

**MADTEST  
INSTRUMENTS  
INSTRUCTION  
MANUAL  
DSM4i1  
ADAPTER**

June

**2016**

The MadTest Instruments DSM4i1 Adapter is a 4 in 1 adapter option that replaces the OEM 877CO2G04 Magnum Adapter and an 877CO2G03 DS/DSL adapter as well as an auxiliary source 32Volt and 120VAC 10 amp power outlets. The unit is designed as an all in one adapter to test both Magnum and DigiTrip Trip units.

MADTEST  
INSTRUMENTS  
DSM4i1  
TEST KIT  
ADAPTER

# MADTEST INSTRUMENTS

## COMPONENT CHECK LIST FOR

### AND PROCEDURES FOR

#### MADTEST INSTRUMENTS DSM411 TEST KIT ADAPTER.

Components and accessories check list;

The Cutler Hammer **DSM411** is composed of the components listed below;

1. DSM411 BASE UNIT PART # **DM-0025**
2. MAGNUM CABLE HARNESS PART # **DM-0024**
3. DS/DSII CABLE HARNESS PART # **DM-0023**
4. DIGITRIP 2 PIN CABLE HARNESS PART # **DM-0022**
5. 120V CABLE PART # **DM-0021**
6. PELICAN CASE 1520 PART # **DM-0020**
7. DSM411 HARD COPY MANUAL PART # **DM-0019**

**Note:** The DSM411 is designed as an accessory adapter for the Westinghouse/ Cutler Hammer/ Eaton 140D481G03 Amptector test set. The adapter tests both DS/DSII, Magnum, and OPTIM trip units. **Note** Optim RMS units will still require the Cutler Hammer OPTIMIZER test kit model 7801CS7 not included. The unit also incorporates an internal auxiliary 32VDC power supply for programming RMS Digitrip trip units.

## CAUTION

DO NOT WORK ON LIVE EQUIPMENT. DEATH OR SERIOUS INJURY CAN OCCUR. IF POSSIBLE REMOVE THE TRIP UNITS FROM THE CIRCUIT BREAKER AND TEST TRIP UNIT ON A BENCH IF POSSIBLE. IF TESTED IN PLACE MAKE SURE THERE ARE NO VOLTAGES PRESENT. DO NOT

~~CONNECT THE ADAPTER WHILE THE CIRCUIT BREAKER IS ENGAGED AND IN THE ON POSITION.~~  
PLEASE EXERCISE CAUTION MADTEST INSTRUMENTS IS NOT LIABLE FOR MISAPPLICATION OF THIS PRODUCT. EXERCISE ALL SAFETY PROCEDURES.

### BASE UNIT WARNING

THE ORIGINAL WESTINGHOUSE AND CUTLER HAMMER MODELS 140D481G01 AND 140D481G02 CANNOT BE USED WITH THIS ADAPTER WITHOUT A FACTORY MODIFICATION. HOWEVER, THESE OLDER GENERATION TEST SETS CAN BE MODIFIED TO BE USED WITH THE DSM411 ADAPTER.

Modification of the G01 and G02 can be performed by SOLID STATE EXCHANGE, DENTON TEXAS 877-874-7349

It is also important to keep in mind that the original OEM AMPTECTOR base unit test set was designed as a current source to verify trip units in the field. The accuracy of the output can vary up to  $\pm 20\%$  at best. Field personal should be aware during testing with an actual trip unit that results may differ.

DS/DSII and MAGNUM the DSM411 has 3 umbilical cords. The unit was designed to offer an alternative to keeping multiple adapters on hand. It replaces the following;

MAG Harness DM-0024 replaces OEM adapter 8779C02G04

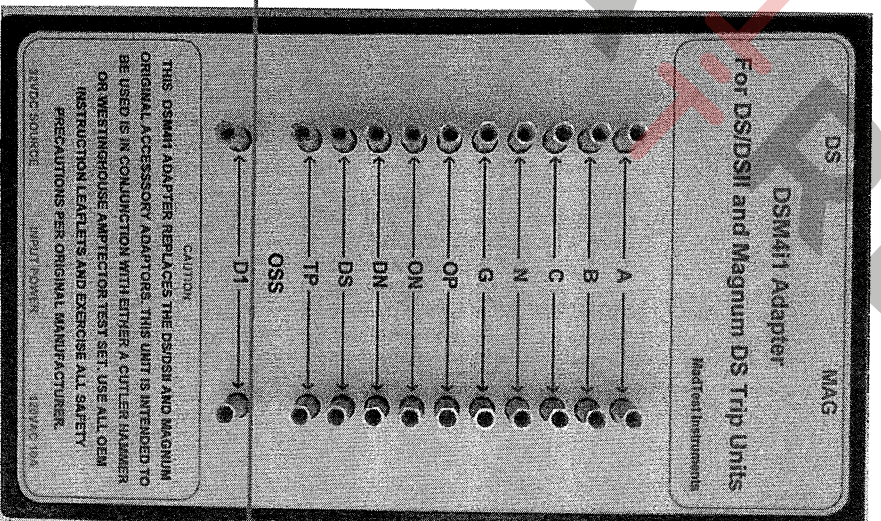
DS Harness DM-0023 replaces OEM adapter 8779C02G03

Digitrip 2 pin harness DM-0022 replaces the PRTBAP 32VDC adapter

Remote Magnum power supply replaced by 120VAC 10 foot power cable

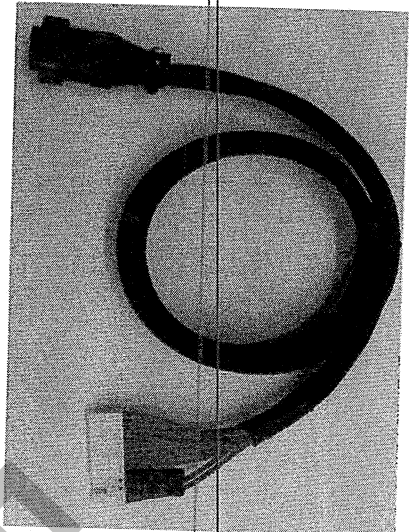
### DESCRIPTION OF MADTEST INSTRUMENTS DSM4I1 BREAKER TEST KIT ADAPTER.

The MadTest instruments DSM4I1 Test Kit Adapter pictured below is composed of a base unit and 3 cable harnesses. The adapter was designed to accommodate both the Magnum 220,520, and 1150 as well as Digitrip trip units RMS 500,510,600,610,700,800,810,910, OPTIM 550,750,1150 units. The 14-pin connection point on the left side is the DS/DSII converts to a 9 pin Molex connector and the right side 11 pins are for the Magnum trip units are converted to a 14 pin connector. The DSM4I1 adapter also supplies both 120VAC and a 32VDC auxiliary power which is a 2 pin connection. The adapter can be used as a 32V power supply that replaces the need for an OEM PRTBAP

