SURE TRIP

SLT-201 SECONDARY TEST SET

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SLT-201 SECONDARY TEST SET

The **SURE TRIP SLT-201** Secondary Test Set has been designed to perform full function testing of the RMS-2007AF, RMS-2002, RMS-85, WESTRIP RMS-2000, AMPTECTOR, and ITEKTOR Logic controllers. It allows the user to check the time current characteristics of the logic programmer at an infinite number of points along its curves, test the programmer diagnostic circuitry, and flux shifter operation. The test set is a rugged, lightweight, portable device designed specifically with the service man in mind.

The following are some simple precautions that should be observed when performing a secondary test on any logic controller.

***** The Test Set operates, at full load, at more than 60 amps and is designed to handle current amplitudes according to the Long Time trip curves. Prolonged or repetitive testing at higher current settings will cause internal damage to the Test Set and Logic.

* Holding the "CALIBRATE" switch for more than 10 to 15 seconds at a time may cause overheating and/or damage to the Test Set and Logic.

* Use the "STOP" whenever a trip occurs and the Test Set does not cut off.

LEGEND TO PICTURE 1

1> POWER CORD	9> RESET	17> INST
2> FUSE	10> PICK-UP	18> SHORT DELAY
3> POWER	11> TEST	19> LOGIC SELECTOR
4> TRIP TIMER	12> CALIBRATE	20> GROUND FAULT
5> AMMETER	13> RANGE	21> EXTERNAL AMMETER
6> PHASE SELECTOR	14> VARIAC	22> RMS 2007AF INTERFACE CABLE
7> ACTUATOR	15> STOP	23> OPTIONAL AMPTECTOR & ITEKTOR
8> TIMER	16> TEST/RESET	INTERFACE CABLE

1> POWER CORD
Receptacle for inserting modular power cord supplied with unit

2> FUSE
Replace with 4A fuse only.

3> POWER
Switch turns power on and off to the test set. The red lamp indicates when power is on. Lamp will not light if Fuse has failed.

4> TRIP TIMER
Meter shows the elapsed time between the start of the Test and the trip pulse from the logic.

5> AMMETER
Meter shows the level of current flowing to the logic from the test set. The reading updates about 3 times per second.

6> PHASE SELECTOR
4-Position switch that simulates the three phase ("A", "B", "C") currents for testing of the logic inputs. The "N" setting is for testing of the 'GROUND FAULT' on the AMPTECTOR or ITEKTOR logic.

7> ACTUATOR
Binding post that allows an external actuator to be tested with the logic without having to wire directly to the logic.

8> TIMER
Switch to turn the "TRIP TIMER" indication "ON" or "OFF".

9> RESET
Green indication for the "RESET" function of the test set.

10>PICK-UP
Yellow indication that shows "PICK-UP" for the AMPTECTOR or ITECKTOR logic.

11>TEST
Red indication for the "TEST" function of the test set.

12>CALIBRATE
Switch that allows the test current to be set at higher levels. It turns on the output current and prevents the test set from tripping.

13>RANGE
"LO" limits the output current to about 7.5 Amps. "HI" is not limited and will exceed 60A when testing a logic. Care should be taken to start all tests at the lower setting so as not to damage the logic control. The "N" setting of the "PHASE SELECTOR" switch works with the "LO" setting only.

14>VARIAC
Provides for accurate control of the output current. Levels are determined by the setting on the "RANGE" switch.

15>STOP
Switch stops all tests that are in progress.

16>TEST/RESET
Switch to the "TEST" position to begin the test. The "RESET" position to reset the test set after a trip. The test set must be "RESET" after turning the test set "ON" and prior to running any test.

17>INST
Disables the "INSTANTANEOUS" function on the AMPTECTOR and ITECKTOR logic.

18>SHORT DELAY
Defeats the "SHORT DELAY" function on the AMPTECTOR and ITECKTOR logic.

19>LOGIC SELECTOR
Used to select the type of logic being tested.

20>GROUND FAULT
"TEST" position to test the 'GROUND FAULT' portion of the SURETRIP RMS-2002. "DEFEAT" position to test the "LONG TIME", "SHORT TIME", and "INSTANTANEOUS" functions of the RMS-2007AF, RMS-2002, RMS-85, WESTRIP RMS-2000.

