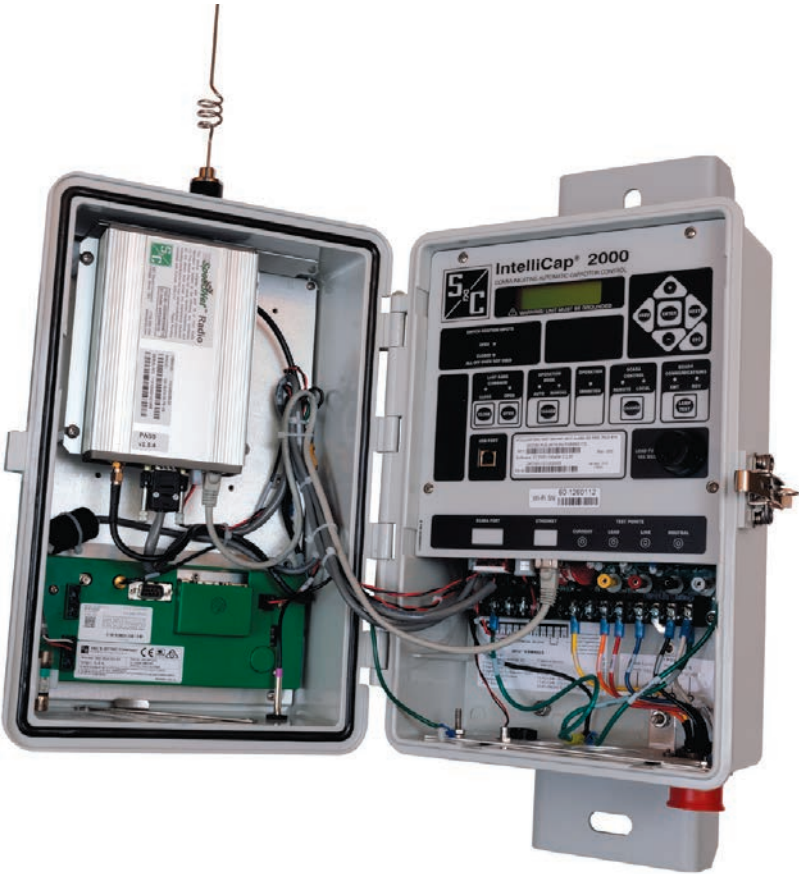


Installation

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Introduction

Qualified Persons

WARNING

Only qualified persons who are knowledgeable in the installation, operation, and maintenance of overhead and underground electric distribution equipment, along with all associated hazards, may install, operate, and maintain the equipment covered by this publication. A qualified person is someone who is trained and competent in:

- The skills and techniques necessary to distinguish exposed live parts from nonlive parts of electrical equipment
- The skills and techniques necessary to determine the proper approach distances corresponding to the voltages to which the qualified person will be exposed
- The proper use of special precautionary techniques, personal protective equipment, insulated and shielding materials, and insulated tools for working on or near exposed energized parts of electrical equipment

These instructions are intended only for such qualified persons. They are not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment.

Read this Instruction Sheet

NOTICE

Thoroughly and carefully read this instruction sheet and all materials included in the product's instruction handbook before installing or operating the IntelliCap 2000 Automatic Capacitor Control. Familiarize yourself with the Safety Information and Safety Precautions on pages 4 through 5. The latest version of this publication is available online in PDF format at sandc.com/en/support/product-literature/.

Retain this Instruction Sheet

This instruction sheet is a permanent part of the IntelliCap 2000 Automatic Capacitor Control. Designate a location where users can easily retrieve and refer to this publication.

Proper Application

WARNING

The equipment in this publication must be selected for a specific application. The application must be within the ratings furnished for the selected equipment. Ratings are listed in S&C Specification Bulletin 1024-31.

Special Warranty Provisions

The standard warranty contained in S&C's standard conditions of sale, as set forth in Price Sheets 150 and 181, applies to the IntelliCap 2000 Automatic Capacitor Control, except that the first paragraph of the said warranty is replaced by the following:

(1) General: The seller warrants to the immediate purchaser or end user for a period of 10 years from the date of shipment that the equipment delivered will be of the kind and quality specified in the contract description and will be free of defects of workmanship and material. Should any failure to conform to this warranty appear under proper and normal use within 10 years after the date of shipment, the seller agrees, upon prompt notification thereof and confirmation that the equipment has been stored, installed, operated, inspected, and maintained in accordance with the recommendations of the seller and standard industry practice, to correct the nonconformity either by repairing any damaged or defective parts of the equipment or (at the seller's option) by shipment of necessary replacement parts. The seller's warranty does not apply to any equipment that has been disassembled, repaired, or altered by anyone other than the seller. This limited warranty is granted only to the immediate purchaser or, if the equipment is purchased by a third party for installation in third-party equipment, the end user of the equipment. The seller's duty to perform under any warranty may be delayed, at the seller's sole option, until the seller has been paid in full for all goods purchased by the immediate purchaser. No such delay shall extend the warranty period.

Replacement parts provided by the seller or repairs performed by the seller under the warranty for the original equipment will be covered by the above special warranty provision for its duration. Replacement parts purchased separately will be covered by the above special warranty provision.

Warranty of the IntelliCap 2000 Automatic Capacitor Control is contingent upon the installation, configuration, and use of the control or software in accordance with S&C's applicable instruction sheets.

This warranty does not apply to major components not of S&C manufacture, such as communication devices. However, S&C will assign to the immediate purchaser or end user all manufacturer's warranties that apply to such major components.

Warranty of equipment/services packages is contingent upon receipt of adequate information on the user's distribution system, sufficiently detailed to prepare a technical analysis. The seller is not liable if an act of nature or parties beyond S&C's control negatively impact performance of equipment/services packages; for example, new construction that impedes radio communication, or changes to the distribution system that impact protection systems, available fault currents, or system-loading characteristics.

Warranty Qualifications

Warranty of IntelliCap 2000 Automatic Capacitor Controls is contingent upon the installation, configuration, and use of the control or software in accordance with S&C's applicable instruction sheets. This warranty does not apply to major components not of S&C manufacture, such as batteries, communication devices, and remote terminal units. However, S&C will assign to the immediate purchaser or end user all manufacturers' warranties that apply to such major components.

Safety Information

Understanding Safety-Alert Messages

Several types of safety-alert messages may appear throughout this instruction sheet and on labels and tags attached to the IntelliCap 2000 Automatic Capacitor Control. Familiarize yourself with these types of messages and the importance of these various signal words:

DANGER

“DANGER” identifies the most serious and immediate hazards that will likely result in serious personal injury or death if instructions, including recommended precautions, are not followed.

⚠ WARNING

“WARNING” identifies hazards or unsafe practices that can result in serious personal injury or death if instructions, including recommended precautions, are not followed.

⚠ CAUTION

“CAUTION” identifies hazards or unsafe practices that can result in minor personal injury if instructions, including recommended precautions, are not followed.

NOTICE

“NOTICE” identifies important procedures or requirements that can result in product or property damage if instructions are not followed.

Following Safety Instructions

If you do not understand any portion of this instruction sheet and need assistance, contact the nearest S&C Sales Office or S&C Authorized Distributor. Their telephone numbers are listed on S&C’s website sandc.com, or call the S&C Global Support and Monitoring Center at 1-888-762-1100.

NOTICE

Read this instruction sheet thoroughly and carefully before installing an IntelliCap 2000 Automatic Capacitor Control.



Replacement Instructions and Labels

If additional copies of this instruction sheet are required, contact the nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

It is important that any missing, damaged, or faded labels on the equipment be replaced immediately. Replacement labels are available by contacting the nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

DANGER



The IntelliCap 2000 Automatic Capacitor Control line voltage input range is 93 to 276 Vac. Failure to observe the precautions below will result in serious personal injury or death.

Some of these precautions may differ from your company's operating procedures and rules. Where a discrepancy exists, follow your company's operating procedures and rules.

1. **QUALIFIED PERSONS.** Access to an IntelliCap 2000 Automatic Capacitor Control must be restricted only to qualified persons. See the "Qualified Persons" section on page 2.
2. **SAFETY PROCEDURES.** Always follow safe operating procedures and rules.
3. **PERSONAL PROTECTIVE EQUIPMENT.** Always use suitable protective equipment, such as rubber gloves, rubber mats, hard hats, safety glasses, and flash clothing, in accordance with safe operating procedures and rules.
4. **SAFETY LABELS.** Do not remove or obscure any of the "DANGER," "WARNING," "CAUTION," or "NOTICE" labels. Remove tags only if instructed to do so.
5. **MAINTAINING PROPER CLEARANCE.** Always maintain proper clearance from energized components.

Pre-Installation Instructions

Applicable Software

This instruction sheet was prepared for use with IntelliCap 2000 control software: IC2000Installer-2.3.x or later.

The installed software version is shown on the IntelliLink® Setup Software *Setup>General>Software Versions* screen. For questions regarding the applicability of information in this instruction sheet to future product releases, please contact S&C Electric Company.

Pre-Installation Checklist

Before installing the IntelliCap 2000 control, carry out the following steps in the service center:

- STEP 1.** Inspect the control for visible damage. Make sure there is no obvious damage to the control enclosure or any internal components.
- STEP 2.** Confirm the required sensor cable(s) are included. With var, neutral current, or neutral voltage sensing, the control may require a connection cable for the sensors.
- STEP 3.** Make sure the required setup software and equipment are available.
- STEP 4.** The following are needed to install IntelliCap 2000 control software on the computer:
 - (a) A portable PC computer with Microsoft® Windows® 10; an Intel® Core™ i7 Processor with 8 GB of Ram (recommended) or a dual-core processor with 4 GB Ram (minimum); a wireless card when using the Wi-Fi configuration option (onboard or USB); an Internet browser; and access to **sandc.com**
Note: S&C no longer supports Windows® 7 because Microsoft has discontinued that operating system.
 - (b) Administrative privileges
 - (c) Microsoft.Net Framework Version 4.5 (Verify it has been installed on the computer by opening C:\Windows\Microsoft.Net\Framework with Windows Edge. If version 4.5 has not been installed, download it at this link: **microsoft.com/net**.)
 - (d) Verify Windows Installer 3.1 is installed:
 - Click on the Windows **Start** button and open the *Settings>Control Panel* screen.
 - Double click on the “Add or Remove Programs” entry.
 - Scroll down the list and verify Windows Installer 3.1 is present.
 - (e) Windows WZC–Wireless Zero Configuration (recommended). To verify Windows Wireless Zero Configuration is installed:
 - Click on the Windows **Start** button and open the *Settings>Control Panel* screen.
 - Double click on the “Administrative Tools” entry.
 - Double click on the “Services” entry.
 - Scroll down the list and verify Wireless Zero Configuration is present.

