

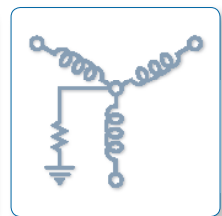
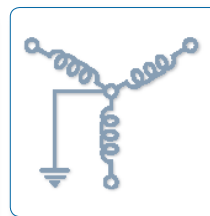
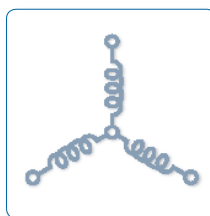
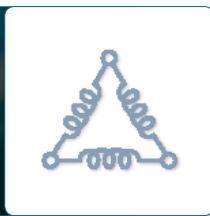
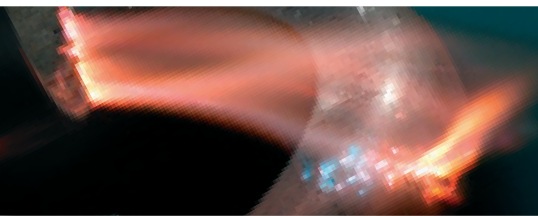


Unparalleled Protection



STOPLIGHT

HIGH RESISTANCE GROUNDING
HIGH RESISTANCE GROUNDING



ABOUT I-GARD

I-Gard's commitment to electrical safety provides both industrial and commercial customers with the products needed to protect their electrical equipment and the people that operate them.

As the only electrical-safety focused company whose product portfolio includes neutral grounding resistors, high-resistance grounding systems and optical arc mitigation, we take pride in our technologies that reduce the frequency and impact of electrical hazards, such as arc flash and ground faults.

For those customers who have purchased from us over the last 30 years, you know us for the quality and robustness of our products, our focus on customer service and technical leadership. We build on this foundation by investing in developing new products in electrical safety education - including EFC scholarship program - by actively participating in the IEEE community programs on technical and electrical safety standard, and working with local universities at discovering new technologies. We remain unrelenting in our goal of improving electrical safety in the workplace.

Our commitment to excellence is validated by long-standing relationships with industry leaders in fields as diverse as petroleum and gas, hospitals, automotive, data centers, food processing, aerospace, water and waste water plants, and telecommunications. We provide our customers with the product and application support required to ensure that their electrical distribution system is safe and reliable.

TABLE OF CONTENTS

	SUBJECT	PAGE
	1. General Description	2
	2. Installation	4
	2.1 Inclusive Mounting	4
	2.2 Separately Mounting	4
	2.3 Electrical Connection	4
	2.4 Relay Set-up	5
	2.5 Pickup	6
	2.6 Time	6
	3. Operation	7
	4. Maintenance and Testing	7
	5. Service	8
	FIGURES	
	Figure 1: Mounting Dimensional Details	4
	Figure 2: Electrical Connections	5
	Figure 3: mGard-10A Relay	5
	TABLES	
	Table 1: mGard-10A Settings	6
		
		
		
		

1. GENERAL DESCRIPTION

Allowing a plant to operate safely, even with a ground fault on the system, Stoplight is a high resistance grounding system that 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.

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 signal indicates a ground fault has occurred.
- A green signal signifies there are no active ground faults on the system.

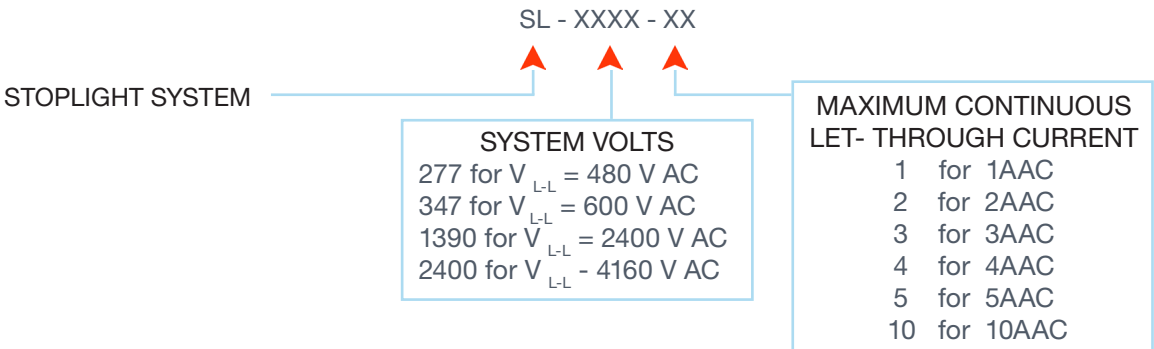
IMPORTANT

Each Stoplight module is carefully inspected before being packed into a custom 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 until the installation process can begin.

The Stoplight 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.

The Stoplight is designed for use on low to medium voltage power distribution systems up to 4160 V AC, where the fault current is to be limited to 10 amperes or less. The Stoplight can be used on wye connected systems or on delta connected systems with a companion artificial neutral device and is specified in the following manner;



Why select the I-Gard Stoplight?

