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SECTION 1—INTRODUCTION

ABOUT THIS BULLETIN

This bulletin contains receiving, installation, testing, and maintenance instructions for the Class 4885 surgical facility panel from Square D.

Table 1: Term Definitions

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitor Hazard Current</td>
<td>The hazard current of the line isolation monitor (LIM) alone.</td>
</tr>
<tr>
<td>Hazard Current</td>
<td>For a given set of connections in an isolated power system, the total current that would flow through a low impedance if it were connected between either isolated conductor and ground.</td>
</tr>
<tr>
<td>Reference Grounding Point</td>
<td>A grounding terminal bus in the branch circuit electric distribution panel for circuits which serve a particular patient care area as the common grounding point. It may be the equipment grounding bus in a grounded distribution system.</td>
</tr>
<tr>
<td>Isolated Power Transformer</td>
<td>A power transformer with both of the secondary leads ungrounded in normal operation.</td>
</tr>
<tr>
<td>Leakage Current</td>
<td>Any current, including capacitively coupled currents, not intended to be applied to a patient but which may be conveyed from accessible parts of an appliance to ground, or to other accessible parts of the appliance.</td>
</tr>
<tr>
<td>Line Isolation Monitor</td>
<td>A test instrument designed to continually check the balanced and unbalanced impedance from each line of an isolated circuit to ground. It is equipped with a built-in test circuit to exercise the alarm without adding to the leakage current hazard. The monitor continuously displays hazard current.</td>
</tr>
</tbody>
</table>

For more information, consult National Electrical Code (NEC) Article 517 and National Fire Protection Association (NFPA) 99.
SECTION 2—SAFETY PRECAUTIONS

BEFORE YOU BEGIN

Before attempting any of the procedures in this instruction bulletin, read and understand the following precautions.

⚠️ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

- Only qualified personnel should install, operate, service, or maintain this equipment.
- Successful equipment operation depends on proper handling, installation, and maintenance.
- Before installing the equipment, disconnect all sources of electrical power. Assume that all circuits are live until they have been completely de-energized, tested, grounded, and tagged. Consider all sources of power, including the possibility of backfeeding.
- Before replacing covers, carefully inspect the panel area for tools and objects left in the equipment.
- Always have at least two qualified individuals present during installation.

Failure to follow this instruction will result in death or serious injury
SECTION 3— RECEIVING AND STORING

RECEIVING

The surgical facility panel is shipped as three units:

1. The backbox
2. The front panel cover
3. The transformer

The backbox and transformer are shipped ahead of the pre-wired front panel cover to allow electrical contractors to begin rough-in work. Check the details of the order to ensure you have received the complete shipment.

STORING

Before storing or installing any unit, thoroughly inspect the device for possible shipping damage. Upon receipt, remove the unit from its package and inspect it for signs of damage or rough handling. If damage is apparent, notify the shipping agent and your Square D field sales representative.

If storing the unit, place it in its original packaging, and store in a clean, dry place. Exposure to moisture and dust can damage the unit.

⚠️ CAUTION ⚠️

HAZARD OF EQUIPMENT DAMAGE
Do not operate or install any equipment that appears damaged.
Failure to follow this instruction can result in injury or equipment damage

DIMENSIONS AND WEIGHTS

Surgical facility panels are available in two backbox sizes:

Table 2: Backbox Dimensions

<table>
<thead>
<tr>
<th>Height</th>
<th>Width</th>
<th>Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>42 in. (106.7 cm)</td>
<td>56 in. (1142.2 cm)</td>
<td>12 in. (30.5 cm)</td>
</tr>
<tr>
<td>42 in. (106.7 cm)</td>
<td>56 in. (1142.2 cm)</td>
<td>8 in. (20.3 cm)</td>
</tr>
</tbody>
</table>

The front panel cover overlaps the backbox to cover any imperfections in the wall construction. The front panel cover is hinged on the right side and has an integrated electrical interlock system to guard against shock when the cover is open. The components available for installation on the front panel cover are:

- line isolation monitor
- ground jacks
- circuit breakers
- X-ray film viewers
- digital clocks
- power receptacles
- dial clocks and timers
- AM/FM cassette stereo system
The standard transformer in the surgical facility panel is rated either 5, 7.5, or 10 kVA. The transformer primary voltage can range from 120 to 277 V, with a secondary rated at 120 V.