Note: Windows PowerShell 2.0 is set for an AllSigned execution policy. RemoteSigned and Unrestricted execution policies will also work. Policy selection should be based

on security policy set forth by your IT department. The AllSigned execution policy will result in the appearance of a dialog box, shown in Figure 1, after a firmware upgrade has begun. To perform the firmware upgrade, the **Run once** or **Always run** button must be selected. Selection should be based on the security policy set forth by your IT department.

- (f) Set and verify the execution policy. Administrative privilege is required. Follow this procedure:

Click on the Windows **Start** button and open the *All Programs> Accessories>Windows PowerShell>Windows PowerShell (x86)* screen to start the application

- In the PowerShell console, type: “set-executionpolicy AllSigned” to set the policy.
- In the PowerShell console, type: “get-executionpolicy” to verify the policy setting.

- (g) Review the communication equipment for this control.

Depending on the installation location, the user may also need one or more repeater radios to enable communication between the control and the SCADA master station. For more details, see the manufacturer’s documentation for your communication system.

- (h) Do one of the following:

- Go to the installation site and install the IntelliCap 2000 control. Then, configure the control as described in S&C Instruction Sheet 1024-530, “IntelliCap® 2000 Automatic Capacitor Control: *Setup*.”
- Complete the configuration steps summarized below while you are in the shop. Then, install the control at the site.

Optional In-Shop Setup Steps

The following steps can be completed in the shop or later at the installation site:

- STEP 1.** Install the IntelliLink Setup Software on the computer.

For details, see S&C Instruction Sheet 1024-530, “IntelliCap® 2000 Automatic Capacitor Control: *Setup*.” Click on the **Always Run** button in the Confirmation dialog box. See Figure 1.

- STEP 2.** If this control is part of a SCADA system, configure the communication equipment.

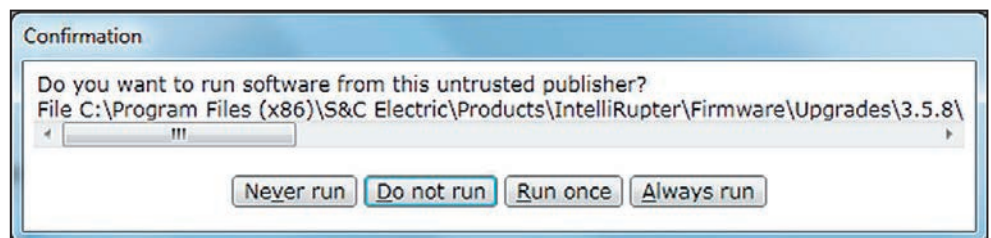


Figure 1. Firmware upgrade Confirmation dialog box.

STEP 3. Configure the control software.

Most of the software setup can be completed in the shop. For an explanation of how to configure the software, see the “Setting Up the Capacitor Control” section in S&C Instruction Sheet 1024-530, “IntelliCap® 2000 Automatic Capacitor Control: *Setup*.”

NOTICE

With firmware version 2.3.x and later, the default passwords for all user accounts, including the admin account, must be changed before the IntelliLink Setup Software can connect to and configure a control. See Instruction Sheet 1024-530, “IntelliCap® 2000 Automatic Capacitor Control: *Setup*,” for more information.

On-Site Installation

Follow these steps to install the control:

WARNING

This control is connected to capacitors operating at primary voltage levels. High voltage may be present in the wiring to the control or the control itself during certain malfunctions of the capacitor bank wiring or grounding system or due to a malfunction of the capacitor bank itself. For this reason, access to the control should be treated with the same safety precautions that would be applied when accessing other high-voltage lines and equipment. Follow all locally approved safety procedures when working on or around this control.

When open-circuited, current transformers can produce high voltages that can result in injury or death. Proper shorting hardware and operating procedures are required for safe operation. The current transformer must be shorted before installing or removing the control. This control does NOT provide for shorting of the current transformer.

WARNING

To avoid accident or serious injury, read the following safety instructions:

Do not energize the 93- to 130-Vac power source entering the control enclosure until all wiring is complete.

Do not plug the sensor cable into the control until called for in the instructions.

Do not enable communications by connecting radios, fiber-optic cables, or dedicated phone lines until called for in the instructions.

Before attempting to access an existing installation, check carefully for visible or audible signs of electrical or physical malfunction—do this before touching or operating the control or any other part of the installation. These warning signs include such things as smoke, fire, open fuses, crackling noises, loud buzzing, etc. If a malfunction is suspected, treat all components of the installation, including the control and associated mounting hardware, as if they were elevated to primary (HIGH) voltage.

The sequence of installation steps outlined in this instruction sheet must be followed to insure a safe and successful control installation.

- STEP 1.** Remove the 10-A load fuse near the lower right corner of the faceplate. See Figure 2.

Installing the Capacitor Control

⚠ WARNING

Leave the 10-A fuse out until instructed to replace it later in the installation process. Otherwise, dangerous unexpected bank operation may occur.

- STEP 2.** Install the control on the meter base, pole, or panel in a location with minimum traffic exposure.

All IntelliCap 2000 controls have an internal terminal strip; the terminal strip configuration is shown on a label inside the enclosure below the faceplate. The terminal strip wires connect to the meter base, cable connector, or cable wire configurations shown in Figure 2. A meter base with a pole-mounting bracket and meter-ring assembly is available from S&C.



Figure 2. Load fuse on the faceplate.

Meter Base Mounting

Follow these steps to install the control on the meter base:

STEP 1. Confirm the meter base socket is wired correctly for this control.

The required socket wiring for a four-jaw plug is shown in Figure 3. The wiring for each type of six-jaw meter base is shown in Figures 4 through 10. The correct configuration for the control is also indicated by a label on the back of the control enclosure. A meter base mount control may also have sensor cable connectors on the bottom of the enclosure. See Figure 11 on page 13 for connector locations.

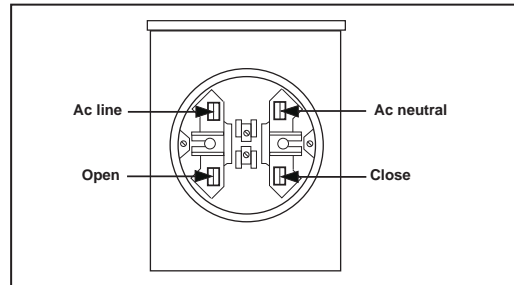


Figure 3. A four-jaw meter base socket configuration for capacitor controls with catalog number suffix “-J40.” Catalog number suffix “-J41” reverses only ac line and ac neutral. Catalog number suffix “-J42” reverses only open and close.

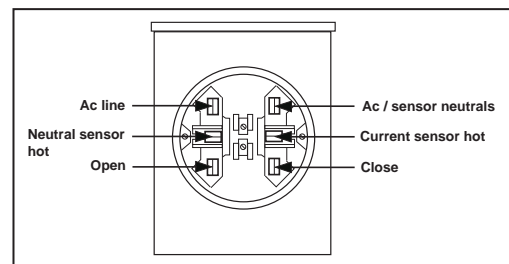


Figure 4. A six-jaw meter base socket configuration for capacitor controls with catalog number suffix “-J60.”

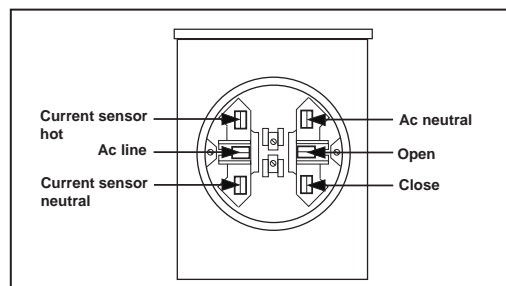


Figure 5. A six-jaw meter base socket configuration for capacitor controls with catalog number suffix “-J61.”

Installing the Capacitor Control

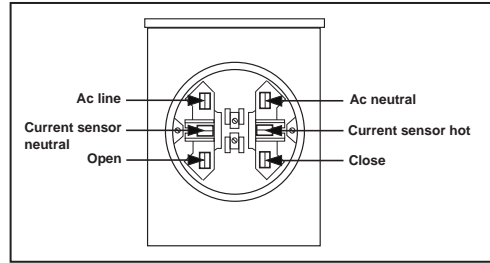


Figure 6. A six-jaw meter base socket configuration for capacitor controls with catalog number suffix “-J62.”

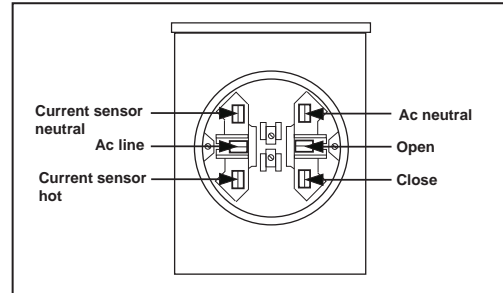


Figure 7. A six-jaw meter base socket configuration for capacitor controls with catalog number suffix “-J63.”

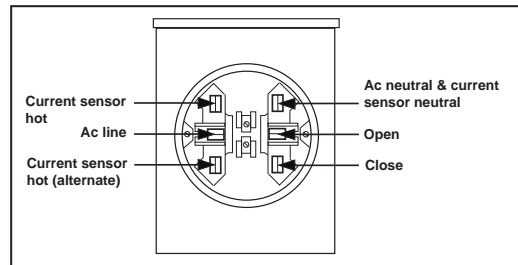


Figure 8. A six-jaw meter base socket configuration for capacitor controls with catalog number suffix “-J64.”

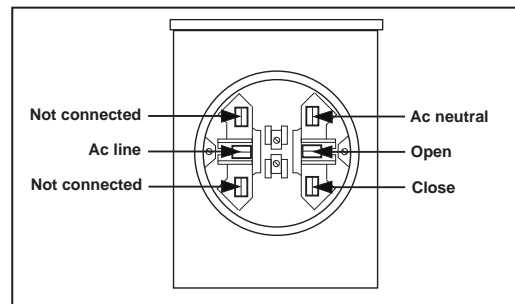


Figure 9. A six-jaw meter base socket configuration for capacitor controls with catalog number suffix “-J65.”

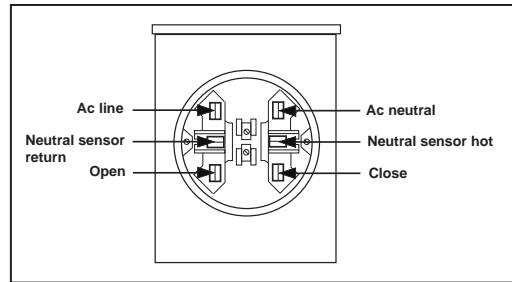


Figure 10. A six-jaw meter base socket configuration for capacitor controls with catalog number suffix “-J68.”

