TEST SET

I-AC-PRO-TS | AC-PRO TRIP UNIT

INSTRUCTION MANUAL

Secondary Injection Test Set
for AC-PRO Trip Units

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1.0 Introduction

The Model B-291 Secondary Injection Test Set is a single-phase test set specifically designed for testing the operation of the AC-PRO microcontroller based trip units manufactured by Utility Relay Co.

The test set will test the standard AC-PRO trip unit configured for 1-amp secondary current transformers (CTs) or special AC-PRO trip units configured for other secondary CT ratings.

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

The test set will test 60, 50, 40 or 25 Hertz AC-PRO trip units.

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

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

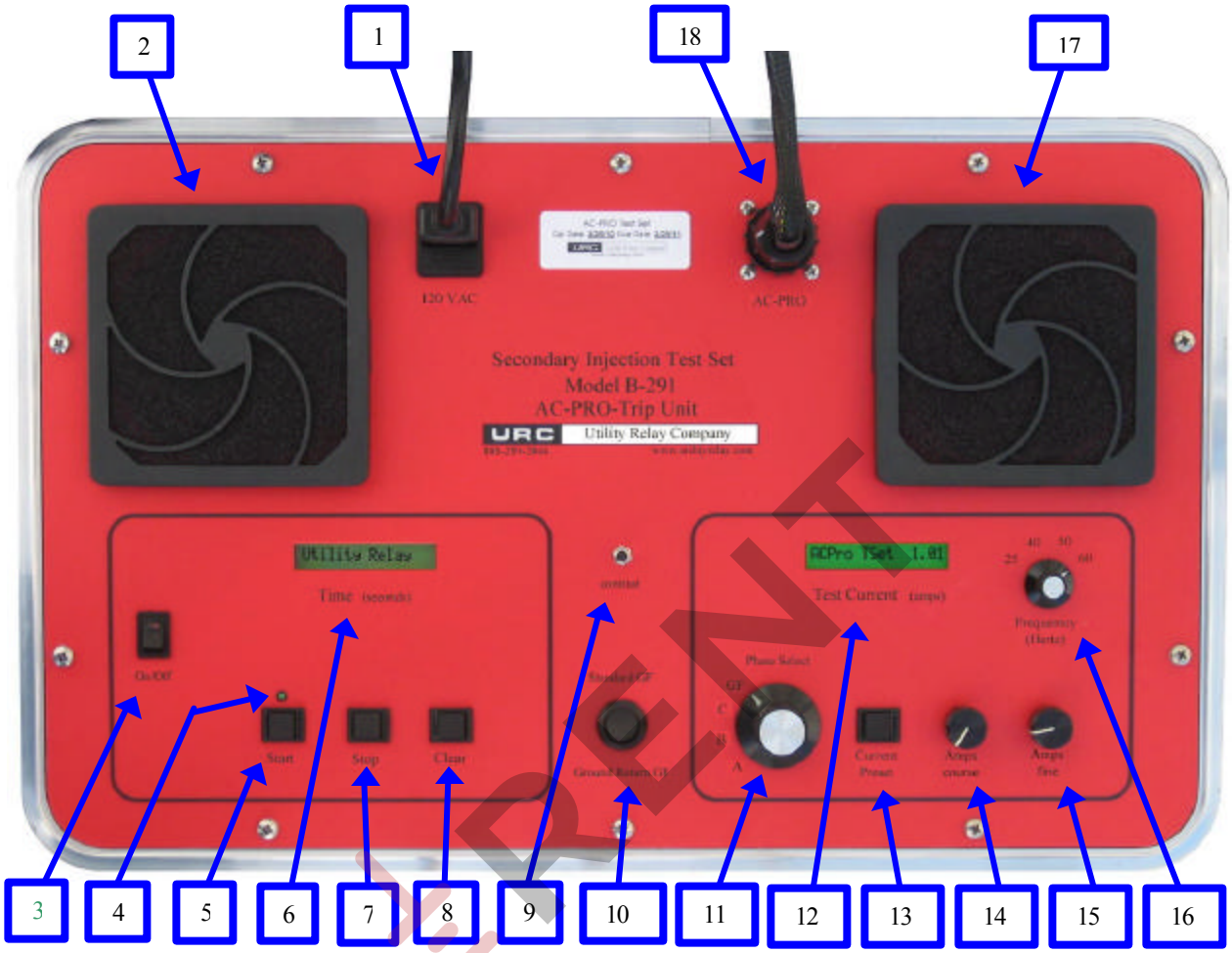
2.0 Overview

The basic function of the test set is to deliver an accurate level of AC current directly to the AC-PRO trip unit under test and to verify the pick-up values and times required for the AC-PRO to trip.

The technician running the test will operate the Start (5), Stop (7), Clear (8) and Current Preset (13) push buttons, adjust the Amp Coarse (14) and Amp Fine (15) potentiometers (pots), and adjust the Phase (11) and Frequency (16) Selector switches. The two displays (6 & 12) are used to indicate elapsed time in seconds and test current in amps.

Note: Numbers in parentheses refer to the labeled items in Figure 1.

Please reference the AC-PRO users manual for complete AC-PRO operating instructions.



1 Power Cable/Fuse Holder
Power cable connector with main fuse. (120Vac 50/60Hz).

2 Cooling Airflow Exhaust
Cooling air for the test set exits via this filter opening. (Must not be blocked)

3 Power ON/OFF Switch

4 Start LED
Illuminates when test current is flowing.

5 Start Push Button
Starts test current flow and starts the timer.

6 Timer Display
Displays elapsed time of test current flow in seconds.

7 Stop Push Button
Stops test current flow and freezes the timer.

8 Clear Push Button
Resets the timer to zero.

9 Contrast Push Button
Hold this input in until the desired display contrast is reached.

10 Ground Fault Type Select Switch
Selects between an AC-PRO with Standard GF or Ground Return GF.

11 Phase Select Switch
Selects one of the phases (A,B,C) or ground fault as the test current path.

12 Current Display
Displays measured true RMS current and Current Preset value.

13 Current Preset Push Button
When held, the current display indicates the setting of the Amp Coarse and Fine pots but does not send current to the trip unit.