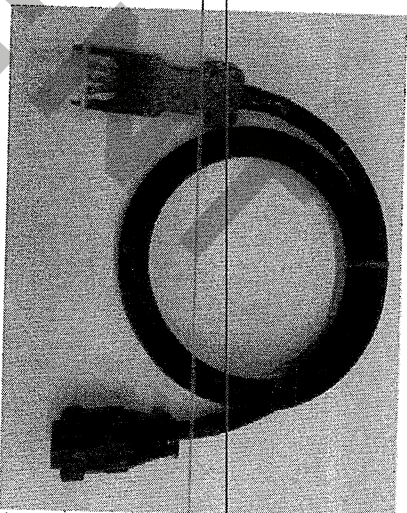


DSM4I1 BASE UNIT





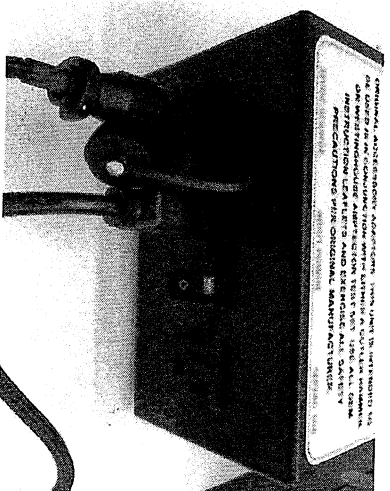
Above the **MAGNUM** harness DM-0024



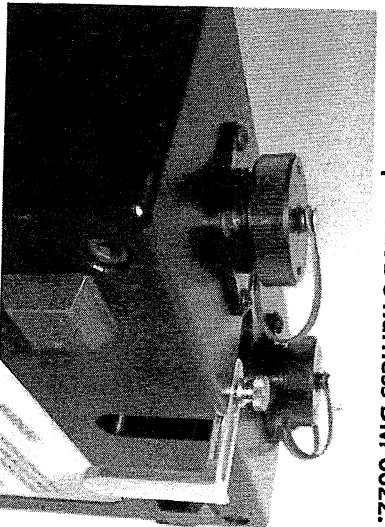
Above the **DS/DSII** harness DM-0023



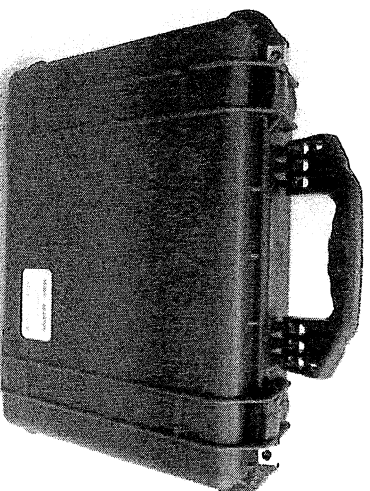
Above the **2 pin 32VDC** harness DM-0022.



Above the **10 amp fused switch.**

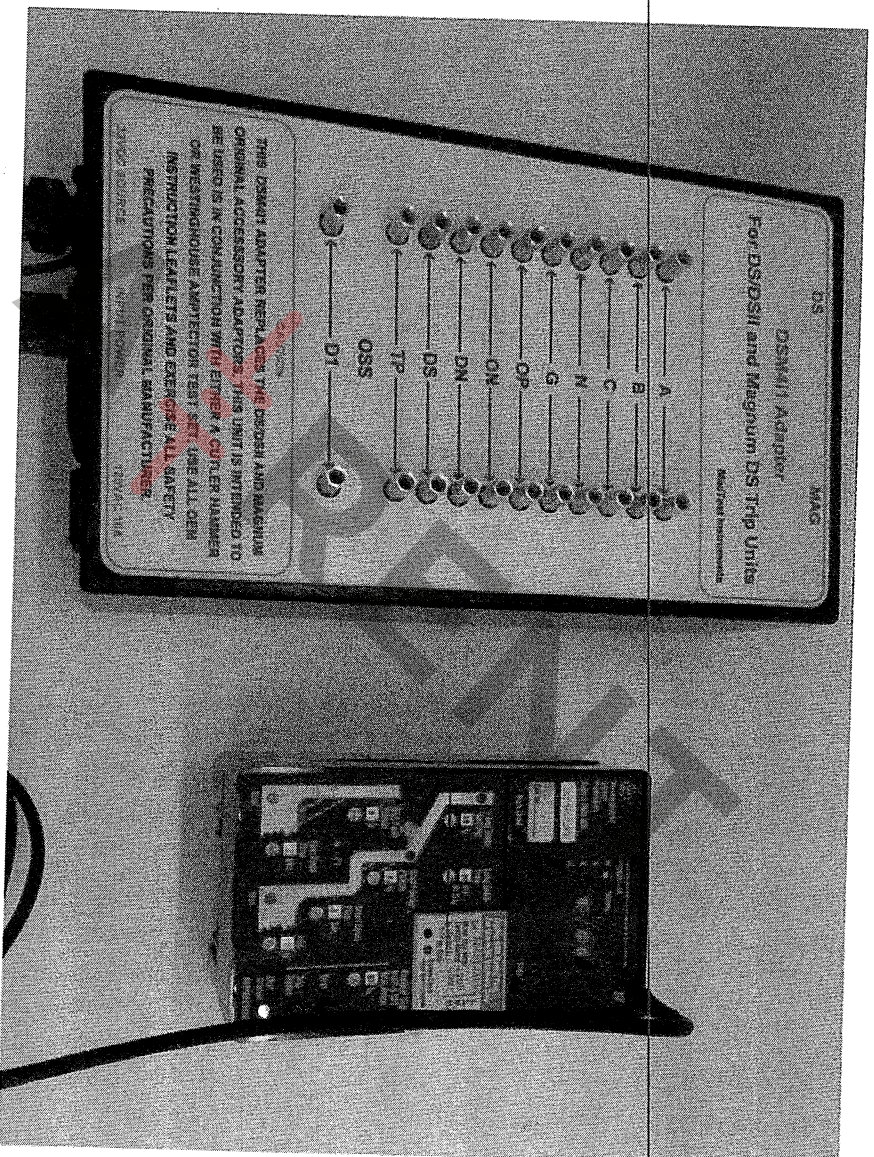


Adjustable strong slid clip for hanging yellow as an option while purchasing.



Pelican model **1520** cases offered in black and





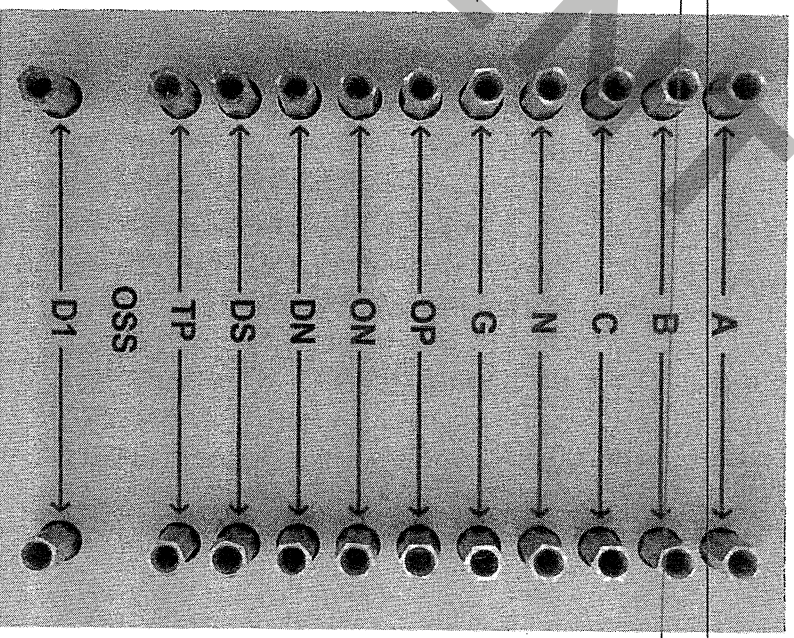
Above a Digitrip RMS 600 trip unit is connected to the DSM411 with an input power of 120VAC and on the left a 32V connection point for programming. The 120VAC input must be connected. This eliminates the need for an OEM PRTAAPM module. The DSM411 is designed to use on a bench top or hang it off switchgear.

Testing of LSIG Amprector Programmer is used for simplicity of running the base Amprector test set.

