# VERY IMPORTANT - PLEASE READ

## MOST COMMON ISSUES ENCOUNTERED DURING INSTALLATION

Polara's 2-Wire Accessible Pedestrian System transmits power **and data** between the iCCU Central Control Unit and each Push Button Station (PBS). It is not simply voltage/power carried over the PBS wires. This equipment must be wired correctly, and the wiring must be of good quality for data to transmit properly. The following are the **most common problems** installers experience when installing Polara's 2-Wire system. Please read the items listed below, then thoroughly read the attached Quick Start Installation Guide and make sure each step is understood before proceeding.

1. **PROPER WIRING:**
   A. **Never apply 120 VAC to a PBS, ICB or iCCU terminal block. This will cause damage and void the warranty.**
   B. For proper operation, a dedicated pair of #14 or #12 AWG wire is required between each PBS and the Interconnect Board (ICB) / iCCU to ensure good communication. It is not recommended to share button wires between buttons.
2. **PROPER POWER UP SEQUENCE:**
   A. **DO NOT CONNECT AC POWER TO THE iCCU UNTIL INSTALLATION OF ALL SYSTEM WIRING IS COMPLETE!**
   B. Once all cabinet wiring is complete and all PBSs are mounted and connected to the button wires, power up the iCCU-S2 by connecting the power cord to the iCCU-S2 AC inlet, or if using an iCCU-C2, slide it into the rack.
   C. Each PBS should beep, and then after a short time, its LED should flash with a 2-flash sequence, while the PBSs attempt to communicate with the iCCU. Once a PBS is communicating with the iCCU, it will begin to flash in a four-flash pattern.
   D. If after a few minutes any PBS continues in a two-flash pattern, this indicates the PBS has not established communication with the iCCU. Typically, this is corrected by changing the communication channel. See Advanced Communications, Settings Sections 5.3 (iOS App) in the iNS2 System Manual (or Section 1.3 in Android manual) before proceeding with system setup. The manual is available in the Field Service apps, or on our website **www.polara.com**. *****(Do not change the gain settings)***** If changing the channel does not bring a PBS out of a two-flash pattern, contact Polara Tech support for assistance @ 903-366-0300 EXT 4 or 888-340-4872. **ALL buttons must have a four-flash pattern to proceed with setting up the system**.
   E. If installing an iCCU-C2 and there is a two-flash sequence on **all** buttons, verify wiring complies with that shown in the iCCU-C2 Quick Start Guide or Section 3.3 of Manual.
3. **PASSWORD ISSUES**: The iCCU can be connected to thru Wi-Fi. The buttons can be connected to thru Bluetooth.
   A. Once Wi-Fi is turned on at the iCCU, the Wi-Fi password is ***DEFAULT1*** (ALL CAPS).
   B. Following power up, each button will say "change password" every 30 seconds, until the default password is changed. There is one shared password for logging into an iCCU and all PBS connected to it. The factory default password is **1234**. Using a Field Service app, use 1234 to log into the iCCU or any PBS the first time, and change the password. This changes the password for all PBS and the iCCU. See Section 5.2 in the Manual for details.
   C. If the password is unknown, a **Password Reset** requires a call to Polara Tech Support.
4. **iCCU and PBS FIRMWARE VERSIONS:**
   A. The system will not work properly if it does not have the latest, or correct firmware. Once the system is powered up and operating, **the firmware must be upgraded** to the latest version, **first on each PBS**, then on the iCCU using the Polara Intelligent Config PC app, or the Polara iOS / Android Field Service apps. **UPGRADE BUTTONS FIRST**
5. **CHANGING SYSTEM SETTINGS:**
   A. A button can be logged into to change its settings. If desired, those settings can be uploaded to all buttons.
6. **Operating in BIU/SDLC mode**:
   A. **A connection from the iCCU-S2 to the Traffic Controller's Logic Ground must be established using a Polara manufactured SDLC cable because standard SDLC cables do not pass-through Logic Ground connections.** Polara offers a straight SDLC cable with an external ground wire, or a "Y" cable with internal ground. **If a Polara made SDLC cable is not used, then the CABLE-C-LG supplied with every iCCU-S2, must be used. Not doing this can cause damage to the iCCU and other equipment connected to the SDLC bus. Request document 350-079 for details.**

If you have questions, or encounter issues during installation, call our Tech Support line at **888-340-4872** between 7:30 AM and 5:00 PM CDT/CST.