14 Amp Coarse Pot
Used to make large adjustments in current.

15 Amp Fine Pot
Used to make small adjustments in current.

16 Frequency Select Switch
This switch selects the AC frequency; 25, 40, 50 or 60 Hertz.

17 Cooling Airflow Intake
Cooing air for the test set enters via this filter opening. (Must not be blocked).

18 AC-PRO Test Harness Connector
The AC-PRO connects to the test-set with the supplied wire harness via this connector.

Figure 1
Control Panel Overview

3.0 Test Set Controls

A brief description of the operation of the various test set controls is given below.

The numbers in parentheses refer to the labels in Figure 1.

3.1 Power (3)

Power to the test set is controlled with the Power On-Off switch.

An AC cord is supplied with the test set. The recommended AC power source is 120V AC at either 50 or 60 Hz. The 120 VAC receptacle also contains the 5 Amp, 250V, 5 x 20mm main power fuse.

3.2 Time Display (6)

The test set will measure the time elapsed while current is being delivered to the AC-PRO, and display the time on the Timer display.

The displayed time is in seconds with 1/100 of a second resolution.

The time will stop accumulating when the AC-PRO trips or when the Stop (7) push button is pushed.

The timer display is cleared when the Clear (8) push button is pushed.

3.3 Timer Clear Push Button (8)

The Clear (8) push button clears the Timer display.

3.4 Start Push Button (5) and LED (4)

The Start push button starts the test current flow to the AC-PRO and simultaneously starts the Timer (6).

The green LED located above the Start push button indicates test current flow.

3.5 Stop Push Button (7)

The Stop push button stops the test current flow and simultaneously freezes the Timer (6).

3.6 Test Current display (12)

The Test Current display indicates the true RMS test current in amps, going to the AC-PRO during a test.

To determine the equivalent CT primary current:

1-Amp AC-PRO…multiply the test set current by the CT rating set in the trip unit.

For example:

If the CT rating is 600 and the test current is 1.50 amps, then the equivalent primary current is:

1.50 x 600 = 900 amps primary

1/2-Amp AC-PRO…multiply the test set current by 2 and then multiply by the CT rating set in the trip unit.

For example:

If the CT rating is 600 and the test current is 0.75 amps, then the equivalent primary current is:

0.75 x 2 x 600 = 900 amps primary

3.7 Current Preset Push Button (13)

While the Current Preset push button is pushed, the test set will display the current setting (from the Amp Coarse and Fine adjust pots) in the Current (12) display without actually driving any current to the AC-PRO.

The sum of the Amp Coarse (14) and Fine (15) pots is displayed in the Current (12) display and is continually updated while the Current Preset switch is pushed.

After the current pots are adjusted to the desired test current as seen on the display, release the Current Preset push button.

The test set limits the current set point level to 12.00 amps.

3.8 Amp Coarse Adjust (14)

The Amps Coarse adjustment quickly changes the test current to the trip unit or the test Current Preset, with clockwise rotation increasing the value.

3.9 Amp Fine Adjust (15)

The Amps Fine adjustment slowly changes the test current to the trip unit or the test Current Preset, with clockwise rotation increasing the value.

3.10 Phase Selector (11)

The Phase Select selector switch is used to select which phase of the AC-PRO the test current is driven into. It selects between Phase A, Phase B, Phase C or Ground Fault (Neutral).

3.11 Frequency Selector (16)

The Frequency selector switch is used to select the AC test current frequency. This is used to select either 25, 40, 50 or 60 Hz.

3.12 Contrast Push Button (9)

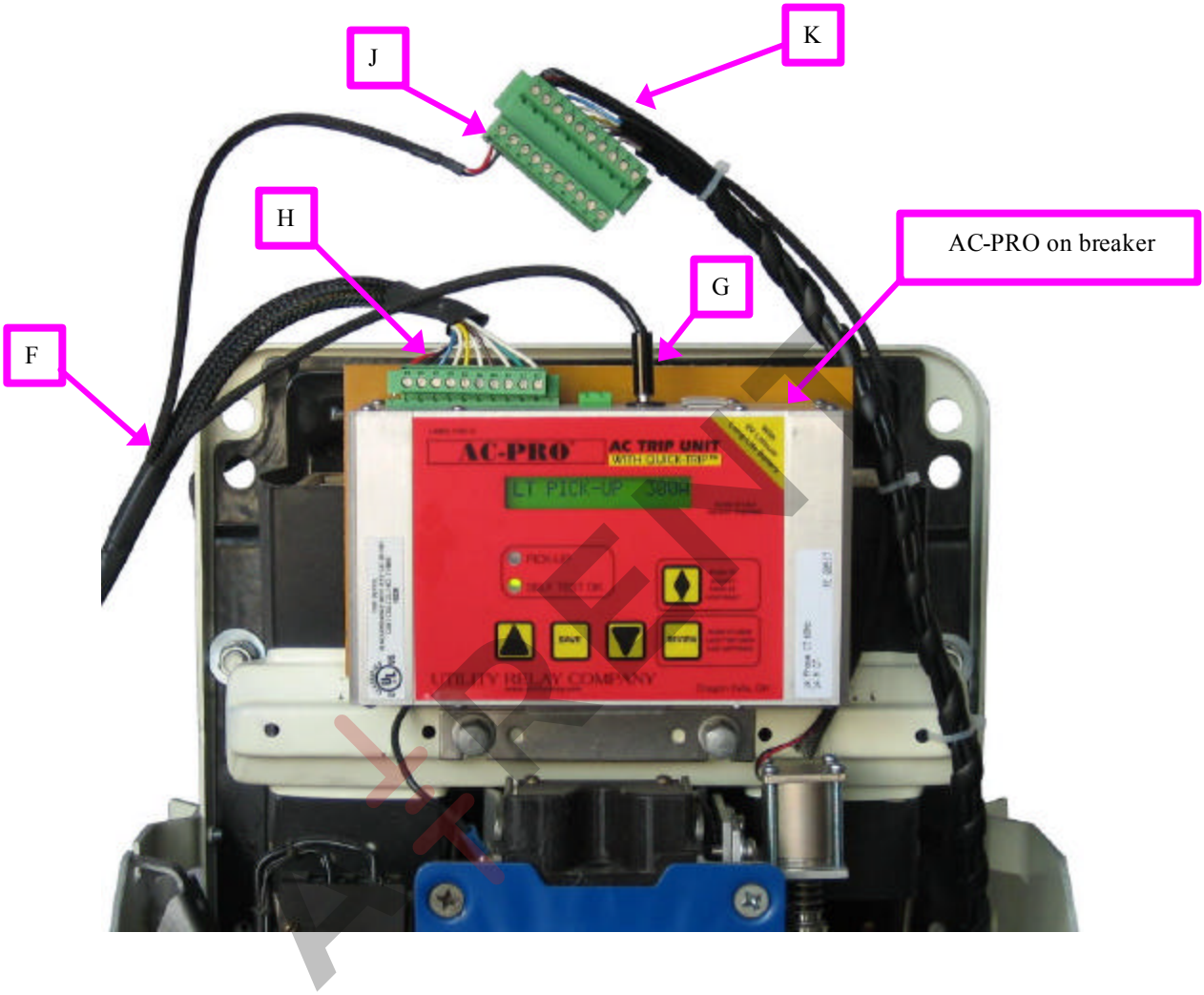
The Contrast push button changes the contrast of both the Timer (6) and Current (12) displays. The push button should be pushed until the desired contrast is seen in the displays.