STEP 2. Ground the control enclosure.

Use the ground lug on the bottom of the control enclosure to ground the enclosure. See Figure 11 and Figure 12 on page 14. The ground lug will accommodate up to #2 copper or aluminum, solid or stranded, wire. Ground impedance must be 25 ohms or less to properly protect the equipment.

⚠ WARNING

The control must be properly grounded. Installers must read and understand all applicable grounding codes and requirements for the service area before installing this device. Failure to properly ground the control may cause serious injury.

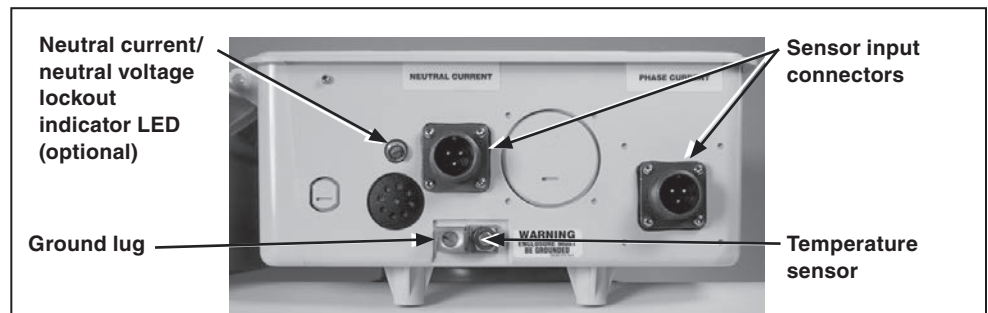


Figure 11. The ground lug on the bottom of the enclosure.

Installing the Capacitor Control

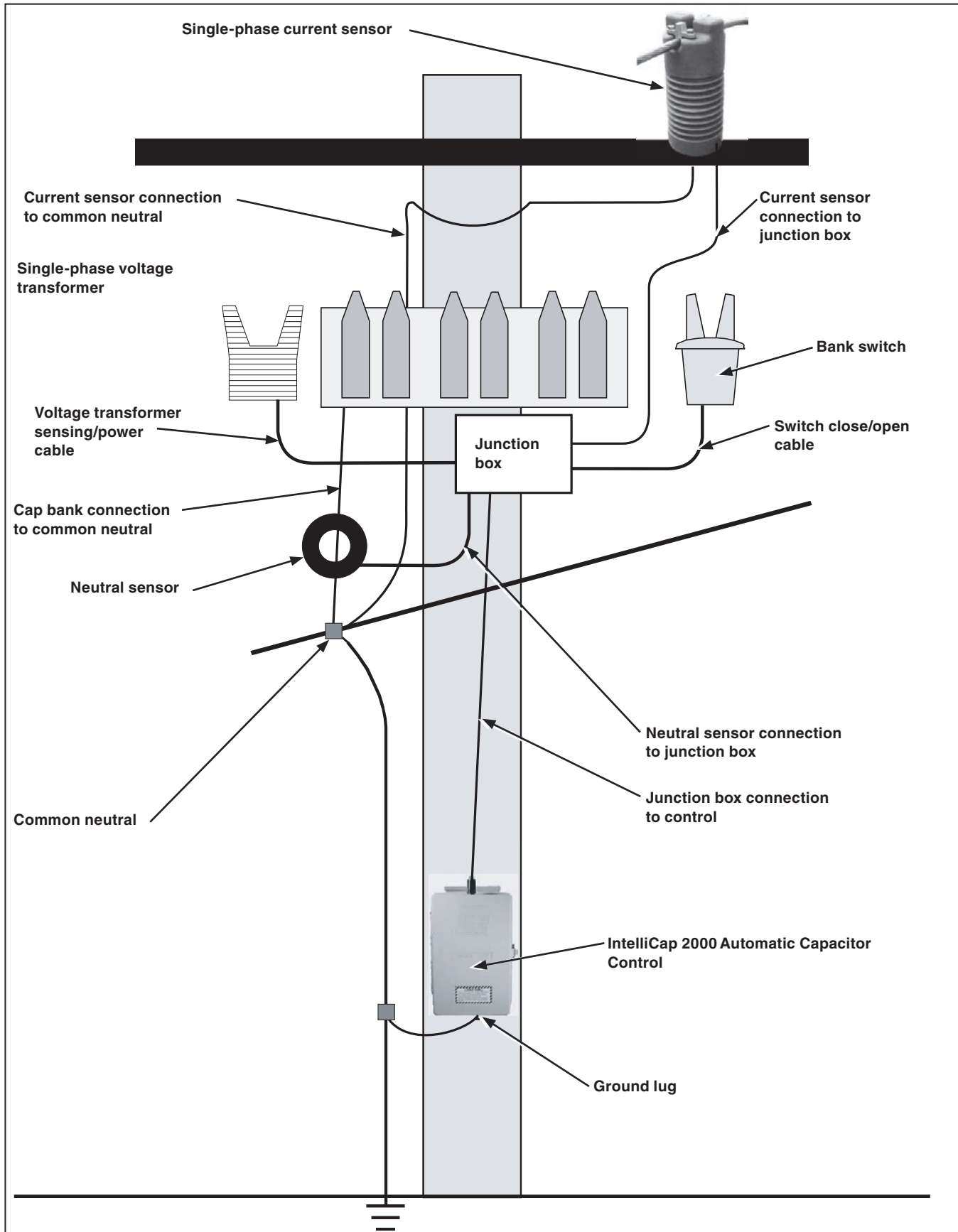


Figure 12. Grounding the IntelliCap 2000 control enclosure.

⚠ WARNING

If lightning arresters are installed, their ground path must not go through the neutral current sensor. Connect them to ground on the earth side of the sensor. Failure to connect them properly could result in death of an operator.

STEP 3. Plug the control into the meter base socket. See Figure 13.

When the control is plugged into an energized meter base, all faceplate LEDs light momentarily. After a few seconds, the LCD screen will show ****Unit OK****.

Make sure the OPERATION MODE MANUAL and SCADA CONTROL LOCAL LEDs are lit. If not, press the applicable CHANGE button.

⚠ WARNING

The control must be set to **Manual** and **Local** mode to avoid unexpected operation of the capacitor bank during installation or setup operations. Failure to use the proper settings could result in death of an operator.

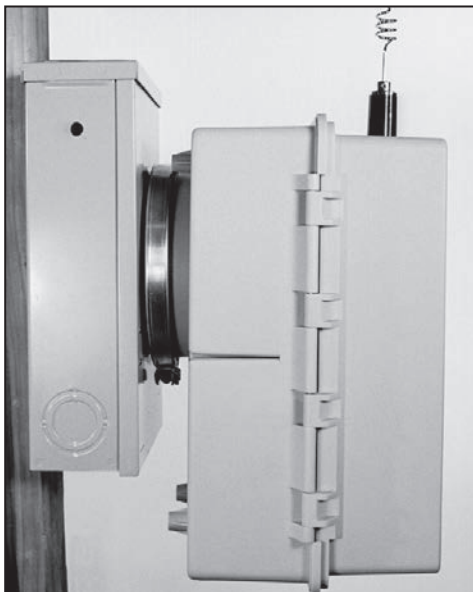


Figure 13. Side view of the capacitor control enclosure and meter base with a snap ring and crimp lock installed.

STEP 4. Lock the control to the meter base.

Use your standard procedure for a locking ring, snap ring, crimp lock, etc., and lock the control to the meter base.

STEP 5. Go to the “Harness Wiring” section on page 19.

Installing the Capacitor Control

Bracket Mounting

Follow these steps to attach the control to the pole with either lag bolts for a wood pole or metal straps for a concrete or metal pole. See Figure 13 on page 15. Then, connect the cable as described below:

For a Metal or Concrete Pole

- STEP 1.** Pass a stainless steel strap or clamp through the two upper mounting slots in the bracket. Pass a second strap through the two lower mounting slots. See Figure 14 on page 17.
- STEP 2.** Lift the control into position on the pole. Then, support the control while tightening the upper and lower straps around the pole. Then, go to Step 5 of the “For a Wood Pole” section.

For a Wood Pole

- STEP 1.** Use two ½-inch through-bolts or lag screws, and flat washers if necessary. Drill a hole for the top bolt, or start the top lag screw.
- STEP 2.** Support the control and install the top bolt to hold the control on the pole, or hang the control on the top lag screw.
- STEP 3.** Vertically align the control on the pole and drill the bottom hole. Install the bottom bolt or lag screw.
- STEP 4.** Tighten the two bolts or lag screws.
- STEP 5.** Confirm the cable from the switch and power source is wired correctly for the connector on the control.

The wiring options for the connector are shown in Figures 15 through 18 on page 18. The configuration used in this control is also shown on a label inside the enclosure. The bracket mounted control has additional sensor cable connector(s) mounted on the bottom of the enclosure. See Figure 11 on page 13.

- STEP 6.** Connect ground lug on the bottom of the control.

Use the ground lug on the bottom of the control enclosure to ground the enclosure. See Figure 11 on 12 and Figure 12 on page 14. The ground lug will accommodate up to #2 copper or aluminum, solid or stranded, wire.

⚠ WARNING

The control must be properly grounded. The installer must read and understand all applicable grounding codes and requirements for the service area before installing this device. Failure to ground the equipment correctly could result in death of an operator.

STEP 7. Connect the cable from the junction box to the connector on the bottom of the IntelliCap 2000 control.

When an energized cable is connected to the control, all faceplate LEDs light momentarily. After a few seconds, the LCD screen will show ****Unit OK****.

Make sure the OPERATION MODE MANUAL and SCADA CONTROL LOCAL LEDs are lit. If not, press the applicable CHANGE button.

⚠ WARNING

The control must be set to **Manual** and **Local** mode to avoid unexpected operation of the capacitor bank during installation or setup operations. If the control uses dial-up software, it may still be operated remotely. Failure to use the proper settings could result in death of an operator.

STEP 8. Go to the “Harness Wiring” section on page 19.

