Installation, Operation and Maintenance Instructions

LOADBREAK THREE-PHASE
Programmable Resettable Sectionalizer (3Ø PRS)

GENERAL

NOTE

Qualified Person

For the purpose of this manual, a qualified person is one who is familiar with the installation, construction and operation of the equipment, and the hazards involved. In addition, this person should have the following qualifications:

(a) Is trained and authorized to energize, de-energize, clear, ground, and tag circuits and equipment in accordance with established safety practices.

(b) Is trained in the proper care and use of protective equipment such as rubber gloves, hard hats, safety glasses or face shields, flash clothing, etc., in accordance with established safety practices.

(c) Is trained in rendering first aid.

For the purpose of this manual and product labels:

| ⚠ **DANGER** | indicates death, severe personal |

injury or substantial property damage **will** result if proper precautions are not taken.

| ⚠ **WARNING** | indicates death, severe personal |

injury or substantial property damage **can** result if proper precautions are not taken.

| ⚠ **CAUTION** | indicates minor personal injury or |

property damage **could** result if proper precautions are not taken.

| **NOTICE** | Indicates notification of installa- |

tion, operation or maintenance information.

Hubbell® Three-Phase Programmable Resettable Loadbreak Sectionalizer works in conjunction with Three-phase Gang Operated Reclosers to a isolate all three phases(Y- ▲ or ▲ -Y) of a distribution system. The 3Ø PRS consists of 3 sectionalizer units which will open synchronously to isolate the fault. These units will drop open only during 'Reclose Interval' of upstream 3 phase gang operated recloser. The units can be manually reset with an adjustable wrench.

| ⚠ **DANGER** |

Hazardous voltage.

Will cause severe personal injury, death, or property damage.

Only qualified personnel should work on or around this equipment after becoming thoroughly familiar with this document and other publications regarding this equipment.
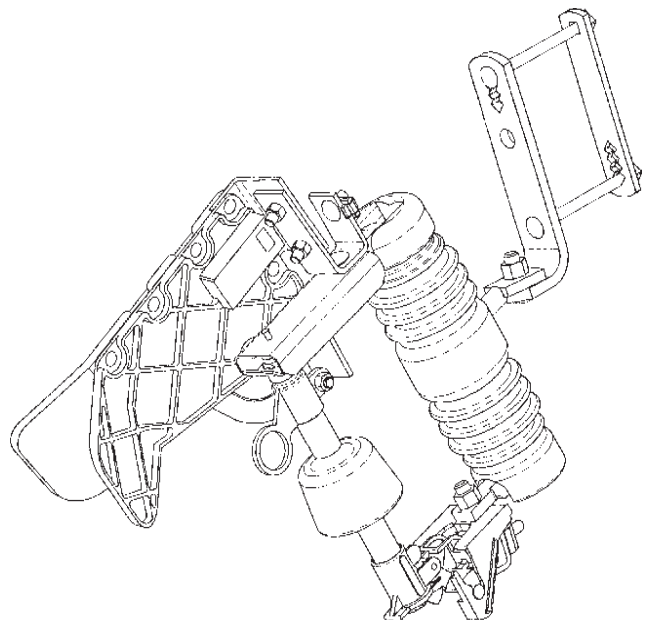
These instructions do not claim to cover all details or variations in equipment, nor to provide for all possible conditions to be met concerning installation, operation, or maintenance of this equipment. If further information is desired or if particular problems are encountered which are not sufficiently covered in this guide, contact Hubbell Power Systems.

INSPECTION

Thoroughly inspect the sectionalizer for visible damage. Do not install the sectionalizer if there is damage to any of the parts.

STORAGE

If the 3Ø Sectionalizer will not be installed immediately ,it must be stored in a clean, dry location at an ambient temperature.

INSTALLATION

Each 3ØPRS set consists of 3 separate PRS units. To install, select correctly programmed Hubbell® *Three-Phase* Programmable Resettable Sectionalizer set with consideration to BIL, continuous current, actuating current, deadline threshold current, and number of counts to match the application requirements. Ensure all 3 units in Three Phase PRS set have the same serial number engraved on lower tube casting to confirm correctly linked Three Phase PRS Set. Should there be any concern on the use of this sectionalizer as rated, consult your supervisor **BEFORE** installation.

