Instructions for Ground Fault Protection Systems

I.L. 14517-F
File 29-700

INTRODUCTION

The Westinghouse Ground Fault Protection System, when properly installed on a grounded electrical distribution system, will sense and interrupt phase to ground fault current in excess of its trip setting. It consists of a Current Monitor, Solid State Ground Fault Sensor, protective device with Shunt Trip, and a pilot device or optional Test Panel. See Figs. 1, 2, 3 and 4. A Ground Fault Indicator used with the interlock GFP's is also available.

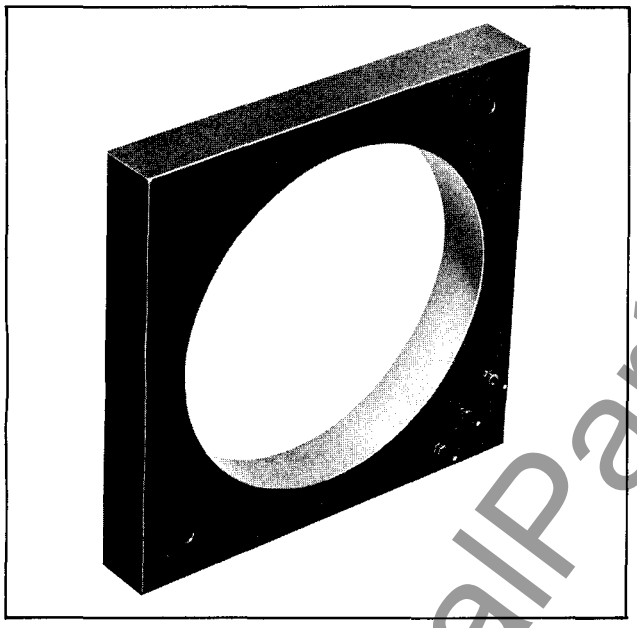

Fig. 1 *Current Monitor*

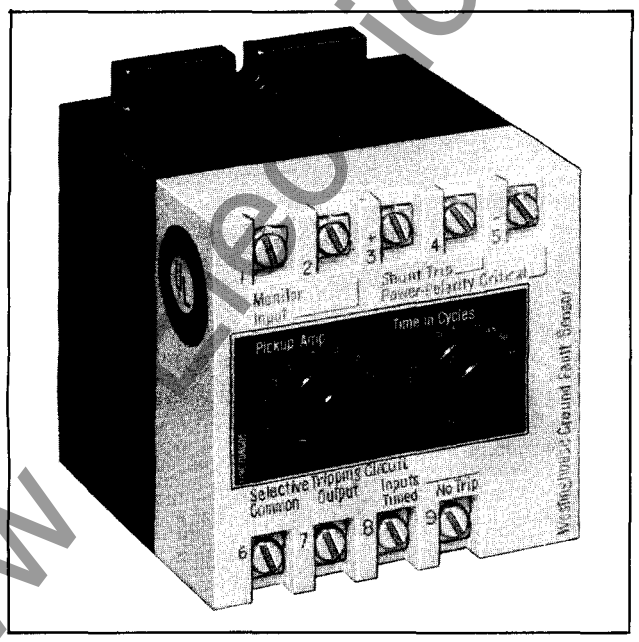

Fig. 2 *Solid State Ground Fault Sensor*

SENSOR

The solid state ground fault sensor is available in two types. The standard units, Catalog Numbers GFP60 and GFP1200, have adjustable current pick-up and tripping time ranges. These adjustments are readily made by means of the two adjusting knobs on the cover of the sensor.

Units with interlocked tripping circuit GFP60A and GFP1200A are for use when coordination is desired

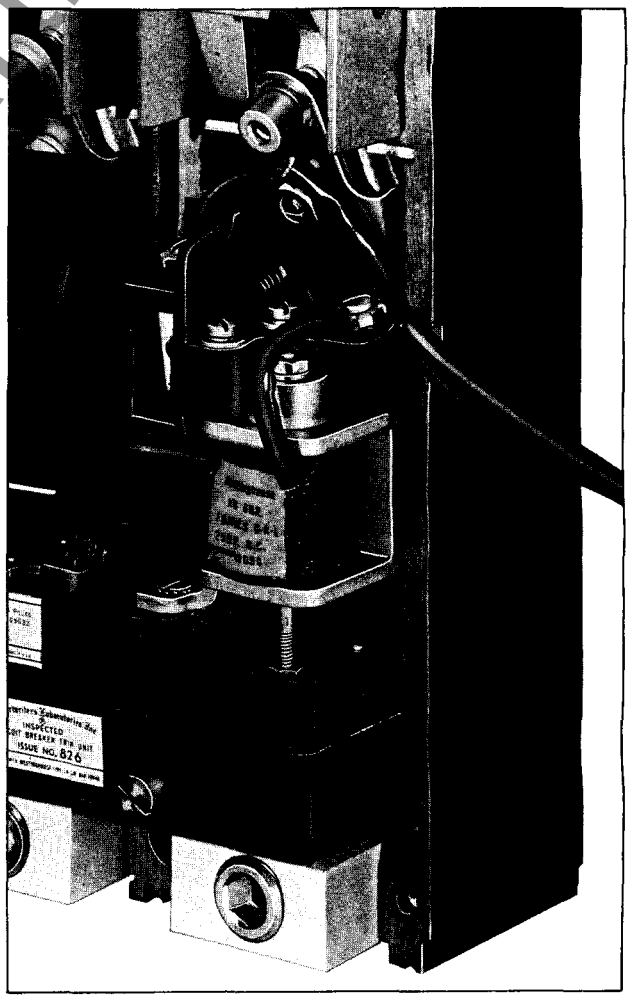

Fig. 3 *Shunt Trip in Protective Device*

between several sensors in the same system. This allows the sensor nearest the fault to initiate tripping and simultaneously send a signal to the sensors "up stream" to either delay tripping for a specified time or to block their tripping, thus the "up stream" portion of the system is not effected.