21>EXTERNAL AMMETER
Binding posts that allows an external ammeter to be connected to the test set. Can be used to verify the "AMMETER" reading. A jumper must be placed between the posts if an external ammeter is not used.

22>SURETRIP RMS-2007AF INTERFACE CABLE(Not Pictured)
Allows for the interface of the test set and the SURETRIP RMS-2007AF logic.

23>OPTIONAL AMPTECTOR & ITEKTOR INTERFACE CABLE(Not Pictured)
Allows for the interface of the test set and the AMPTECTOR & ITEKTOR logic.

BASIC SETUP AND TEST PROCEDURE

1. Insert the AC cord into the test set and connect to a 120-volt outlet.
2. Select the correct interface for the type of logic being tested. Connect it to the test set by screwing the round connector plugs together. Plug the into the logic.
3. Turn on test set by placing the "POWER" switch to the "ON" position.
4. "RESET" the Test Set using the "TEST/RESET" switch.
5. If an external ammeter is not used, make certain that a jumper is placed between the "EXTERNAL AMMETER" binding posts.
6. Set "VARIAC" to '0' and "RANGE" to "LO". *After testing a selected pick-up current or delay function, it is advised to return the "VARIAC" control to zero before proceeding to the next test.
7. To begin a test move the "TEST/RESET" switch to the "TEST" position. *When testing pick-up currents, start by selecting "LO" on the "RANGE" switch. With the "VARIAC" at zero turn clockwise until the unit trips or the pick-up light turns on. If the logic controller does not trip at this setting, return the "VARIAC" to zero and select the "HI" position on the "RANGE" switch and proceed with the test.
8. Testing of each logic and function is described in more detail on the following pages.

NOTE: When secondary testing with the Logic on the Breaker, it may not be possible to trip the Actuator and the Test Set Timer at the same time. To test the timing it may be necessary to remove the Actuator wiring.

SAMPLE TEST CHART

DATE: ____/____/____

LOGIC SERIAL NUMBER: _____

LONG TIME FUNCTION:

SWITCH SETTING _____ AMP TAP _____ PICKUP CURRENT _____

DELAY SETTING _____ TEST CURRENT_____ ELAPSED TIME A_____ B_____ C_____

SHORT TIME FUNCTION:

SWITCH SETTING _____ AMP TAP _____ PICKUP CURRENT _____

DELAY SETTING _____ TEST CURRENT_____ ELAPSED TIME A_____ B_____ C_____

INSTANTANEOUS FUNCTION:

SWITCH SETTING _____ AMP TAP _____ PICKUP CURRENT _____

TEST CURRENT_____ ELAPSED TIME A_____ B_____ C_____

ARC FLASH FUNCTION:

