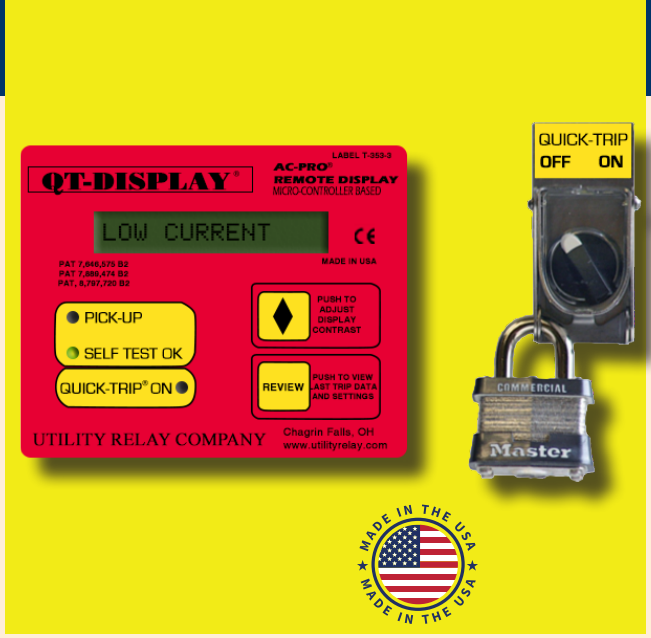
- ❑ De-energizing the substation during maintenance. Not always a feasible option
- ❑ Lower the available fault current for the substation. May not be an option at all
- ❑ Shorten the trip time of the upstream breaker during maintenance periods. Now made fast and easy with QUICK-TRIP®

System Components

The AC-PRO® 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 and 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.



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 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.

REV 3.6.17

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
- ❑ The QT-DISPLAY® includes "QUICK TRIP® ON" LED, "SELF-TEST" LED, &"PICK-UP" LED
- ❑ Last trip data, 3-phase currents, and all settings can be reviewed 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

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 50 kA)
- D = Distance from the electrode in inches (for distances 18 in and greater)
- t = Arc duration in seconds

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)

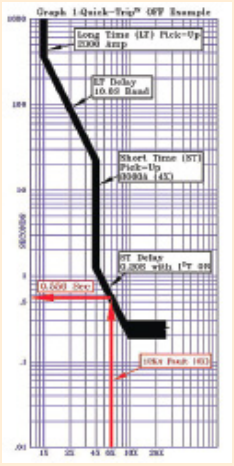
The Incident Energy Level determines the hazard risk category shown in the table to the right which further determines the PPE requirements for personnel working on the affected electrical equipment.

INCIDENT ENERGY LEVEL (E_I)	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

Practical Example

A technician needs to rack out a feeder breaker for maintenance. He or she is the minimum 18" away from any potential arc fash 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, clearing the fault in the feeder breaker cubicle. The two graphs illustrate the dramatic impact that the arc-clearing time has on the incident energy levels. Given that **F = 12kA and D = 18 in.**

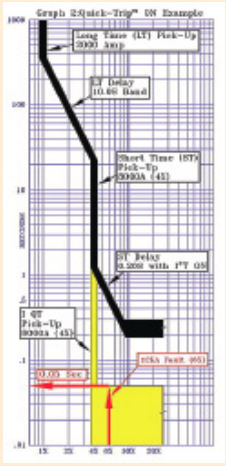
QUICK-TRIP Off



Graph 1: QUICK-TRIP® is 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 .2 seconds with I^2T ON). The resulting arc duration will be t = .556
- ❑ The resulting incident energy is E_I= 25.8022
- ❑ **The hazard risk category is a 4**

QUICK-TRIP On



Graph 2: QUICK-TRIP® is ON & shows the trip time characteristics of the main breaker