Fig. 4 *Optional Test Panel*

Table I - Sensor Units

Catalog Number	Style Number	Pick-Up Range	Time Delay Range	Inter-locking Circuit
GFP 60A	179C708G05	5-60	I-60 cycles	Yes
GFP 60	179C708G06	5-60	I-60 cycles	No
GFP 1200A	179C708G07	100-1200	I-60 cycles	Yes
GFP 1200	179C708G08	100-1200	I-60 cycles	No

Power

Power required to operate the sensor and shunt trip can be any voltage, depending on the shunt trip rating, 40-130 volts D-C or 35-130 volts, 60 Hz A-C, applied between terminals 3 and 5. When using D-C observe the polarity marks on Sensor. See Fig. 2. A 50 VA control transformer is sufficient to run a shunt trip and GFP.

Input

The input (signal) is obtained from a current monitor. The input terminals, 1 and 2, are non-polarized.

Output

The sensor output is connected to a shunt trip. The shunt trip may be rated either A-C or D-C. The shunt trip is connected to terminals 3 and 4 of the sensor using #14 wire. It is recommended that the length of leads be kept to a maximum of 250 feet. The sensor output will switch shunt trips with a maximum inrush current requirement of 8 amps and a steady state rating of 2.5 amps.

Warning: **1. Do not short output. This will burn out the sensor. 2. The sensor output shall be the only power that actuates the shunt trip.**

Reset

Once the sensor detects a fault and trips the shunt trip the sensor must be reset by interrupting its power supply with a pilot device or the optional test panel.

INTERLOCKED TRIPPING CIRCUIT

The output, the signal which is sent to the "up stream" sensor, is taken from terminals 6 (common) and 7 (output). See Fig. 2. A twisted pair of #14 or heavier wire is used to transmit the signal a maximum of 250 ft. No more than four interlocking sensors may be connected together.

If the upstream sensor is required to time, if the fault persists, then the output signal is sent to the timed input, terminals 6 (common) and 8 (timed). If the "up stream" sensor is not allowed to trip, then the output signal is sent to the no-trip input terminals 6 (common) and 9 (no-trip). The common (6) terminals are connected together. See Fig. 5. The pickup and time settings are made as if there were no interlocked tripping circuit.

CURRENT MONITORS

The monitors are supplied in various sizes and ratings. See Table 2.

The monitors are independent of system voltage. They are insulated units which can be laid in an enclosure or mounted in an enclosure. They must be installed so all the phase conductors and neutral conductors pass through the window opening of the monitor. For mounting dimensions, see Figs. 10 through 20. A test winding, terminals 2 and 3, is supplied on the monitor. Wiring diagrams are provided (Fig. 18 and 19) showing connections.

Table 2 - Current Monitors

Window Size	Style Number ©
5-60 Amps	
2-1/2" I.D.	179C768H01
5-1/2" I.D.	1256C13H01
8-1/4" I.D.	179C767H01
8" x 11" Rect.	1257C88G02©
3" x 18" Rect.	1257C93G01©
3" x 25" Rect.	1257C92G01
6-3/4" x 29-1/2" Rect.	1255C39H04©
100-1200 Amps	
2-1/2" I.D.	179C768H02
5-1/2" I.D.	1256C13H02
8-1/4" I.D.	179C767H02
8" x 11" Rect.	1257C88G01©
16" x 20" Rect.	1257C89G01
10" x 17" Rect.	1257C90G01
10" x 24" Rect.	1257C91G01
3" x 18" Rect.	1257C93G02
3" x 25" Rect.	1257C92G02
5" x 36" Rect.	1257C94G02©
6-3/4" x 29-1/2" Rect.	1252C39H03©

All rect. Current Monitors are split core for easy installation on existing conductors.

GROUND FAULT WARNING INDICATOR

The Ground Fault Warning Indicator is an optional package used in conjunction with the interlock circuit of the G.F.P. An input is supplied at approximately 30-50% of pickup setting. This causes power to be applied to the load connected to the Ground Fault Indicator. The load may be a lamp or relay. See Fig. 6.

Elec. Specs: Voltage - 120/110 VAC 50/60 Hz.
Max. Load - 132 VAC, 0.5A.

The Ground Fault Indicator is available in self-resetting and a unit that has to be reset. The self-resetting unit will reset when the interlock signal disappears. The normal unit has to be reset by interrupting power to the unit. This may be done by taking power from Pins 1 and 5 on Test Panel and using the reset button on Test Panel. For style numbers and mountings see Figs. 21 and 22.