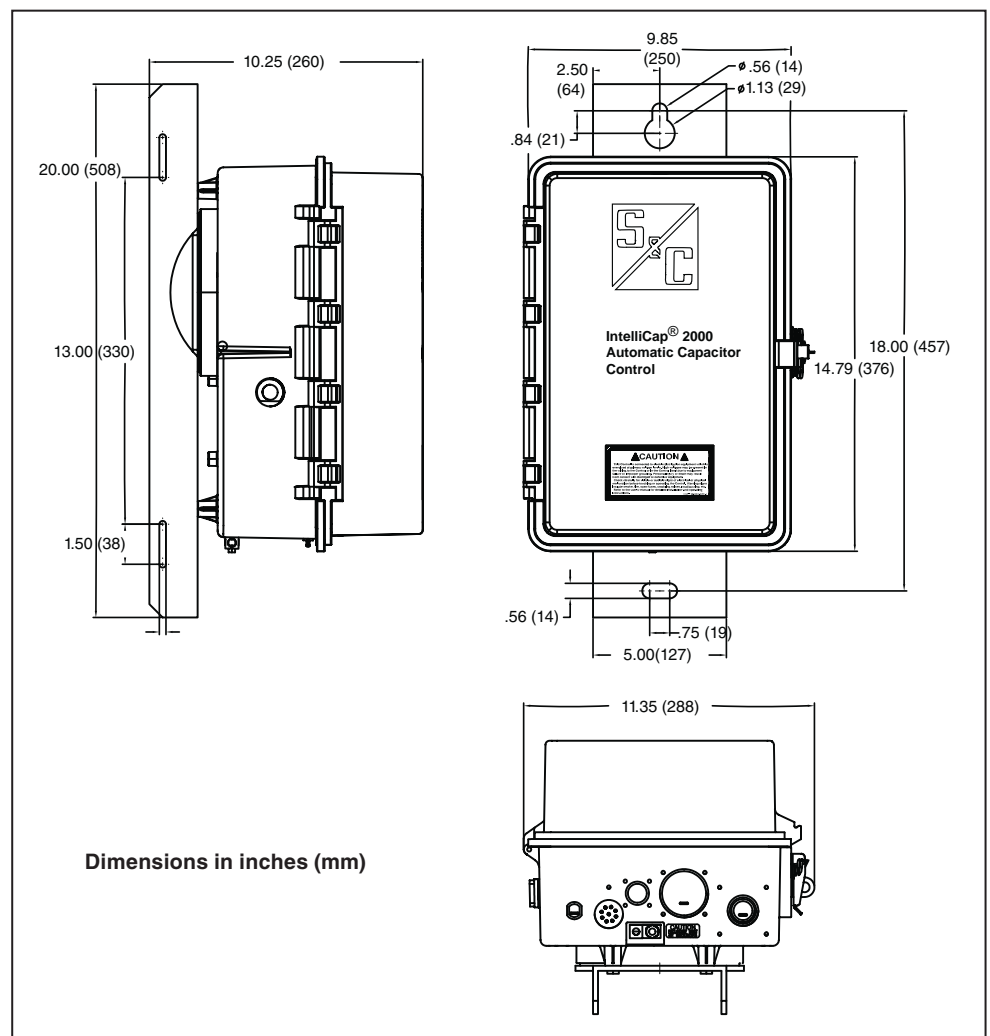


Figure 14. Enclosure dimensions with pole-mount bracket.

Installing the Capacitor Control

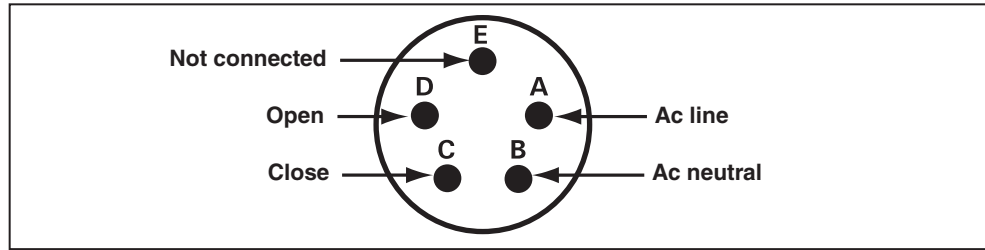


Figure 15. Bracket-mount receptacle wiring configuration, five-pin for capacitor controls with catalog number suffix “-M1.”

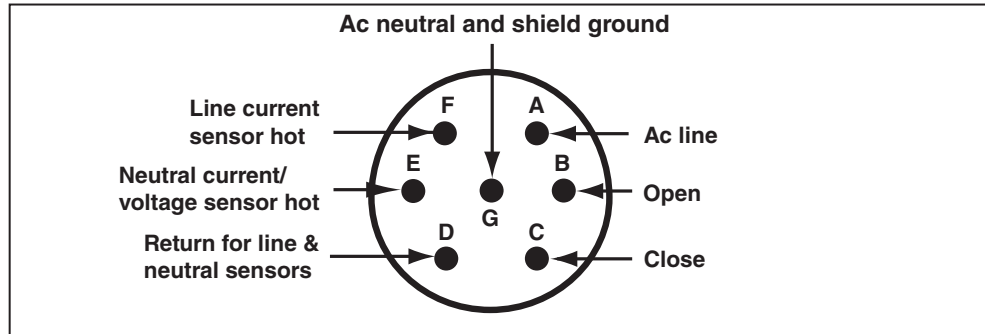


Figure 16. Bracket-mount receptacle wiring configuration, seven-pin for capacitor controls with catalog number suffix “-M3.”

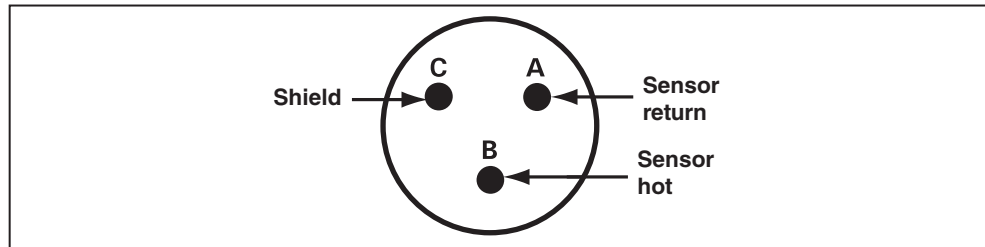


Figure 17. Bracket-mount receptacle wiring configuration, three-pin for capacitor controls with catalog number suffix “-M5,” “-M7,” or “-K1.”

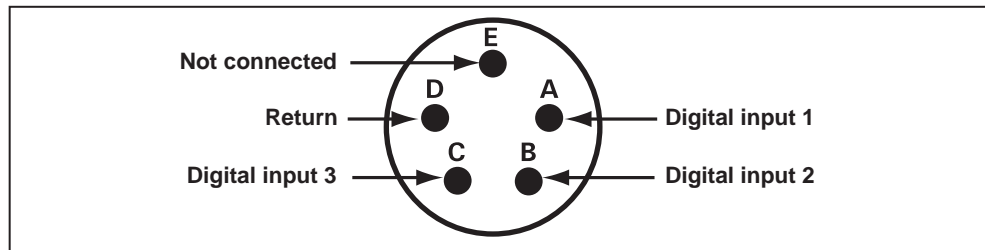


Figure 18. Bracket-mount receptacle wiring configuration, five-pin for capacitor controls with catalog number suffix “-M11.”

Harness Wiring

The standard plus var and current control with single-phase current sensing provided by a customer-furnished 0- to 5-A current transformer, catalog number 240164-J67, is designed for mounting on the surface of a control panel. It has a special wiring harness that has seven 3-foot (914 mm) wires that exit from the bottom of the control. A shorting block should be connected to this harness and mounted nearby. The shorting block allows you to safely remove the control without leaving the current transformer circuits open. See Table 1 for the harness color code; each wire is labeled on the harness.

Connected to a potential transformer, the PT wires provide voltage sensing and power to the control and internal relays. Average IntelliCap 2000 control power consumption is 0.5 Watts. Control power is used to whet the Open and Close relay contacts to operate the capacitor bank switches or the interposing relays.

The IntelliCap 2000 control relay contacts are rated at 20 A @ 250 Vac. In addition, they have been tested to operate three Joslyn vacuum switches (36 A). If requiring 125 Vdc to operate the capacitor switches, install interposing relays rated for 125 Vdc.

Control power is used as wetting voltage for the Open and Close relays and is not fused in the IntelliCap 2000 control. An external fuse must be installed when necessary. Polarity and phase-angle corrections can be adjusted with the control software.

Table 1. Catalog Number 238164-67 Var and Neutral Input Wiring.

Catalog Number 240164-J67 Var and Neutral Input Wiring	
Black	Station power hot (+)
Blue	Close
Red	Open
Red	CT return (-)
Red	CT hot (+)
White	PT/ac—neutral
Black	PT/ac—line
Wiring for Neutral Input	
Orange	Neutral sensor hot (+)
White	Neutral sensor return (-)

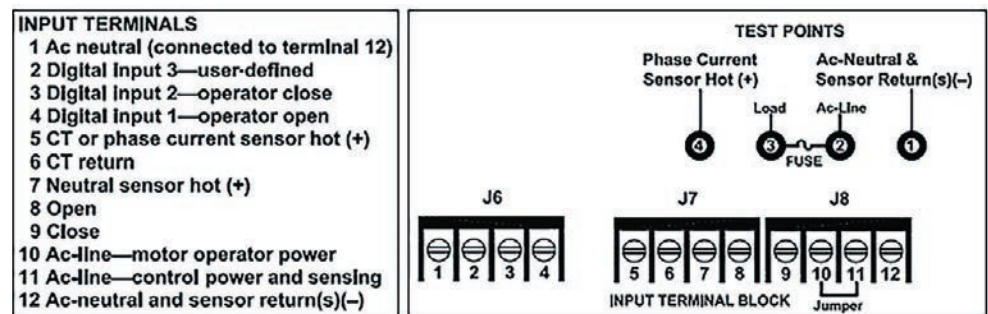


Figure 19. Terminal block wiring and test point configuration for catalog number suffix “-JB1” or “-JB2.”

Installing the Capacitor Control

Voltage Sensing Source

When equipped with option suffix “-K1,” an IntelliCap 2000 control can derive its voltage sensing from an external voltage sensor and will ship from the factory configured to use an external voltage sensor. The available sensor input ranges are 0-5 V or 0-10 V. The external sensor positive input connects to the left spade terminal and neutral to the right terminal. See Figure 20.

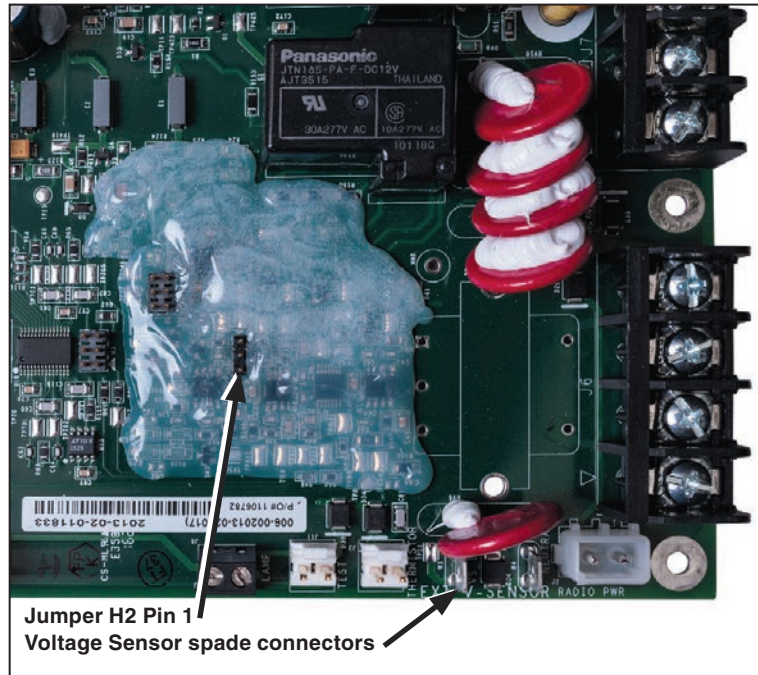


Figure 20. Jumper H2 and external voltage sensor input spade terminals.