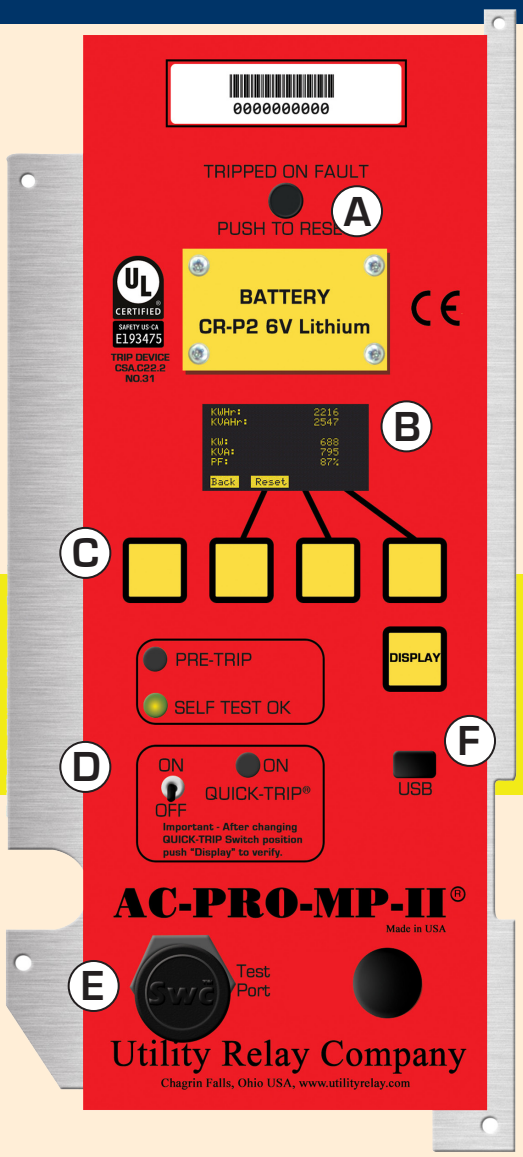
- ❑ The AC-PRO® will now cause the main breaker to clear the 12kA fault in .05 seconds (based on the QT-Instantaneous PICK-UP setting of 8000 amps). The resulting arc duration will be t = .05
- ❑ The resulting incident energy is E_I = 2.3203
- ❑ **The hazard risk category is a 1**

URC Utility Relay Company

AC-PRO-MP-II®

MICRO-CONTROLLER BASED TRIP UNIT WITH ADDED COMMUNICATIONS AND POWER METERING

Just as reliable as the AC-PRO-MP®, The AC-PRO-MP-II® is a plug-in, fully programmable, direct replacement trip unit for Merlin Gerin & Schneider Electric Masterpact MP, IEC, or UL rated Breakers. The AC-PRO-MP-II® is user programmed to replace any of the versions of STR-18M, 28D, 38S, or 58U trip units. The AC-PRO-MP-II® has the same protective functions, settings, and time current curves as the original STR.



A MECHANICALLY INTERLOCKED POP-OUT TRIPPED INDICATOR

B GRAPHIC OLED DISPLAY

C "SMART" PUSH BUTTONS

D QUICK-TRIP® IS STANDARD

E FRONT MOUNTED TEST PORT

F USB PORT FOR LAPTOP & SAFE-T-TRIP®

MADE IN THE USA

The AC-PRO-MP-II® provides more advanced features:

- ❑ Modbus RTU communications (24VDC aux power required)
- ❑ Voltage, power, and energy metering (24VDC aux power required)

Additional advanced features of the AC-PRO-MP® and the AC-PRO-MP-II® Include:

- ❑ Patented QUICK-TRIP® for **arc flash hazard reduction**
  - ▶ QUICK-TRIP® instantaneous & ground fault settings are standard for arc flash reduction.
  - ▶ The QUICK-TRIP® switch is easily accessible on the face of the AC-PRO-MP-II™.
- ❑ Patented **Sluggish Breaker®** detection to help determine if the breaker mechanism needs service
- ❑ Date & time stamp of trip events
- ❑ No rating plug required
  - ▶ No physical rating plug is required. The required rating plug value is a programmed setting
- ❑ Neutral Overload Protection

The original features of the STR trip unit are still provided:

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

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
- ❑ Waveform capture

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 display information
- ❑ A "SELF-TEST OK" LED indicates a properly operating trip unit
- ❑ A "PRE-TRIP" LED indicates a pending trip

Warranty

2-Year limited warranty on all AC-PRO-MP-II®'s.