3.13 Ground Fault Type Selector Switch (10)

The GF Type Selector switch selects between the standard "residual" ground fault AC-PRO and the special "ground return" ground fault AC-PRO.

The option label on the front of the AC-PRO indicates if that trip unit is the special "ground return" type.

Push the GF Type Selector switch so the correct type of ground fault is selected.



F) Test Set Harness.

G) Test Set Harness Power Plug to AC-PRO.

H) Test Set Harness Main Connector to AC- PRO.

J) Test Set Harness Actuator Connector.

K) Circuit Breaker Wiring Harness (previously connected to the AC-PRO).

Figure 2
AC-PRO / Breaker Test Set Connections

4.0 Operation

The following describes the operation of the test set.

Note: Letters in parentheses refer to the labeled items in Figure 2.

4.1 Connecting to the AC-PRO

The Test Harness (F) makes the connections from the test set to the AC-PRO (including power (G) for the AC-PRO). It also provides a connector for connection to the breaker harness (J) to allow the AC-PRO to fire the breaker actuator and trip the breaker. **See Figure 2.**

While the Power (3) switch is in the off position (red led in switch off):

1) Connect the round connector on the Test Harness (F) to the connector on the test set marked "AC-PRO" (18). Twist the outer ring clockwise to fully seat and lock the connector.
2) Remove the breaker wiring harness from the "breaker harness" connector on the AC-PRO (if installed on a breaker).
3) Connect the female ten-position terminal block connector (H) on the Test Harness to the AC-PRO.
4) Connect the small round connector on the Test Harness (G) to the "24 VAC auxiliary power" jack on the AC-PRO.
5) Connect the previously removed breaker wiring harness connector to the male ten-position terminal block on the Test Harness (J) (if installed on a breaker).
6) Once all connections are made the test set power can be turned on. The AC-PRO should also power up. (A short current pulse to the selected AC-PRO phase can occur on power-up or power-down, which may cause an instantaneous trip.)

4.1.1 AC-PRO-GR, Ground Return Trip Unit

When testing a special trip unit with "ground return" ground fault see Section 3.13.

4.2 Select the Frequency

Select the desired frequency of operation using the Frequency (16) selector switch.
This must match the AC-PRO frequency.

4.3 Calculate Long Time (LT) Pick-Up Secondary Current

Calculate the secondary LT pick-up current (LT_{SPU}) as follows:

For 1-Amp AC-PRO:

$$LT_{SPU} = \frac{\text{LT Pick-UP}}{\text{CT Rating}}$$

Example: If the CT rating is 1600 and the LT pick-up is 800 amps, then

$$LT_{SPU} = \frac{800}{1600} = 0.50 \text{ amp}$$

Example: If the CT rating is 1600 and the LT pick-up is 1600 amps, then

$$LT_{SPU} = \frac{1600}{1600} = 1.00 \text{ amp}$$

For 1/2-Amp AC-PRO:

$$LT_{SPU} = \frac{\text{LT Pick-Up}}{\text{CT Rating}} \times 1/2$$

Example: If the CT rating is 1600 and the LT Pick-Up is 800 amps, then

$$LT_{SPU} = \frac{800}{1600} \times 1/2 = 0.25 \text{ amp}$$

Example: If the CT rating is 1600 and the LT Pick-Up is 1600 amps, then

$$LT_{SPU} = \frac{1600}{1600} \times 1/2 = 0.50 \text{ amp}$$

4.4 Long Time (LT) Pick-Up Test

To test the LT pick-up:

1) Hold down the Current Preset (13) while adjusting the Amp Coarse (14) and Fine (15) pots until the Current (12) display shows about 90% of the LT pick-up current (LT_{SPU}) previously calculated.
2) Set the Phase selector (11) to either Phase A, B or C.
3) Push the Start (5) button.
4) Increase the test current until the display on the AC-PRO matches the LT pick-up programmed in the AC-PRO. The red pick-up LED on the AC-PRO should be flickering or solidly on. The test set current should be within ?10% of LT_{SPU}.
5) Push the Stop (7) button.
6) If desired, test the other two phases in the same way.

4.5 Long Time (LT) Time Test

To test the LT time delay trip:

1) The first step is to select a test current. For example, three times the LT pick-up (3X on the TCC in Figure 5). The desired test current is then 3 X LT_{SPU}.

Note, to accurately test the LT delay, the test current must be at least 110% of the LT pick-up.