A unit with suffix “-K1” can be configured to obtain its voltage sensing signal from the control power but will require a hardware-configuration change to match the software setting. Voltage is sensed on Pins 11 and 12 of the input terminal block. See Figure 19 on page 19, Figure 20, and the warning below.

NOTICE

The setting for option “-K1” requires a hardware jumper change to operate properly. Connecting control power to Terminal 11 will cause damage to the control if jumper H2 on the PSIO board is not in the proper position. To change a control from external sensing to control power will require the front panel to be removed so the position of jumper H2 on the PSIO board can be changed. See the “Front Panel Removal” section on page 26.

The jumper positions are:

Pins 1 and 2 = Control power

Pins 2 and 3 = External sensor, maximum input voltage = 20 Vac

Voltage and Current Sensing

Some controls have var and/or neutral current or neutral voltage sensing connected in the meter socket. Other controls use connector(s) on the bottom of the control enclosure, or terminal block J6. See Figures 11 and 12 on pages 13 and 14 and Figure 19 on page 19.

NOTICE

Do not ground sensor cable shields at the top of the pole. Sensor cable shields should be grounded only at the control end to prevent extraneous ground current from flowing through the cable shields. This rule applies to all S&C connectorized cables.

NOTICE

For neutral current sensing on four-wire distribution systems where the starpoint of the capacitor bank is tied to the neutral and/or ground, installation of the neutral current sensor must be between the starpoint and the system neutral and/or ground. See Figure 21.

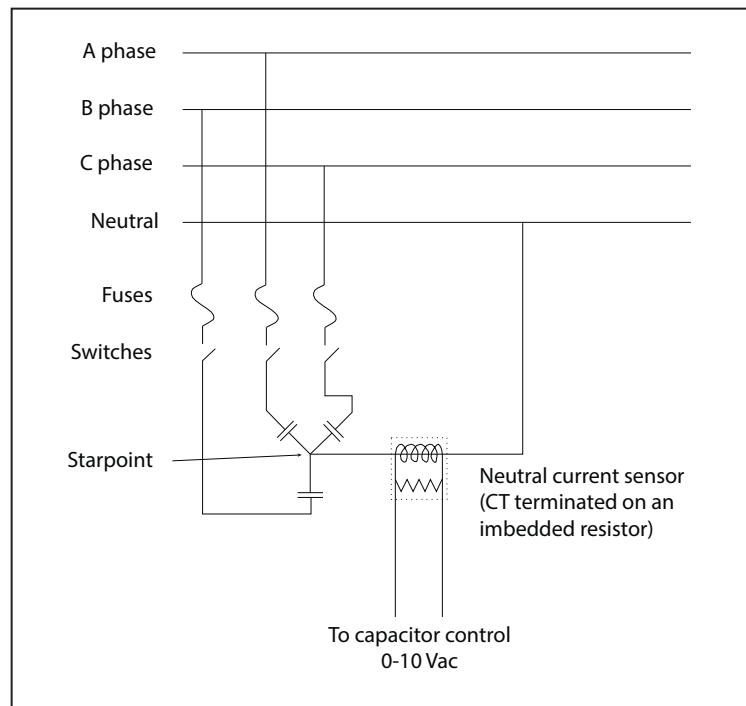


Figure 21. Neutral current sensor installation between the starpoint and the neutral.

Installing the Capacitor Control

The **Neutral Voltage Sensing** option allows the capacitor control to monitor and take action if it detects abnormal levels of voltage on the starpoint of an ungrounded wye-connected bank. Use the information provided by the neutral voltage sensor manufacturer to design the installation. See Figure 22.

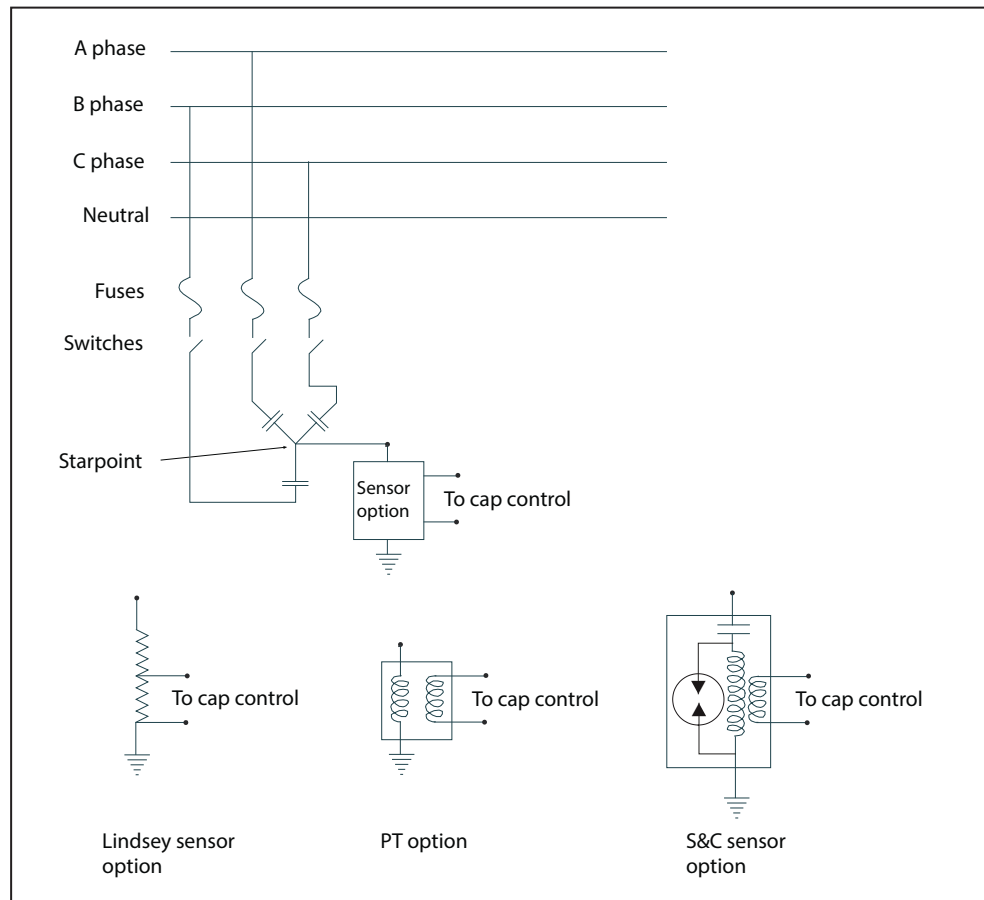


Figure 22. Neutral voltage sensor and wye-connected bank with the starpoint.

Energize and Test the Control

Follow these steps to put the installed control in service:

STEP 1. Test the faceplate functions.



Figure 23. The IntelliCap 2000 control faceplate.

At this point, most of the faceplate LEDs and buttons can be tested. See Figure 23.

- (a) Observe that the LCD screen shows: ****UnitOK****. If the LCD screen shows ****ACTIVE ALARMS****, check the capacitor bank for a problem. The alarm condition must be corrected before the IntelliCap 2000 control will operate correctly.
- (b) If the display is blank or if there is an error message, see S&C Instruction Sheet 1024-550, “IntelliCap® 2000 Automatic Capacitor Control: *Troubleshooting.*”
- (c) Press the LAMP TEST button and check that all the faceplate LEDs illuminate.

STEP 2. Replace the load fuse.

STEP 3. Check the Close and Open relays by operating the capacitor bank.

- (a) Make sure the LOCAL and MANUAL LEDs are lit.

- (b) Follow your company procedures. **Note:** The IntelliCap 2000 control has a manual operation delay that can be set from 1 to 300 seconds or disabled. The default setting is 30 seconds. Press the CLOSE or OPEN button on the faceplate to operate the capacitor bank. Check visually to verify the faceplate LEDs correctly indicate each capacitor bank switch position.
- (c) Check visually to verify the switch position indicators on the capacitor bank switches for all three phases match the CLOSE or OPEN indication of the faceplate LEDs.

The CLOSE and OPEN LEDs indicate the last requested operation. Neither LED will be lit until the bank is switched for the first time.

NOTICE

The capacitor bank **Close** command is blocked for a period of 5 minutes after an **Open** command. This delay provides time for the capacitor charge to bleed off. For more details, see the “Switching the Capacitor Bank” section in Instruction Sheet 1024-540, “IntelliCap 2000 Automatic Capacitor Control: *Operation*.”

STEP 4. Check NEUTRAL CURRENT and NEUTRAL VOLTAGE indication on the faceplate LCD screen.

- (a) When the **Neutral Sensing** option is installed, check whether the LCD screen shows ****NeutralSensorErr**** or ****NeutLockErr****. If it does, continue to Step 4(b). If the LCD screen shows ****Unit OK****, go to Step 5.
- (b) Press the NEXT faceplate button once. The LCD screen will show ****Menu**** data.
- (c) Use the NEXT faceplate button to scroll the data to “Nue Fund:=” and note the value displayed.
- (d) Use the NEXT faceplate button to scroll to “Setup Sensor Cong.”
- (e) Then, use the +/- keys to scroll to “Setup: N Cur Snsr 0 Alm Lvl:.” If the displayed value is greater than the **Alm Lvl** value, check the capacitor bank for a problem indicated when neutral voltage or neutral current is present. The problem must be corrected before the IntelliCap 2000 control will operate correctly.

STEP 5. At this stage, the capacitor control is ready for local, manual operation. Set the control for **SCADA Control-Local** mode and **Operation-Manual** mode.

NOTICE

Leave the control in **SCADA Control Local** mode (not **Remote** mode) and in **Operation Manual** mode (not **Auto** mode) until the software in the capacitor control is set up for this installation.

Communication Equipment

If this capacitor control uses a radio, make sure the radio has power.

For most installations, the radio is installed in the enclosure door.

The IntelliCap 2000 control has two remote communication access ports: an Ethernet port and a serial SCADA port. When used with suitable communication equipment and protocol, users can remotely monitor and control the capacitor control installation.