Securely attach mounting bracket to crossarm or pole. Install the sectionalizer mounting assembly on the mounting bracket with the external tooth lockwasher placed between the mounting bracket and the sectionalizer bushing support pin (see Figure 1). Tighten the nut finger-tight. Locate the sectionalizer on the mounting bracket to provide maximum clearance for the operator and to provide maximum ease of operation. Securely tighten the carriage bolt nut.

To attach electrical leads to the top and bottom terminals, loosen the nuts on both terminals, wire brush the conductors, and apply a coating of oxidation inhibitor to both leads. Insert leads into terminals and tighten nuts to approximately 20 ft. lbs.

Figure 1
SECTIONALIZER MOUNTING
ASSEMBLY INSTALLATION
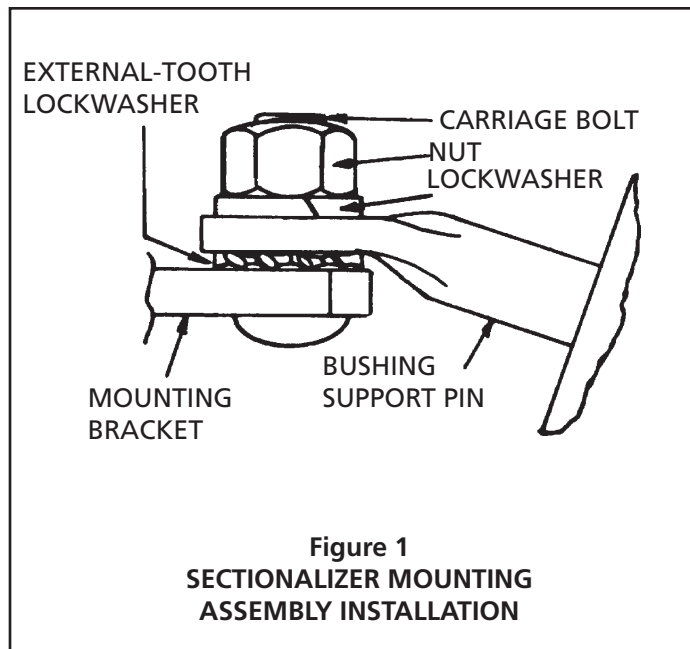
OPERATION & RESETTING

In the event of a permanent fault on any of the three-phase lines of the distribution system, all 3 units will drop synchronously to isolate the fault. Always repair the fault and reset all 3 PRS units before placing them back into service.

All Hubbell resettable sectionalizers can be reset by using an adjustable wrench. Insert the opening of the adjustable wrench into the hole on the back of the trunnion as shown in Figure 2. Rotate the trunnion with the wrench until the trunnion is completely latched as shown in Figure 3. Slowly, remove the wrench from the trunnion. The trunnion will snap open if it is not fully closed. If this should occur repeat this step.

⚡	⚠ **WARNING**
	Closing on fault.
	Can cause death, serious injury or equipment damage.
	Locate and repair fault before closing sectionalizer.

Hubbell sectionalizers are not loadbreak devices. The sectionalizer must be opened using only approved loadbreak type tools or a similar device designed for use with cutouts. Follow all instructions provided with such tools. Hubbell sectionalizers are equipped with "hooks" for use with these types of loadbreak tools.

⚡	⚠ **CAUTION**
	Ensure trunnion is latched.
	Sectionalizer will not function if trunnion is not latched properly.
	Follow recommended latching procedure in this manual.

⚡	⚠ **WARNING**
	Arcing and particles discharge.
	Can cause personal injury and equipment damage
	Use loadbreak tool when opening an energized sectionalizer.