The test panel, Fig. 4, can be purchased to completely test the ground fault sensor. A signal is injected into the current monitor test winding. The ground current sensor sees this as a fault and trips the protective device. It can be used to reset the sensor and to give an indication that the sensor has tripped the breaker. The system may be tested by tripping the breaker or, if this is not desirable, without tripping the breaker. The test panel may also be used as a remote trip. See Figs. 4 and 9.

The standard test panel is made to use with 120 volt, 60 cycle A-C power. Consult with factory for other voltage ratings. When the test panel is not used, a standard pilot device must be used to reset the system and pilot devices can be used to test the system as shown in Fig. 13. S^1 is used to disconnect the shunt trip to keep from tripping the breaker. R is to be adjusted to provide a 2.4 ampere A-C test signal at terminals 2 and 3 on monitor, when the momentary Switch S^2 is pressed. S^3, a momentary switch, is used to reset the sensor by interrupting power.

INDICATING AMMETER

The Indicating Ammeter is an accessory item for use with the GFP system. For style numbers and ratings see Table 3. For wiring and dimensions, see Figs. 22 and 23.

Table 3 - Indicating Ammeter

Style Number	Range
1255C51G02	5-60 Amp
1255C51G03	100-1200 Amp

Table 4

Style Number	Mounting	Resetting
1255C32G01	Relay Attachment	Pushbutton
1255C32G02	Panel Mounting	Pushbutton
1255C32G03	Relay Attachment	Self
1255C32G04	Panel Mounting	Self

Style Numbers for Ground Fault Indicator

© Changed since previous issue.