# Installation Quick Start Guide for iNS2/iCCU-C2 System

See “iNS2 System Manual” Rev. A or newer for complete Installation and Operation instructions. When Sections are referenced below, it is referring to the System Manual. Installation is covered in Section 3.

**The iNS2 can operate as an iNS3 when paired with an iPHCU3S. Refer to iNS3/iDS3 System Manual and Quick Start Guide.**

Polara offers a free iOS app that can be downloaded from the Apple Store. The app can be used to change the password, adjust settings, upload custom messages and update firmware. The website also has tutorial videos that show how to do most processes.

**Note 1: Pay special attention to Steps #9 and #10 below. The firmware versions in the iCCU-C2 and Push Button Stations may not be compatible depending on when each was manufactured. The only way to ensure compatibility and proper operation of the system is to update with the latest released firmware to each push button station first, then the iCCU-C2.**

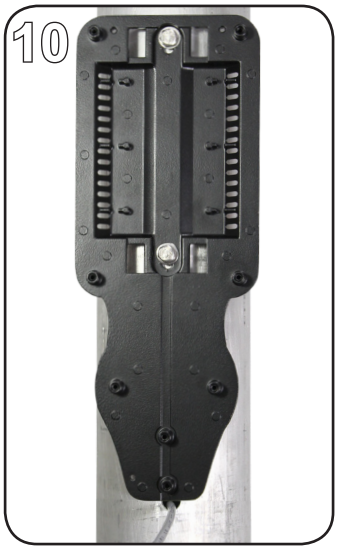
**ALWAYS UPDATE THE BUTTONS FIRST, THEN UPDATE THE iCCU-C2.**

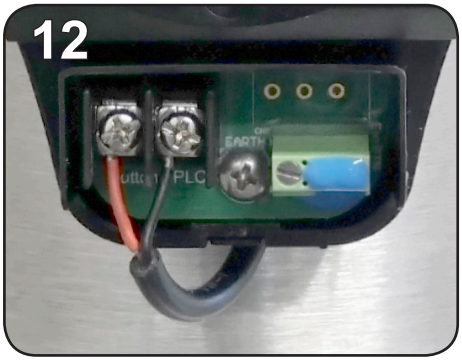
**Note 2: For optimum functionality Polara recommends:**

1. **A dedicated cable with two (or three for a spare) conductors run from the Traffic Cabinet to each APS button. We recommend IMSA 50-2 cable. This cable includes a shield, but connecting the shield is not required/recommended. Twisted pair is not required, but would be acceptable. Cable similar to 50-2 without the shield and drain wire would also be acceptable.**
2. **If the distance from the cabinet to the farthest APS button is less than 300’, #14 AWG solid or stranded conductors/wire should be fine. If the distance is greater than 300’, #12 AWG stranded conductors/wire should be used.**
3. **If dedicated pairs cannot be pulled/provided to each button, at a minimum a single pair daisy chained to two buttons on a corner of an intersection typically will work. A 3-wire cable per corner with the common wire shared by two buttons on the corner will also typically work, but with either option in place of dedicated pairs, you may encounter data transmission issues.**
4. **A common wire for 120 VAC lights must never be used as the button common.**
5. **For further wiring information refer to the document “Field Wiring Recommendations for 2-Wire” at polara.com.**

