MiTek®
SERVICE BULLETIN

Affected machinery:

***SmartSet® Pro* saw**

Document:

SB208-C

Title:

Replacing the PLC With an Rx3i PLC

Distribution:

Customers upon order

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Applicability	All saws with PLC prior to Rx3i

The RX3i is referred to by the manufacturer as a Programmable Automation Controller, but for the purposes of this equipment, it is still called a PLC.

Purpose and Scope

The previous PLC on this equipment is being outdated. When a PLC system or associated components are needed, the RX3i model is now supplied. This procedure describes how to install the new backplane and electrical components needed.

The current touch screen model installed determines which kit is needed:

- **SB208KIT-C** is for customers who currently have a PA2 series CTC-brand touch screen. This touch screen can accept the Rx3i communication protocol, but new screen software must be loaded.
- **SB208KIT-E** is for customers who do NOT have a PA2 series CTC-brand touch screen. These screens will not communicate with the Rx3i PLC, so a new touch screen is included in this kit.

Overview

The parts included in this kit are shown below. Please make sure all parts are present before starting this procedure.

Table 1: Parts in SB208KIT-C and SB208KIT-E

Quantity	Description	Part Numbers
1	Adapter, 9 pin	504754
1	Serial comm cable, rj11, S232	504779
1	Expansion transmitter	519912
1	Power supply,120vac,40w, 2 slot	519916
1	Backplane (rack),12 slot	519932
4	Blank filler	519945
1	Programmed PLC CPU (includes energy pack)	92281-502
1	Service bulletin document	SB208-C
1 *(Kit C)*	Compact flash disk, programmed	92160 (*Kit C only)*
1 *(Kit E)*	CTC touch screen w/programmed flash disk	92197-501 (*Kit E only)*
1 *(Kit E)*	Powering kit: power cord, A/C adapter, cable leads, instructional document	*92203* (*Kit E only)*

Before beginning the procedure, gather the supplies listed here:

- lockout/tagout mechanism
- masking tape and pen
- Phillips and slotted screwdrivers
- Drill handle, #29 bit, and 8-32 tap
- Grinder may be needed (for step on page 10)

If you have any questions, call MiTek Machinery Division Customer Service at 1-800-523-3380.

Procedure

Preparing the Saw

1. Before shutting down the saw, move the saw to all blades and centerlines to a home position. Set the carriage length to a known length such as 6-0-0 (6 ft, 0 inches, 0 16th).
2. Power down the operator interface (touch screen and computer).
3. Power down the saw, turning the disconnect switch to Off.
4. Lockout/tag out the source that supplies power to the saw, following the instructions in the next section and your internal procedures.

Electrical Lockout/Tagout Procedure

	⚠ WARNING
	ELECTROCUTION HAZARD. All electrical work must be performed by a qualified electrician. Verify that all power to the machine has been turned off and follow approved lockout/tagout safety procedures before performing any maintenance. If it is absolutely necessary to troubleshoot an energized machine, follow NFPA 70E for proper procedures and person protective equipment.

Procedure for Working Either on a Machine Inside the Machine's Main Electrical Enclosure or in the Electrical Transmission Line to the Machine

Before opening the main electrical enclosure or attempting to repair or replace an electrical transmission line, lockout/tagout the machine properly. Follow your company's approved lockout/tagout procedures, which should include, but are not limited to, the steps here.

1. Engage an E-stop on the machine.
2. Turn the machine's disconnect switch to the Off position. This is usually required to open the main electrical enclosure's door.
3. Shut the power to the machine off at the machine's power source, which is usually an electrical service entry panel on the facility wall. One example of a locked-out power source panel is shown in Figure 1.
4. Attach a lock and tag that meet OSHA requirements for lockout/tagout to the electrical service entry panel.
5. Open the door to the enclosure to which you need access. Using a multimeter, verify that the power is off.

Figure 1: Lockout/Tagout on the Power Source Panel

Pneumatic System Lockout/ Tagout Procedure

	⚠ WARNING
	MOVING PARTS CAN CRUSH AND CUT. Always verify that power to the machine has been turned off and follow approved lockout/tagout procedures.

	⚠ WARNING
	HIGH PRESSURE HAZARD. Bleed pneumatic lines before performing any maintenance on the system. Working on pressurized lines may cause injury.

Removing Modules Overview

Care must be exercised when installing and removing modules to avoid damage to the modules and backplane.