2) Hold down the Current Preset (13) while adjusting the Amp Coarse (14) and Fine (15) pots until the Current (12) display shows the test current calculated in step 1. Release the Current Preset (13) button.
3) Set the Phase selector (11) to either Phase A, B or C.
4) Push the Clear (8) button to reset the Timer (6) to zero.
5) Push the Start (5) button and quickly make any minor adjustments required to the Amp Fine (15) pot. The red pick-up LED on the AC-PRO should be on and the AC-PRO should display OVERLOAD.
6) When the AC-PRO trips, the test set current will stop and the Timer (6) will freeze and display the total trip time.
7) Compare the trip time with the TCC in Figure 5 for the LT time band setting in the AC-PRO.
8) Verify that the AC-PRO saved the proper last trip data.
9) Repeat for the other two phases if desired.

4.6 Calculate Short Time (ST) Pick-Up Secondary Current

Calculate the ST secondary pick-up current (ST_{SPU}) as follows:

For 1-Amp AC-PRO:

$$ST_{SPU} = \frac{\text{ST Pick-Up}}{\text{CT Rating}}$$

Example: If the CT rating is 1600 and the ST pick-up is 6400 amps, then

$$ST_{SPU} = \frac{6400}{1600} = 4.00 \text{ amp}$$

For 1/2-Amp AC-PRO:

$$ST_{SPU} = \frac{\text{ST Pick-Up}}{\text{CT Rating}} \times 1/2$$

Example: If the CT rating is 1600 and the ST pick-up is 6400 amps, then

$$ST_{SPU} = \frac{6400}{1600} \times 1/2 = 2.00 \text{ amp}$$

4.7 Short Time (ST) Pick-Up Test

To test the ST pick-up:

1) Hold down the Current Preset (13) while adjusting the Amp Coarse (14) and Fine (15) pots to 90% of the calculated $ST_{SPU.}$
2) Set the Phase selector (11) to either Phase A, B or C.
3) Push the Start (5) button but leave the test current on only long enough to see if a ST trip occurs. If the current is left on long enough a LT trip will occur.

   A ST trip should NOT occur.

4) Hold down the Current Preset (13) while adjusting the Amp Coarse (14) and Fine (15) pots to 110% of the calculated $ST_{SPU.}$
5) Push the Clear (8) button to reset the Timer (6) to zero.
6) Push the Start (5) button.

   A ST trip should occur. The test set current will stop and the Timer (6) will freeze displaying the trip time.

7) Verify that the AC-PRO saved the proper last trip data.
8) Repeat for the other two phases if desired.

4.8 Short Time (ST) Test

To test the ST time delay trip:

1) The first step is to select a test current. For example, 150% of the ST pick-up. The desired test current is then 1.5 X ST_{SPU}.

   Note, to accurately test the ST delay, the test current must be at least 110% of the ST pick-up.

2) Hold down the Current Preset (13) while adjusting the Amp Coarse (14) and Fine (15) pots until the Current (12) display shows the test current calculated in step 1.
3) Set the Phase selector (11) to either Phase A, B or C.
4) Push the Clear (8) button to reset the Timer (6) to zero.
5) Push the Start (5) button.
6) When the AC-PRO trips, the test set current will stop and the Timer (6) will freeze displaying the trip time.
7) Compare the trip time with the TCC in Figure 5 for the ST time band setting in the AC-PRO.
8) Verify that the AC-PRO saved the proper last trip data.
9) Repeat for the other two phases if desired.

4.9 Calculate Instantaneous (I) Pick-Up Secondary Current

Calculate the I secondary pick-up current (I_{SPU}) as follows:

For 1-Amp AC-PRO:

$$I_{SPU} = \frac{\text{I Pick-Up}}{\text{CT Rating}}$$

Example: If the CT rating is 1600 and the I pick-up is 9600 amps, then:

$$I_{SPU} = \frac{9600}{1600} = 6.00 \text{ amp}$$

For 1/2-Amp AC-PRO:

$$I_{SPU} = \frac{\text{I Pick-Up}}{\text{CT Rating}} \times 1/2$$

Example: If the CT rating is 1600 and the I pick-up is 9600 amps, then:

$$ST_{SPU} = \frac{9600}{1600} \times 1/2 = 3.00 \text{ amp}$$

4.10 Instantaneous (I) Pick-Up Test

To test the I pick-up:

1) Hold down the Current Preset (13) while adjusting the Amp Coarse (14) and Fine (15) pots to 90% of the calculated $I_{SPU.}$
2) Set the Phase selector (11) to either Phase A, B or C.
3) Push the Start (5) button but leave the test current on only long enough to see if an I trip occurs. If the current is left on long enough a LT or ST trip will occur. If ST is on, it is best to temporarily turn it off.

   An I trip should NOT occur.

4) Hold down the Current Preset (13) while adjusting the Amp Coarse (14) and Fine (15) pots to 110% of the calculated $I_{SPU.}$
5) Push the Clear (8) button to reset the Timer (6) to zero.
6) Push the Start (5) button.

   An I trip should occur. The test set current will stop and the Timer (6) will freeze displaying the trip time.

7) Verify that the AC-PRO saved the proper last trip data.
8) Repeat for the other two phases if desired.

4.11 Calculate Ground Fault (GF) Pick-Up Secondary Current

Calculate the GF secondary pick-up current (GF_{SPU}) as follows:

For 1-Amp AC-PRO:

$$GF_{SPU} = \frac{\text{GF Pick-Up}}{\text{CT Rating}}$$

Example: If the CT rating is 1600 and the GF pick-up is 1200 amps, then:

$$GF_{SPU} = \frac{1200}{1600} = 0.75 \text{ amp}$$

For 1/2-Amp AC-PRO:

$$GF_{SPU} = \frac{\text{GF Pick-Up}}{\text{CT Rating}} \times 1/2$$

Example: If the CT rating is 1600 and the GF pick-up is 1200 amps, then:

$$GF_{SPU} = \frac{1200}{1600} \times 1/2 = 0.38 \text{ amp}$$

For AC-PRO with Special 2-Amp Neutral Input:

$$GF_{SPU} = \frac{\text{GF Pick-Up}}{\text{CT Rating}} \times 2$$

Example: If the CT rating is 1600 and the GF pick-up is 1200 amps, then:

$$GF_{SPU} = \frac{1200}{1600} \times 2 = 1.50 \text{ amp}$$

4.12 Ground Fault (GF) Pick-Up Test

Verify that the Ground Fault Type (10) selector switch is in the correct position for the AC-PRO being tested.