**Installation Instructions**

1. Place intersection in PED recall.
2. Determine locations for Interconnect Board (iN2-ICB-C) and Power Supply (iN2-150WPS-C). See Section 3.3 of the Manual, or page 3 of this Quick Start Guide for mounting and wiring information.
3. Place cabinet in FLASH and install C4 Cable Adapter (iN2-C4CABLE-C). See Section 3.3.3 of Manual, or page 4 of this Quick Start Guide. Take cabinet out of FLASH.
4. Polara recommends that the AC power cord of the Power Supply be connected to a source of AC that is switched off during flash. See Section 3.1 of the Manual. **DO NOT CONNECT POWER TO iCCU-C2 UNTIL SYSTEM INSTALLATION IS COMPLETED. THE POWER CORD SHOULD NOT BE CONNECTED TO A GFI PROTECTED SOURCE.**
5. Plan PBS (push button station) locations if they have preprogrammed special messages. If special messages are not used, or will be programmed once each PBS is installed, proceed to next step.
6. **The iNS2 PBS must be mounted only in the normal upright orientation, with the connection terminals at the bottom. Any other mounted orientation will void the warranty as moisture could collect inside the unit.** If retrofitting these buttons on an intersection with existing buttons, remove existing buttons. Typical push button frames have the wire exit hole in the pole directly behind the center of the button (approx. 3.5” below lower mounting hole). Because our PBS requires the wires to reach the bottom of the unit, verify 8” of wire extends beyond wire exit hole in pole. If enough wire is not available, evaluate whether a new, lower wire exit hole that would line up with the terminal block access point in the bottom of the PBS would provide adequate wire length. If yes, drill and reroute wires, the optimal position of this hole is approx. 6.5” below the lower mounting hole. If not, you need to figure out a way to achieve more wire length.
7. The iNS2 is a modular device consisting of a backplate, electronics module, speaker module, arrow button diaphragm, button cover, sign, and optional sign backplate (for larger signs). The iNS2 is shipped partially assembled to secure it during transport. To prepare for mounting, remove 3 screws from the lower cover. Remove all screws securing the sign and sign backplate if present. Remove EARTH GND (ground) screw located between the two terminal blocks at the bottom of the unit. Store this screw in a safe place, it ensures the unit is grounded to the pole and must be reinstalled. Verify the arrow on PBS module is oriented toward the associated crosswalk. If necessary, the button diaphragm assembly may be taken off and rotated as needed. Secure the button diaphragm in the correct orientation by tightening the two retaining screws with a Phillips-head screwdriver. **Please use**





**caution as the metal button diaphragm is sharp.** Remove the electronics module and speaker module together from the backplate.

8. Position backplate on pole at correct height and orientation so arrow points to ending of crosswalk on the opposite side of the street. Orientation is very important because a blind person uses the arrow and face of the sign to orient themselves to the direction of travel. Mark mounting bolt locations if existing holes not correctly located. MUTCD max. height is 48". Typical recommended height is 42", but can be lower. Drill and tap ¼-20 bolt holes and wire access hole (if necessary, see **Step 6**).
9. Position the backplate against the pole and route the wires forward near the bottom end of the backplate. Position the wire such that 3 or 4 inches of wire is available at the bottom of the backplate.
10. Attach the backplate to the pole using the provided ¼-20 bolts with washers.
11. Re-install the electronics/speaker modules. Re-install the sign (and sign backplate if using), securing the PBS Module in place before wiring. Re-install EARTH GND (ground) connection screw to location between terminal blocks.
12. Connect the two wires from the traffic signal cabinet to the terminals of the larger black terminal block labeled BUTTON/PLC. Wire polarity is not important. Recheck tightness of all connections. Re-install the lower cover.

**Note: To maintain corrosion protection, leave the blue dielectric grease intact while tightening any screws.**

13. Remove two ped isolators from Input File and replace with iCCU-C2. The two ped isolators that will be removed are normally located in slots I-12 and I-13. In this case, the iCCU-C2's card edge needs to be installed in slot I-13. The iCCU-C2's card edge always needs to be installed into the odd-numbered slot, to be able to use all 4 channels. Connect 15 pin cable of C4 Cable adapter to front of iCCU-C2.
14. Once all cabinet wiring is complete and all PBSs are mounted and connected to the button wires, power up the iCCU-C2 by connecting the power cord to the iN2-150WPS-C's AC inlet. Each PBS will beep, then it's LED should blink in a four sequence pattern. If any PBS flashes in a two sequence pattern, this indicates the PBS has not established communication with the iCCU-C2. See Advanced Communications Settings, Sections 5.3 (iOS App), in the iNS2 System Manual before proceeding to step 9.