To remove any module discussed in this procedure, use these guidelines:

1. Locate the release lever(s) at the bottom of the module and firmly press upward **(1)**, toward the module. Wider modules have two release levers that must both be pressed up at the same time.
2. While holding the module firmly and fully depressing the release levers, pivot the module upward until its connector is out of the backplane **(2).**
3. Lift the module up and away from the backplane to disengage the pivot hook **(3)**.

Figure 2: Removing a Module

How to Avoid Damage When Reinstalling Modules

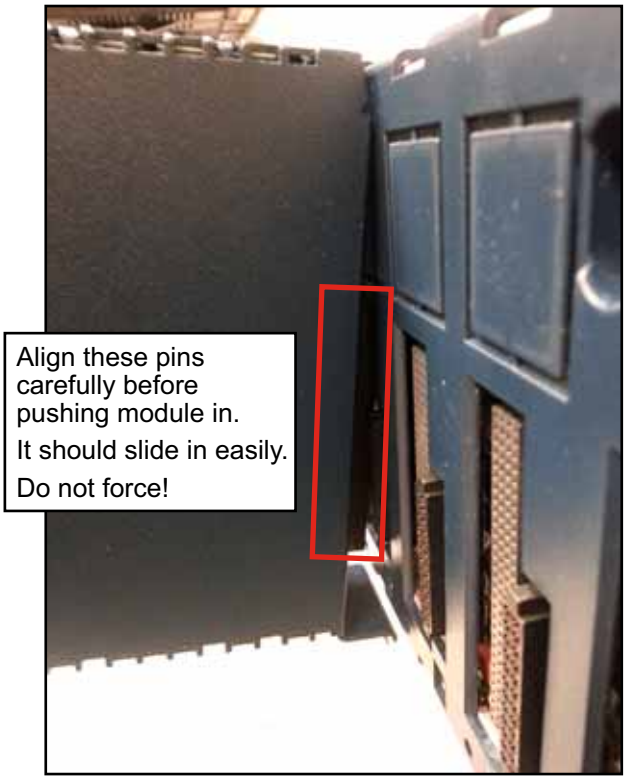
NOTICE

Be careful not to bend or break the pins on the back of the module! Do NOT use force while installing!

These modules are designed with male pins that should easily slide into the female port on the backplane. The pins must be perfectly aligned, though, or they will bend or break when pushed in. Follow the guidelines in Figure 3 and the procedure on page 7 to properly install the modules.

If you receive unexplained errors later in the procedure, check the condition of these pins. If they are bent, try straightening them and re-installing the module. If they are broken off or pushed in, call MiTek Customer Service to return the current module and obtain a new one.

Figure 3: Avoiding Damage When Re-Installing

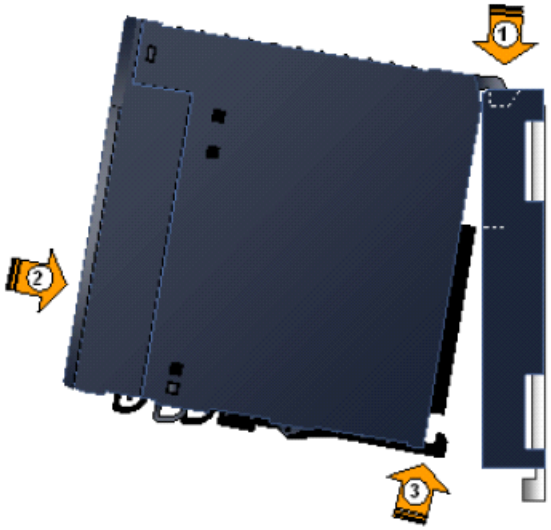


Installing Modules Overview

To install modules discussed in this Service Bulletin, use the applicable procedure below and follow the guidelines given on page 6.

Pivot-Hook Modules

Figure 4: Installing a Pivot-Hook Module

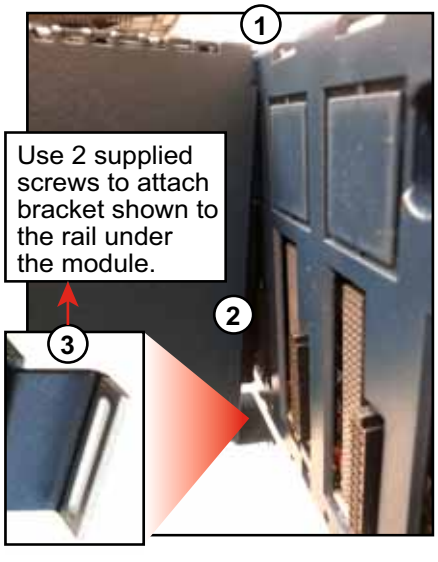


1. Holding the module firmly, align the module with the correct slot and connector.
2. Engage the module's rear pivot hook(s) in the notch(es) on the top of the backplane **(1)**
3. Swing the module down **(2)** until the module's connector engages the backplane's connector, and the release lever(s) on the bottom of the module snaps into place in the bottom module retainer **(3)**.