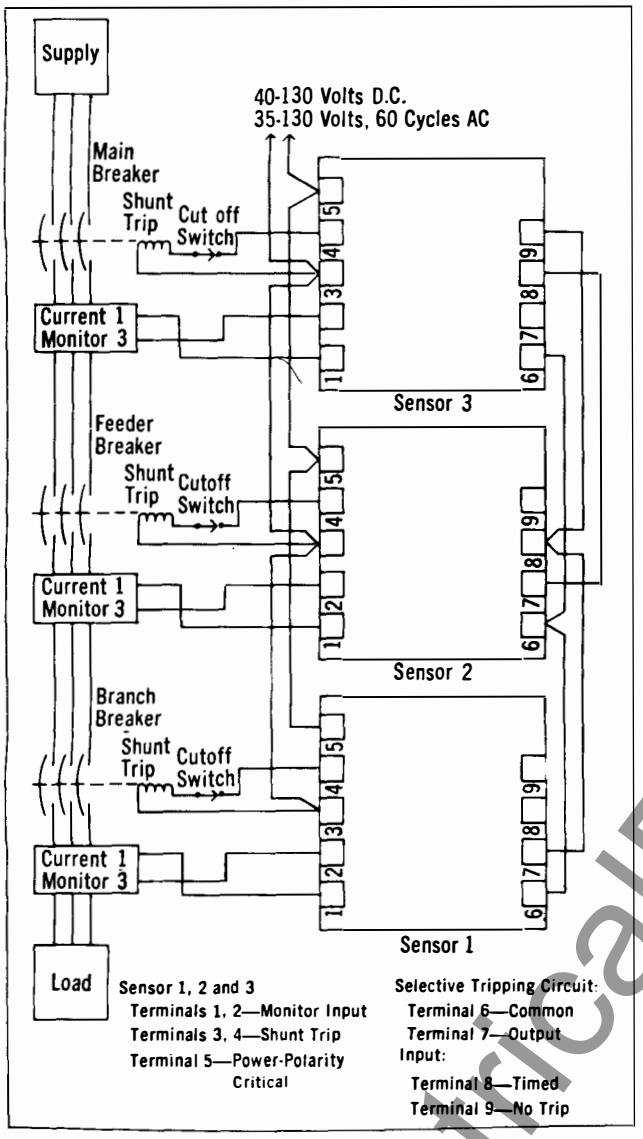

Fig. 5 *Sample Wiring Diagram*©

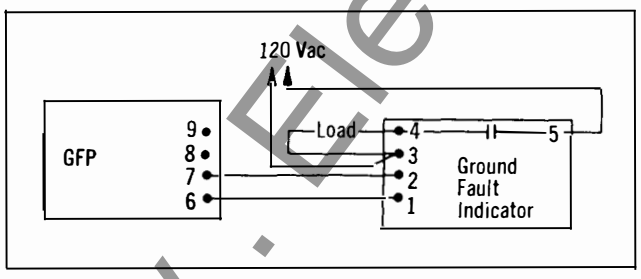

Fig. 6 *Wiring Diagram for Ground Fault Detector*

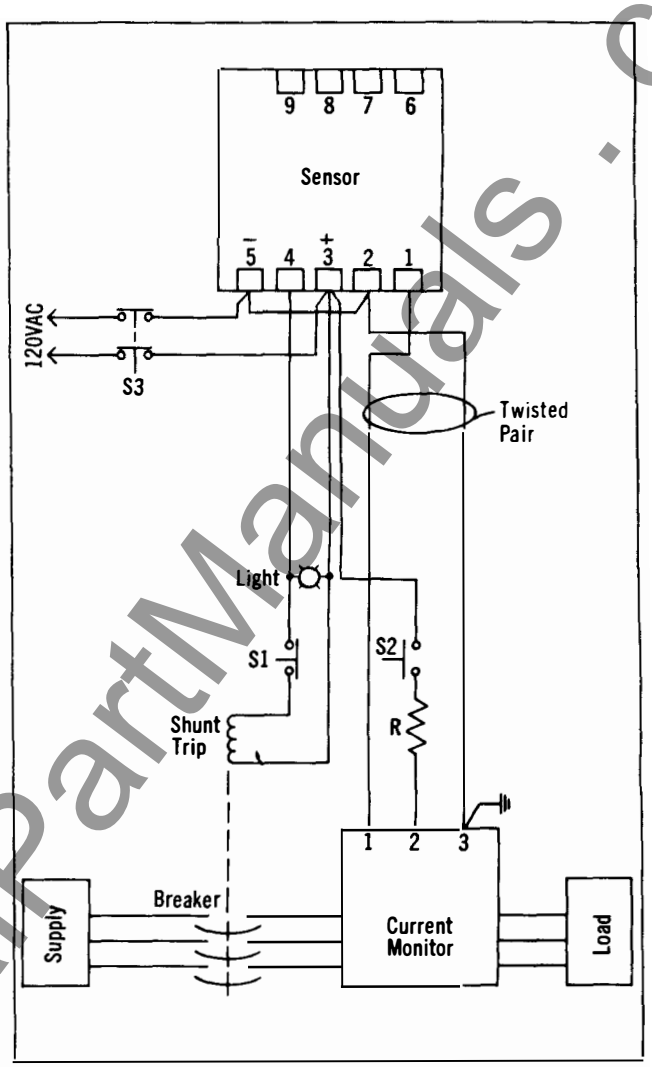

Fig. 7 *Wiring Diagram for Testing Without Test Panel* ©

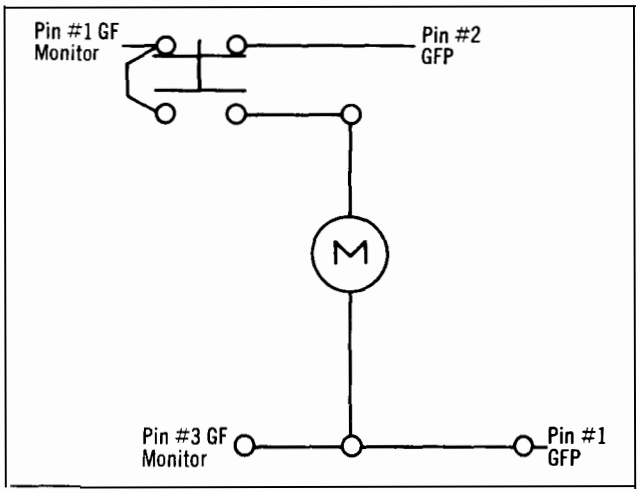

Fig. 8 *Indicating Ammeter Wiring*

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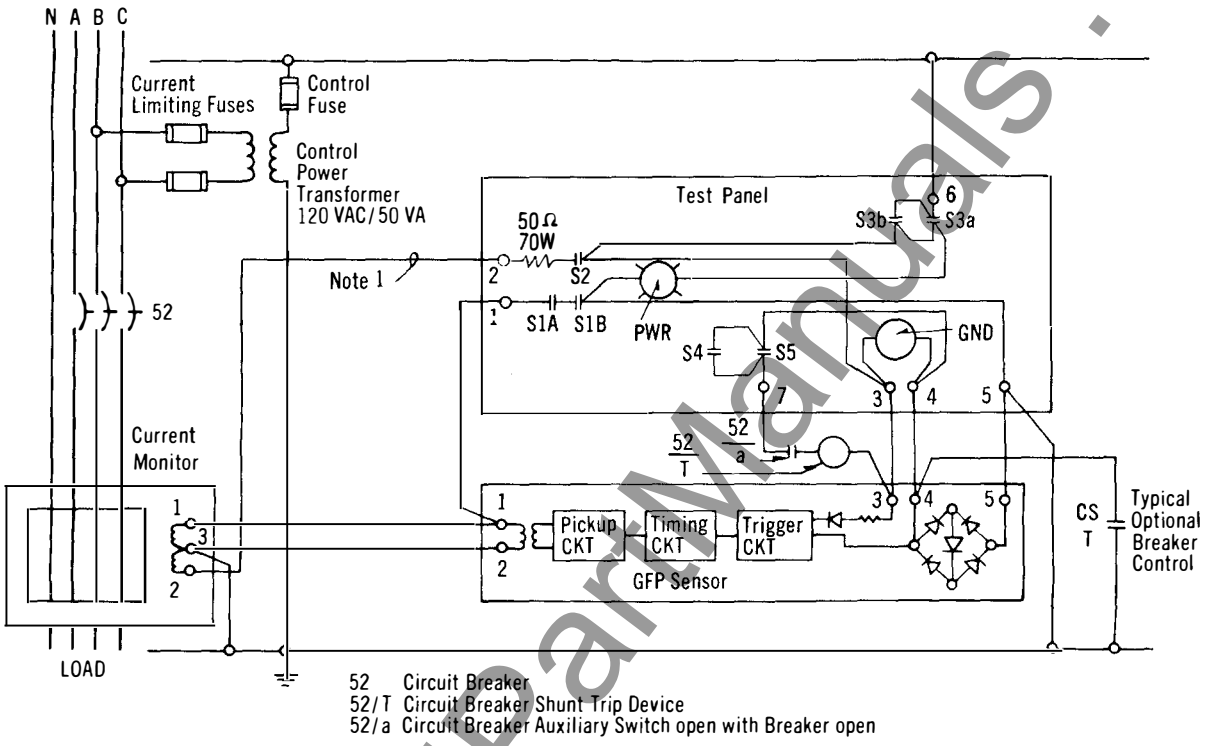

52 Circuit Breaker
52/T Circuit Breaker Shunt Trip Device
52/a Circuit Breaker Auxiliary Switch open with Breaker open

Normal Operating Condition
1. Sensor Power Lamp "On".
2. Ground Fault Lamp "Off".
3. Selector Switch Position "Normal".