S&C supports the IntelliCap 2000 control with a variety of communication hardware options. Supported manufacturers and hardware options include the following:

- SpeedNet™ Radio
- Hayes™ compatible modems
- Cellular transceivers
- Fiber-optic transceivers

For other options, contact S&C Electric Company

DNP 3.0 is the standard protocol for the IntelliCap 2000 control.

All 8-bit, asynchronous SCADA communications (at up to 9600 BAUD) are handled directly by control software.

Most communication equipment can be mounted inside the capacitor control enclosure (in the door). This eliminates clutter and provides better reliability for the installation.

Depending on the location of the capacitor bank site, users may also need one or more repeater radios to enable communication between this control and the SCADA master station.

For more information, see S&C Instruction Sheet 1024-561, “IntelliCap® 2000 Automatic Capacitor Control: *DNP Points List and Implementation*,” or contact a local S&C Sales Office.

Connecting Communication Hardware

All IntelliCap 2000 controls are radio-ready. This gives users the flexibility to add communication hardware later. Serial and Ethernet connectors are provided.

The SCADA PORT connector provides a data and power (12-Vdc) connection for the radio. Wiring for the six-pin IDC 0.156-inch header in the control is shown in Figure 24.

The cable from the radio is terminated with an ITW MAS-CON 0.156-inch center line IDC connector (or equivalent).

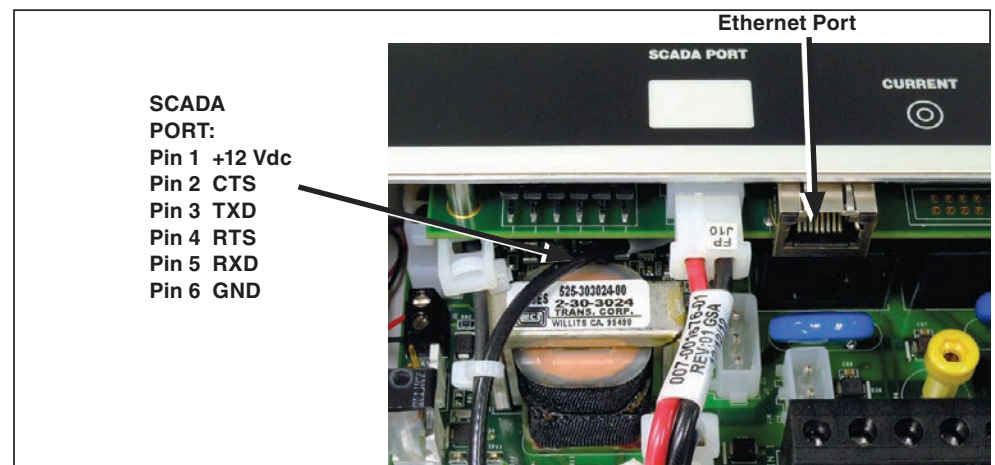


Figure 24. Ethernet Port and pinout for the SCADA PORT.

Front Panel Removal

The front panel is installed close to the PS/IO board underneath it. The ribbon data cable is shown in Figure 25. When removing the front panel, make sure the ribbon cable is not crimped when reinstalling the front panel. Verify it is carefully bent to the shape shown in Figure 26 before reinstalling the front panel. Avoid pinching the ribbon cable between the front panel and the enclosure protrusions when reinstalling the front panel.

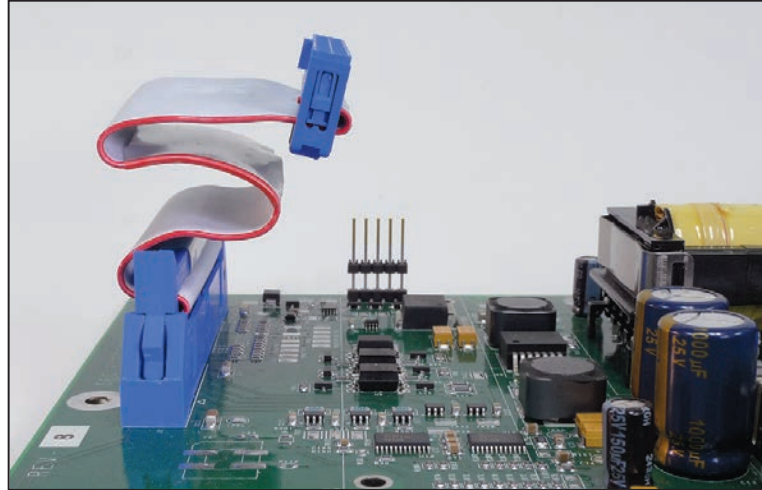
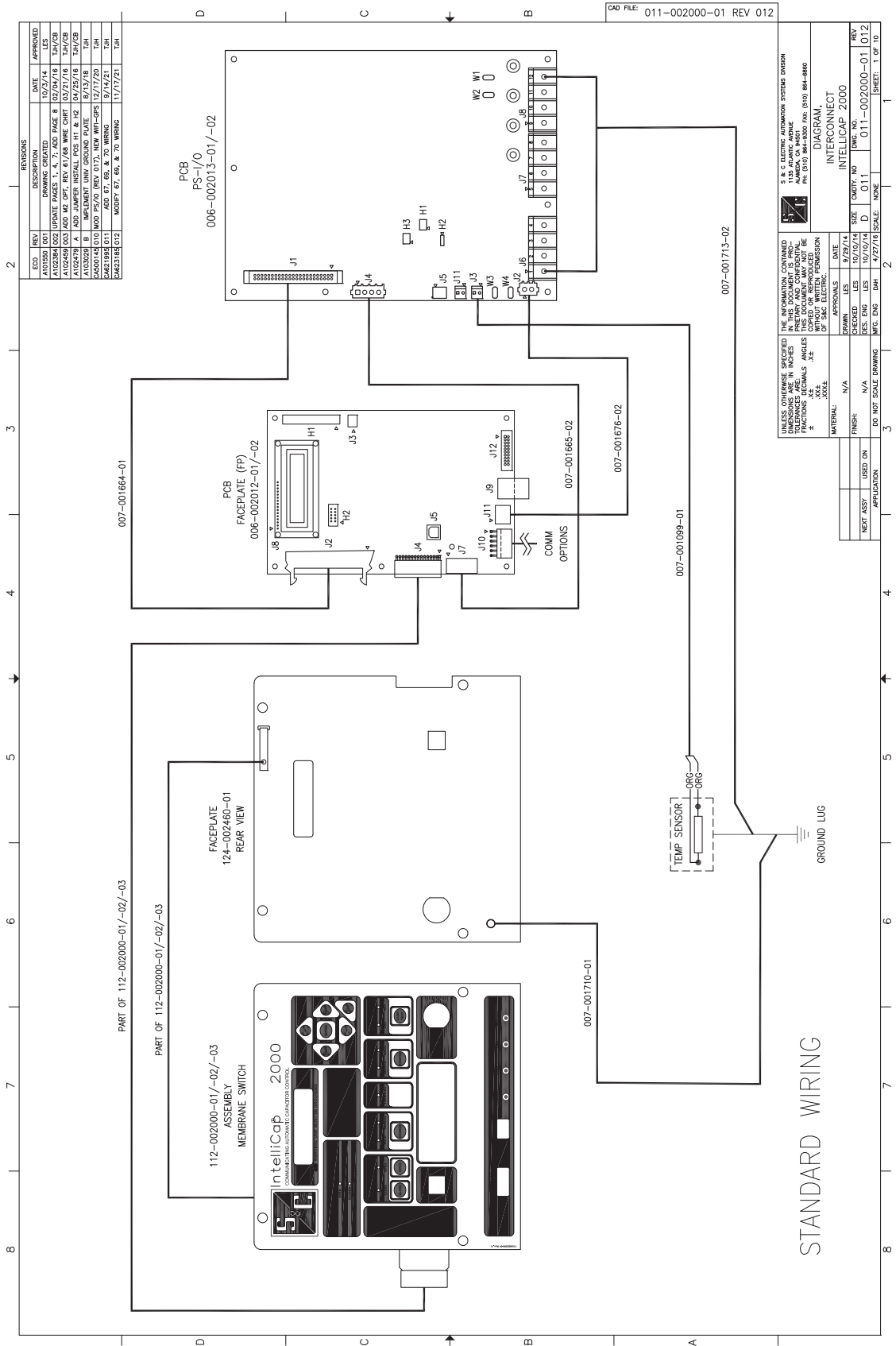


Figure 25. Front panel harness installed on the PS/IO board.



Figure 26. Harness to connect front panel, bent so it will not be crimped.

This completes hardware installation and testing. Continue with S&C Instruction Sheet 1024-530, “IntelliCap® 2000 Automatic Capacitor Control: *Setup.*”



REVISIONS

ECO	REV	DESCRIPTION	DATE	APPROVED
A10150	001	DRAWING CREATED	10/2/14	LES
A10254	002	UPDATE PAGES 4, 7, ADD PCB B	02/07/16	1M/08
A10254	003	ADD PCB C, 4, 7, ADD PCB B	02/07/16	1M/08
A10247	004	ADD PCB D, 4, 7, ADD PCB B	04/25/16	1M/08
A10247	005	ADD JUMPER INSTAL POS H1 & H2	04/25/16	1M/08
A10302	006	IMPLEMENT UNV GROUND PLATE	8/13/18	TSH
CAS0014	010	MOD P5/A2 (REV 017), NEW WFT-SPR	12/7/20	TSH
SAB1195	011	ADD 87, 66, & 70 WIRING	9/1/21	TSH
SAB2181	012	MODIFY 87, 66, & 70 WIRING	11/17/21	TSH

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APPROVALS	DATE
DESIGN	9/29/14
LES	10/1/14
DES. ENG.	10/07/14
MFG. ENG.	4/27/16
DAI	