The Stoplight system offers you a range of benefits that make it a great choice when it comes to protecting equipment and personnel from the hazards related to ground faults:

- It is a complete, inexpensive and effective high resistance grounding system.
- Allows a plant to operate safely, even with a ground fault on the system.
- Ensures both personnel and equipment protection by controlling the fault to a minimal level.
- Detects a ground fault as it is happening.
- Provides fault indication by indicator lights and audible annunciation.
- Informs that a ground fault occurred on the system and has cleared itself. This is a very useful feature in plants with an advanced warning system to deteriorating insulation levels in the distribution system based on the frequency of fault occurrences.

Moreover, four key integrated elements contained in the Stoplight system work to protect against damaging ground fault currents:

- **High Resistance Grounding Resistor.** This resistor is connected to the wye point of the transformer or generator supplying the facility. Its function is to limit ground fault currents to non-damaging levels under a single line-to-ground fault condition. This provides the user an opportunity to retain process continuity and to detect and clear the fault.
- **Ground Fault Sensing Transformer and Relay.** This microprocessor based digital relay measures ground fault current using a 1:1 zero sequence current transformer. It maintains accuracy over a range of 45Hz to 65Hz and filters out harmonics to eliminate nuisance tripping.
- **Automatic Pulsing System (optional).** Once the pulsing feature on the Stoplight system is selected and activated, the system will cyclically limit the fault to 100%, 75% and 50% of the available ground fault current. The cyclical pulsing combined with the hand held pulse tracing sensor empowers the user to trace the fault circuit to the point of the fault even in complex distribution systems without de-energizing the load.
- **Hand Held Pulse Tracing Sensor (for use with optional pulsing system).** This device, similar to a clamp-on ammeter, allows the user to follow the pulses from their source at the Stoplight unit through to the specific location of the line to ground fault. Once the fault is located, it can be isolated and repaired.

Stoplight Features

- Inexpensive ground fault protection with visual indication in NEMA 2R enclosure (NEMA 3R available upon request)
- Optional pulsing system for easier fault location
- Unique 3 light system for easy visual indication of system condition
- Available for 480 V, 600 V and 4160 V distribution systems
- Current limiting resistor
- Integral ground fault relay

2. INSTALLATION

The Stoplight is available in two forms of enclosures:

1. Inclusive, one wall mounted NEMA 2R 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 2R 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.

The Stoplight is suitable for mounting on or over non-combustible material only.

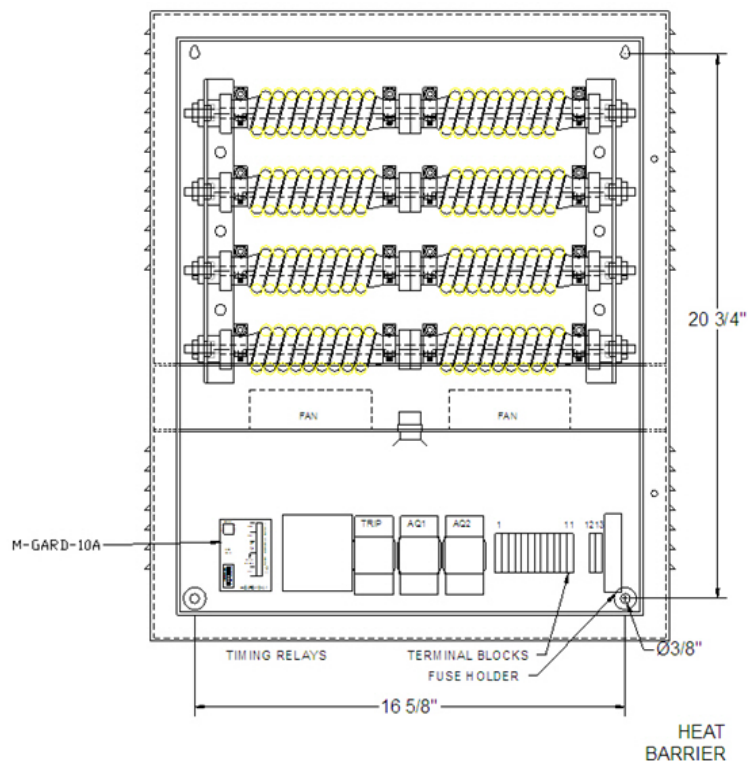


Figure 1: Mounting Dimensional Details

2.2 SEPARATELY MOUNTING

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

2.3 ELECTRICAL CONNECTIONS

The Stoplight requires a 120 V AC, 60 Hz. The supply is connected to terminal blocks 1 and 2 as indicated in figure 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'.

