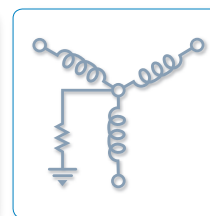
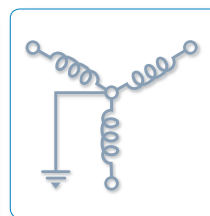
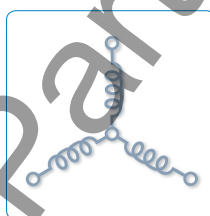
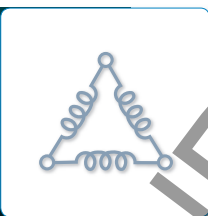




**GARD**

# STOPLIGHT

**HIGH RESISTANCE  
GROUNDING SYSTEM**



**the power to protect**

**Instruction Manual C-101**

**IPC**

## HIGH RESISTANCE GROUNDING PROTECTION



The **StopLight™** system uses a unique indicator light system to provide visual detection of a ground fault. A red signal indicates an active ground fault, an amber light indicates a ground fault has occurred and a green light signifies there are no active ground faults on the system.

Allowing a plant to operate safely, even with a ground fault on the system, StopLight™ virtually eliminates equipment damage and safeguards personnel by controlling the fault to a minimal level. Capable of detecting a ground fault as it is happening through the use of an innovative circuitry system, StopLight™ ensures both personnel and equipment are protected from ground faults and provides fault indication by both indicator lights and audible annunciation.

## IMPORTANT

Each STOPLIGHT module is carefully inspected before packed in a specially designed carton. The unit should be examined immediately upon receipt. If damage or indication of rough handling is apparent, a claim should be filed without delay with the transport company. I-Gard should be notified promptly if replacements for damaged goods are necessary. If units received are not to be installed immediately they should be stored in their original containers in an area free of dust and moisture.

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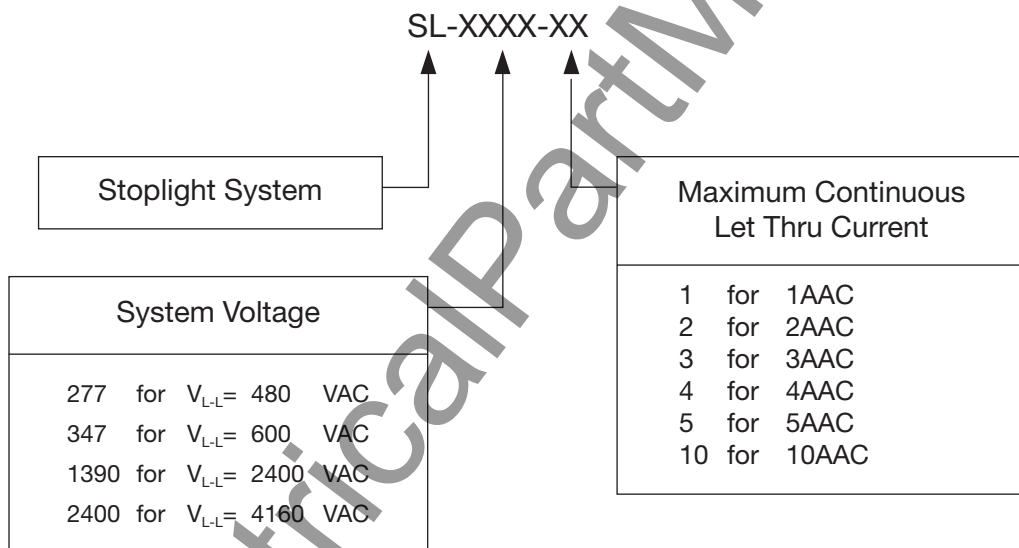
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## 1 GENERAL DESCRIPTION

The “Stoplight” is a High Resistance Grounding device. It is primarily used in small distribution systems with few feeders. The “Stoplight” complies with the National Electrical Code by limiting ground fault current to a low level, typically 5 amperes, on systems up to 1000 Volts in the United States, and, 4160 Volts in Canada.

Ground faults are the most common form of electrical fault. When a ground fault occurs, “Stoplight” limits the fault current to a non-destructive level. “Stoplight” then notifies you of the fault. The “Stoplight” can also inform plant personnel that a ground fault occurred on the system and has cleared itself. This is a useful feature in that plant personnel may have an advanced warning system to deteriorating insulation levels in the distribution system based on the frequency of fault occurrences.