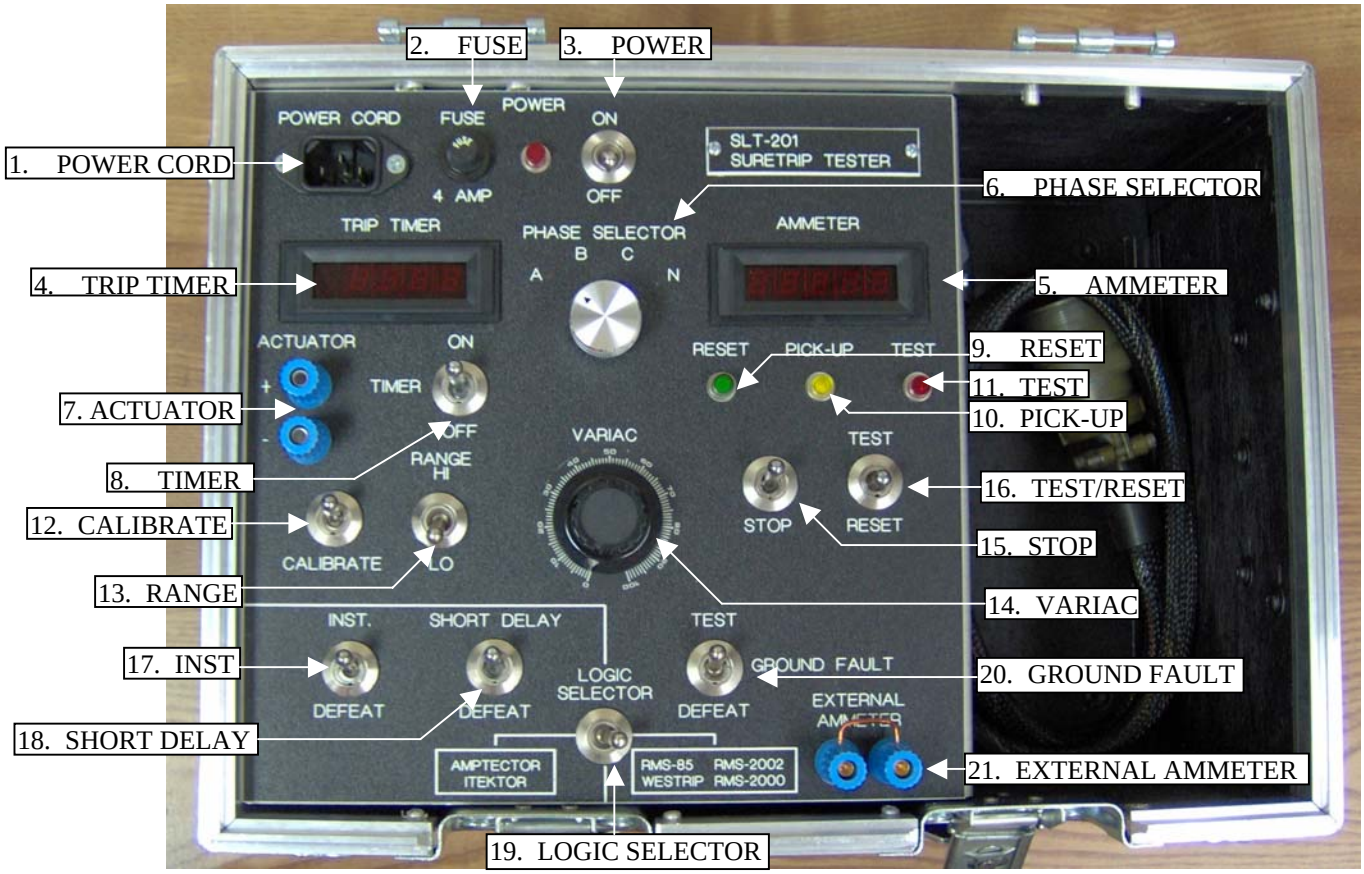
SWITCH SETTING _____ AMP TAP _____ PICKUP CURRENT _____

TEST CURRENT_____ ELAPSED TIME A_____ B_____ C_____

GROUND FAULT FUNCTION:

SWITCH SETTING _____ PICKUP CURRENT _____

DELAY SETTING _____ TEST CURRENT_____ ELAPSED TIME A_____ B_____ C_____



TEST PROCEDURE FOR THE SURETRIP RMS-2007AF LOGIC

1. Using the RMS-2007AF Interface Cable, connect to the test set wiring harness to the logic box to be tested.
2. Verify the "VARIAC" is set to zero, "RANGE" is on "LO", then switch "POWER" "ON".
3. Switch the "LOGIC SELECTOR" to "RMS-2007AF, etc".
4. "RESET" the test set.
5. When testing the LSI logic the "GROUND FAULT" switch must be set to "DEFEAT". The LSIG logic can also be tested on this setting except for 'GROUND' function. Set this switch to the "TEST" position to test the 'GROUND' function.
6. After testing a selected pick-up current or delay function, it is advised that the "VARIAC" be returned to zero before proceeding to the next test.
7. When testing pick-up currents, start by selecting the "LO" "RANGE". With the "VARIAC" at zero, turn clockwise until the unit trips or the pick-up light on the logic turns on. If the logic controller does not trip at this setting, return the "VARIAC" to zero and select "HI" "RANGE" and proceed with the test.
8. Testing of each function is described in more detail on the following pages.

The "Sample Test Chart" on page 4 gives a basic layout for recording the results of the test performed on any Logic Control. The form can be used when testing on secondary or primary.