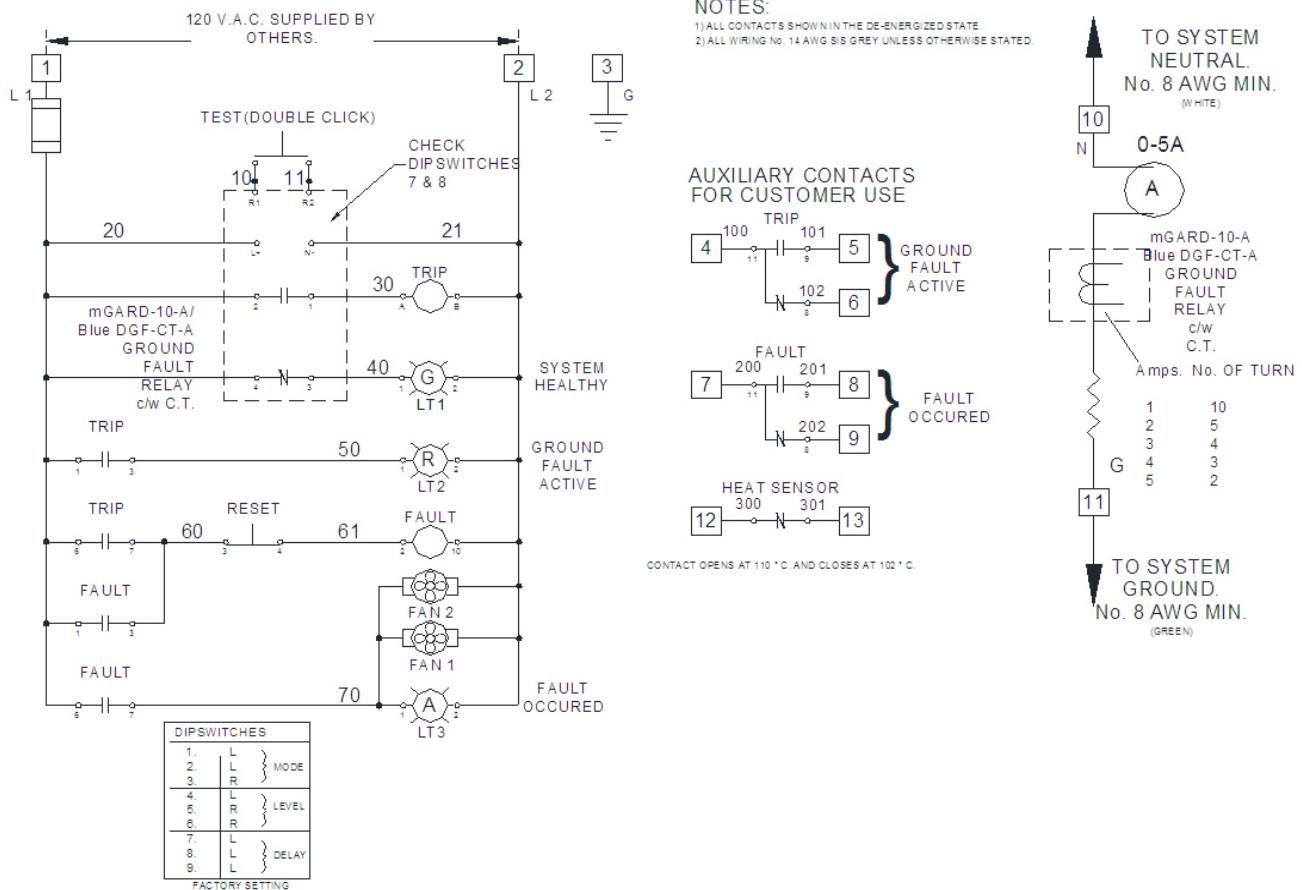


Figure 2: Electrical Connections

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

Terminal 12 & 13 are a 'Normally Closed' contact that opens when the internal ambient temperature exceeds 230°F indicating 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 SETUP

Self contained precision current transformer.



Figure 3: mGard-10A Relay

Table 1: mGard-10A Settings

SWITCH	FUNCTION	SET TO	MEANING
1	Harmonic Filter	L  R	Disabled Enabled
2	Trip Contacts	L  R	Non-Failsafe Failsafe
3	Auto Reset	L  R	Disabled Enabled
4, 5, 6	Ground Fault Trip Current Limit	L L L  L L R L R L L R R R L L R L R R R L R R R	5 percent 10 percent 15 percent 20 percent 25 percent 50 percent 75 percent 100 percent
7, 8, 9	Trip Time Delay	L L L  L L R L R L L R R R L L R L R R R L R R R	0.5 seconds 1.0 seconds 1.5 seconds 2.0 seconds 2.5 seconds 5.0 seconds 7.5 seconds 10 seconds

 Factory Setting; L = left and R = right

2.5 PICKUP

The ground fault current level is adjusted by setting the DIP switches 4, 5 & 6 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 7, 8 & 9 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 0.5 seconds to 10 seconds.

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 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 3 seconds

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 (next page).

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 3 seconds

C. Press the RESET button upon completion of test:

1. Amber light turns OFF
2. Fans turn OFF.

DANGER

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.

Failure to observe these precautions may result in death or severe personal injury and damage to equipment. 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.

5. SERVICE

For assistance in installation, setup or testing please call I-Gard toll free at 1-888-737-4787 or email us at info@i-gard.com

NOTES



GARD

Unparalleled Protection

Phone: 905-673-1553
Toll Free: 1-888-737-4787

Fax: 905-673-8472
sales@i-gard.com



www.i-gard.com