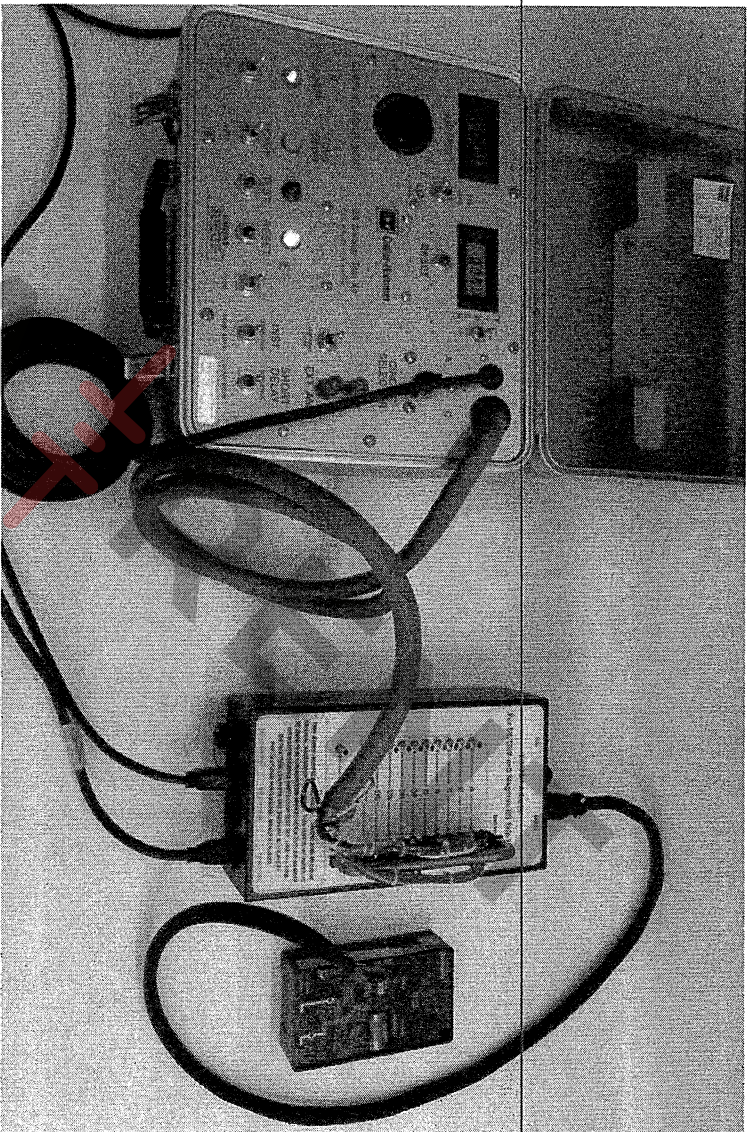


**Markings on Terminals of the DS & DS II adapter and Amptector (Reference Only)**

- A-Sensor Phase A →
- B-Sensor Phase B →
- C-Sensor Phase C →
- N-Sensor Neutral →
- G-Ground →
- OP-Output Positive →
- ON-Output Negative →
- DN-Test Point (internal neutral) →
- DS-Test Point →
- TP-Test Point →
- OSS not used
- D1-Test Point →



In the above photo F there are 22 terminals that mate up to the DSM411 Test Kit mail banana plugs. A brief description is provided for reference only.



In the photo above shows a typical set up with the MAG connection Checking of DS Test Set connected to a 520M Digitrip Programmer.

When beginning testing to avoid over heating the base unit and programmer only hold the calibration in the momentary position no more than 15 seconds. If running a test and the current does not shut down then use the STOP switch to stop test.

~~Zone interlock is required if the circuit breaker is removed from its cubical. Zone interlock is~~  
Cutler Hammer part # 8779C02G06 NOT INCLUDED.



Test Kit check list below shown for step by step test on an OEM Base Test Kit. You can refer to Cutler Hammer I.L. 32-693A and Ampptector I.L 33-791 for OEM directions. The DSM4i1 is designed to operate the same way as a standard DS/DSII or Magnum Adapter.

1. Connect the polarized plug from the test kit to DSM4i1 Adaptor.
2. Timer Switch to OFF / HI-LO SWITCH to TO AMPS / CURRENT ADJUST TO ZERO.
3. Plug tester into 120 volts 60 hertz outlet on DSM4i1 / Turn Power Switch ON.
4. Power Pilot Lamp (red) should light / RESET Pilot lamp (amber) should light.
5. IF RESET pilot lamp is not lit / push RESET button the Reset Pilot Lamp should then light.
6. Turn TIMER switch ON / Timer should not run / Push TEST button.
7. Test Pilot lamp (red) should light / RESET pilot lamp (amber) should go out.
8. Timer should operate counting seconds / Operate STOP toggle switch to stop Timer.
9. Timer should stop / RESET pilot lamp (amber) should light / TEST pilot lamp (red) should go out.
10. Push manual RESET button on timer / TIMER should reset to zero.
11. Hold CALIB toggle switch (momentary) in CALIB position and turn CURRENT ADJUSTMENT knob from zero to max.
12. NOTE: if current remains at zero check shorting bar across EXT AM check for tightness / if shorting bar is missing a substitute can be made using # 10 gage wire and spade terminals as a jumper between the two red terminals.
13. Return CURRENT ADJUSTMENT knob to ZERO.
14. Put HI-LO switch in HI AMPS position and repeat previous step turn CURRENT ADJUSTMENT knob from zero to max.
15. If any checks do not work, operate the STOP switch and RESET button and repeat checks.



For simplicity and illustration purposes we used a standard 140D481G03 base unit and LISG Amprector programmer is used. The DSM4i1 would be used in the same way as this test and connected in between the trip unit and base test set.

### **LONG DELAY PICKUP TEST**

#### Test Procedure

Preset Test Kit **See photos 2A-7A** for Reference on page 11

HI-LO switch is LO/Timer is OFF/ Circuit Selector Switched to A/ Current Adjustment to ZERO

1. Set Programmer LONG DELAY setting on the programmer:

If your trip unit is an LISG turn Short Delay or Instantaneous pickup off or up to maximum

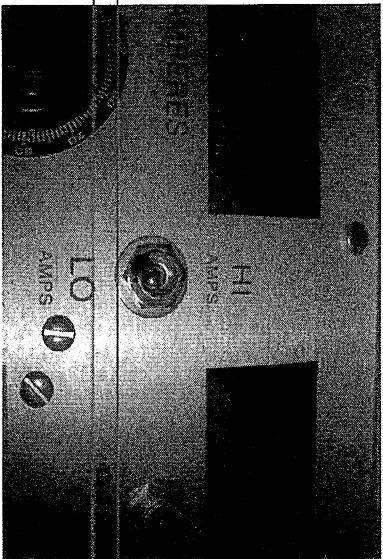
Set the Long Delay to desired setting,

2. Position Test Set Controls:  
Push RESET and then TEST,
3. Slowly Increase Current until the LONG DELAY lamp Glows steadily indicating Amprector Pickup, NOTE when the current is below the pickup the lamp will not light.

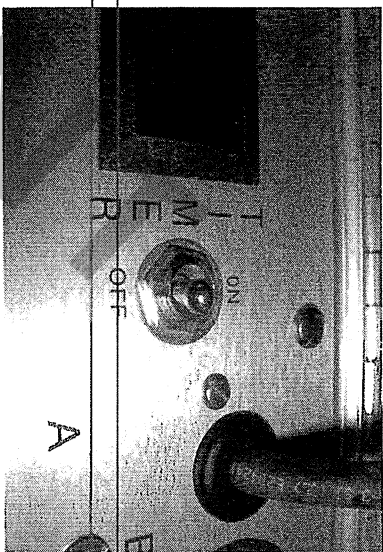
Use STOP switch to cut off current repeat on remaining B and C phases,

**NOTE 1:** To minimize thermal stress on the DS BREAKER TEST KIT and trip unit, start testing from the highest current settings and work down to the lowest current settings.

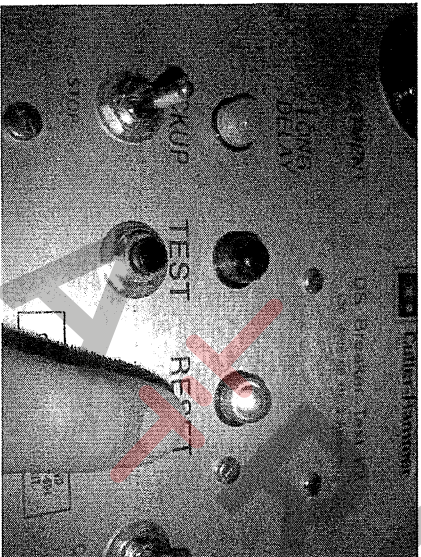
**NOTE 2:** For “CALIB” (MOMENTARY) toggle switch presets, do not hold the toggle switch for more than 15-20 seconds at a time.