LONG TIME FUNCTION TESTING

PICK-UP TEST

1. Select the Phase to be tested. Make certain all other functions are adjusted so as not to interfere with the selected test.
2. Set the 'LONG TIME' Delay switch to '2' and the 'LONG TIME' Pick up switch to the test point.
3. Start the "Test Set" and slowly increase the "VARIAC" from "0" until the 'PICK-UP' LED on the logic turns on. The "PICK-UP" Light on the Test Set does not function with the WESTRIP RMS-2000.
4. Record the "AMMETER" reading just as the pick-up LED lights. Compare the reading to that of Chart 2A. The reading should be within +/- 10% of the stated value.
5. Return "VARIAC" control to "0". Repeat for other phases or pick-up settings if desired.

LONG TIME DELAY

1. Select the Phase to be tested. Make certain all other functions are adjusted so as not to interfere with the selected test.
2. Set the 'LONG TIME' Delay switch to the desired setting; '2', '3', '4', '5', '7', '10', '12', '15', '20', or '24'. These settings are referenced to a current level equal to 600% of the 'LONG TIME' Pick-Up. Actual delays can vary in accordance with the 'Time vs. Current Characteristic' curves. If a current level of 200% or 300% is used, refer to the table below for the corresponding timing range.
3. After the logic is adjusted, set the test current to the desired level, i.e. 300% of the long time pick-up switch setting. "STOP" the test and "RESET" the test set.
4. Start, "TEST", the test set and let run until the logic trips and the "TRIP TIMER" stops. The "TRIP TIMER" should indicate the elapsed time. Compare this time to that of the Chart 1A below or the trip curves. Repeat for other phases or switch settings if desired.
5. Return the "VARIAC" to "0".

Chart 1A **Long Time Delay** *Time in Seconds		Test Current Level					
		200%		300%		600%	
		Low Side	High Side	Low Side	High Side	Low Side	High Side
Delay Setting	2	14.4	21.6	6.4	9.6	1.6	2.5
	3	21.6	32.4	9.6	14.4	2.4	3.8
	4	28.8	43.2	12.8	19.2	3.2	5.0
	5	36	54	16	24	4	6.3
	7	50.4	75.6	22.4	33.6	5.6	8.8
	10	72	108	32	48	8	12.5
	12	86.4	129.6	38.4	57.6	9.6	15
	15	108	162	48	72	12	18.8
	20	144	216	64	96	16	25
	24	172.8	259.2	76.8	115.2	19.2	30

Chart 2A		LONG TIME PICK UP						
		.4	.5	.6	.7	.8	.9	1.0
L/T Pick-Up Amp Tap	.5	1.00	1.25	1.5	1.75	2.00	2.25	2.50
	.6	1.20	1.50	1.80	2.10	2.40	2.70	3.00
	.7	1.40	1.75	2.10	2.45	2.80	3.15	3.50
	.8	1.60	2.00	2.40	2.80	3.20	3.60	4.00
	.9	1.80	2.25	2.70	3.15	3.60	4.05	4.50
	1.0	2.00	2.50	3.00	3.50	4.00	4.50	5.00

SHORT TIME FUNCTION TESTING

PICK-UP TEST

1. Select the Phase to be tested and set the 'LONG TIME' Delay switch to '24'. Make certain all other functions are adjusted so as not to interfere with the selected test.
2. Set 'SHORT TIME' Delay switch to '.15' and adjust the 'SHORT TIME' Pick up switch to the test point.
3. Start the "Test Set" and slowly increase the "VARIAC" from "0" until the logic trips.
4. Record the "AMMETER" reading at the moment the trip occurs. Compare the reading to the value found in Chart 2B. The reading should be within +/- 10% of the stated value. Repeat for other phases or pick-up settings if desired.
5. Return the "VARIAC" to "0".

SHORT TIME DELAY

1. Select the Phase to be tested and set the 'LONG TIME' Delay switch to '24'. Make certain all other functions are adjusted so as not to interfere with the selected test.
2. Set the 'SHORT TIME' Delay switch to the desired setting; '.1', '.15', '.2', '.25', '.3', '.35', '.4', '.45', '.5', or 'I^2T'.
3. Using the "CALIBRATE" switch set the test current to a level that is 150% of the 'SHORT TIME' Pick-up current. Once the "VARIAC" is set, release the "CALIBRATE" switch. "RESET" the test set. When performing the test, the 'INSTANTANEOUS' or 'ARC FLASH' pick-up may interfere. If this occurs adjust the 'DEFEAT SELECTOR' on the logic box to the 'INSTANTANEOUS' setting and Jumper to external connector for the ARC FLASH Defeat to prevent tripping.
4. Start, "TEST", the test set and let run until the logic trips and the "TRIP TIMER" stops. The "TRIP TIMER" should indicate the elapsed time. Compare this time to that of the Chart 1B below or the trip curves. Repeat for other phases or switch settings if desired.
5. Return the "VARIAC" to "0".