DIAGRAM, INTERCONNECT

ITEM	QTY	DESCRIPTION
011	1	INTELLICAP 2000

011-002000-01 012

SHEET: 1 OF 10

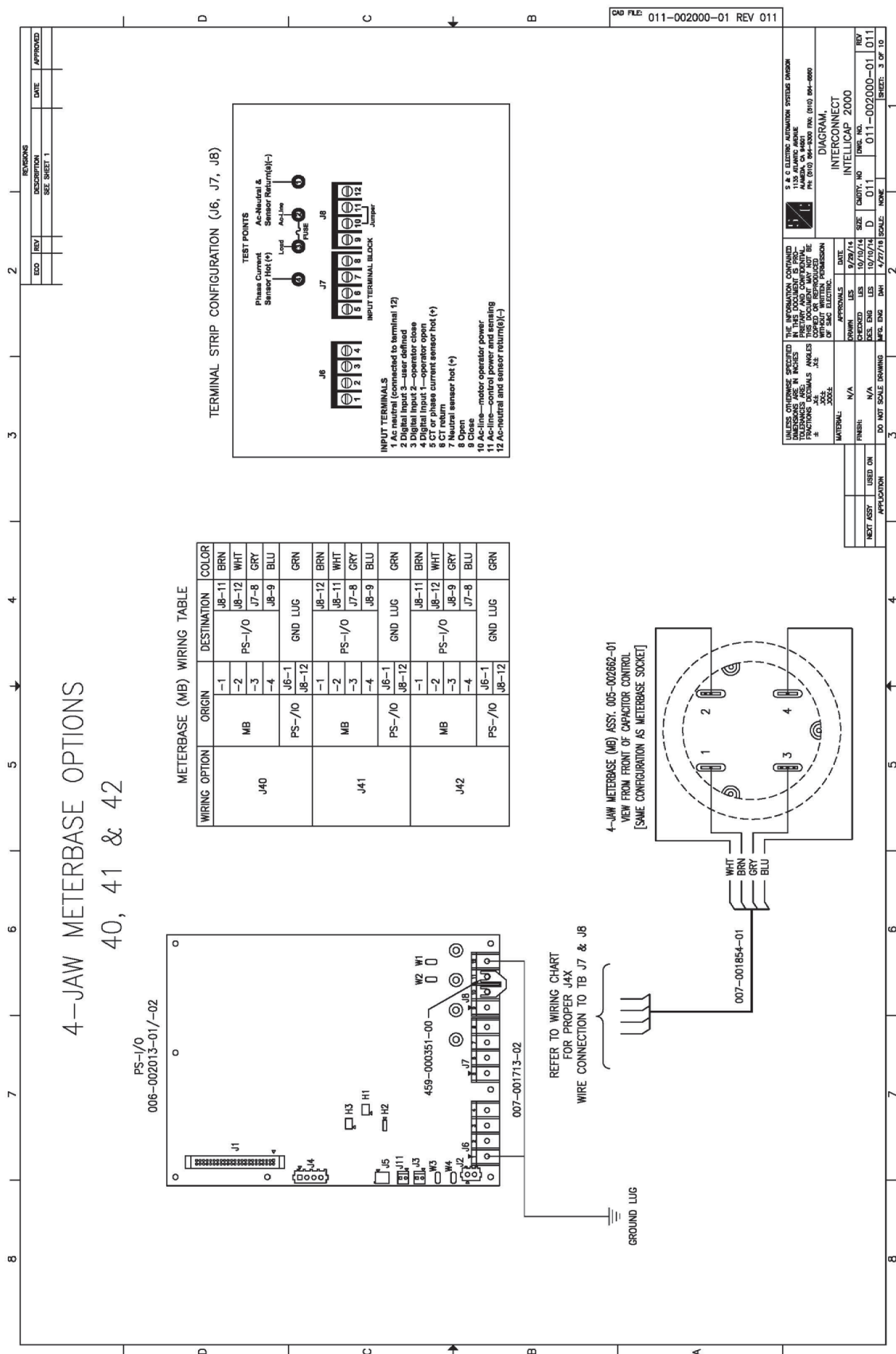
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SCALE: NONE

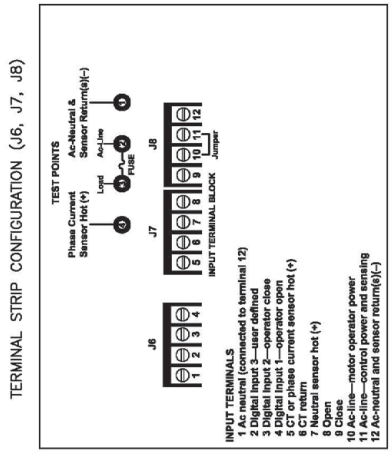
STANDARD WIRING



4-JAW METERBASE OPTIONS 40, 41 & 42

METERBASE (MB) WIRING TABLE

WIRING OPTION	ORIGIN	DESTINATION	COLOR
J40	1	J8-11	BRN
	2	J8-12	WHT
	3	PS-I/O	GRY
	4	J8-9	BLU
J41	J6-1	GND LUG	GRN
	1	J8-12	BRN
	2	PS-I/O	WHT
	3	J7-8	GRY
J42	J6-1	GND LUG	GRN
	1	J8-11	BRN
	2	PS-I/O	WHT
	3	J8-9	GRY
J42	J6-1	GND LUG	GRN
	4	J7-8	BLU
	J6-1	GND LUG	GRN
	J8-12	GRN	



REVISIONS

ECO	REV	DESCRIPTION	DATE	APPROVED
		SEE SHEET 1		

CAD FILE 011-002000-01 REV 011

U.S. ELECTRIC CORPORATION
 1150 ALAMOGADO AVENUE
 SAN DIEGO, CA 92108
 TEL: 619/594-2000 FAX: 619/594-2000

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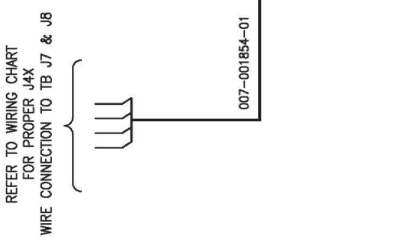
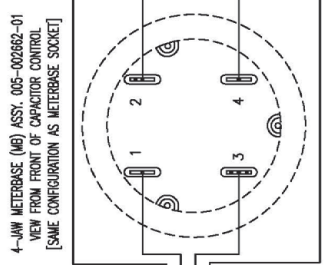
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 DESIGNED BY: J.E.
 CHECKED BY: J.E.
 APPROVALS: J.E.

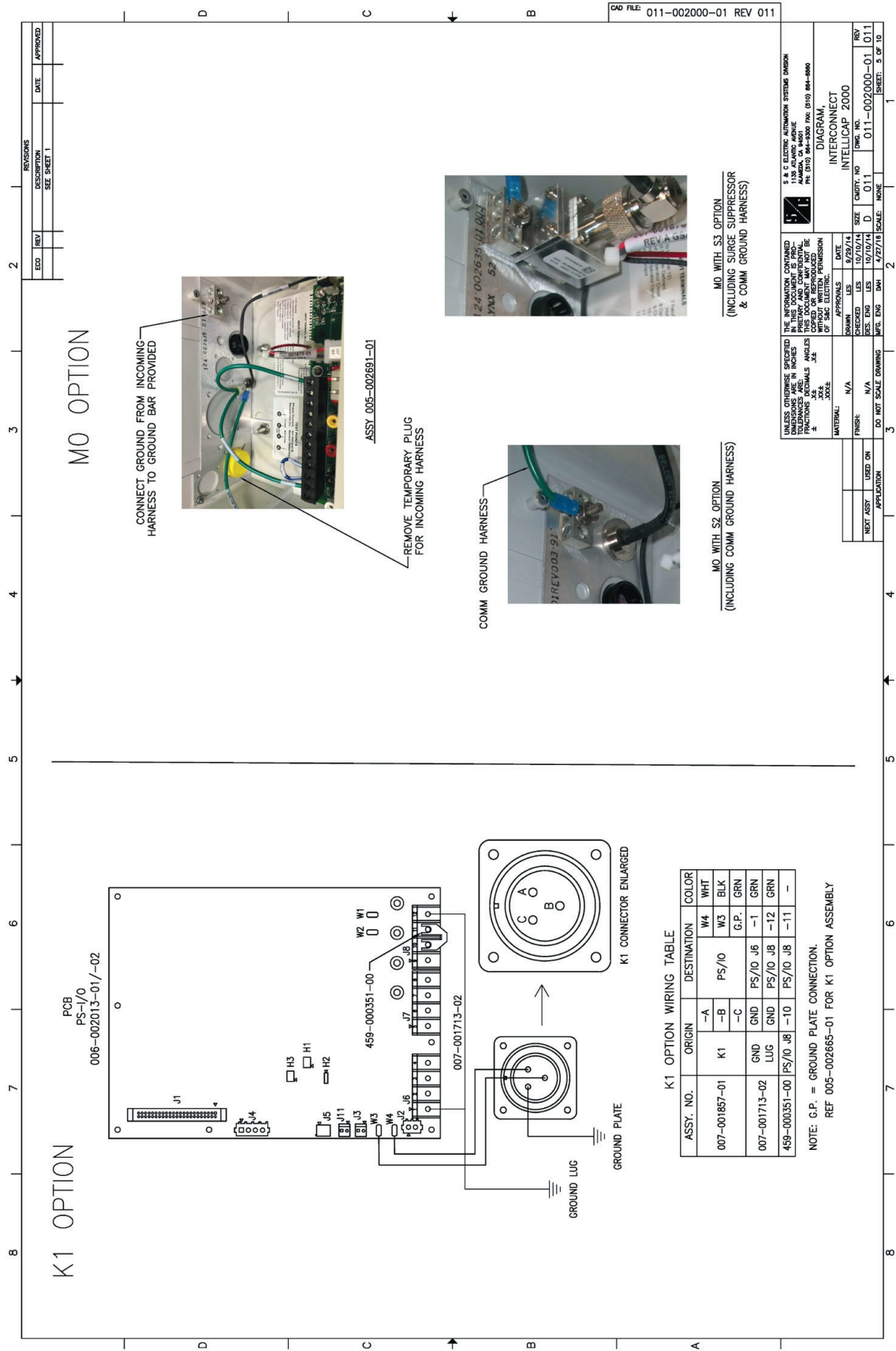
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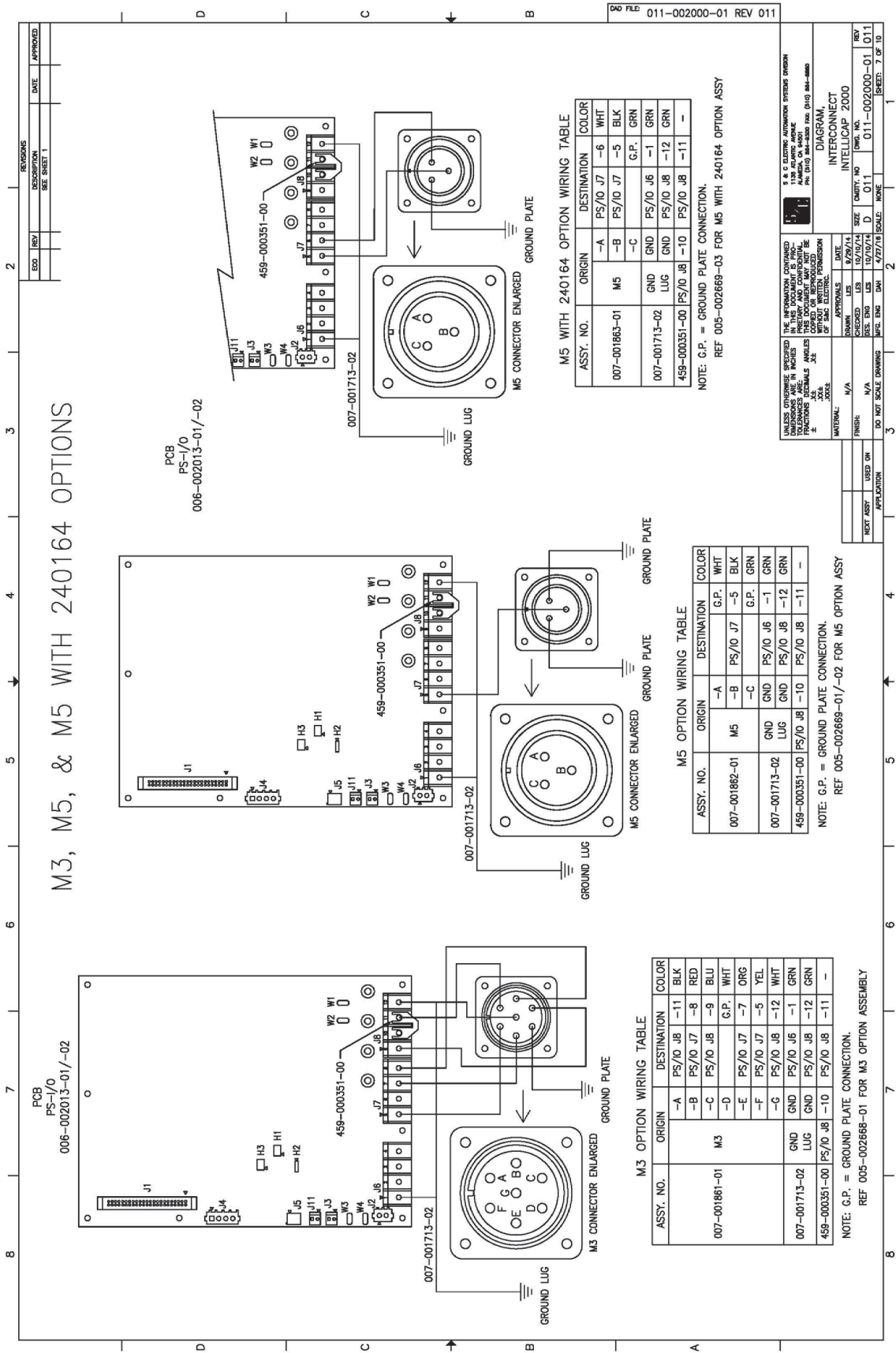
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INTERCONNECT DIAGRAM
 INTELLECAP 2000
 D 011
 011-002000-01