2. A



3. A



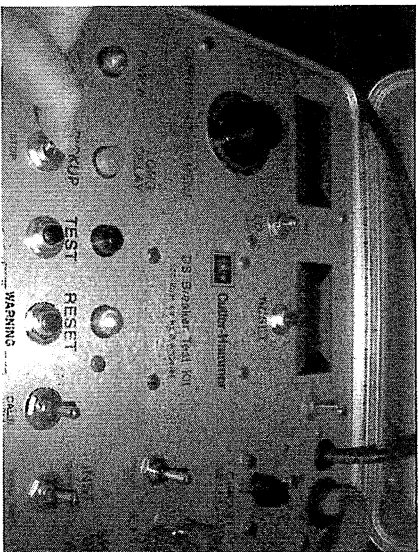
4. A



5. A



6. A



7. A

## LONG DELAY TIME TEST

### Test Procedure

1. Set Programmer Settings:

Set Long Delay

Position Test Set Controls:

Set HI-LO Switch to HI AMPS,

Preset current to 30 amps with CALLIB switch and I adjust, See **Picture 3.B page 13.**

Push RESET then Turn TIMER ON See **Picture 4.B and 5.B page 13.**

2. Push TEST, See **Picture 4.A and 5.B page 11.**

The timer will stop when the trip unit trips. The timer should read less than the preset setting however not under 2/3 of the setting. If set at 24 it should not be more than 16 seconds and under 24 seconds.

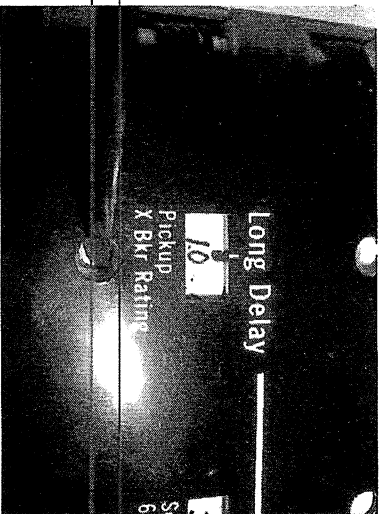
Note the  $I^2t$  = CONSTANT, so the trip time at other than 6 (In) is calculated  $(6/Z)^2 \times$  (Long Delay Time) = Trip Time a z current. Where z = multiples of LDPU when the test current is applied.

Example Long Time Delay Setting =24 seconds. Then 3 X Long Delay Pick Up current seeing would be applied.

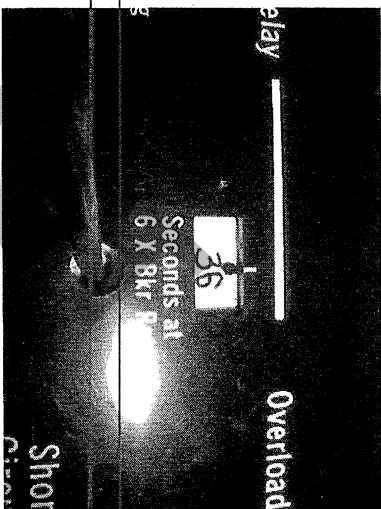
The Long Delay Trip Time would be:

$(6/3)^2 \times$  (24 Seconds) = 96 second Long Delay Time at Long Delay Pick Up. Use 5 amps LDPU setting to set the Ampetector test current.

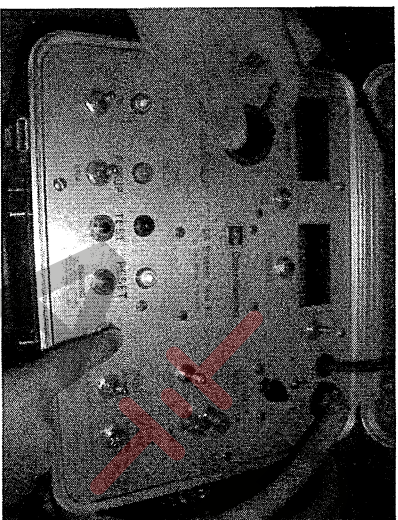




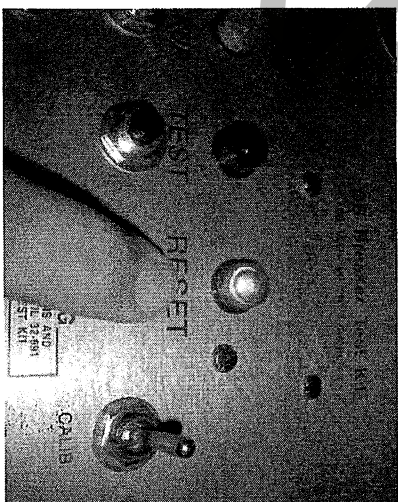
1. B



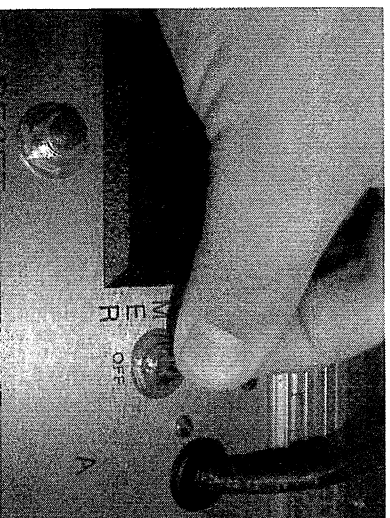
2. B



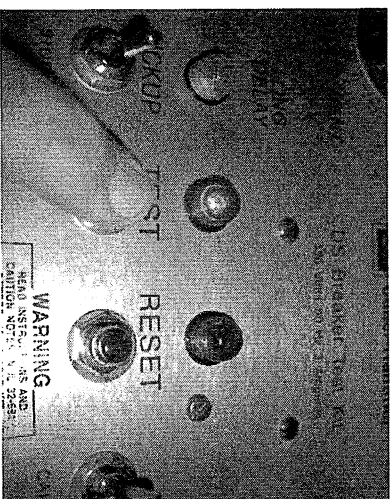
3. B



4. B



5. B



6. B

## INSTANTANEOUS TEST

### Test Procedure

1. Set Programmer Settings:

Set Long Delay to the highest range with an adjustment screwdriver, See **Picture 1.A page 10.**

Set INSTANTANEOUS to 2X, See **Picture 1.C page 15.**

2. Position Test Set Controls:

Set HI-LO Switch on HI

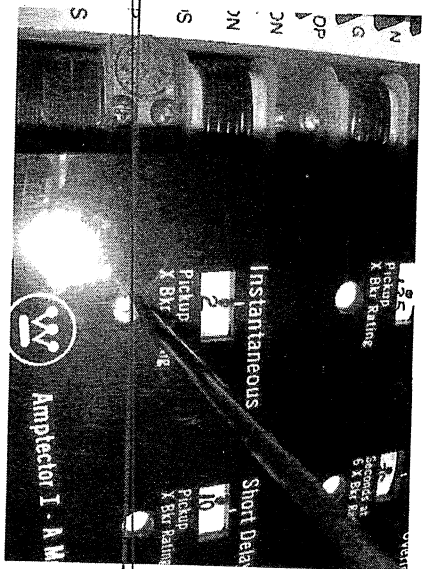
Set the SHORT DELAY switch to READ AMPS to disable the SHORT DELAY FUNCTION, See **Picture 2.C page 15.**

3. Push RESET then TEST and Increase CURRENT ADJUSTMENT steadily but quickly until red and white lamps go out leave ADJUSTMENT at trip point where lamps went out, See **Pictures 3.C, 4.C and 5.C page 15.**