Chart 1B		Test Current Level	
Short Time Delay		150%	
*Time in milli-Sec.		Low Side	High Side
Delay Setting	.1	65	100
	.15	98	150
	.2	130	200
	.25	163	250
	.3	195	300
	.35	228	350
	.4	260	400
	.45	293	450
	.5	325	500
	**I^2T	.58 Sec.	.90 Sec.

**I^2T Test Settings: 'AMP TAP' = '1.0', 'SHORT TIME' = '2', Test current = 15A.

		SHORT TIME PICK UP									
Chart 2B		1.5	2	3	4	5	6	7	8	9	10
S/T Pickup											
Amp Tap	.6	3.75	5.00	7.50	10.0	12.5	15.0	17.5	20.0	22.5	25.0
	.6	4.50	6.00	9.00	12.0	15.0	18.0	21.0	24.0	27.0	30.0
	.7	5.25	7.00	10.5	14.0	17.5	21.0	24.5	28.0	31.5	35.0
	.8	6.00	8.00	12.0	16.0	20.0	24.0	28.0	32.0	36.0	40.0
	.9	6.75	9.00	13.5	18.0	22.5	27.0	31.5	36.0	40.5	45.0
	1.0	7.50	10.0	15.0	20.0	25.0	30.0	35.0	40.0	45.0	50.0

INSTANTANEOUS FUNCTION TESTING

PICK-UP TEST

1. Select the Phase to be tested and set the 'LONG TIME' Delay switch to '24'. Make certain all other functions are adjusted so as not to interfere with the selected test.
2. Set 'INSTANTANEOUS' Pick up switch to the test point.
3. Start the "Test Set" and slowly increase the "VARIAC" from "0" until the logic trips.
4. Record the "AMPERE" reading at the moment the trip occurs. Compare the reading to the value found in Chart 2C. The reading should be within +/- 10% of the stated value. Repeat for other phases or pick-up settings if desired.
5. Return the "VARIAC" to "0".

INSTANTANEOUS DELAY

1. Select the Phase to be tested and set the 'LONG TIME' Delay switch to '24'. Make certain all other functions are adjusted so as not to interfere with the selected test.
2. Using the "CALIBRATE" switch set the test current to a level that is 150% of the 'INSTANTANEOUS' Pick-up current. Once the "VARIAC" is set, release the "CALIBRATE" switch. "RESET" the test set.
3. Start, "TEST", the test set and let run until the logic trips and the "TRIP TIMER" stops. The "TRIP TIMER" should indicate the elapsed time. Compare this time to that of the Chart 1C below or the trip curves. Repeat for other phases or switch settings if desired.
4. Return the "VARIAC" to "0".

Chart 1C – Instantaneous Delay

Set Secondary Current	No More Than
To 150% of Chart 2C	.06 Sec

		INSTANTANEOUS PICK UP									
Chart 2C		2	3	4	5	6	7	8	9	10	12
Inst. Pick-up	.5	5.00	7.50	10.0	12.5	15.0	17.5	20.0	22.5	25.0	30.0
Amp Tap	.6	6.00	9.00	12.0	15.0	18.0	21.0	24.0	27.0	30.0	36.0
	.7	7.00	10.5	14.0	17.5	21.0	24.5	28.0	31.5	35.0	42.0
	.8	8.00	12.0	16.0	20.0	24.0	28.0	32.0	36.0	40.0	48.0
	.9	9.00	13.5	18.0	22.5	27.0	31.5	36.0	40.5	45.0	54.0
	1.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0	45.0	50.0	60.0

ARC FLASH FUNCTION TESTING

PICK-UP TEST

1. Select the Phase to be tested and set the 'LONG TIME' Delay switch to '24'. Make certain all other functions are adjusted so as not to interfere with the selected test.
2. Set 'ARC FLASH' Pick up switch to the test point.
3. Start the "Test Set" and slowly increase the "VARIAC" from "0" until the logic trips.
4. Record the "AMPERE" reading at the moment the trip occurs. Compare the reading to the value found in Chart 2D. The reading should be within +/- 10% of the stated value. Repeat for other phases or pick-up settings if desired.
5. Return the "VARIAC" to "0".