REV 3.6.17

888.289.2864 | UTILITYRELAY.COM | URCSALES@UTILITYRELAY.COM

ISO 9001 2008

NETA CORPORATE ALLIANCE PARTNER

SELF-TEST Features:

The AC-PRO-MP-II™ continuously monitors:

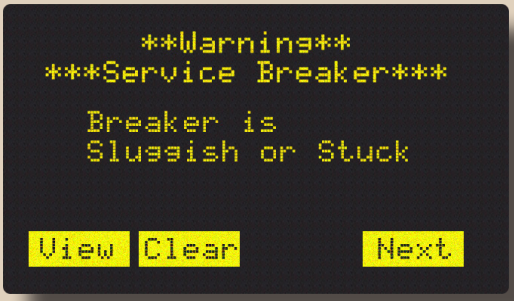
- ❑ The actuator connection
- ❑ Proper execution of the software routines
- ❑ The micro-controller & A/D converter

Last Trip Data

The AC-PRO-MP-II™ retains all of the trip data for the last 8 trip events, including waveforms. This data includes a date & time stamp of each event from the internal real time clock, the trip type, & detailed information of the phase, neutral, & ground fault currents.

Sluggish Breaker® Detection

The patented Sluggish Breaker® detection captures the mechanism time of every trip including the "first trip" and determines if a breaker mechanism is in need of service. Capturing the mechanism time of the first operation is crucial since later operations are faster because the breaker mechanism was exercised. If a mechanism's operating time is excessive, the AC-PRO-MP-II® will alarm, indicating required maintenance.



Secondary Injection Testing

The model B-291-MP Secondary Injection test set is a single-phase test set specifically designed for testing the operation of the AC-PRO-MP-II™. The test set performs actual phase & ground fault tests, not simulated tests.

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. When needed, the SAFE-T-TRIP® plugs into the USB port on the front of the AC-PRO-MP-II™.

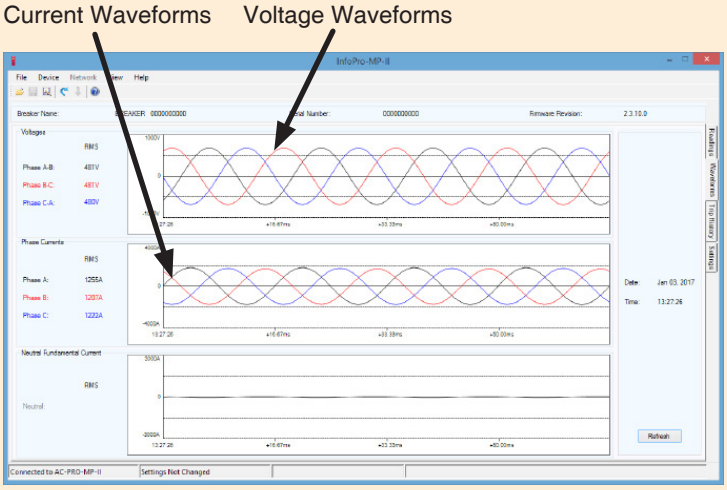
SAFET-T-TRIP® also helps capture the "First Trip" for Sluggish Breaker® detection by tripping the breaker prior to removing the breaker from the cubicle.

InfoPro-MP-II Software

- ❑ Software provides direct computer to trip unit interface communication using the USB port on the AC-PRO-MP-II™
- ❑ Provides an easy method to view the data provided by the AC-PRO-MP-II™ & also to download information into the trip unit

InfoPro-MP-II features:

- ❑ View the trip history from the last 8 trip events, including waveforms
- ❑ View & save the trip history & settings
- ❑ View metering data & alarm status
- ❑ Review & change settings
- ❑ View on-demand waveforms
- ❑ Firmware updates