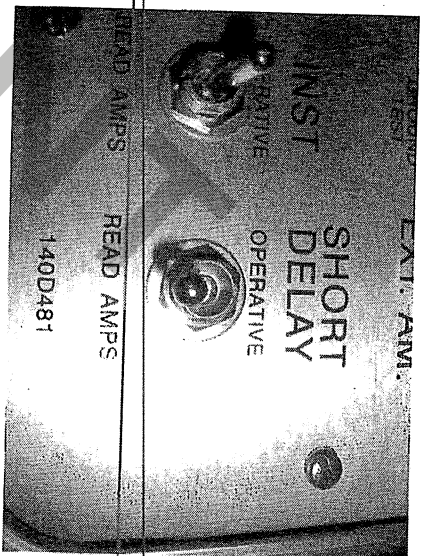
Push RESET then HOLD INST Switch to READ AMPS and push TEST button and read current, See **Picture 6.C page 15.**

---





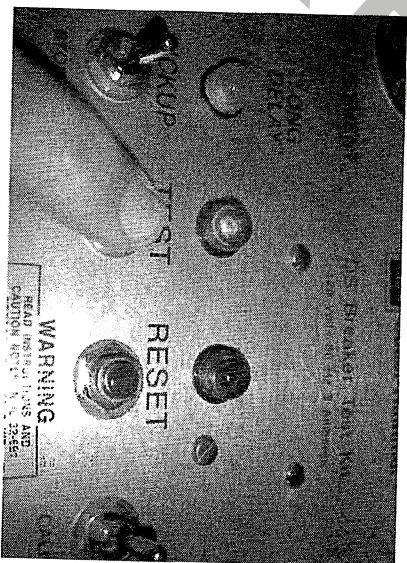
1. C



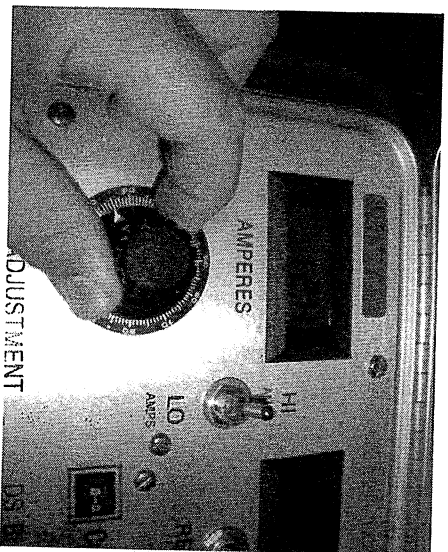
2. C



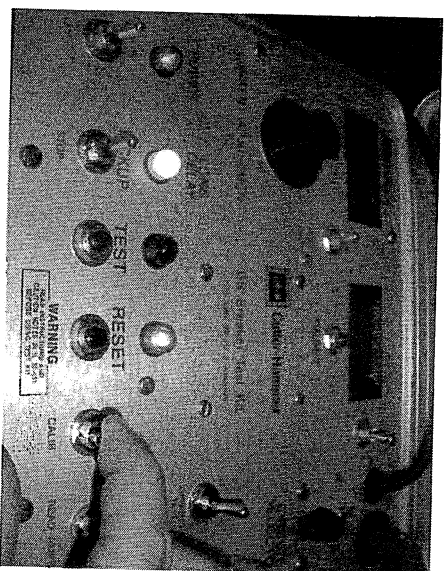
3. C



4. C



5. C



6. C

## SHORT DELAY PICKUP TEST

### Test Procedure

1. Set Programmer Settings:

Set INSTANTANEOUS to MAX Setting.

Set SHORT Delay to 4X and time to MIN or RED DOT, See Picture 1.D page 17.

2. Position Test Set Controls:

Set HI-LO Switch on HI,

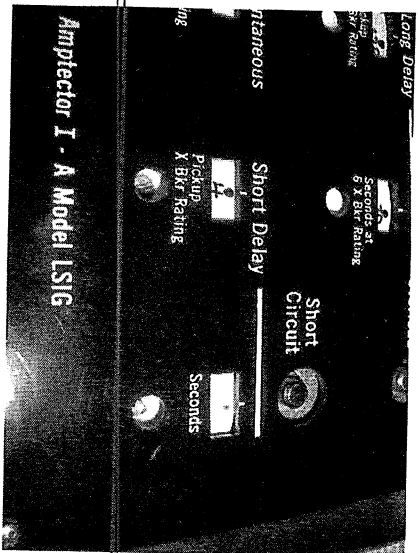
Set the SHORT DELAY switch to OPERATIVE position, See Picture 2.D page 17.

3. Push RESET then TEST and Increase CURRENT ADJUSTMENT steadily but quickly until red and white lamps go out leave ADJUSTMENT at point where lamps went out, See Pictures 3.D, 4.D and 5.D page 17.

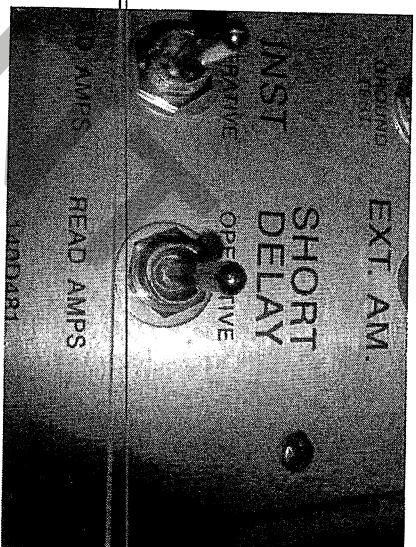
Set SHORT DELAY to READ AMPS, Push RESET then push TEST button and read current, Switch Stop after you take your record your reading. See Picture 6.C page 15.

---





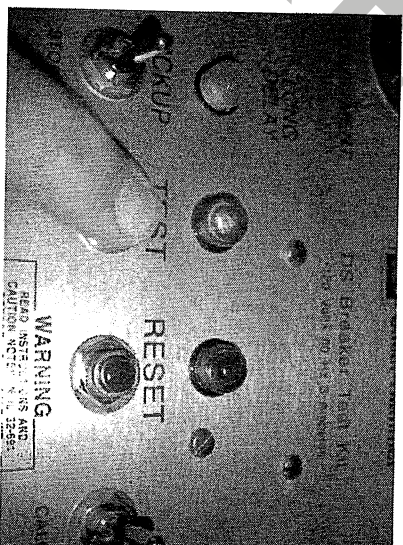
1. D



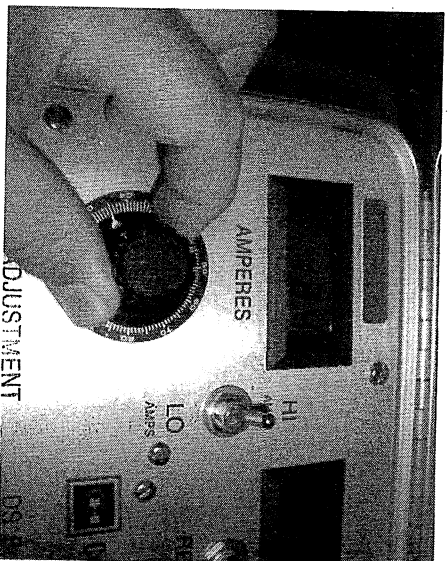
2. D



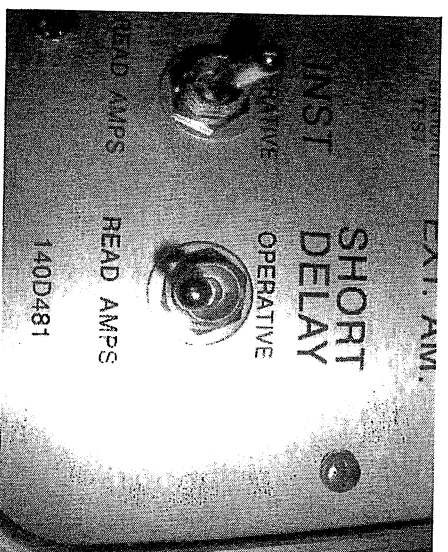
3. D



4. D



5. D



6. D

## SHORT DELAY TIME TEST

### Test Procedure

1. Set Programmer Settings:

Set SHORT Delay to 4X, set your Seconds to 0.18 Seconds, See Picture 1.E page 19.