REV 011
 SHEET 3 OF 10







M3, M5, & M5 WITH 240164 OPTIONS

REV	DATE	APPROVED

DWG FILE 011-002000-01 REV 011

M5 WITH 240164 OPTION WIRING TABLE

ASSY. NO.	ORIGIN	DESTINATION	COLOR
007-001863-01	M5	PS/I/O J7 -6	WHT
		PS/I/O J7 -5	BLK
		G.P.	GRN
007-001713-02	GND	PS/I/O J6 -1	GRN
459-000351-00	LUG	PS/I/O J8 -12	GRN
		PS/I/O J8 -10	GRN
		PS/I/O J8 -11	-

NOTE: G.P. = GROUND PLATE CONNECTION.
REF 005-002668-03 FOR M5 WITH 240164 OPTION ASSY

M5 OPTION WIRING TABLE

ASSY. NO.	ORIGIN	DESTINATION	COLOR
007-001862-01	M5	G.P.	WHT
		PS/I/O J7 -5	BLK
		G.P.	GRN
007-001713-02	GND	PS/I/O J6 -1	GRN
459-000351-00	LUG	PS/I/O J8 -12	GRN
		PS/I/O J8 -10	GRN
		PS/I/O J8 -11	-

NOTE: G.P. = GROUND PLATE CONNECTION.
REF 005-002668-01/-02 FOR M5 OPTION ASSY

M3 OPTION WIRING TABLE

ASSY. NO.	ORIGIN	DESTINATION	COLOR
007-001861-01	M3	PS/I/O J8 -11	BLK
		PS/I/O J7 -8	RED
		PS/I/O J8 -9	BLU
		G.P.	WHT
		PS/I/O J7 -7	ORG
		PS/I/O J7 -5	YEL
		PS/I/O J8 -12	WHT
007-001713-02	GND	PS/I/O J6 -1	GRN
459-000351-00	LUG	PS/I/O J8 -12	GRN
		PS/I/O J8 -10	GRN
		PS/I/O J8 -11	-

NOTE: G.P. = GROUND PLATE CONNECTION.
REF 005-002668-01 FOR M3 OPTION ASSEMBLY

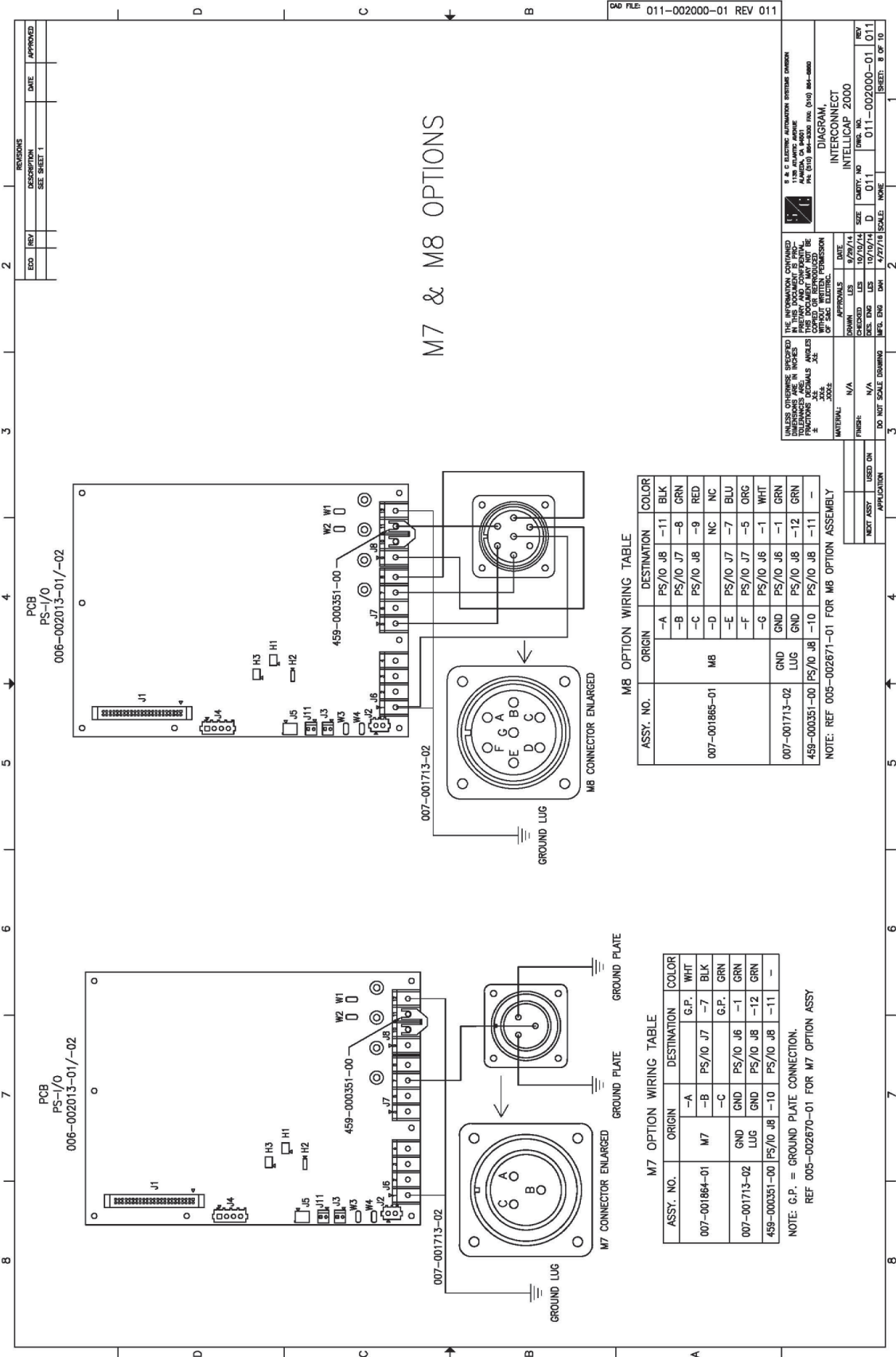
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APPROVALS:
 DESIGNED: LES 10/29/14
 CHECKED: LES 10/29/14
 DRAWN: N/A
 MATERIAL: N/A
 FINISH: N/A
 NEXT ASSY: N/A
 USED ON: N/A
 APPLICATION: N/A

DATE: 10/29/14
 SIZE: 11.0 X 17.0
 DWG NO.: 011-002000-01
 SHEET NO.: 1 OF 1

DIAGRAM: INTERCONNECT

S & C ELECTRIC, AUTOMATION SYSTEMS DIVISION
 10000 WILSON AVENUE
 AMERICA, VA 20101
 TEL: (703) 844-3300 FAX: (703) 844-6860



GAD FILE 011-002000-01 REV 011

REVISIONS		
REV	DESCRIPTION	DATE

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DATE: 9/29/14
 DRAWN: LES
 CHECKED: LES
 APPROVED: LES

DIAGRAM, INTERCONNECT

INTELICAP 2000

011-002000-01_011

SCALE: 1:1

SHEET: 3 OF 10

M8 OPTION WIRING TABLE

ASSY. NO.	ORIGIN	DESTINATION	COLOR
-A	PS/IO JB	-11	BLK
-B	PS/IO J7	-8	GRN
-C	PS/IO JB	-9	RED
-D		NC	NC
-E	PS/IO J7	-7	BLU
-F	PS/IO J7	-5	ORG
-G	PS/IO JB	-1	WHT
GND	PS/IO JB	-1	GRN
GND	PS/IO JB	-12	GRN
459-000351-00	PS/IO JB	-10	PS/IO JB -11

NOTE: REF 005-002871-01 FOR M8 OPTION ASSEMBLY

M7 OPTION WIRING TABLE

ASSY. NO.	ORIGIN	DESTINATION	COLOR
-A	G.P.	-7	BLK
-B	PS/IO J7	-7	BLK
-C	G.P.	GRN	GRN
GND	PS/IO JB	-1	GRN
GND	PS/IO JB	-12	GRN
459-000351-00	PS/IO JB	-10	PS/IO JB -11

NOTE: G.P. = GROUND PLATE CONNECTION.
 REF 005-002670-01 FOR M7 OPTION ASSY