NOTICE	Units are shipped in latched position. **Do NOT** attempt to unlatch mechanism manually. Manual opening may damage both internal and external mechanism parts.
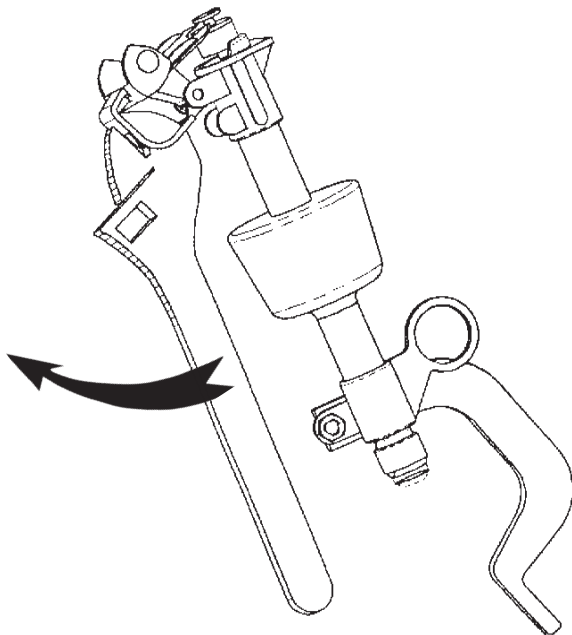
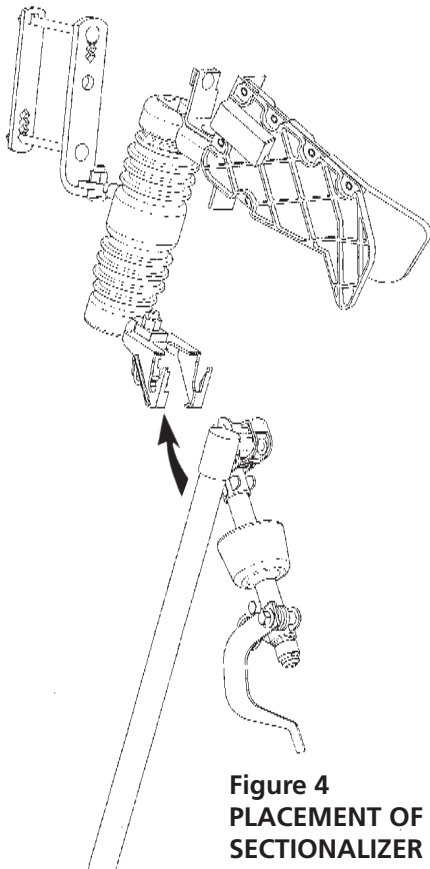**Figure 2**
RESETTING SECTIONALIZER
START POSITION
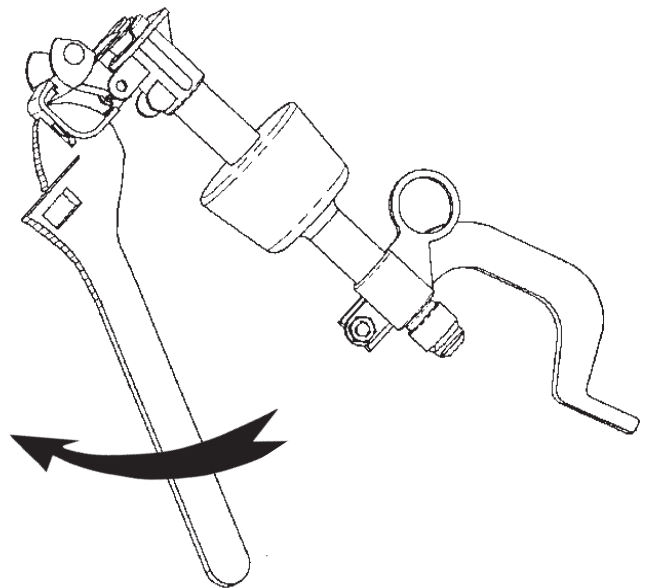
Figure 3
RESETTING SECTIONALIZER
FINISH POSITION

OPERATION & RESETTING

To close the sectionalizer for the first time after properly repairing a fault, insert a hook stick into the opening in the trunnion and place the section-alizer module into the hinge as shown in Figure 4. Remove the hook stick. Position yourself to the side of the sectionalizer. Place the hook stick in the hook stick ring and rotate to the position shown in Figure 5. Look away from the sectionalizer and quickly and firmly push the sectionalizer into the closed position. Remove the hook stick from the ring carefully to avoid opening of the sectionalizer.