If Ground Fault Occurs
1. Breaker/Interrupter "Opens".
2. Ground Fault Lamp Turns "On".

Action Required
1. Locate and clear Ground Fault Condition.
2. Turn Selector Switch to "Reset" (Hold one second)
3. Release Selector Switch.
   Spring returns to "Normal".
4. Reset and close Breaker/Interrupter.

To Test System Without Opening Breaker/Interrupter
1. Turn Selector Switch to "Test" (Hold one second).
   Ground Fault Lamp Turns "On".
2. Turn Selector Switch to "Reset" (Hold one second).
   Ground Fault Lamp Turns "Off".
3. Release Selector Switch. Spring returns to "Normal".

To Test System Complete By Opening Breaker/Interrupter
1. Depress and hold Ground Fault Lamp.
2. Turn Selector Switch to "Test" (Hold one second).
   Breaker/Interrupter "Opens".
   Ground Fault Lamp Turns "On".
3. Turn Selector Switch to "Reset" (Hold one second).
   Ground Fault Lamp Turns "Off".
4. Release Selector Switch.
   Spring returns to "Normal".
5. Release Ground Fault Lamp.
6. Reset and close Breaker/Interrupter.

Contact	Normal	Reset	Test No Trip	Test with Trip
S1A	O	X	X	X
S1B	X	X	O	O
S2	O	O	X	X
S3A	O	O	X	X
S3B	X	O	O	O
S4	X	O	O	O
S5	O	O	O	X

X = Closed Contact

Notes:
1. Current Monitor Test Circuitry cannot be used on DC Control Power unless a DC Convertor is used.