ISO 9001 2008

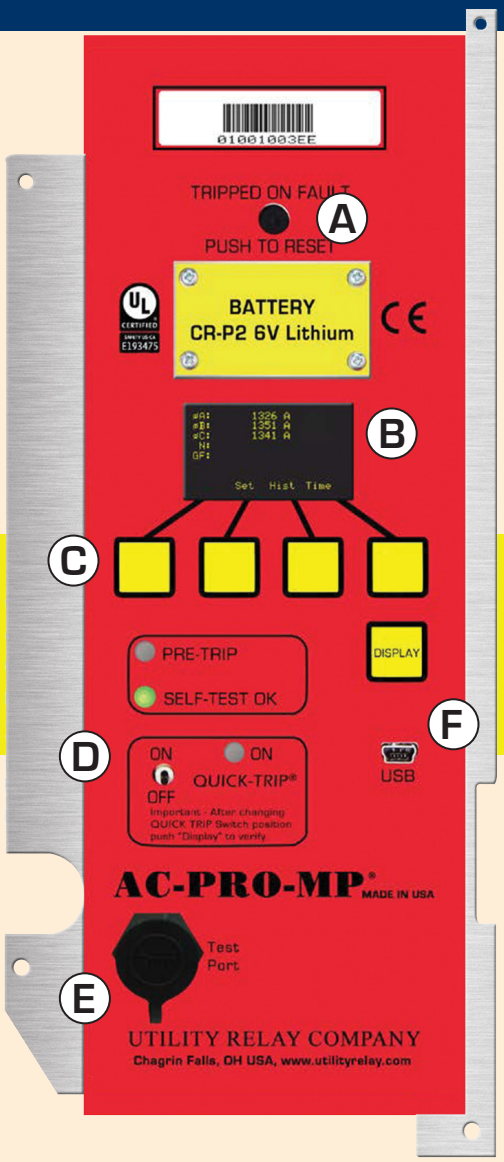
NETA CORPORATE ALLIANCE PARTNER

URC Utility Relay Company

AC-PRO-MP®

MICRO-CONTROLLER BASED TRIP UNIT

Fully programmable direct plug-in replacement trip unit for Masterpact STR trip units.The AC-PRO-MP-II® is a plug-in, direct replacement trip unit for Merlin Gerin & Schneider Electric Masterpact MP, IEC, or UL rated Breakers. The AC-PRO-MP-II® is user programmed to replace any of the versions of STR-18M, 28D, 38S, or 58U trip units. The AC-PRO-MP-II® has the same protective functions, settings, and time current curves as the original STR.



A MECHANICALLY INTERLOCKED POP-OUT TRIPPED INDICATOR

B GRAPHIC OLED DISPLAY

C "SMART" PUSH BUTTONS

D QUICK-TRIP® IS STANDARD

E FRONT MOUNTED TEST PORT

F USB PORT FOR LAPTOP & SAFE-T-TRIP®

MADE IN THE USA

The original features of the STR trip unit are still provided:

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

Additional advanced features include:

- ❑ Patented QUICK-TRIP® for arc flash hazard reduction
  - ▶ The QUICK-TRIP® on/off switch is easily accessible on the face of the AC-PRO-MP®
  - ▶ QUICK-TRIP® instantaneous & ground fault settings are standard for arc flash reduction.
- ❑ Patented **Sluggish Breaker®** detection to help determine if the breaker mechanism needs service
- ❑ Date & time stamp of trip events
- ❑ No rating plug required
  - ▶ The required rating plug value is a programmed setting
- ❑ Neutral Overload Protection

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
- ❑ Waveform capture

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 display information
- ❑ A "SELF-TEST OK" LED indicates a properly operating trip unit
- ❑ A "PRE-TRIP" LED indicates a pending trip

Warranty

2-Year limited warranty on all AC-PRO-MP®'s.

REV 3.6.17

888.289.2864 | UTILITYRELAY.COM | URCSALES@UTILITYRELAY.COM

ISO 9001 2008

NETA CORPORATE ALLIANCE PARTNER

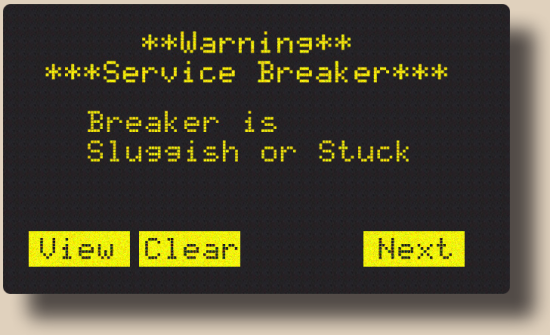
SELF-TEST Features:
The AC-PRO-MP® continuously monitors:

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

Last Trip Data
The AC-PRO-MP® retains all of the trip data for the last 8 trip events, including waveforms. This data includes a date & time stamp of each event from the internal real time clock, the trip type, & detailed information of the phase, neutral, & ground fault currents.

Sluggish Breaker® Detection

The patented Sluggish Breaker® detection captures the mechanism time of every trip including the "first trip" and determines if a breaker mechanism is in need of service. Capturing the mechanism time of the first operation is crucial since later operations are faster because the breaker mechanism was exercised. If a mechanism's operating time is excessive, the AC-PRO-MP® will alarm, indicating required maintenance.