INSTANTANEOUS DELAY

1. Select the Phase to be tested and set the 'LONG TIME' Delay switch to '24'. Make certain all other functions are adjusted so as not to interfere with the selected test.
2. Using the "CALIBRATE" switch set the test current to a level that is 150% of the 'ARC FLASH Pick-up current. Once the "VARIAC" is set, release the "CALIBRATE" switch. "RESET" the test set.
3. Start, "TEST", the test set and let run until the logic trips and the "TRIP TIMER" stops. The "TRIP TIMER" should indicate the elapsed time. Compare this time to that of the Chart 1D below or the trip curves. Repeat for other phases or switch settings if desired.
4. Return the "VARIAC" to "0".

Chart 1D – Instantaneous Delay

Set Secondary Current	No More Than
To 150% of Chart 2D	.05 Sec

		ARC FLASH PICK UP									
Chart 2D		2	3	4	5	6	7	8	9	10	12
Inst. Pick-up Amp Tap	.5	5.00	7.50	10.0	12.5	15.0	17.5	20.0	22.5	25.0	30.0
	.6	6.00	9.00	12.0	15.0	18.0	21.0	24.0	27.0	30.0	36.0
	.7	7.00	10.5	14.0	17.5	21.0	24.5	28.0	31.5	35.0	42.0
	.8	8.00	12.0	16.0	20.0	24.0	28.0	32.0	36.0	40.0	48.0
	.9	9.00	13.5	18.0	22.5	27.0	31.5	36.0	40.5	45.0	54.0
	1.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0	45.0	50.0	60.0

GROUND FAULT FUNCTION TESTING

PICK-UP

1. Set the "GROUND FAULT" switch to the "TEST" setting.
2. Select the Phase to be tested and set the 'LONG TIME' Delay switch to '24'. Make certain all other functions are adjusted so as not to interfere with the selected test.
3. Set 'GROUND FAULT' Delay switch to '.15' and adjust the 'GROUND FAULT' Pick up switch to the test point.
4. Start the "Test Set" and slowly increase the "VARIAC" from "0" until the logic trips.
5. Record the "AMMETER" reading at the moment the trip occurs. Compare the reading to the value found in Chart 2E. The reading should be within +/- 10% of the stated value. Repeat for other phases or pick-up settings if desired.
6. Return the "VARIAC" to "0".