**Note: Wi-Fi default password is "DEFAULT1" (all caps, no quotes), iNS2/iCCU-C2 default password is "1234".**

15. The first step is to update the firmware on each PBS. For each PBS, connect to the PBS and perform a firmware update. See Section 8.1 of Manual if using the iOS app. The PBS will reset after the firmware upgrade is completed.
16. Next, connect to the iCCU-C2 and perform a firmware update. See Sections 5.1 and 8.1 of Manual if using the iOS app. The iCCU-C2 will reset after the firmware upgrade is complete.
17. Each PBS will play the message "Change Password" until the password is changed. It is now necessary to change the password and perform channel and PED phase setup of the iCCU-C2. Use the iNS2/iCCU-C2 default password as the "Current" password. See Sections 5.2-5.4 of Manual if using the iOS app.
18. Once the channel and phasing is set for the iCCU-C2, each PBS must be assigned to a phase. See Section 5.5 of Manual if using the iOS app.
19. Once each PBS phase is assigned, the settings of each PBS can be configured as needed. See Section 6 of Manual if using iOS app.

**Advanced Communications Settings**

All iNS2 PBSs connected to the interconnect board communicate with the iCCU-C2 via the field wires, using one of three communication channels, A, B, or C.

The iNS2 PBSs and the iCCU-C2 need to be on the same channel in order to communicate with each other. Anytime an iNS2 PBS is powered and electrically connected to an iCCU-C2 but is not communicating with the iCCU-C2, the iNS2 will automatically perform a recalibration. The iNS2 will recalibrate by resetting itself, identifying the correct communications channel, and adjusting its signal until it establishes communication with the iCCU-C2. This process typically takes 1-3 minutes. Once calibrated, each iNS2 will save its communications settings in non-volatile memory and use them during any subsequent restart. Once a PBS's communications settings are calibrated and it makes a successful connection to the iCCU-C2, it will flash its pilot light in a four flash pattern. This four flash pattern will continue until the PBS is assigned to a phase that is receiving pedestrian Walk, Don't Walk, or Clearance intervals.

There may be field conditions that make one communication channel work better than another. Upon installation, customers should place calls and observe proper operation during at least 3 full ped cycles. Next, connect to any iNS2 and confirm that the health log of every other iNS2 and the iCCU-C2 can be read without error. If either of these steps fail, try the other communication channel. It is only necessary to change the channel of the iCCU-C2, as the iNS2 PBSs will automatically configure to the appropriate channel. To change the communication channel on the iCCU-C2 with the iOS App: from the main menu, choose Advanced Options, then Communication Settings. Next, select Channel A, B, or C and then Save. Make sure the target device is the iCCU and not an iNS2. Within a few minutes, all iNS2 PBS devices should establish a connection to the iCCU-C2.

If any PBS exhibits a two flash pattern, see Advanced Communications Settings, Sections 5.3 (iOS App), in the iNS2 System Manual.