Secondary Injection Testing
The model B-291-MP Secondary Injection test set is a single-phase test set specifically designed for testing the operation of the AC-PRO-MP®. The test set performs actual phase & ground fault tests, not simulated tests.

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. When needed, the SAFE-T-TRIP® plugs into the USB port on the front of the AC-PRO-MP®.

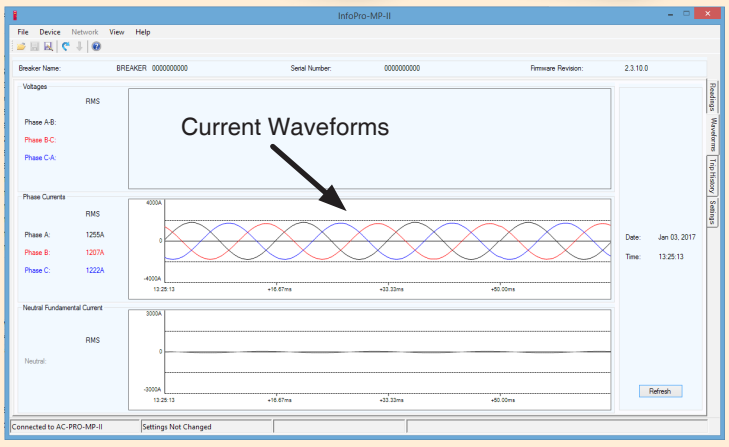
SAFET-T-TRIP® also helps capture the "First Trip" for Sluggish Breaker® detection by tripping the breaker prior

InfoPro-MP-II Software:

- ❑ Software provides direct computer to trip unit interface communication using the USB port on the AC-PRO-MP®
- ❑ Provides an easy method to view the data provided by the AC-PRO-MP® & also to download information into the trip unit

InfoPro-MP-II features:

- ❑ View the trip history from the last 8 trip events, including waveforms
- ❑ View & save the trip history & settings
- ❑ View metering data & alarm status
- ❑ Review & change settings
- ❑ View on-demand waveforms
- ❑ Firmware updates



Note:
InfoPro-MP-II software is for units with front test ports.
InfoPro-MP software should be used for units with side test ports.

URC Utility Relay Company

ZERO-Hertz®

MICRO-CONTROLLER BASED DC TRIP UNIT

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** button.

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

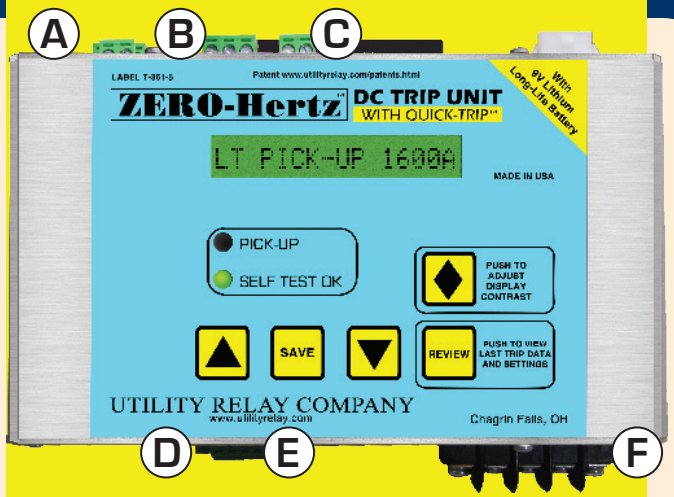
Last Trip Data

The trip unit retains the data from the most recent trip in non-volatile memory. This information includes the type of trip and current at the time of the 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.



A UNIVERSAL CONTROL POWER INPUT

B TRIP RELAY/ACTUATOR OUTPUT

C SECURITY KEY

D RS485 COMMUNICATIONS PORT (OPTIONAL)

E ALARM RELAY

F DC SHUNT INPUT (OPTIONAL)

QUICK-TRIP®

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

- ❑ QT-Instantaneous setting
- ❑ QT-Ground fault setting
- ❑ Door mounted switch with lockable clover

"SELF-TEST OK" LED

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

Alarm Relay

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

REV 3.6.17

ISO 9001 2008
NETA CORPORATE ALLIANCE PARTNER

DC Shunt Input (Optional)

This allows signal input to the ZERO-Hertz® directly from a DC metering 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 is 1000 VDC. DC bus isolation is 3750 VDC for 60 seconds. No calibration is required when using the optional shunt input.

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).