The Stoplight is designed for use on low to medium voltage power distribution systems up to 4160 VAC, where the fault current is to be limited to 10 Amperes or less. The “Stoplight” can be used on either “delta” or “wye” connected systems and is specified in the following manner;



## 2 INSTALLATION

The “Stoplight” is available in two forms of enclosures as follows.

1. Inclusive, one wall mounted NEMA 3R enclosure containing both the High Resistance Grounding resistors as well as the controls.
2. Separately mounted NEMA 4 or NEMA 12 enclosure housing the controls for a Remotely mounted High Resistance Neutral Grounding Resistor.

## 2.1 Inclusive Mounting

The self-contained model is housed within a NEMA 3R enclosure and is to be mounted in accordance with local authorities. The “Stoplight” has provisions for a quantity of 4 - 3/8” [10mm] bolts as shown in figure 2-1. The “Stoplight” is suitable for mounting on or over non-combustible material only.

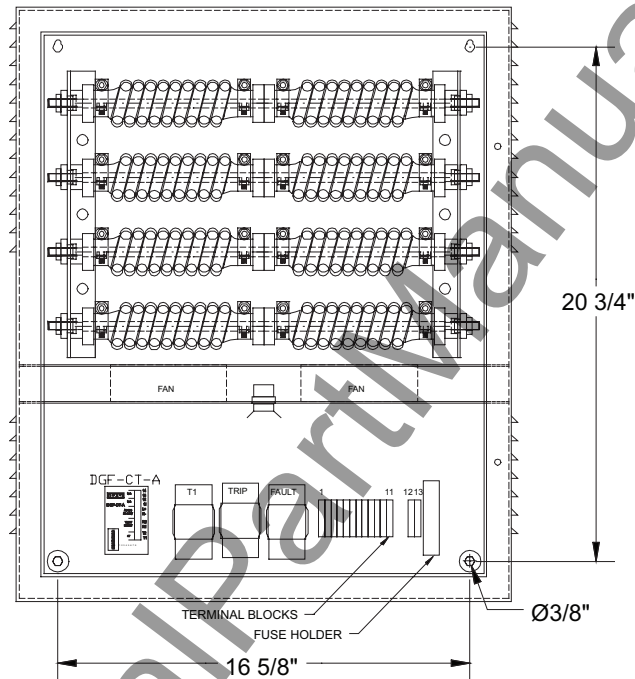


Figure-1 Mounting Details

## 2.2 Separately Mounting

For separately mounted enclosures, typically 10 Amperes let through current or if system voltage is greater than 1000 VAC please refer to the drawings that accompany models.

## 2.3 Electrical Connections

The “Stoplight” requires a 120 VAC, 60 Hz. Supply connected to terminal blocks 1 and 2 as indicated in figure 2-2. Terminal Blocks 4,5 & 6 are used for remote indication of a ground fault. They are a type C contact with terminal No. 4 as common, 5 as Normally Open, and 6 as Normally Closed.