   Ensure the pins are aligned as described on page 6!
4. Visually inspect the module to be sure it is properly seated.

Screw-In CPU/Modules

Figure 5: Installing a Screw-In CPU



1. Holding the module firmly, align the module with the correct slot and connector.
2. Engage the module's rear pivot hook(s) in the notch(es) on the top of the backplane **(1)**.
3. Gently press the module pins into the connector holes **(2)**. Ensure the pins are aligned as described on page 6!
4. Attach the bracket at the bottom of the module **(3)** to the bracket on the backplane with 2 screws.

Removing the Old Backplane (Rack)

1. Open the stationary enclosure's top doors and get familiar with the PLC main rack as shown in Figure 6.

Figure 6: Old PLC Rack Components

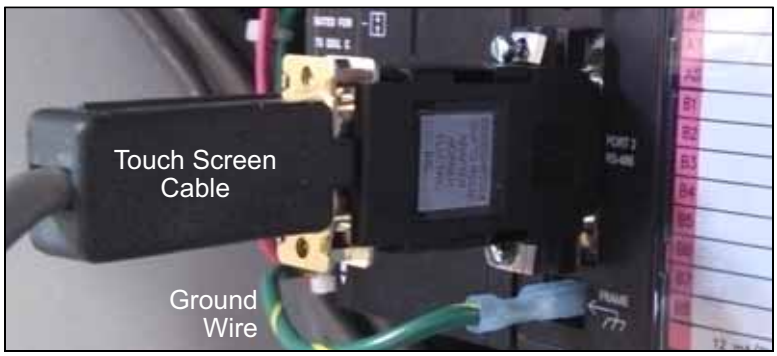
2. Label module 1-5 as shown in Figure 7.

Figure 7: Module Numbers Labeled

3. Disconnect the ground wire from the CPU that is either green or green and yellow. It is shown in Figure 8. Remove the other end of the ground wire from the enclosure back and discard the wire. Grounding is not required with the new CPU design.

4. Remove the touch screen cable from the front of the PLC and allow it to hang. If an adapter is present, discard it.

Figure 8: Touch Screen Cable With Adapter



5. At the PLC power supply, loosen the screws on the red, white, and green wires, and remove the wires from the PLC power supply.
6. Remove all components from the rack using these steps:

Figure 9: Modules and I/O Expansion Cable Disassembled from PLC Rack

   a) Remove all modules one by one starting from the right side moving to the left side (Refer to *Removing Modules Overview* on page 5). Carefully let them hang by their wiring as shown in Figure 9.
   b) Loosen the cable screws and disconnect the I/O expansion cable from the backplane. It is shown in Figure 6 on page 8.
   c) Remove the CPU and power supply. Discard both.
7. Unscrew all screws from the backplane and remove the backplane from the enclosure wall.
   - Keep the screws to be re-used later.
   - Discard the old backplane.

Installing the New Components

1. Mount the new backplane (also called a *rack*):

   a) Using the new backplane as a template, hold it up in the space available in the enclosure and mark the 2 top holes to indicate where new holes should be drilled in the enclosure wall.

If the screw or nut shown in Figure 10 is in the way, remove the nut and grind the screw post down until it is flush with the enclosure wall. Cover surrounding components to protect them from metal shavings and vacuum the enclosure when done.

Figure 10: Grind Down the Screw Post if Needed

   b) Drill and tap the holes using drill bit #29 and an 8-32 tap.

   c) Mount the backplane using the two top holes and the previously used screws.