RS485 Communications Port

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

Retrofit Kits

ZERO-Hertz® is provided as a complete retrofit kit, including all necessary mounting hardware and documentation. Complete kits are available from stock for **GE** (AK, AKR, AL, MC-5, MC-6), **Westinghouse** (DB, DBL, DMD, DR-150), **I-T-E** (K-Line, FB, FBK,KA,KB,KC), and **Federal Pioneer** (H2, H3)

Information monitored over communications includes:

- ❑ DC Current
- ❑ Last trip data
- ❑ Trip counter
- ❑ Alarm conditions
- ❑ Trip unit settings

Secondary Injection Test Set

The model B-290 test set is designed to test both the transducer input and the 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 current curve.

ISO 9001 2008
NETA CORPORATE ALLIANCE PARTNER

URC Utility Relay Company

SAFE-T-TRIP®

REMOTE TRIP DEVICE FOR AC TRIP UNITS

Reduce arc flash risk and determine if a breaker mechanism needs service with the SAFE-T-TRIP® device.The SAFE-T-TRIP® hand-held USB device provides an operator with the ability to safely trip a circuit breaker from a distance of up to 30ft away, reducing the potential risk of hazardous arc flash.

Compatible URC Trip Units

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

- ❑ AC-PRO-II®
- ❑ QT-DISPLAY-II™
- ❑ AC-PRO-MP®
- ❑ AC-PRO-MP-II®

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 permanently attached to the SAFE-T-TRIP® device. No other USB devices will initiate a remote trip.

SAFE-T-TRIP® Device Power

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

Determining if the Breaker Mechanism needs service using the SAFE-T-TRIP®

All of the URC trip units compatible with the SAFE-T-TRIP® are equipped with the **Sluggish Breaker®** detection system. Sluggish Breaker® detection determines if the breaker mechanism is in need of 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 measures the time between triggering the actuator and when the breaker opens. If this time is greater than the threshold setting the Sluggish Breaker® alarm is set. If the Sluggish Breaker® alarm was set, that is an indicator that the breaker mechanism should be serviced.

A RUGGED ALUMINUM HOUSING
B OPERATIONAL CONTROLS
C 30 FOOT USB CORD
D STATUS LED'S
E 9-VOLT BATTERY

MADE IN THE USA

SAFE-T-TRIP® Operation

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

REV 3.6.17

ISO 9001 2008

NETA CORPORATE ALLIANCE PARTNER

URC Utility Relay Company

SLUGGISH BREAKER®

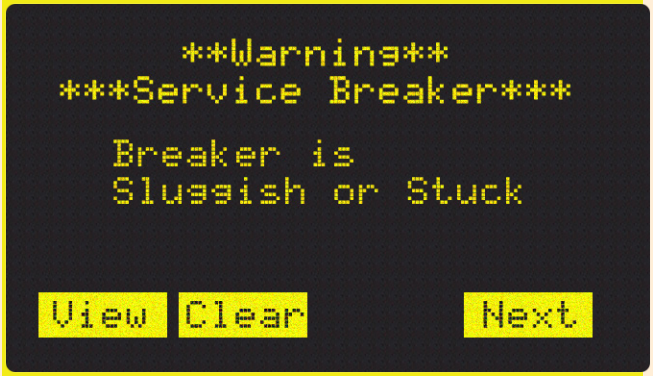
PATENTED METHOD FOR DOCUMENTING THE CONDITION OF THE BREAKER MECHANISM

The patented Sluggish Breaker® detection feature captures the breaker mechanism time when a trip occurs that was initiated by the trip unit. If the breaker mechanism time is in excess of the Sluggish Breaker® mechanism 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 mechanism time by one of two methods:*

Limit Switch:
For many breakers, a limit switch is provided that operates when the mechanism is fully open. The trip unit will record the breaker mechanism time based on the change in state of the mechanism limit switch that is wired to the trip unit. This allows the mechanism time to be recorded even if current was not flowing at the time of the trip. The Sluggish Breaker® timer stops when the limit switch contact changes state.

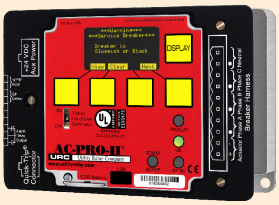
For breakers where limit switches are not yet included in the retrofit kit design, the AC-PRO-II® can use the "Zero Current" method to determine breaker mechanism time.