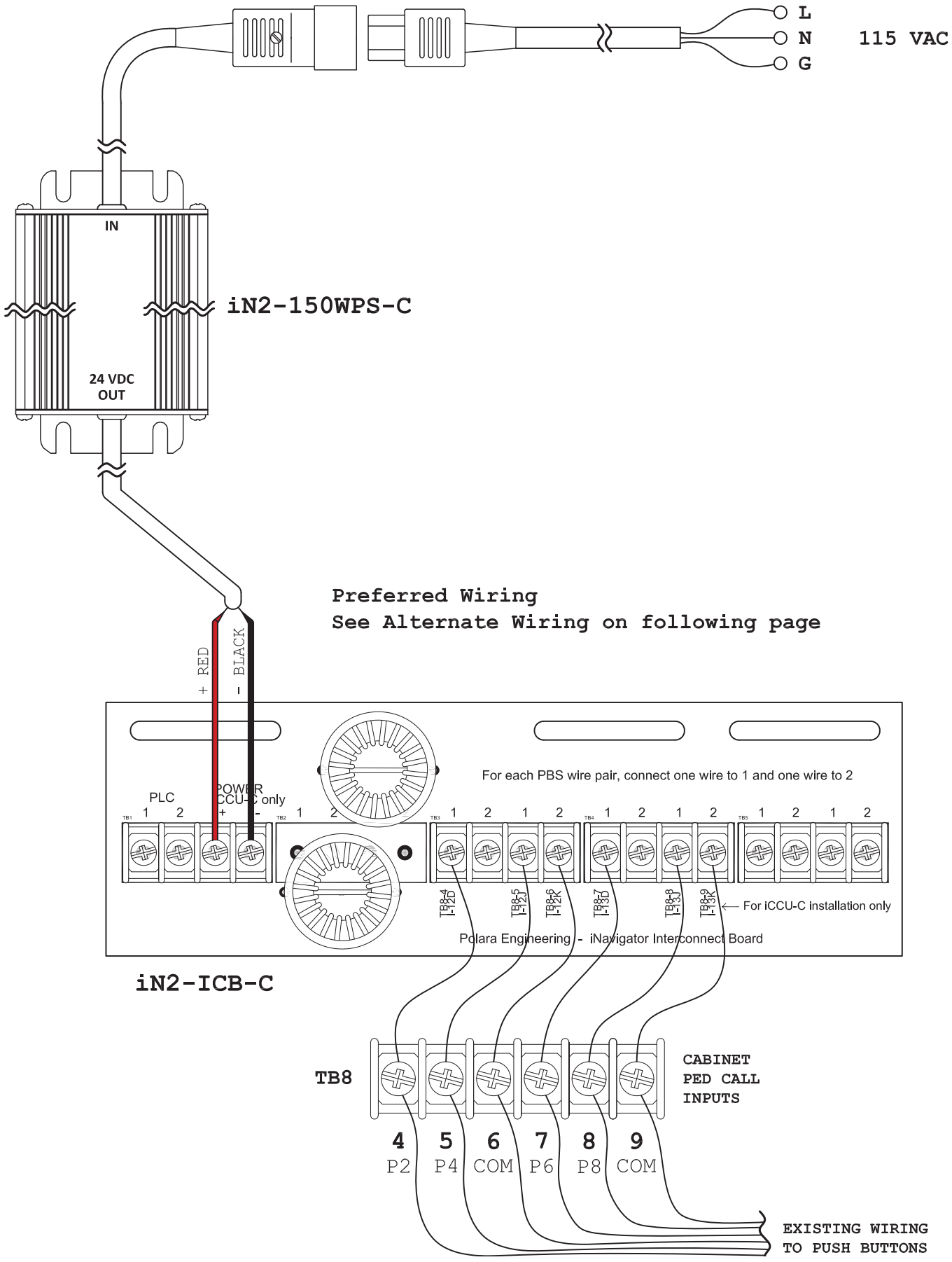
**Because of the various types and states of field wiring, PLC communication may not work in all field wiring conditions. Therefore, Polara cannot guarantee an iNS2 system will work on all intersections. If the steps in the Advance Communications Settings Sections of the iNS2 System Manual fail in establishing reliable communication between a PBS and iCCU-C2, a 3-Wire system is the only option.**