Fig. 9 *Wiring Diagram for Test Panel*

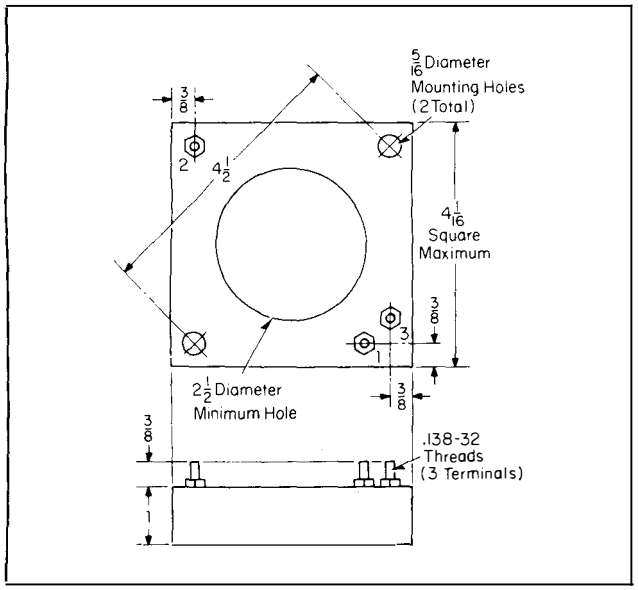

Fig. 10 *Mounting Dimension for S# 179C768H01, H02*

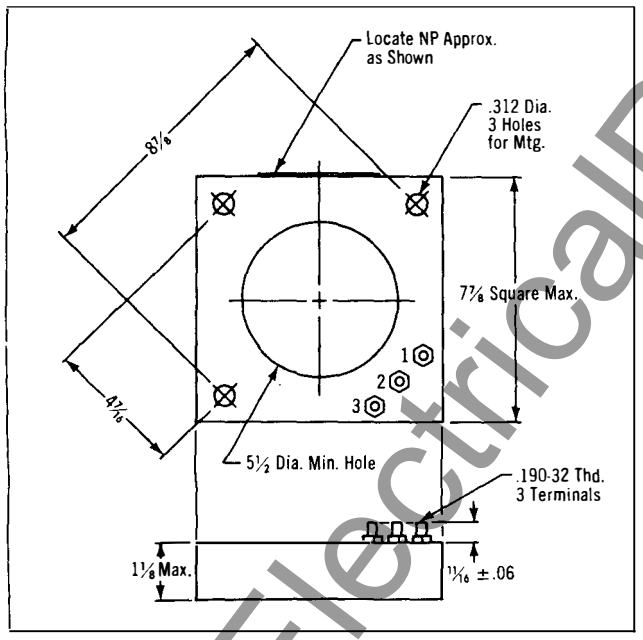

Fig. 11 *Mounting Dimension for S# 1256C13H01, H02*

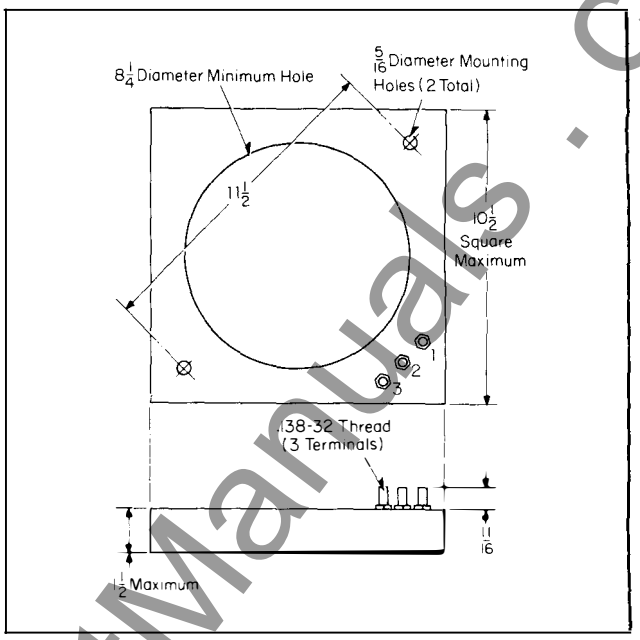

Fig. 12 *Mounting Dimension for S# 179C767H01, H02*

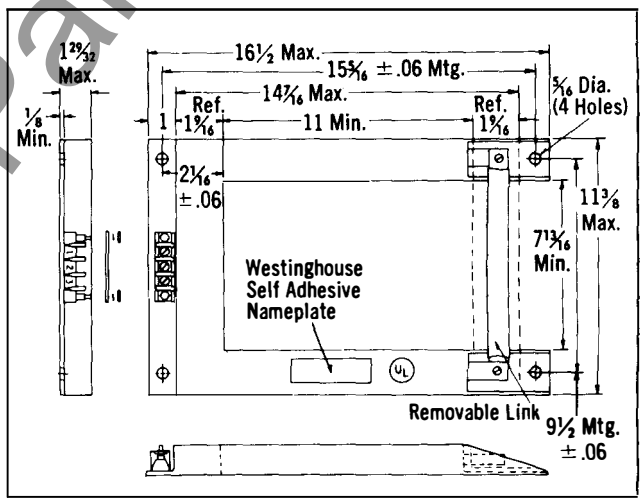

Fig. 13 *Mounting Dimension for S# 1257C88G01, G02*

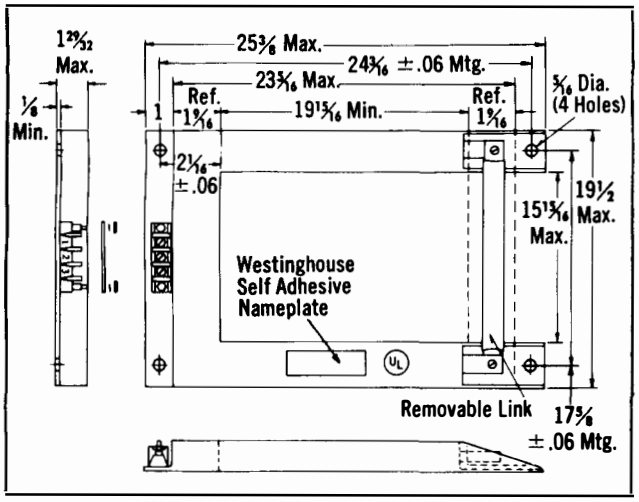