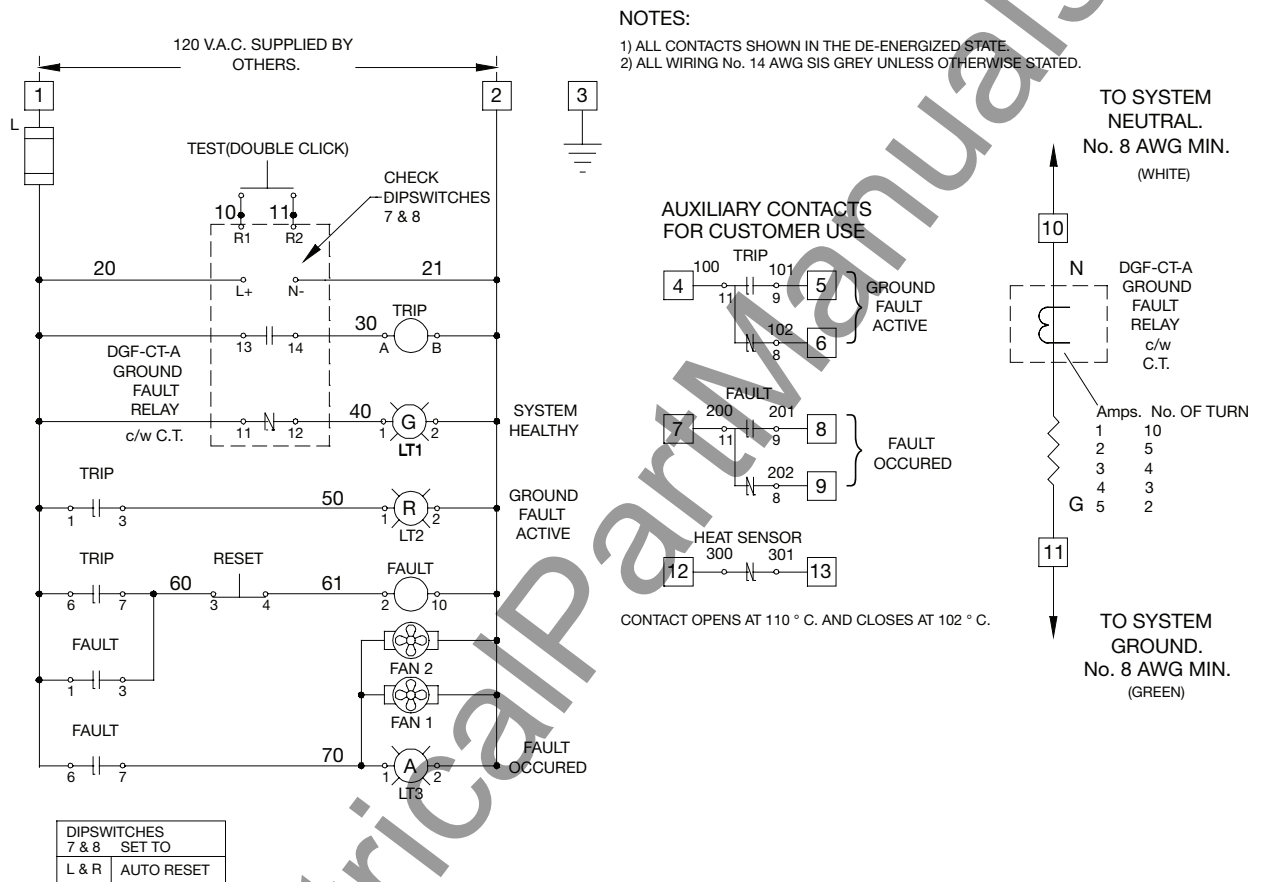


Figure-2 Electrical Connections

Terminal Blocks 7,8 & 9 are used for remote indication of a ground fault has occurred. They are a type C contact with terminal No. 7 as common, 8 as Normally Open, and 9 as Normally Closed.

Terminal 12 and 13 is a Normally Closed contact that opens when the internal ambient temperature exceeds 230°F. indicated a fan failure alarm.

Terminal blocks 10 & 11 are connected to the System Neutral and System Ground respectively with a minimum of No. 8 awg. Wire, as dictated by the Electrical Code.

## 2.4 Relay Set-up

Self-Contained Precision  
Current Transformer



Figure-3 DGF-CT-A Relay

TABLE 1 DIP SWITCH SETTINGS

Switch	Function	Position	Setting
123	Ground Fault Trip pickup	RLL	5 Percent
		RLR	10 Percent
		RRL	15 Percent
		RRR ◇	20 Percent
		LLL	25 Percent
		LLR	50 Percent
		LRL	75 Percent
		LRR	100 Percent
456	Time Delay	RRR ◇	0.5 seconds
		RRL	1.0 seconds
		RLR	1.5 seconds
		RLL	2.0 seconds
		LRR	2.5 seconds
		LRL	5.0 seconds
		LLR	7.5 seconds
		LLL	10.0 seconds
◆78	Trip Relay Operation Mode	RR ◇	Non-Failsafe, Continuous operation
		RL	Failsafe, Continuous Operation
		LR	Pulsed, Auto reset Operation, (Pulse turns off 3s. after G/F removed)
◇ Factory Settings			

## 2.5 Pickup

The ground fault current level is adjusted by setting the DIP switches 1, 2 and 3 to the desired positions indicated in Table 1. The trip level is adjustable from 5% to 100% of the NGR let through current. The trip level can be set just above the charging current. Any deterioration in the circuit will trip the relay. This also permits scheduled field testing of the relay (by lowering the trip level).

It is recommended that the G/F LEVEL (PERCENTAGE) setting be kept as low as possible. This will provide maximum safety for operating personnel and equipment protection.