GROUND DELAY

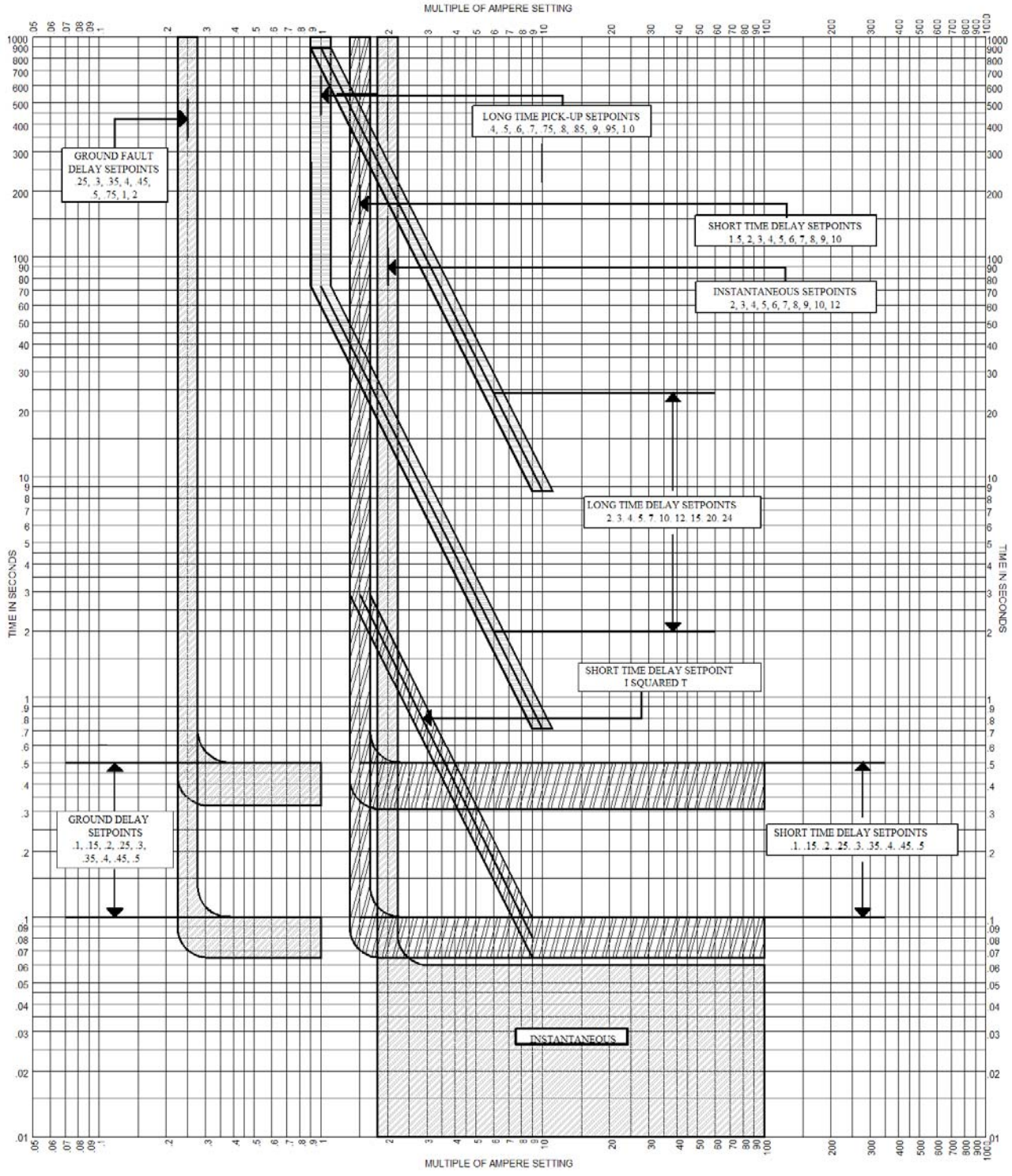
1. Select the Phase to be tested and set the 'LONG TIME' Delay switch to '24'. Make certain all other functions are adjusted so as not to interfere with the selected test. Verify that "GROUND FAULT" is set to "TEST".
2. Set the 'GROUND FAULT' Delay switch to the desired setting; '.1', '.15', '.2', '.25', '.3', '.35', '.4', '.45', or '.5'.
3. Using the "CALIBRATE" switch set the test current to a level that is 300% of the 'GROUND FAULT' Pick-up current. Once the "VARIAC" is set, release the "CALIBRATE" switch. "RESET" the test set.
4. Start, "TEST", the test set and let run until the logic trips and the "TRIP TIMER" stops. The "TRIP TIMER" should indicate the elapsed time. Compare this time to that of Chart 1E below or the trip curves. Repeat for other phases or switch settings if desired.
5. Return the "VARIAC" to "0".

Chart 1EE		Test Current Level	
Ground Fault Delay		300%	
*Time in milli-Sec		Low Side	High Side
Delay Setting	.1	65	100
	.15	98	150
	.2	130	200
	.25	163	250
	.3	195	300
	.35	228	350
	.4	260	400
	.45	293	450
	.5	325	500

Chart 2E – Ground Fault Pick-up Currents

GROUND FAULT PICK UP									
.25	.3	.35	.4	.5	.6	.75	1.0	2.0	Defeat
1.25	1.50	1.75	2.00	2.50	3.00	3.75	5.00	10.0	No Trip