To test the GF pick-up:

1) Set the Phase selector (11) switch to GF.
2) Hold down the Current Preset (13) while adjusting the Amp Coarse (14) and Fine (15) pots to 90% of the calculated GF_{SPU}.
3) Push the Start (5) button but leave the test current on only long enough to see if a GF trip occurs.

   A GF trip should NOT occur.

4) Hold down the Current Preset (13) while adjusting the Amp Coarse (14) and Fine (15) pots to 110% of the calculated GF_{SPU}.
5) Push the Clear (8) button to reset the Timer (6) to zero.
6) Push the Start (5) button.

   A GF trip should occur. The test set current will stop and the Timer (6) will freeze displaying the trip time.

7) Verify that the AC-PRO saved the proper last trip data.

4.13 Ground Fault (GF) Time Test

To test the GF time delay trip:

1) The first step is to select a test current. For example, 150% of the GF pick-up. The desired test current is then 1.5 X GF_{SPU}.

   Note, to accurately test the GF delay, the test current must be at least 110% of the GF pick-up.

2) Hold down the Current Preset (13) while adjusting the Amp Coarse (14) and Fine (15) pots until the Display (12) shows the test current calculated in step 1.
3) Set the Phase selector (11) to GF.
4) Push the Clear (8) button to reset the timer (6) to zero.
5) Push the Start (5) button.
6) When the AC-PRO trips, the test set current will stop and the Timer (6) will freeze displaying the trip time.
7) Compare the trip time with the TCC in Figure 4 for the GF time band and I^2T settings in the AC-PRO.
8) Verify that the AC-PRO saved the proper last trip data.

4.14 Unbalance Testing

The Unbalance function cannot be tested with this test set.

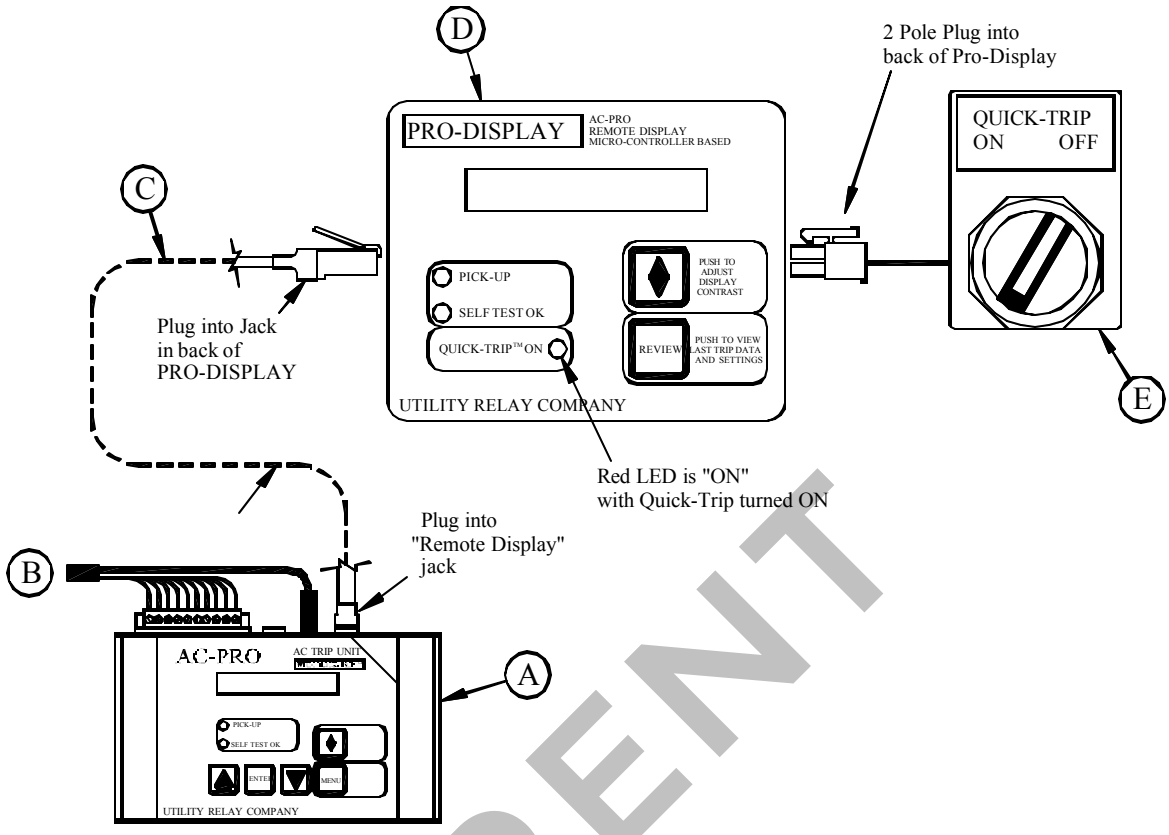


Figure 3
Quick-Trip™ Testing Connections

A AC-PRO™ Trip Unit

B Test Set Harness

C Shielded Cable
8/C Shielded cable with modular connectors.

D PRO-DISPLA Y

E Quick-Trip™ ON/OFF Selector Switch

5.0 Quick-Trip™ Testing

In order to test the Quick-Trip™ settings, the PRO-DISPLAY (D) and Quick-Trip™ ON/OFF Selector switch (E) must be connected as shown in Figure 3.