Fig. 14 *Mounting Dimension for S# 1257C89G01*

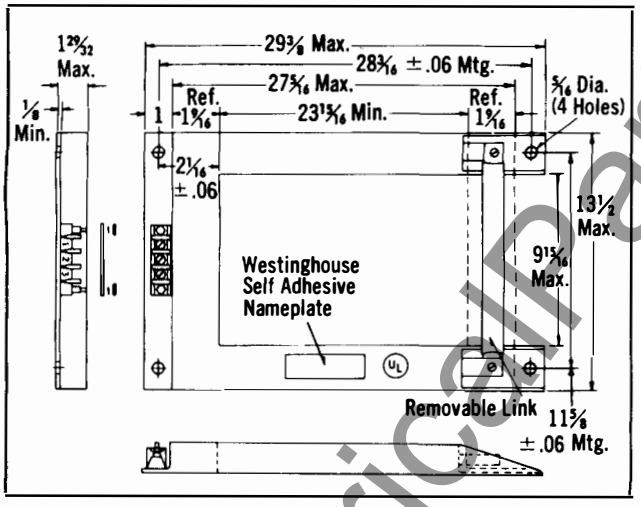

Fig. 15 *Mounting Dimension for S# 1257C91G01*

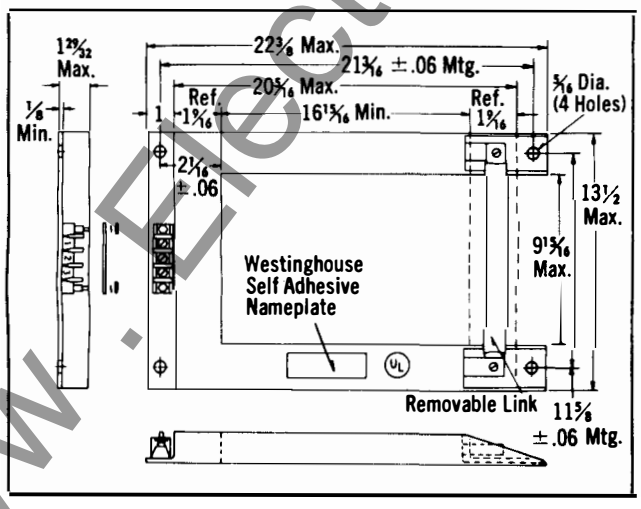

Fig. 16 *Mounting Dimension for S# 1257C90G01*

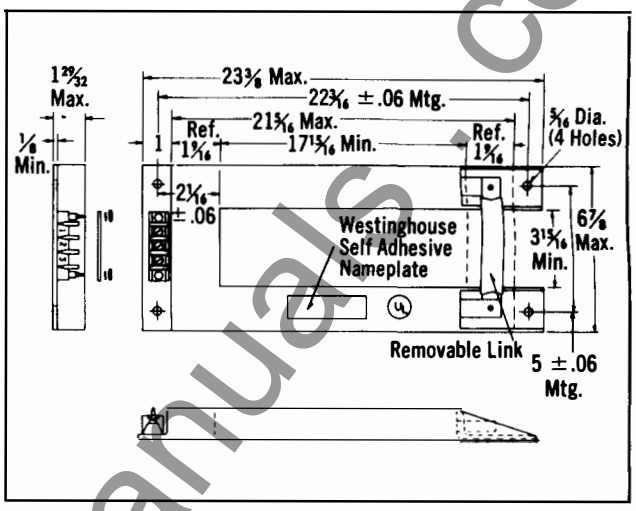

Fig. 17 *Mounting Dimension for S# 1257C93G01, G02*

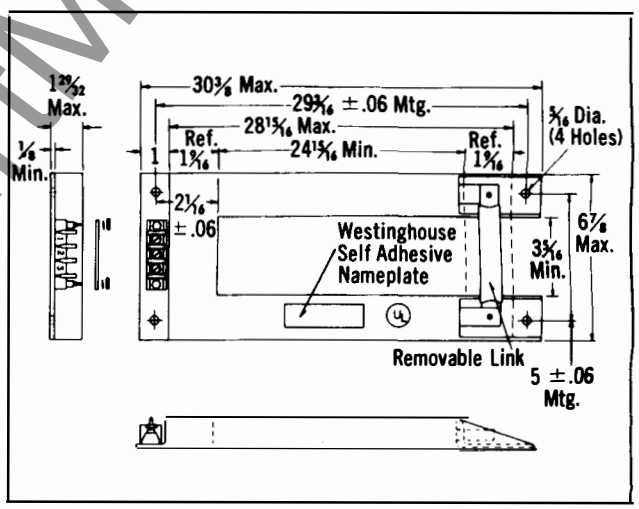

Fig. 18 *Mounting Dimension for S# 1257C92G01, G02*

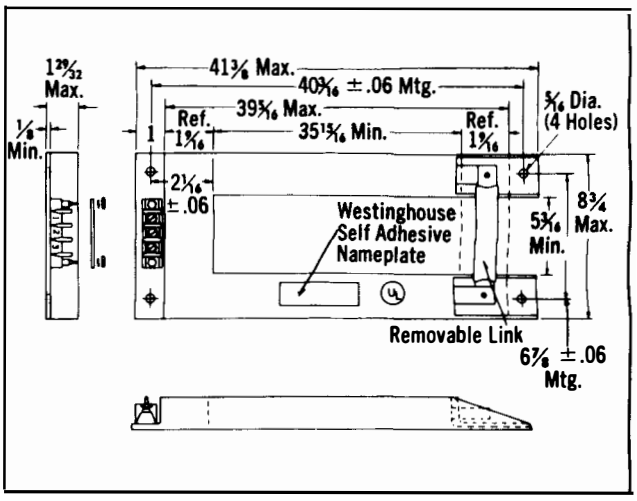

