DESCRIPTION

The OMEGA® SBG144600 Solid-State Relays are used as "intrinsically safe switching circuits in hazardous locations, with non-voltage-producing sensors". When installed in accordance with this manual, these field sensors are suitable for Classes I and 2, Divisions 1 and 2, Groups A, B, C, D, E, F, and G, as defined by the National Electrical Code Handbook.

UNPACKING

Remove the Packing List and verify that you have received all equipment. If you have any questions about the shipment, please call the OMEGA Customer Service Department at 1-800-622-2378 or (203) 359-1660. When you receive the shipment, inspect the container and equipment for any signs of damage. Note any evidence of rough handling in transit. Immediately report any damage to the shipping agent.

NOTE

The carrier will not honor any claims unless all shipping material is saved for their examination. After examining and removing contents, save packaging material and carton in the event reshipment is necessary.

Associated Equipment

Caution: The intrinsically safe relays must be mounted outside the hazardous location. Only the sensor’s terminals provide an intrinsically safe switch circuit (Fig. 1). (Exia) means associated equipment “Appareil connexe”, located in safe area.

Mounting and Enclosure Consideration

Field wiring of intrinsically safe circuits is to be segregated from non-intrinsically safe wiring by use of suitable barriers, separate wireways or trays (see Fig. 2). Wire insulation to be .010", minimum.

Intrinsically safe and non-intrinsically safe connection points should be located sufficiently apart to prevent any possibility of bypassing or miswiring during installation or servicing of equipment.

The enclosure shall contain a cautionary statement as follows: "CAUTION: ANY SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY".

The mounting plate must be grounded to ensure intrinsic safety. Resistance between the plate and earth ground should be less than one ohm. (See Figs. 3 and 4 for recommended selection of grounding hardware and refer to Article 250 of the National Electrical Code for methods and practices.)

Installation of Sensor Switch and Associated Field Wiring

The nature of the sensor switch must be that it is a non-voltage-producing, essentially resistive termination or other device specifically examined and approved for use with the intrinsically safe solid-state relay.

The conductors of the intrinsically safe circuit should be seated in a rigid metal conduit at the point where the wiring enters the hazardous area. The wiring and sensor switch should be such that conductive dusts in the hazardous area will not close the circuit.

Hazardous area field wiring will store energy due to distributed capacitance and inductance in proportion to its length. It is therefore recommended that the characteristics of the cable be known and judged against the length of run and atmosphere of exposure.

The following chart is presented as a guideline in determining the limits of reactance for signal loops in the hazardous area wiring for the intrinsically safe solid-state relays.

<table>
<thead>
<tr>
<th>GROUP</th>
<th>CAPACITANCE</th>
<th>INDUCTANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A &amp; B</td>
<td>0.6 µF</td>
<td>1.3 mH</td>
</tr>
<tr>
<td>C &amp; E</td>
<td>1.9 µF</td>
<td>5.4 mH</td>
</tr>
<tr>
<td>D, F, G</td>
<td>1.9 µF</td>
<td>10 mH</td>
</tr>
</tbody>
</table>

Example: Typical values of capacitance for a twisted pair of copper wires in between 20 and 60 pF per foot. Using the maximum value of 60 pF/ft, Groups A & B could have a run of 1500+ feet with safety. Inductance of a typical twisted pair is between 0.10 and 0.20 µH/ft, thus making a cable run in this example essentially determined by the capacitance.

WARNING

Product must be maintained and installed in strict accordance with the National Electrical Code. Failure to observe this warning could result in serious injuries or damages.

Notes

1. For 120V application, only one fuse is required in the ungrounded circuit of the input line.

2. Required torque on these terminals not to exceed 10 lb-inches on stranded wire - 8 lb-inches on solid wire.

NOTES

1. Grounding Hardware to be #8 or larger and stainless steel.

2. Lockwashers to be internal or external tooth-type.
Whenever possible, the actual measured parameters should be used in determining the allowable length. Shielded cable is not required, but if used in the application, the shield must be returned to ground, the same point as the mounting tab.

**Non-intrinsically safe wiring cannot be run in conduit or open raceways together with intrinsically safe wiring.** (See **Note - next page**.)