5.1 Calculate Quick-Trip™ Instantaneous (QT-I) Pick-Up Secondary Current

Calculate the QT-I secondary pick-up current ($QT\text{-}I_{SPU}$) as follows:

For 1-Amp AC-PRO:

$$QT\text{-}I_{SPU} = \frac{\text{QT-I Pick-Up}}{\text{CT Rating}}$$

Example: If the CT rating is 1600 and the QT-I pick-up is 9600 amps, then:

$$QT\text{-}I_{SPU} = \frac{9600}{1600} = 6.00 \text{ amp}$$

For 1/2-Amp AC-PRO:

$$QT\text{-}I_{SPU} = \frac{\text{QT-I Pick-Up}}{\text{CT Rating}} \times 1/2$$

Example: If the CT rating is 1600 and the QT-I pick-up is 9600 amps, then:

$$QT\text{-}I_{SPU} = \frac{9600}{1600} \times 1/2 = 3.00 \text{ amp}$$

5.2 Quick-Trip™ Instantaneous (QT-I) Pick-Up Test

To test the QT-I pick-up:

1) Connect the Pro-Display (D) and the Quick-Trip™ ON/OFF Selector switch (E) as shown in Figure 3.
2) Set the Quick-Trip™ ON/OFF Selector switch (E) to ON.
3) Hold down the Current Preset (13) while adjusting the Amp Coarse (14) and Fine (15) pots to 90% of the calculated $QT\text{-}I_{SPU.}$
4) Set the Phase selector (11) to either Phase A, B or C.
5) Push the Start (5) button but leave the test current on only long enough to see if a QT-I trip occurs.

   A QT-I trip should NOT occur.

6) Hold down the Current Preset (13) while adjusting the Amp Coarse (14) and Fine (15) pots to 110% of the calculated $QT\text{-}I_{SPU.}$
7) Push the Clear (8) button to reset the Timer (6) to zero.
8) Push the Start (5) button.

   A QT-I trip should occur. The test set current will stop and the Timer (6) will freeze displaying the trip time.

9) Verify that the AC-PRO saved the proper last trip data.
10) Set the Quick-Trip™ ON/OFF Selector switch (E) to OFF.
11) Push the Start (5) button but leave the test current on only long enough to see if a QT-I trip occurs.

    A QT-I trip should NOT occur.

12) Repeat for the other two phases if desired.

5.3 Calculate Quick-Trip™ Ground Fault (QT-GF) Pick-Up Secondary Current

Calculate the QT-GF secondary pick-up current ($QT\text{-}GF_{SPU}$) as follows:

For 1-Amp AC-PRO:

$$QT\text{-}GF_{SPU} = \frac{\text{QT-GF Pick-Up}}{\text{CT Rating}}$$

Example: If the CT rating is 1600 and the QT-GF pick-up is 1200 amps, then:

$$QT\text{-}GF_{SPU} = \frac{1200}{1600} = 0.75 \text{ amp}$$

For 1/2-Amp AC-PRO:

$$QT\text{-}GF_{SPU} = \frac{\text{QT-GF Pick-Up}}{\text{CT Rating}} \times 1/2$$

Example: If the CT rating is 1600 and the QT-GF pick-up is 1200 amps, then:

$$GF_{SPU} = \frac{1200}{1600} \times 1/2 = 0.38 \text{ amp}$$

For AC-PRO with Special 2-Amp Neutral Input:

$$QT\text{-}GF_{SPU} = \frac{\text{QT-GF Pick-Up}}{\text{CT Rating}} \times 2$$

Example: If the CT rating is 1600 and the QT-GF pick-up is 1200 amps, then:

$$QT\text{-}GF_{SPU} = \frac{1200}{1600} \times 2 = 1.50 \text{ amp}$$

5.4 Quick-Trip™ Ground Fault (QT-GF) Pick-Up Test

Verify that the Ground Fault Type (10) selector switch is in the correct position for the AC-PRO being tested.

To test the QT-GF pick-up:

1) Connect the Pro-Display (D) and the Quick-Trip™ ON/OFF Selector switch (E) as shown in Figure 3.
2) Set the Quick-Trip™ ON/OFF Selector switch (E) to ON.
3) Set the Phase Selector (11) switch to GF.
4) Hold down the Current Preset (13) while adjusting the Amp Coarse (14) and Fine (15) pots to 90% of the calculated $QT\text{-}GF_{SPU.}$
5) Push the Start (5) button but leave the test current on only long enough to see if a QT-GF trip occurs.

   A QT-GF trip should NOT occur.

6) Hold down the Current Preset (13) while adjusting the Amp Coarse (14) and Fine (15) pots to 110% of the calculated $QT\text{-}GF_{SPU.}$
7) Push the Clear (8) button to reset the Timer (6) to zero.
8) Push the Start (5) button.

   A QT-GF trip should occur. The test set current will stop and the Timer (6) will freeze displaying the trip time.

9) Set the Quick-Trip™ ON/OFF Selector switch (E) to OFF.
10) Push the Start (5) button but leave the test current on only long enough to see if a QT-GF trip occurs.

    A QT-GF trip should NOT occur.

11) Verify that the AC-PRO saved the proper last trip data.

6.0 Error/Fault Conditions

6.1 Current Error

The test set monitors the current level while a test is in progress. Should the current level be outside of the expected range, a current error will occur and the test set will stop current flow and display “Current Error”.

To clear the current error the Clear (8) button must be pressed. After this, normal operation on the test set should be restored.

The most likely causes for a "Current Error" are:

1) The trip unit is not powered up.
2) There are loose connections in the test cable.

6.2 Thermal Limit

As a protective feature, the test set will stop delivering current and display a “Thermal Limit” message if high levels of test current remain for a prolonged time period. The timeout for the thermal limit shutdown begins when any test current exceeds eight amps.

If a thermal limit occurs it must be cleared by pressing the Clear (8) button. The test set will not allow a test to be restarted for about five seconds. Before restarting the test, verify that there are no loose connections.

6.3 Unexpected GF Trip

If a GF trip occurs when the Phase Selector (11) switch is NOT set to GF, the Ground Fault Type (10) selector switch is incorrectly set to "Ground Return" instead of "Standard GF".