The primary circuit breaker ratings are shown in Table 1. All secondary circuit breakers are 20 A; 16 are provided.

### Table 3: Primary Circuit Breaker Ratings

<table>
<thead>
<tr>
<th>Transformer kVA</th>
<th>120 V</th>
<th>208 V</th>
<th>240 V</th>
<th>277 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>60 A</td>
<td>30 A</td>
<td>30 A</td>
<td>25 A</td>
</tr>
<tr>
<td>7.5</td>
<td>80 A</td>
<td>45 A</td>
<td>40 A</td>
<td>35 A</td>
</tr>
<tr>
<td>10</td>
<td>100 A</td>
<td>60 A</td>
<td>30 A</td>
<td>45 A</td>
</tr>
</tbody>
</table>
SECTION 4—INSTALLATION

INSTALLING THE BACKBOX

Before installing the panel, make sure that the structural support can bear the weight of the equipment. The minimum load bearing requirement of the structural support is 500 lbs (227 kg). The backbox is constructed of 12-gauge steel and has four 9/16-inch (14 mm) diameter mounting holes (see Figure 1: “Backbox Mounting Dimensions”). Do not change the size or position of the mounting holes.

1. Mount the backbox on the wall with the bottom above the finished floor (see Figure 1).

Figure 1: Backbox Mounting Dimensions

2. Install the backbox to project 1.5 in., ±.25 in. (38 mm, ±.64 mm) from the finished wall as shown in Figure 2: “Installing the Backbox On the Wall”.

Notes:
1. Dimensions: Inches Millimeters
2. Shaded areas denote space where conduit fittings may be located. Knockouts are not furnished in the backbox for support bracing or conduit fittings.

2. Install the backbox to project 1.5 in., ±.25 in. (38 mm, ±.64 mm) from the finished wall as shown in Figure 2: “Installing the Backbox On the Wall”.

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3. Mount the backbox to its structural support as shown in Figure 3: “Mounting the Backbox”

Figure 2: Installing the Backbox On the Wall

Figure 3: Mounting the Backbox

Improper installation of the backbox will result in improper fit of the front panel.
INSTALLING THE FRONT COVER

The front cover is hinged on the right side as shown in Figure 4. Attach the cover to the backbox with nine 3/8-inch nuts and split lock washers. The mounting hardware is shipped attached to the back of the front panel cover at the top.

Figure 4: Front Cover Installation
SECTION 5— ELECTRICAL CONNECTIONS

GENERAL

![DANGER](image)

HAZARDOUS VOLTAGE. RISK OF ELECTRIC SHOCK BURN OR EXPLOSION

- Turn off all power supplying this equipment before working on it.
- Do not use wire-pulling lubricant of any type on the secondary circuits.
- Conduit must be clean and dry.
- Maintain identical phasing throughout the installation.

Failure to follow this instruction will result in death or serious injury

All components in the front panel cover are completely wired at the factory. The spare secondary circuit breakers and the primary circuit breaker are pre-wired to two sets of terminal block assemblies. Attach the terminal block assemblies to the backbox as shown in Figure 5 after the front panel cover is installed. Hardware for installing the terminal block assemblies is provided in the backbox.

The reference ground bus is shipped installed in the backbox. The green ground wires from the front panel cover devices must be terminated to the reference ground bus.

Figure 5: Terminal Block Assemblies

TRANSFORMER CONNECTIONS

The primary wires are terminated to terminal blocks H1 and H2. The secondary wires are terminated to terminal blocks X1 and X2. Connect the main feeder wiring to terminals H1 and H2. Choose feeder wire that is sized in accordance with the National Electrical Code (NEC) and applicable local codes. Additional connections may be required if remote indicators are supplied, or if any external devices are to be supplied with isolated power. Refer to the design drawings for further information.
WIRE AND CONDUIT REQUIREMENTS

Square D recommends using cross-linked polyethylene wire with a dielectric constant of 3.5 or less. This type of wire minimizes leakage current in the system.