Fig. 19 *Mounting Dimension for S# 1257C94G02*

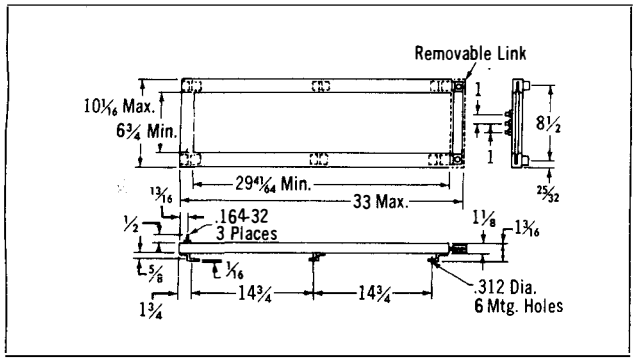

Fig. 20 *Mounting Dimension for S# 1255C39H03, H04*

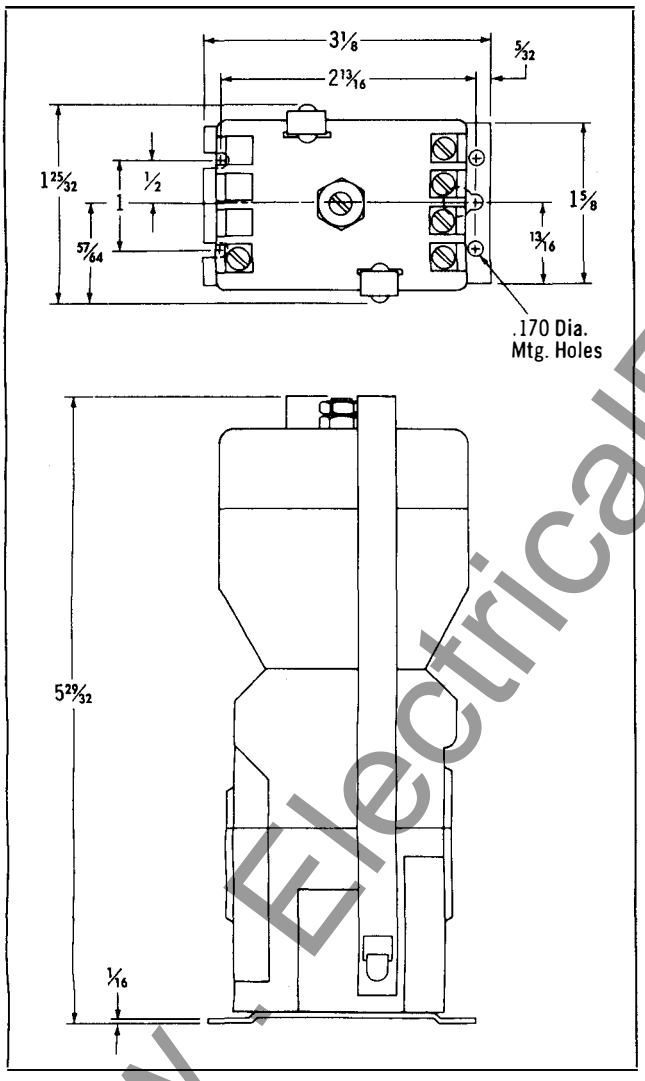

Fig. 21 *Relay Mounted Ground Fault Indicator S# 1255C32G01, G03*

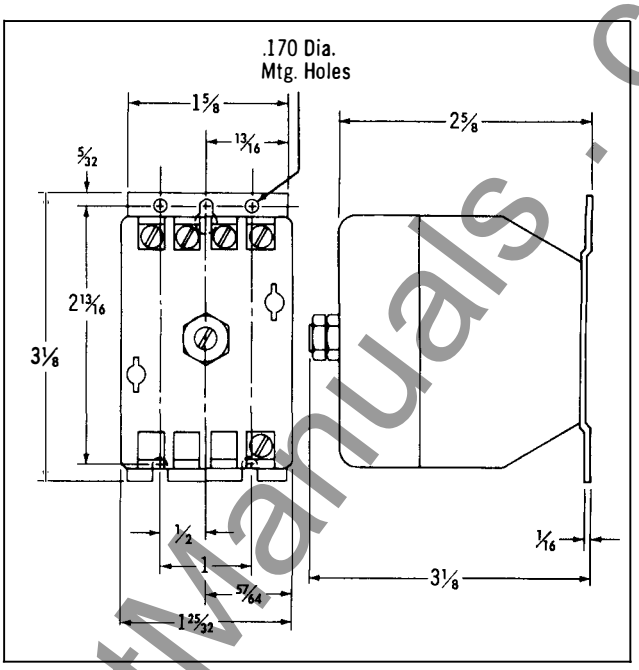

Fig. 22 *Panel Mounted Ground Fault Indicator S# 1255C32G02, G04*

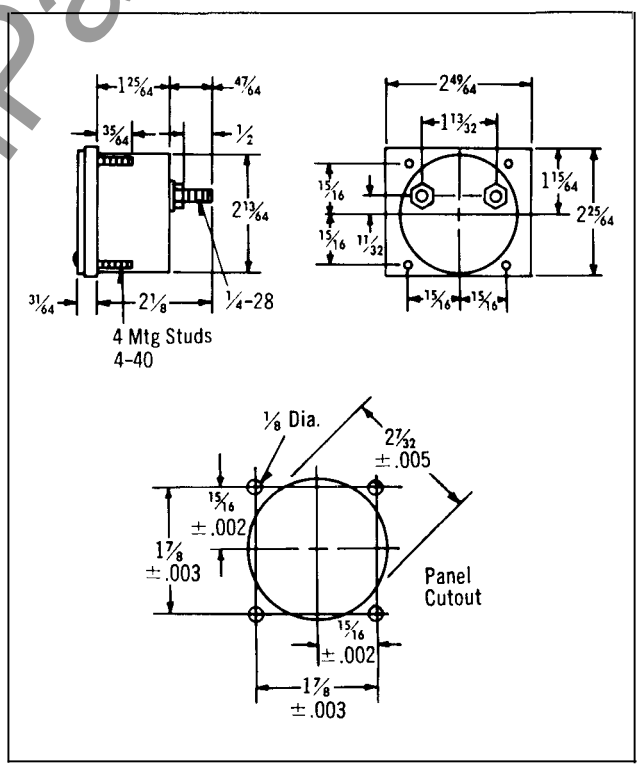

Fig. 23 *Mounting Dimensions and Panel Cut-Out for Indicating Ammeter*