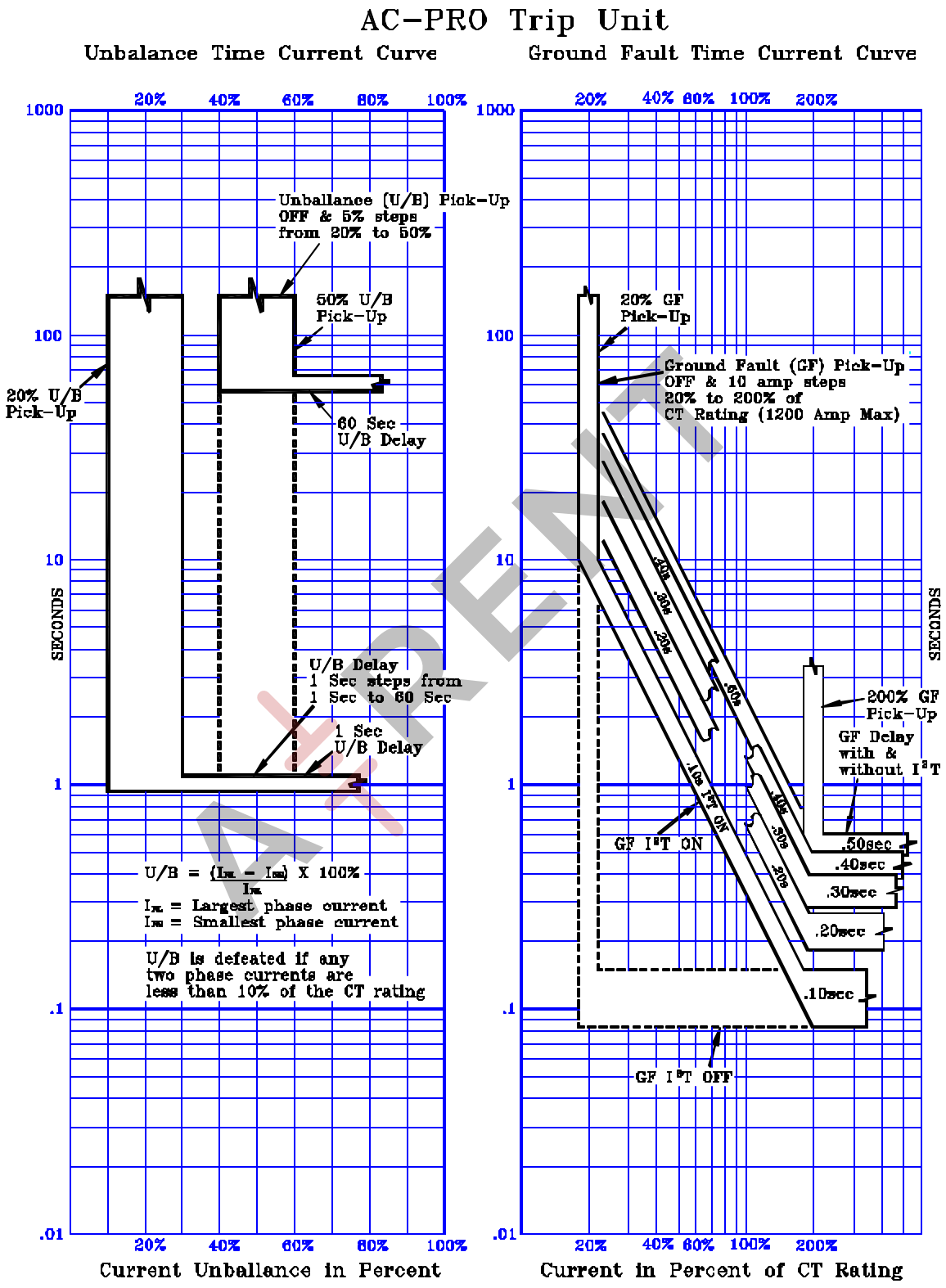


Figure 4
Unbalance TCC & Ground Fault TCC

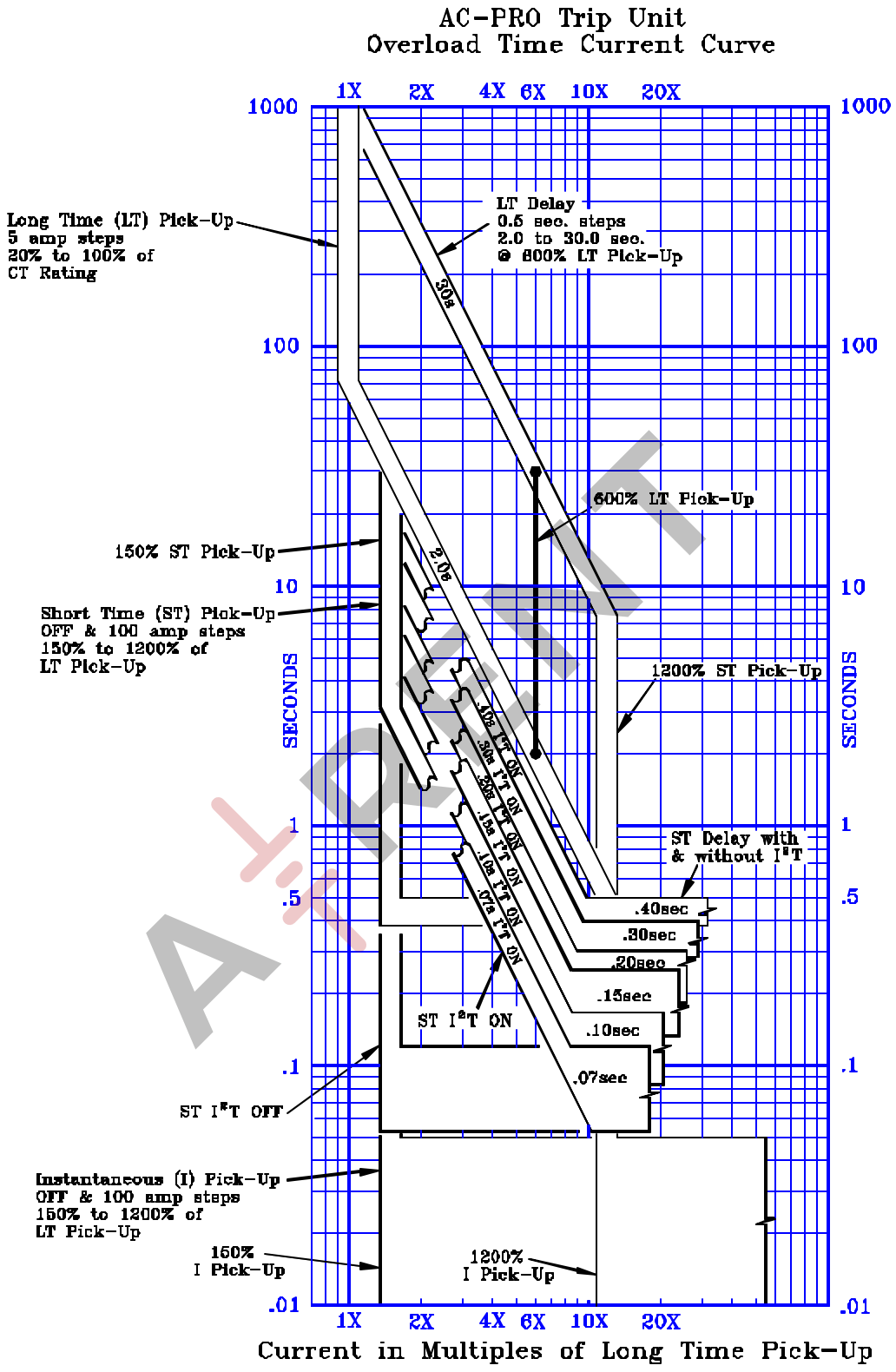
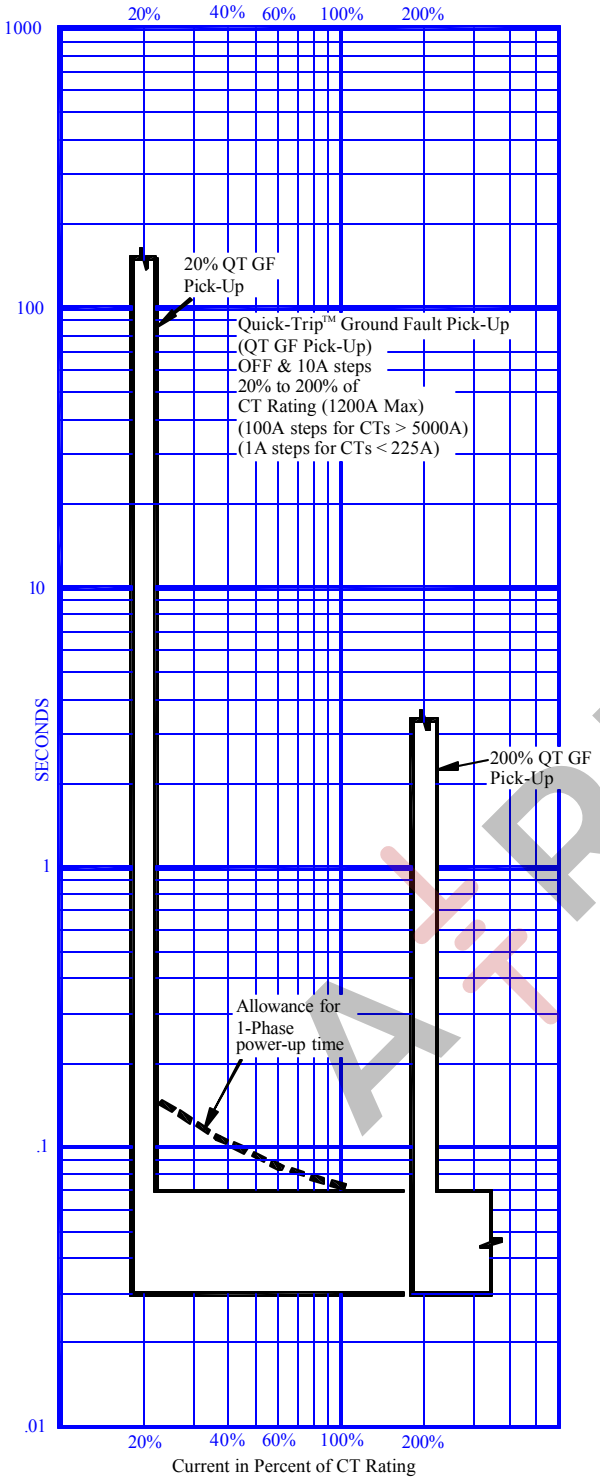