Always specify a dielectric constant of 3.5 or less when purchasing wire. Avoid wires with a high carbon filler. They will produce substantial leakages in the system.

Avoid using wire pulling lubricants when connecting the secondary circuits on the isolating system to insure the proper impedance of the system. Make sure that the conduits are dry and clean.

The secondary isolated conductors are color coded to comply with the NEC as shown in Table 4.

Table 4: Secondary Isolated Conductors

<table>
<thead>
<tr>
<th>Color</th>
<th>Conductor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange</td>
<td>Isolated Conductor No. 1</td>
</tr>
<tr>
<td>Brown</td>
<td>Isolated Conductor No. 2</td>
</tr>
<tr>
<td>Green</td>
<td>Grounding Conductor</td>
</tr>
</tbody>
</table>

GROUNDING

DANGER

IMPROPER GROUNDING CONNECTIONS. RISK OF ELECTRIC SHOCK, BURN OR EXPLOSION

Isolated power systems for health care facilities are not grounded in the same manner as many other types of electrical equipment. Before proceeding, read this section, study the wiring diagram and applicable codes, and thoroughly understand the special grounding requirements for this type of system.

Failure to follow this instruction will result in death or serious injury.

Proper grounding in a patient-care area or anesthetizing location is essential for guarding against electrical shock hazards. Proper grounding provides a means for dissipating static charges and shunting fault currents or normal leakage currents away from attendants.

Isolated power systems for health care facilities have special grounding requirements. Note that the reference grounding point is not the grounded or neutral conductor.

The common ground for the room is the reference grounding point on the surgical facility panel.

This reference point is grounded to the main hospital ground with one conductor only. If there is more than one surgical facility panel serving the area, their reference grounding points should be bonded together with a large conductor. See the consulting engineer’s design or contact Square D for details. The transformer shield wire and the ground terminal of the line isolation monitor must be connected to the reference grounding point.

ELECTRICAL INTERLOCK OPERATION

The surgical facility panel has an electrical interlock incorporated into its design to help guard against a shock hazard when the front panel cover is
open. This interlock is accomplished using a single-pole switch with one set of normally closed contacts wired to the primary shunt trip circuit breaker. If the primary circuit breaker will not open when the front panel cover is opened, verify that the switch is wired correctly. The wires running to the switch should be to the common and normally-closed terminals. When the front panel cover is closed, the switch’s plunger is depressed, thus opening the circuit. When the front panel cover is opened, the switch contacts close, energizing the shunt-trip coil and opening the primary circuit breaker.

**Figure 6:** Electrical Interlock Circuit Diagram
SECTION 6— TESTING

BEFORE YOU BEGIN

The surgical facility panel should be tested by personnel thoroughly familiar with isolated power systems or by a Square D field service representative. Contact your local Square D field services office to order this service.

For line isolation monitor testing instructions, see the instruction bulletin that is shipped with the LIM.

RETURNING THE LIM

Follow steps 1–3 if returning the LIM to the factory is necessary for any reason.

1. Obtain an Return Material Authorization (RMA) and a Return Material Number (RMN) from your local Square D field sales representative.
2. Pack the LIM carefully when returning to the factory to avoid shipping damage.
3. If the LIM is out of warranty, contact your local Square D field sales representative to inquire about exchanging the LIM for a new one.

FIELD TEST AND INSPECTION

The NFPA 99-1996 requires that isolated power systems be tested in accordance with “3-3.3.4.2 Isolated Power Systems, 3-3.3.2.1 Grounding Systems in Patient Care Areas”, “3-3.2.2.2 Impedance of Isolated Wiring, and 3-6.4.2 Record Keeping”.