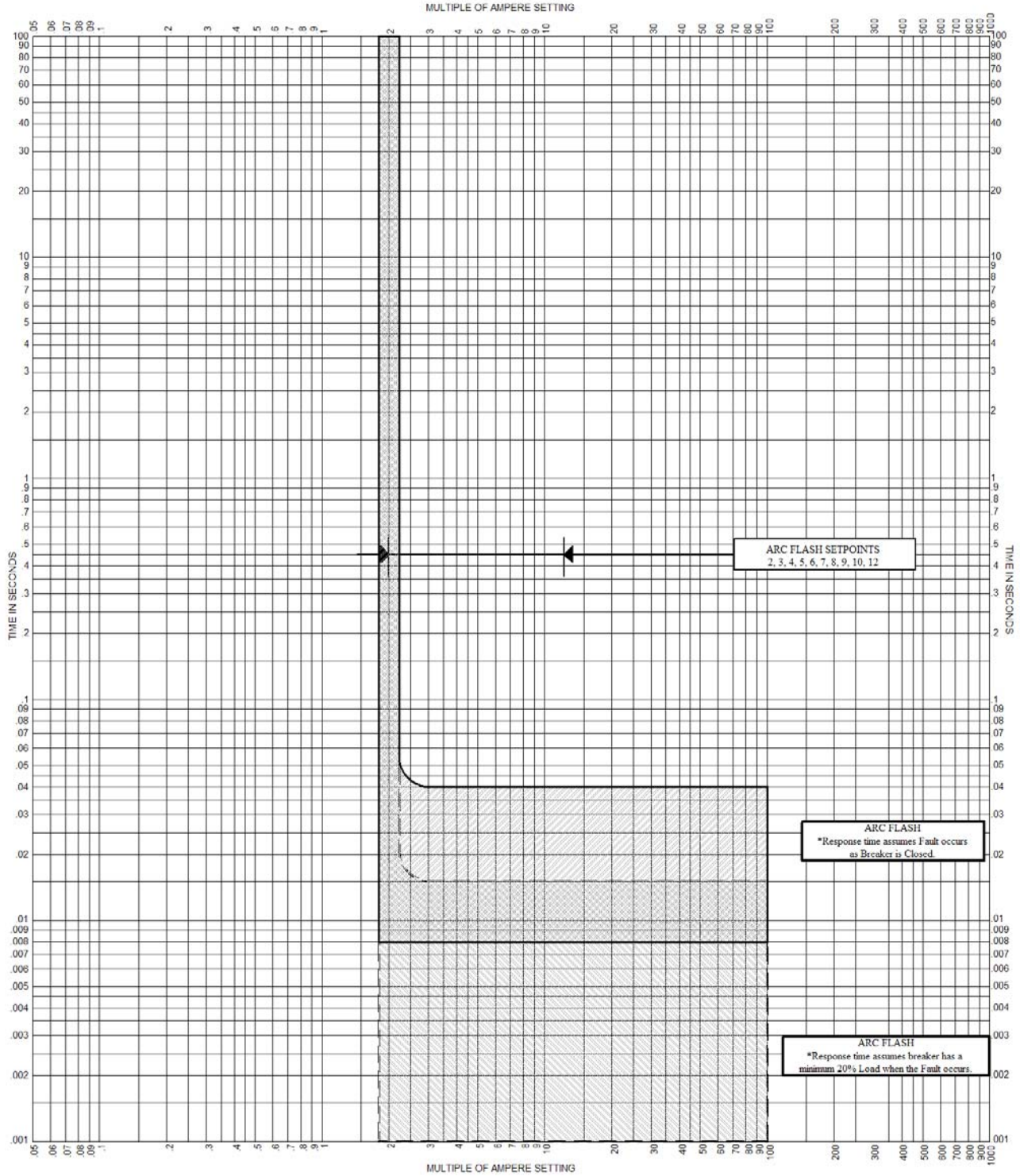
NOTE – 'GROUND FAULT' Pick ups not affected by 'AMP TAP' setting.



RMS-2007AF PROGRAMMABLE LOGIC CONTROL Rev.01 — TIME-CURRENT CHARACTERISTIC CURVES

FOR **SURE TRIP** — DATED **2007**

STANDARD DEVIATION **FOR AMPERE SETTING IS +/- 10%**



SURE-TRIP RMS-2007AF PROGRAMMABLE LOGIC CONTROL Rev.01 TIME-CURRENT CHARACTERISTIC CURVES

FOR RMS-2007AF ARC FLASH CURVE DATED 2007

STANDARD DEVIATION FOR AMPERE SETTING IS +/- 10%

Curve as shown does not include breaker clearing time.