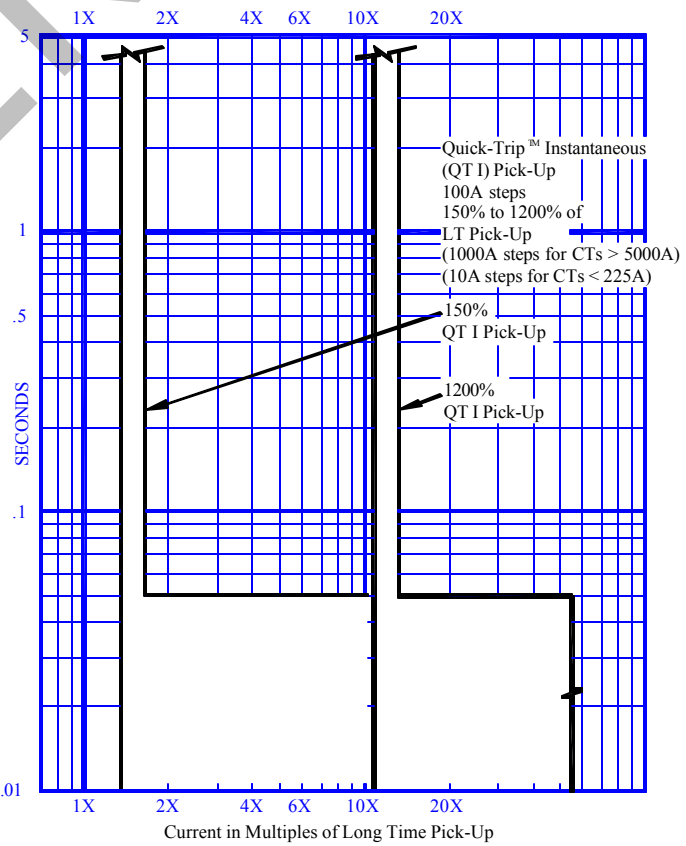


Figure 5
Overload TCC



Quick-Trip™ Ground Fault Time Current Curve



Quick-Trip™ Instantaneous Time Current Curve

Figure 6
Quick-Trip™ TCC