Fusing of the solid-state relays cannot be in accordance with Fig. 1. Fuse F1 to be 6 amps slo-blo, 120 VAC for 120V line voltage; 250 VAC for 240 V application.

**WARRANTY DISCLAIMER**
OMEGA ENGINEERING, INC. warrants this unit to be free of defects in material and workmanship for a period of 1 year from date of purchase. OMEGA Warranty, with the exception of the 11 month grace period to the normal (first) year product warranty to cover handling and shipping time. This ensures that OMEGA’s customers receive maximum coverage on each product.

If the unit should malfunction, it must be returned to the factory for evaluation. OMEGA’s Customer Service Department will issue an Authorization Return (ARR) number immediately upon receipt of a written report of initial examination by OMEGA if the unit is found to be defective. Items returned for evaluation must be accompanied by a signed Warranty Return Authorization Form (WRAF) noting the defect, along with a copy of the purchase order or sales invoice, dated within the last 11 months from the AR date. Cost of transportation to OMEGA is the responsibility of the holder of this Warranty Return Authorization Form (WRAF).

OMEGA makes no other warranties written or implied, and all implied warranties are limited to the normal 1 year period.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either oral or written. OMEGA warrants only that the parts manufactured by it shall be as specified and free from defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY DISCLAIMED.

OMEGA is not responsible for any errors or omissions in the data or other information provided in this document. OMEGA reserves the right to make changes in the product or service described in this document at any time and without notice.

**Notes:**
1. *(Lockwasher to be internal or external tooth type)*
2. Grounding hardware to be #8 or larger and S/S.

Table 1. Specifications

<table>
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<tr>
<th>Model Number</th>
<th>Description</th>
<th>Line &amp; Load Voltage Range</th>
<th>Current Max.</th>
<th>Turn-On Voltage (Typical)</th>
<th>Turn-Off Voltage Loss</th>
<th>Operating Temperature Range</th>
<th>Output Leakage Current Max.</th>
<th>Switching Operation</th>
<th>Weight</th>
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<tr>
<td>SBG144600</td>
<td>SSR for Intrinsic Safety</td>
<td>105 to 125 VAC</td>
<td>5A</td>
<td>40% of 125V</td>
<td>2 VAC</td>
<td>-40°F to 120°F (Typical)</td>
<td>6mA</td>
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Line & Load Voltage Range: 105 to 125 VAC

Current Max.: 2 VAC

Turn-On Voltage (Typical): -40°F to 120°F

Turn-Off Voltage Loss: 6mA

Operating Temperature Range: -40°F to 120°F

Output Leakage Current Max.: 6mA

Switching Operation: SPST N.O.

Weight: 198g

**Installation of Sensor Switch and Associated Field Wiring**

The installation of Sensor Switch and Associated Field Wiring is covered in Installation and Field Wiring, Section II of the OMEGA Catalog. This section describes the installation of the Sensor Switch (OMEGA design model) in its various applications. It contains detailed information on all phases of installation. The questions most often asked are covered in this section. The section also includes an Installation Guide, which provides a step-by-step guide to the installation of the Sensor Switch.

**RETURN REQUESTS / INQUIRIES**

Direct all warranty and repair requests/queries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN ITEM NUMBER FROM OMEGA’S CUSTOMER SERVICE DEPARTMENT IN ORDER TO AVOID PROCESSING DELAYS. The assigned AR number should then be noted on the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit. Non-WARRANTY ITEMS require a Returned Material Authorization (RMA) number.

**Table of Specifications**

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**Notes:**
1. *(Lockwasher to be internal or external tooth type)*
2. Grounding hardware to be #8 or larger and S/S.

**Fig. 4. Mounting Plate Grounding Detail**

- Mounting Plate
- Grounding Detail
- Lockwasher
- Terminal Lug

**Fig. 5. Dimensions**

- 7/32" Dia. (5.5 mm)
- 1-5/16" (33.3 mm)
- 1-3/8" (35 mm)
- 2-7/8" (73 mm)
- 2-7/8" (73 mm)

**Fig. 6. Mounting Tab**

- 2-5/8" (66.6 mm)
- 3" (76.2 mm)

**OMEGA® Ozone Line Service**

https://www.omega.com

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E-mail: info@omega.com

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