2. Position Test Set Controls:

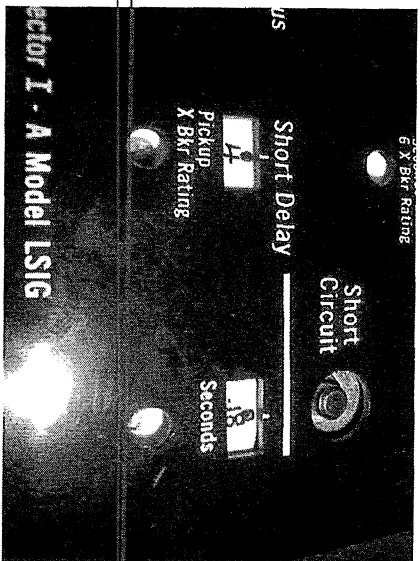
Set HI-LO Switch to HI AMPS,

Preset current to **25 amps** with CALIB switch and adjust I, See Picture 2.E page 19.

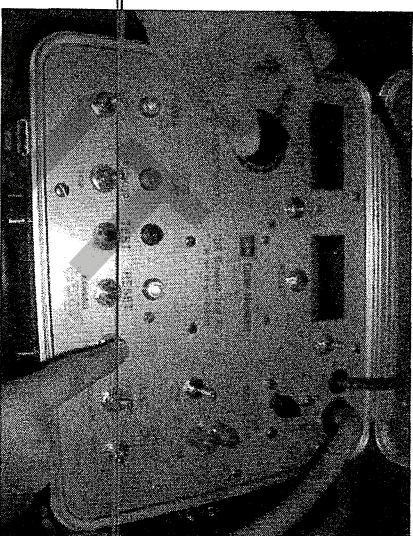
Turn TIMER ON and SHORT DELAY TO OPERATIVE, See Picture 4.E and 5.E page 19.

3. Push RESET, then TIMER RESET button then TEST and TIMER will give an approximate reading of the delay. This is a very quick test pay attention to results.





1. E



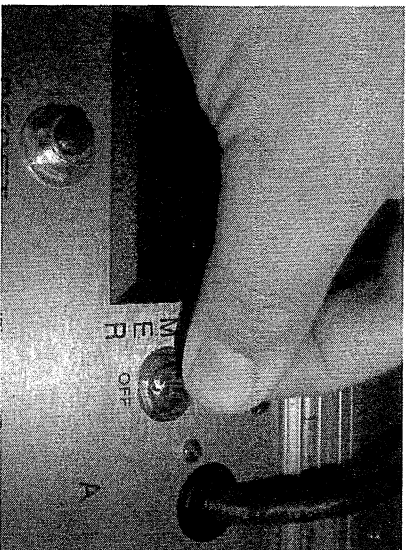
2. E



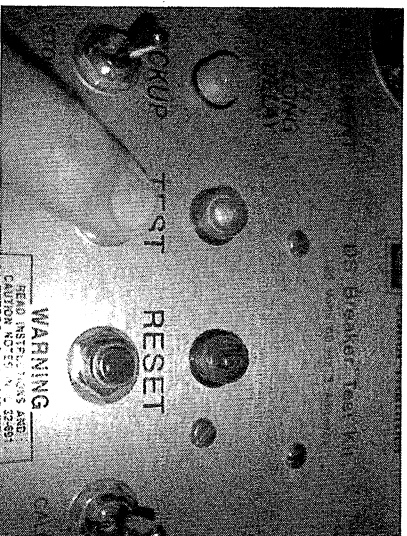
3. E



4. E



5. E



6. E



## GROUND PICKUP TEST (IF APPLICABLE)

### Test Procedure

1. Set Programmer Settings:

Set GROUND PICKUP to A and Seconds to .22, See Picture 1.F page 21.

2. Position Test Set Controls:

Set HI-LO Switch to LO AMPS, Turn CURRENT ADJUSTMENT knob to Zero, See Picture 2.F page 21.

3. While holding down the GROUND TEST momentary switch, press RESET and then Press TEST, See Pictures 3.F, 4.F and 6.F page 21.

Turn CURRENT ADJUSTMENT knob slowly until unit trips, See Picture 5.F page 21.

See Table A for ground pickup values, the values are in secondary ampere values. To convert these readings to primary values multiply ammeter readings by  $I_H/5$ . FOR PICKUP VAULES PLEASE USE TABLE A ON PAGE 26.

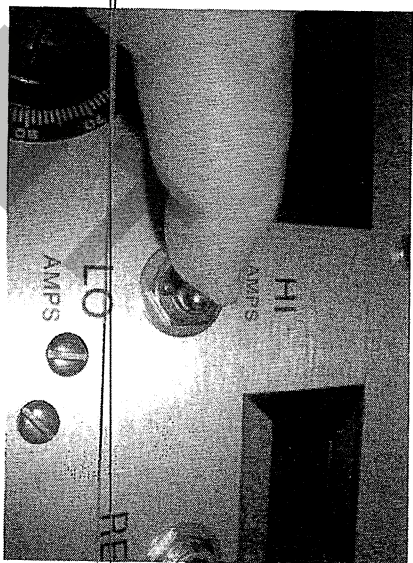
#### Example;

Assume  $I_H = 1.2$  amps,  $I_N = 200$ , pickup setting = .25

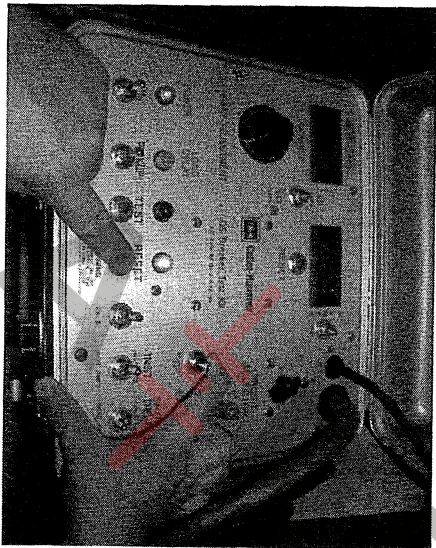
Then  $I_g = 1.2 \times 200/5 = 48$  primary amperes.



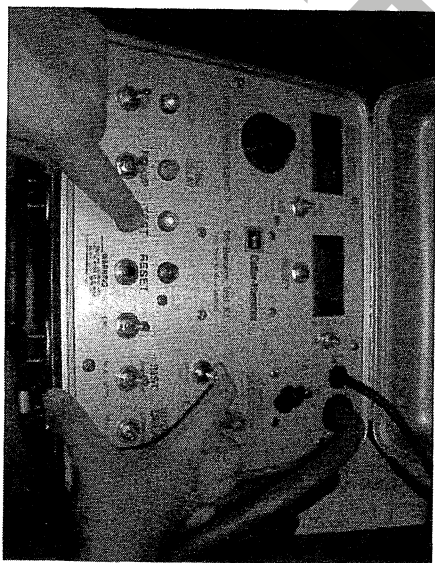
1. F



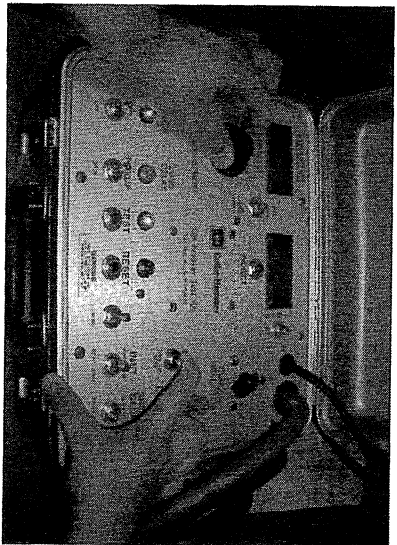
2. F



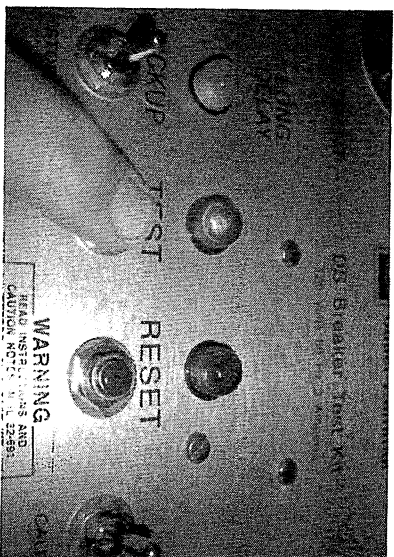
3. F



4. F



5. F



6. F

## GROUND FAULT TIME TEST

### Test Procedure

1. Set Programmer Settings:

Set Ground Pickup to A and Seconds to .22, See [Picture 1.G page 23](#).