The PERCENTAGE should be set lower than 20% of the Neutral Grounding Resistor let-through current.

If the measured ground fault current exceeds the PERCENTAGE setting, the output relay will operate after an adjustable time delay and the red G/F TRIP LED will light. When this occurs the trip will remain latched until the ground fault has been cleared, or the control power is removed and restored.

## 2.6 Time

Set the G/F TIME, via the setting of DIP switches 4, 5 and 6, to provide the desired time delay before the output relay will change state when the ground fault trip current percentage setting is reached or exceeded.

The setting should be selected to coordinate with other ground-fault devices connected on the same transformer secondary: set shorter than upstream devices; set longer than downstream devices. If no other ground-fault devices are connected, set for the shortest time.

---

## 3 OPERATION

Upon energization of the control panel the “SYSTEM HEALTHY”, green light illuminates signifying that no faults are on the system.

When a fault occurs and the Ground Fault relay detects this fault, the “SYSTEM HEALTHY”, green light is no longer illuminated, and both the “GROUND FAULT ACTIVE”, and “GROUND FAULT OCCURRED”, red and amber lights illuminate. The states of the auxiliary relays also change states signifying the occurrence to remote devices. The ground fault pickup level can be set from 5% to 100% of the maximum let through current of the system. The time can be adjusted from 0.7s. to 10s.

Should the fault clear before it is isolated, The “GROUND FAULT ACTIVE”, red light will no longer be illuminated, but the “GROUND FAULT OCCURRED”, amber light stays illuminate until the system is reset via the push button on the front panel or the cycling of the control power.



## 4 MAINTENANCE AND TESTING

The STOPLIGHT should be tested periodically.

To test the STOPLIGHT one of the following 2 procedures should be used:



### ***I. Simulation:***

- A. Press the TEST Button twice rapidly to simulate a ground fault and operate control circuits:
  1. Green Light turns OFF,
  2. Red light Turns ON,
  3. Amber light turns ON,
  4. Fans turn ON,
  5. Red Light turns OFF, Green light turns ON after 3s.
- B. Press the RESET Button upon completion of test:
  1. Amber light turns OFF,
  2. Fans turn OFF.

### ***II. Place Fault on System:***

This method should not be attempted by unqualified personnel. Please observe the DANGER Notice.

- A. Place a fault on the system by connecting a line from a phase conductor through a fuse and resistor to ground at a fused disconnect switch. The fuse should be rated slightly higher than the fault current. The Resistor should be sized to limit the current to a value that will cause the relay to pickup. The Resistor should also be capable of carrying the fault current for the duration of the test.
  1. Green Light turns OFF,
  2. Red light Turns ON,
  3. Amber light turns ON,
  4. Fans turn ON,
- B. Turn off the disconnect:
  1. Red Light turns OFF, Green light turns ON after 3s.
- C. Press the RESET Button upon completion of test:
  1. Amber light turns OFF,
  2. Fans turn OFF.

	<b>DANGER</b>	
Hazard of Electrical Shock, Burn or Explosion		
All installation, servicing and testing referred to in this manual must be performed by qualified personnel. All power should be disconnected prior to removing covers or enclosures and where live conductors may otherwise be exposed.		
<p><b>Failure to observe these precautions may result in death or severe personal injury and damage to equipment.</b></p> <p><b>Before placing an intentional ground fault on the power system, check that a fault does not already exist. Any test ground fault equipment must be rated for full system voltage and be fused for protection.</b></p>		

## 5 SERVICE

For assistance in installation, setup or testing please call I-Gard Corp. toll free at 1-888-737-4787 ( 1-888-RESISTR).

**NOTE:** Please ensure that proper authorisation is obtained from I-Gard before returning the equipment.

## 6 INSTRUCTION MANUALS



**C-101 Stoplight**  
High Resistance Grounding  
System Manual



**C-102 Gemini**  
High Resistance Grounding  
System Manual



**C-105 Fusion**  
Ground Fault Protection  
System Manual



**C-322 MGFR**  
Ground Fault Relay Manual



**C-407 GCHK-100 Mining  
Relay**  
Ground Fault Protection  
System Manual



**C-408 Sleuth**  
High Resistance Ground-  
ing System Manual



**C-409 DSP OHMNI**  
High Resistance  
Grounding System Manual



**C-403 GFR-RM SIGMA**  
Resistor Monitoring  
and Ground Fault Relay



**C-107 SENTINEL**  
High Resistance  
Grounding System

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