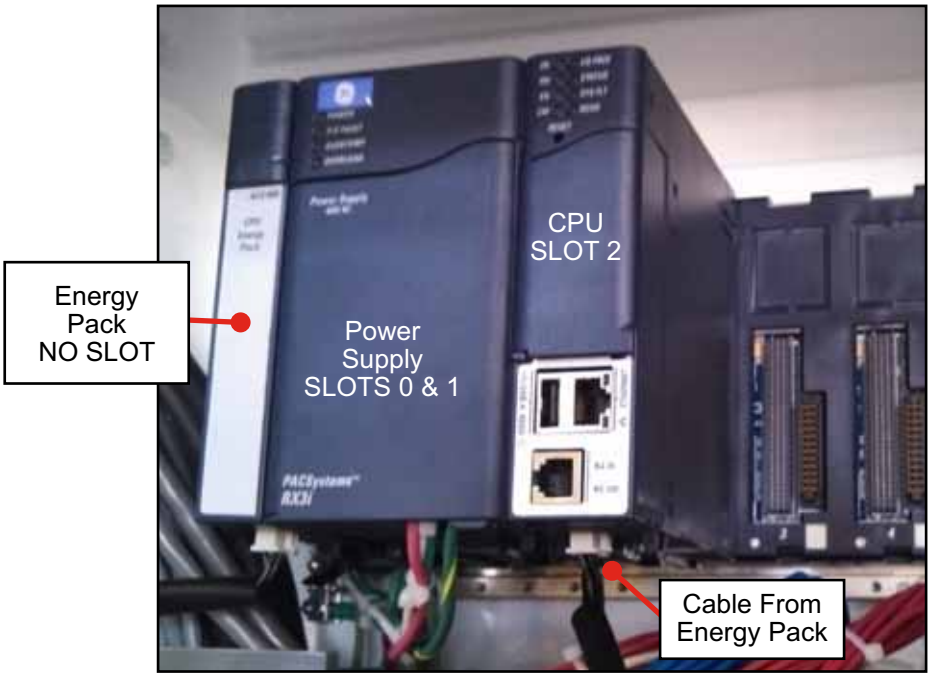
   d) Mark locations of the 2 bottom holes and remove the backplane.

   e) Drill and tap the bottom holes as described above.

   f) Mount the new backplane with previously used screws and tighten all screws.

Figure 11: New Backplane Installed

Figure 12: Left End of New PLC Rack



2. Install the new PLC power supply.

   a) Place the new power supply in slots #0 and #1.

   b) Connect the red wire to terminal +L1, white wire to N, and green wire to ground.

   c) If the ON/OFF switch is in the OFF position, press the switch to ON.

3. Mount the supplied energy pack in the location shown in Figure 12. Place the energy pack so it is mounted onto the left side of the power supply. It connects to the power supply in a similar manner to how the modules connect to the backplane.

4. Install the CPU:

   a) If a protective tab is attached to the CPU, pull it free carefully without removing the battery. See Figure 13.

   b) Install the CPU into slot #2.

   c) Connect the cable on the energy pack to the CPU using the connector at the bottom as shown in Figure 12.

   There is no need for a ground wire with the new CPU design.

Figure 13: Removing Tag From CPU

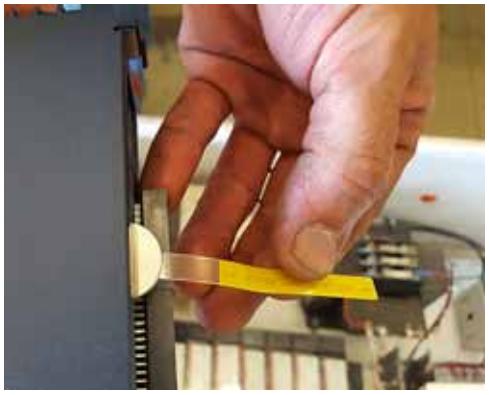
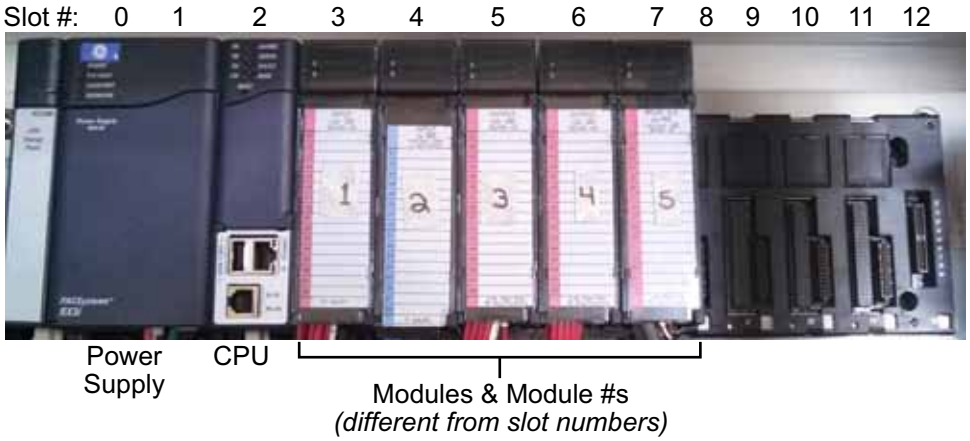