**Technical Support Contact**

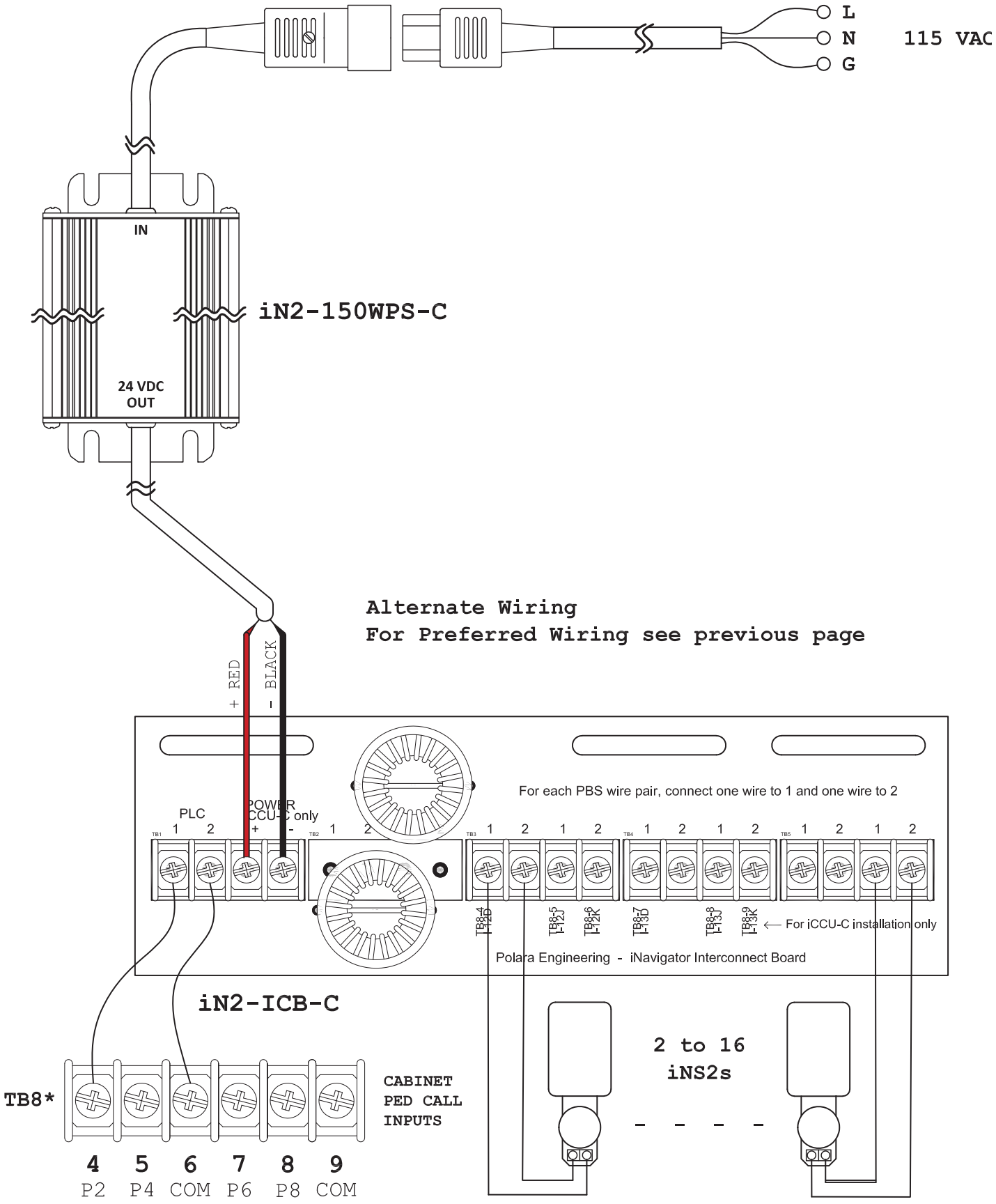
Polara @ 888-340-4872

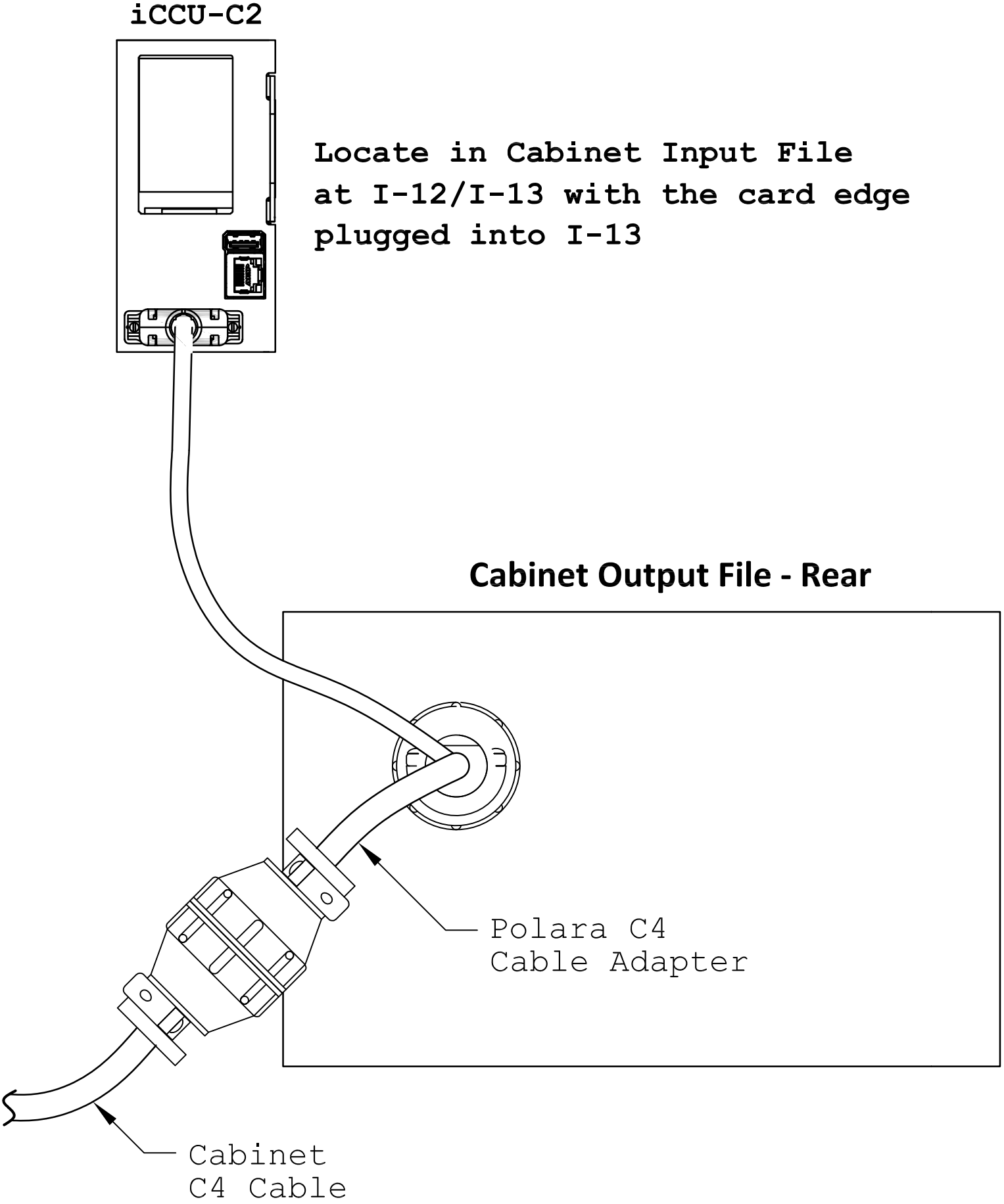
The latest version of the complete manual is available in PDF format at www.polara.com.

# Typical 332 or Similar Cabinet Connection #1 - Preferred



# Typical 332 or Similar Cabinet Connection #1 - Alternate




*** If TB8 is not present, connect the two PLC wires to connections D and E on the backplane for I-13 of the input file.**

## Typical 332 or Similar Cabinet Connection #2