2. Position Test Set Controls:

While holding down the GROUND TEST momentary and CALIB switch turn CURRENT ADJUST to 6.0 AMPS, See [Picture 2.G and 3.G page 23](#).

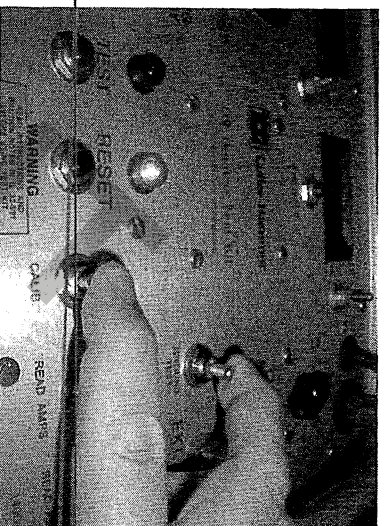
Turn Timer ON and push Timer Reset Button, See [Picture 5.G page 23](#).

3. Holding GROUND TEST switch down, PUSH RESET, TIMER RESET button and then TEST until trip Timer trips the unit will give an approximate reading of delay.





1. G



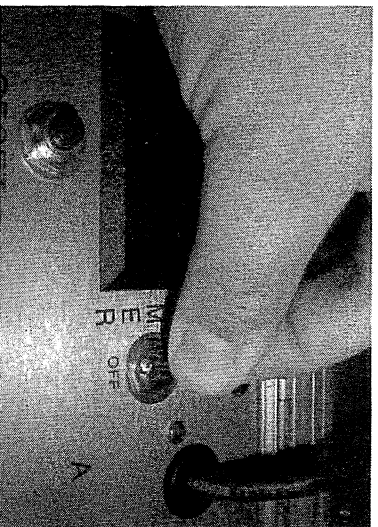
2. G



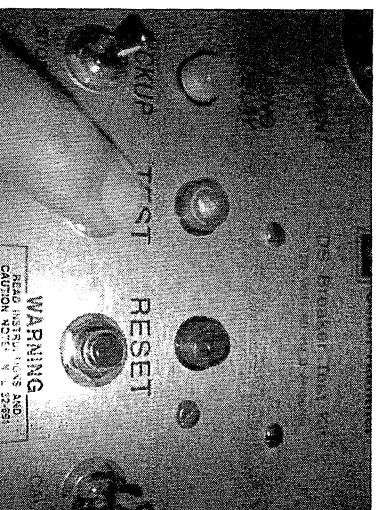
3. G



4. G



5. G



6. G

## LONG DELAY RESET TEST

### Test Procedure

1. Set Programmer Settings:

Set Inst, Short Delay, and Ground, Seconds to highest range with an adjustment screwdriver, [See Picture 1.A page 10](#).

Set Long Delay to 1.00 and Seconds to 36,

2. Position Test Set Controls:

Set HI-LO Switch to HI AMPS,

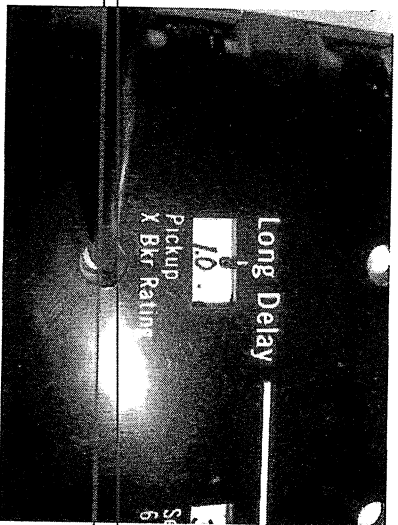
Switch SHORT DELAY to READ AMPS,

Preset current to 30 amps with CALIB switch and I adjust, [See Picture 3.B page 13](#).

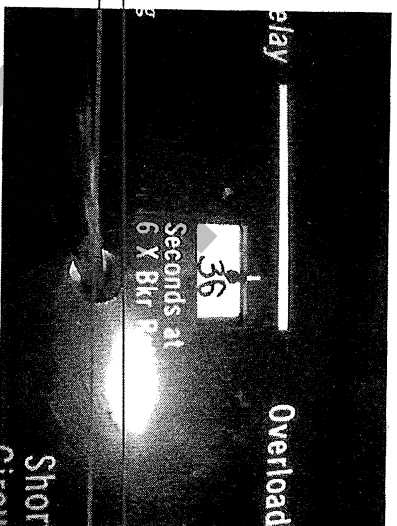
Turn TIMER ON [See Picture 5.H page 25](#).

3. Push RESET and then TEST, [See Picture 4.H and 6.H page 25](#).
4. Push reset the Timer and then TEST and run the test again.