Figure 14: Slot Numbers Shown Above New PLC Rack



5. Install modules 1-5 in order, in slots #3-7 as shown in Figure 14.

6. Install the expansion transmitter module:

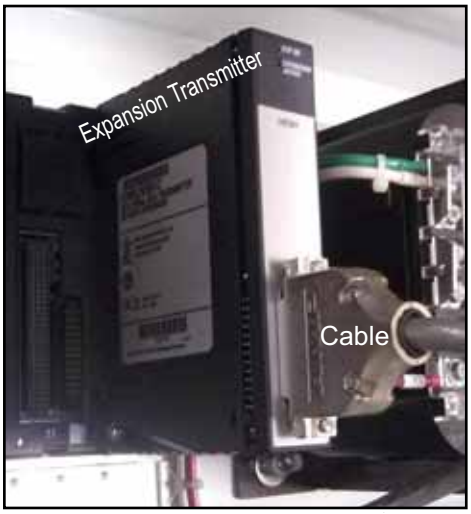
    a) Place the expansion transmitter module in slot #12. Figure 15 illustrates how to insert it.

    b) Locate the I/O expansion cable that was removed from the old backplane (shown on page 8).

    c) Connect the cable to the expansion transmitter as shown in Figure 15 and tighten the screws to hold the cable in place.

7. Install the blank modules in slots 8-11.

Figure 15: Installing the Expansion Transmitter Module



8. Reconnect the touch screen cable using these steps:

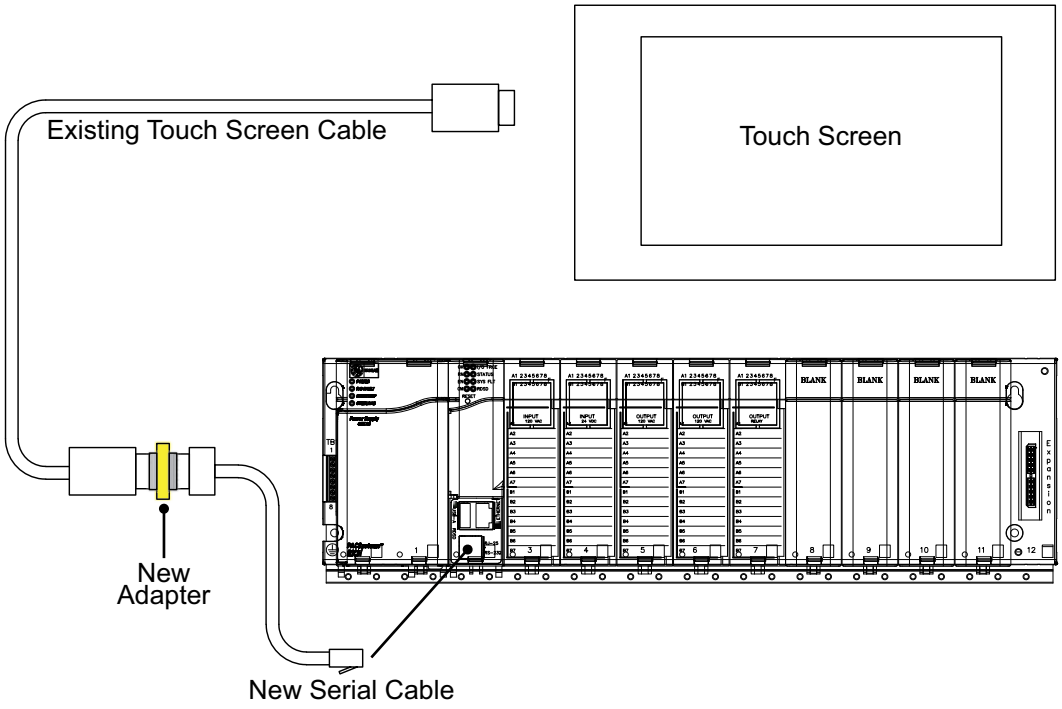
   a) Connect one end of the supplied serial cable to the CPU as shown in Figure 16.

   b) Connect the other end of the new serial cable to the supplied adapter as shown in Figure 17. Be sure to use the new adapter supplied in this kit.

   c) Connect the adapter to the existing touch screen cable that was removed from the backplane on page 8.