- ❑ **Patented Sluggish Breaker® detection is included as part of the firmware of the newer trip units from URC**
- ❑ **Measures the breakers mechanism time 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 with the Sluggish Breaker® detection

AC-PRO-II®



The AC-PRO-II® is a state of the art, micro-controller based trip unit for use on 3-phase, 600 volt class, AC circuit breakers on 50 Hz or 60 Hz systems.

AC-PRO-MP & AC-PRO-MP-II®

The AC-PRO-MP® and AC-PRO-MP-II® are plug-in, direct replacement trip units for Merlin Gerin & Schneider Electric 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 breaker.

REV 3.6.17

ISO 9001 2008
NETA CORPORATE ALLIANCE PARTNER

URC Utility Relay Company

TEST SET

SECONDARY INJECTION TEST SET FOR AC-PRO-II® & AC-PRO® TRIP UNITS

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: www.utilityrelay.com/PDFs/Product_Manuals/I-AC2-PRO-TS_r1.1_reduced2.pdf

Specifications

Dimensions:
22.1” L X 17.9” W X 10.4” H
560 mm L X 455mm W X 265mm H

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:
Ultra high impact polypropylene shell.
Chemical-Resistant
Corrosion-Resistant
Crush-Proof

REV 3.6.17

URC Utility Relay Company

CTs

CURRENT TRANSFORMERS

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 our suppliers, URC completely controls the design and performance of each CT.

Phase CTs

Typical 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 Breaker Style
1600/800 AMP PHASE CT

CT Turns Counter Testing

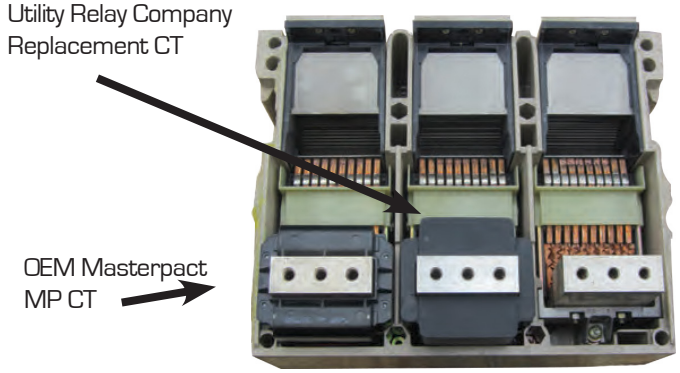
Split Core Neutral CTs

Typical Split-Core Neutral CT

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 tap.
- 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.

REV 3.6.17

URC Utility Relay Company

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.

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.

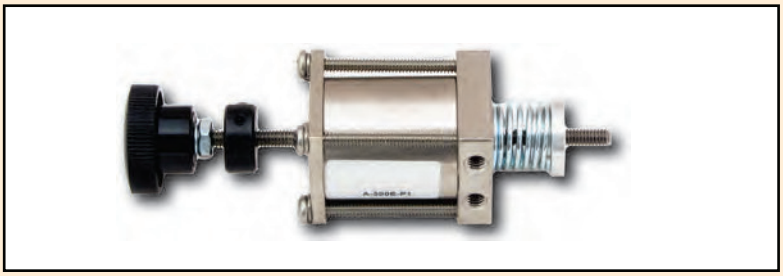
Once reset, the actuator is held in the reset position by the magnetic force from a permanent magnet. When the trip unit applies the trip signal to a coil inside the actuator, the magnetic force is counteracted and the spring is released, pushing out a plunger and tripping the breaker.

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.

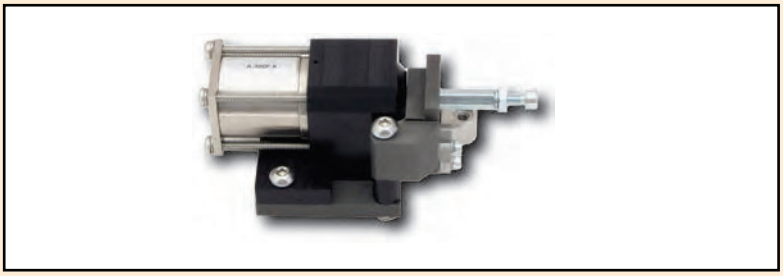
Manual-Reset Actuators

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



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.



REV 3.6.17

URC Utility Relay Company

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

©2015 Utility Relay Company • Rev 05/15