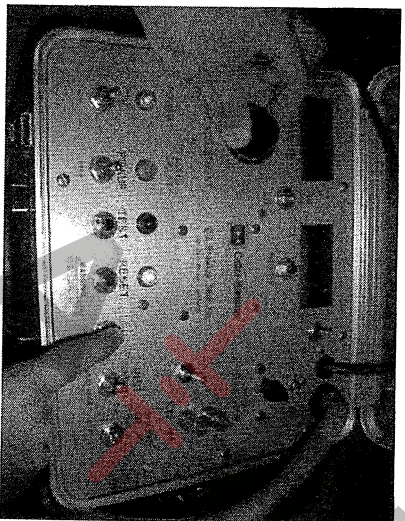




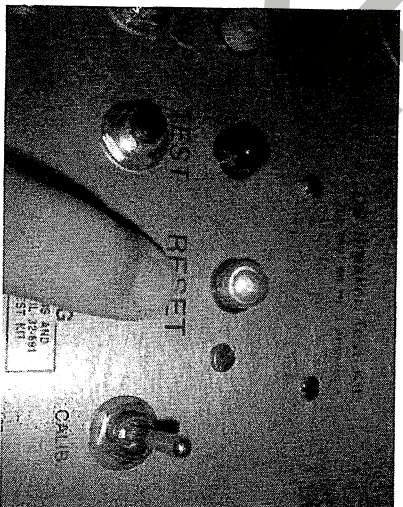
1. H



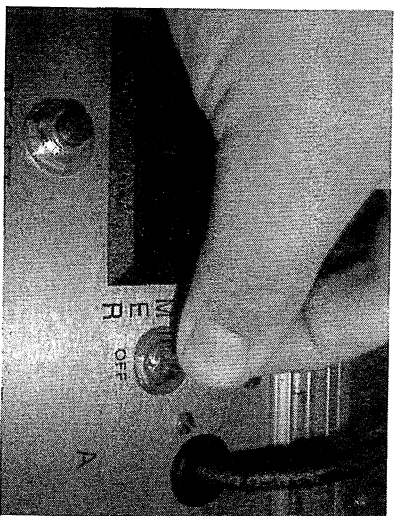
2. H



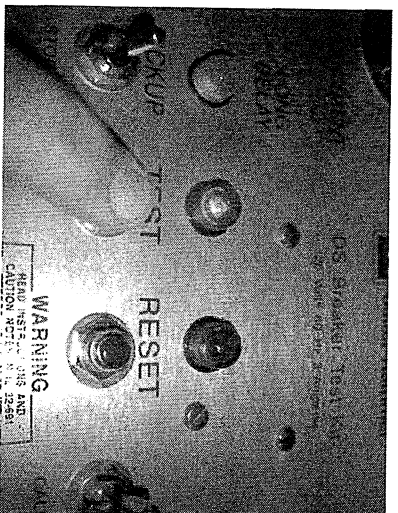
3. H



4. H



5. H



6. H

**Below is the Ground Fault Current Pickup Settings (These are on the test kit display)**

**TABLE A**

Installed Rating Plug Amperes (I) <sup>1</sup>	Pickup Setting (I) <sup>1</sup>	and Corresponding Pickup Levels (Secondary Amperes) <sup>12</sup>
100	.25	.30
100	.25	.35
100	.25	.40
100	.25	.50
100	.25	.60
100	.25	.75
100	.25	1.0
200	1.25	1.50
200	1.25	1.75
200	1.25	2.00
200	1.25	2.50
200	1.25	3.00
200	1.25	3.75
200	1.25	5.00
300	1.25	1.50
300	1.25	1.75
300	1.25	2.00
300	1.25	2.50
300	1.25	3.00
300	1.25	3.75
300	1.25	5.00
400	1.25	1.50
400	1.25	1.75
400	1.25	2.00
400	1.25	2.50
400	1.25	3.00
400	1.25	3.75
400	1.25	5.00
600	1.25	1.50
600	1.25	1.75
600	1.25	2.00
600	1.25	2.50
600	1.25	3.00
600	1.25	3.75
600	1.25	5.00
800	1.25	1.50
800	1.25	1.75
800	1.25	2.00
800	1.25	2.50
800	1.25	3.00
800	1.25	3.75
800	1.25	5.00
1000	1.25	1.50
1000	1.25	1.75
1000	1.25	2.00
1000	1.25	2.50
1000	1.25	3.00
1000	1.25	3.75
1000	1.25	5.00
1200	1.25	1.50
1200	1.25	1.75
1200	1.25	2.00
1200	1.25	2.50
1200	1.25	3.00
1200	1.25	3.75
1200	1.25	5.00
1600	1.25	1.50
1600	1.25	1.75
1600	1.25	2.00
1600	1.25	2.50
1600	1.25	3.00
1600	1.25	3.75
1600	1.25	5.00
2000	1.25	1.50
2000	1.25	1.75
2000	1.25	2.00
2000	1.25	2.50
2000	1.25	3.00
2000	1.25	3.75
2000	1.25	5.00
2400	1.25	1.50
2400	1.25	1.75
2400	1.25	2.00
2400	1.25	2.50
2400	1.25	3.00
2400	1.25	3.75
2400	1.25	5.00
3200	1.25	1.50
3200	1.25	1.75
3200	1.25	2.00
3200	1.25	2.50
3200	1.25	3.00
3200	1.25	3.75
3200	1.25	5.00
4000	1.25	1.50
4000	1.25	1.75
4000	1.25	2.00
4000	1.25	2.50
4000	1.25	3.00
4000	1.25	3.75
4000	1.25	5.00
5000	1.25	1.50
5000	1.25	1.75
5000	1.25	2.00
5000	1.25	2.50
5000	1.25	3.00
5000	1.25	3.75
5000	1.25	5.00

**Below is the Ground Fault Pickup Settings (These are the primary amperes on test kit)**

**TABLE B**

Installed Rating Plug Amperes (I) <sup>n</sup>	Pickup Setting (I) <sup>g</sup>	and Corresponding Pickup Levels (Secondary Amperes) <sup>12</sup>
100	.25	.30
100	.25	.35
100	.25	.40
100	.25	.50
100	.25	.60
100	.25	.75
100	.25	1.0
200	1.50	1.50
200	1.50	1.75
200	1.50	2.00
200	1.50	2.50
200	1.50	3.00
200	1.50	3.75
200	1.50	5.00
300	1.50	1.50
300	1.50	1.75
300	1.50	2.00
300	1.50	2.50
300	1.50	3.00
300	1.50	3.75
300	1.50	5.00
400	1.50	1.50
400	1.50	1.75
400	1.50	2.00
400	1.50	2.50
400	1.50	3.00
400	1.50	3.75
400	1.50	5.00
600	1.50	1.50
600	1.50	1.75
600	1.50	2.00
600	1.50	2.50
600	1.50	3.00
600	1.50	3.75
600	1.50	5.00
800	1.50	1.50
800	1.50	1.75
800	1.50	2.00
800	1.50	2.50
800	1.50	3.00
800	1.50	3.75
800	1.50	5.00
1000	1.50	1.50
1000	1.50	1.75
1000	1.50	2.00
1000	1.50	2.50
1000	1.50	3.00
1000	1.50	3.75
1000	1.50	5.00
1200	1.50	1.50
1200	1.50	1.75
1200	1.50	2.00
1200	1.50	2.50
1200	1.50	3.00
1200	1.50	3.75
1200	1.50	5.00
1600	1.50	1.50
1600	1.50	1.75
1600	1.50	2.00
1600	1.50	2.50
1600	1.50	3.00
1600	1.50	3.75
1600	1.50	5.00
2000	1.50	1.50
2000	1.50	1.75
2000	1.50	2.00
2000	1.50	2.50
2000	1.50	3.00
2000	1.50	3.75
2000	1.50	5.00
2400	1.50	1.50
2400	1.50	1.75
2400	1.50	2.00
2400	1.50	2.50
2400	1.50	3.00
2400	1.50	3.75
2400	1.50	5.00
3200	1.50	1.50
3200	1.50	1.75
3200	1.50	2.00
3200	1.50	2.50
3200	1.50	3.00
3200	1.50	3.75
3200	1.50	5.00
4000	1.50	1.50
4000	1.50	1.75
4000	1.50	2.00
4000	1.50	2.50
4000	1.50	3.00
4000	1.50	3.75
4000	1.50	5.00
5000	1.50	1.50
5000	1.50	1.75
5000	1.50	2.00
5000	1.50	2.50
5000	1.50	3.00
5000	1.50	3.75
5000	1.50	5.00

For the Digitrip 1150 settings they are non-discrete and can fall between the numbers listed above. The values must then be calculated (I<sub>g</sub> X In max 1200A)

Except as noted, the tolerances on pickup levels are ±10% of values in the tables above.



MADTEST INSTRUMENTS A DIVISION OF MADISON TESTING & ACQUISITION SERVICES LLC IS NOT RESPONSIBLE FOR DROPPED OR DAMAGED TEST EQUIPMENT, OR IF THE TEST EQUIPMENT ADAPTER OR BASE UNIT ARE USED BEYOND THEIR CAPABILITIES. USE CAUTION AND INSURE YOU ARE QUALIFIED TO PERFORM ELECTRICAL TESTING. ALWAYS INSURE NO EXTERNAL VOLTAGES ARE PRESENT WHEN REMOVING THE PROGRAMMER OR ~~CIRCUIT BREAKER FROM THE CUBICAL.~~

THE DSM411 IS AN ALL INCLUSIVE ADAPTER. FIRST WE BUILT THIS PRODUCT IN THE USA. AND WE BROUGHT THE DSM411 TO LIFE FOR OUR CUSTOMERS WHO COULD NOT GET THE ORIGINAL OEM ADAPTERS AND STILL WISHED TO USE THEIR BASE AMPTECTOR TEST KIT. THE DSM411 IS DESIGNED TO INSURE THE CUSTOMER HAS A LONG LASTING DURABLE ADAPTER FOR LONGEVITY. DEVELOPED FROM OUR EXPERIENCE IN THE FIELD WE ARE CONFIDENT THIS WILL BE AN ADAPTER WILL BE THE LAST ADAPTER YOU NEED FOR THIS SERIES OF TRIP UNITS.

*We will offer a 2 year manufactures warranty on repair or replacement of the adapter. The warranty will start from day of delivery and in the customer's possession. Any concerns questions or technical support please call our office.*

Thank you for purchasing the DSM411.

For contact on spare parts or technical support please call;

MADTEST INSTRUMENTS

899 DURHAM ROAD MADISON CT, 06443

203-421-9388