Figure 16: Connect the Touchscreen Cable

Figure 17: Connecting the Serial Cable to the Touch Screen Cable



Updating Software on Existing Touch Screen (Kit C only)

If your existing touch screen is a **CTC-brand PA2 series** model, perform the steps in this section to update the software using the flash drive port.

If your existing touch screen is NOT a CTC-brand PA2 series model, you should have received Kit E which comes with a new touch screen that has a flash drive port. Skip to *Replacing the Touch Screen (Kit E only)* to install the new touch screen.

1. Locate the flash drive port on your touch screen, and press the flash drive tab to eject the existing flash drive card. Discard the old card.
2. Pay attention to the front/back orientation of the new flash disk, and insert it into the flash drive port. Press gently until it is fully seated.
3. Proceed to page 15.

Replacing the Touch Screen (Kit E only)

If your existing touch screen is **NOT** a CTC-brand PA2 series model, replace the touch screen with the new one that is supplied in this kit.

1. Remove the old touch screen with these steps:
   a) Remove the COM cable from Port 1, but leave in the enclosure.
   b) Unplug the power cable from its outlet.
   c) Loosen the screws that hold the touch screen in place.
   d) Remove the entire touch screen and power cable from the enclosure.
2. Install the new touch screen with these steps:
   a) Place the new touch screen into the enclosure.
   b) Tighten the screws to hold it in place.
   c) Connect the power according to the supplied powering kit document.
   d) Locate the COM cable lying inside the enclosure, and connect the free end to Port 1.
3. Proceed to page 15.

The new touch screen already has the latest software installed on it.

Checking Software and Calibration

1. Remove the lockout/tagout mechanisms and turn on the main disconnect.
2. Verify the following on the PLC CPU:
    - OK LED is solid green.
    - RN LED is solid green.
    - EN LED is solid green.
    - SYS FLT (system fault) light is off.
3. Verify on the operator interface (touch screen) that the software version numbers have been changed from what they were at the beginning of this procedure. They are shown on the Service or Help screens in the saw software.
    - Touch Screen Software Version should read RX3i 2.0 or higher.
    - PLC Program Version should read 2.0 or higher.

If you receive unexplained errors, check the condition of the pins described on page 6. If they are bent, try straightening them and re-installing the module. If they are broken off or pushed in, call MiTek Customer Service to return the current module and obtain a new one.

The saw is ready for re-calibration. Refer to your Equipment Manual for calibration guidance.

Overview of PLC Indicators

Review and become familiar with the CPU and RDSD indicators in Table 2.

Table 2: Explanation of PLC CPU Indicators (for model CPE305)

LED Name	LED State	CPU Operating State
OK	On, green	CPU has passed its power up diagnostics and is functioning properly (after initialization is complete).
	Off	CPU problem. RUN and OUTPUTS ENABLED LEDs may be blinking in an error code pattern, which can be used by technical support for troubleshooting.
	Blinking, other LEDs off	CPU in Stop-Halt state; possible watchdog timer fault. Refer to the fault tables. If the programmer cannot connect, cycle power and refer to fault tables in PLC manufacturer's manual.
OK and EN (both)	Blinking in unison	CPU is in boot mode and is waiting for a firmware update through a serial port.
RN	On	CPU is in Run mode.
	Off	CPU is in Stop mode.
EN	On	Output scan is enabled.
	Off	Output scan is disabled.
I/O FORCE	On	Override is active on a bit reference.
STATUS	Blinking, green	Energy Pack charging; not yet charged above the minimum operating voltage. (It can operate while below minimum charge because the energy pack is not in use.)
	On, red	Energy Pack circuit fault. There is no need to replace the energy pack because the PLC works without it.
	Blinking, red	Energy Pack near its end of life. There is NO need to replace because the PLC receives its power from the saw.
	On, green	Energy Pack is charged above its minimum operating voltage.
	Off	Energy Pack not connected. Connect the cable to the PLC.
SYS FLT (System Fault)	On, red	CPU is in Stop/Faulted mode because a fatal fault has occurred.
CM	Blinking, green	Signal activity on COM1 port.
	Off	No activity on COM1 port.