A Square D field service representative is available to perform all the tests required by NFPA 99. Contact your local Square D field services office to order this service.
SECTION 7—MAINTENANCE

VERIFICATION OF OPERATION

Maintenance of the surgical facility panel consists mainly of verification of operation. Spare parts that need to be kept in stock are as follows:

- Wickmann Type TR5-T, 250 mA fuses (Square D part number 25499-12821) for the LIM.
- Chicago Miniature No. 382 lamps for the HAZARD and SILENCE indicator. For lamp replacement procedure, see page 17.
- Square D Line Isolation Monitor (catalog number IGD)

RETAINING RECORDS

National Fire Protection Association (NFPA) regulations require that permanent records of the maintenance and test data be kept in a maintenance log (page 18) or log book. All hazard current readings are to be taken from the LIM meter.
SECTION 8—ACCESSORIES

INDICATOR ALARM

The indicator alarm consists of two external lights. One of these is also a push button switch used for silencing the audible alarm. A green light illuminates on the indicator when its associated line isolation monitor (LIM) is energized. A red light illuminates when a fault condition exists on the isolated system.

A typical sequence is as follows:

1. The green light is on.
2. A fault occurs. The lights transfer from green to red and the audible alarm sounds.
3. The Safe/Silence button is pushed. The audible alarm is silenced, but the red light remains illuminated and the Safe/Silence button’s amber light illuminates, indicating that the alarm was silenced.
4. The fault is cleared, the red light goes off, and the green light illuminates automatically.
5. The indicator alarm is ready for next occurrence of a fault.

Installation

The indicator alarm is installed in the surgical facility panel or at a remote station. If it is installed on the panel, it is mounted and wired at the factory. In a remote station installation, the indicator alarm is mounted on a faceplate at the factory. The plate must be secured by the four mounting holes provided and electrical connections must be made in the field. There is no backbox provided with the remote unit.

Wiring

The indicator alarm has a terminal block with terminals identified 1, 2, 3, 4, and 5. Terminal 4 is not used. The other four terminals should be connected to the following labeled points on the LIM terminal block (see Figure 7 and Table 5: “Terminal Connection to LIM Terminal Block Points”):

Table 5: Terminal Connection to LIM Terminal Block Points

<table>
<thead>
<tr>
<th>Terminal Number</th>
<th>LIM Terminal Block Connection Point (Label)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12V COMMON</td>
</tr>
<tr>
<td>2</td>
<td>12V SAFE</td>
</tr>
<tr>
<td>3</td>
<td>12V HAZARD</td>
</tr>
<tr>
<td>4</td>
<td>Not used</td>
</tr>
<tr>
<td>5</td>
<td>TEST</td>
</tr>
</tbody>
</table>

If an indicator/microammeter module (M5-IA) is used in conjunction with the surgical facility panel, two additional wires must be connected from the microammeter to the LIM terminal block. (see Figure 8 and Table 6: “Microammeter to LIM Terminal Block Points”):

Table 6: Microammeter to LIM Terminal Block Points

<table>
<thead>
<tr>
<th>Microammeter</th>
<th>LIM Terminal Block Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>LIM Common</td>
</tr>
<tr>
<td>-</td>
<td>Meter</td>
</tr>
</tbody>
</table>
Use #16 or #18 TW stranded insulated wire for these connections. This is a low voltage circuit and the wires do not contribute leakage current to the system.

**Figure 7: Indicator Alarm Wiring**

**Figure 8: Microammeter MM-IA and M5-IA Wiring**

**Indicator Lamp Replacement**

Follow steps 1–6 to replace the lamps in the indicator alarm:

1. Turn off the primary circuit breaker.
2. Remove the cap by inserting a small flat-blade screwdriver and gently twisting out the cap.
3. Lightly pinch the lamp socket arms, and pull out the lamp and socket assembly.
4. Slide the lamp out of the socket by pushing on the glass envelope.
5. Insert the new lamp out of the socket opening.
6. Replace the cap by sliding the corners at an angle into the lamp housing and pushing the cap into place.
# MAINTENANCE LOG

<table>
<thead>
<tr>
<th>DATE</th>
<th>MAINTENANCE PERFORMED</th>
<th>INITIALS</th>
</tr>
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