Figure 4
PLACEMENT OF
SECTIONALIZER INTO HINGE
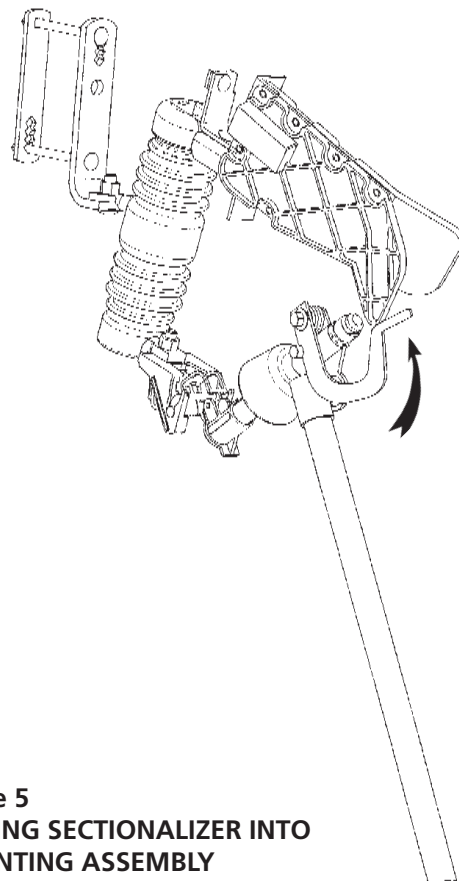
Figure 5
CLOSING SECTIONALIZER INTO
MOUNTING ASSEMBLY

MAINTENANCE

All Hubbell sectionalizers are tested at the factory prior to shipment. The mechanism for this device is sealed from the environment and is not user-serviceable. Replace any caps that show evidence of excessive pitting or burning. Replace any broken or cracked porcelain and/or arc chute if it is damaged. Inspect all contacts for evidence of excessive pitting or burning due to arcing and replace if necessary. Check that the pivot of the trunnion is clean and that the trunnion moves freely when resetting an activated trunnion. The trunnion and internal mechanism, if damaged, can be replaced at the factory.

The Hubbell® Three-Phase Programmable Resettable Sectionalizer (3Ø PRS) is a 3 -phase gang-operated sectionalizer with no mechanical link between the three units. The 3Ø-PRS is resettable and programmable, thus eliminating the need to replace parts and order specific factory settings. It is equipped with a microcontroller-based architecture and RF communication at 2.4GHz. The RF communication range is 20 feet (open air). The units are fully tested for EMI as per IEEE C37.90.2. The 3Ø PRS is combined with the simple and user-friendly software interface allows users to modify settings. Each of the 3Ø PRS units is equipped with an IP68 rated mini-USB port located on the underside of the current transformer housing

When any of the units sees the permanent fault, upon reaching its programmed count value, fault detecting unit will send a trip signal to the other two units to achieve synchronous opening of three phases. The communication logic ensures that all three units synchronously open within 30 msec.
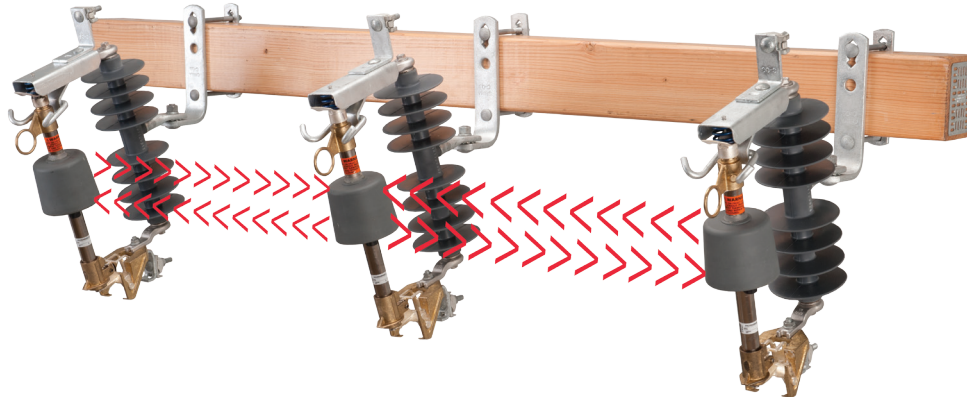

Figure 6   RF communication between the three 3Ø PRS units

**It is recommended that 3Ø PRS be used in conjunction with 3 phase gang operated upstream recloser. Also, it is important to realize that device has no fault-break/interrupting capability. A conventional load break operation can be accomplished by normal opening of cutout by a hookstick.
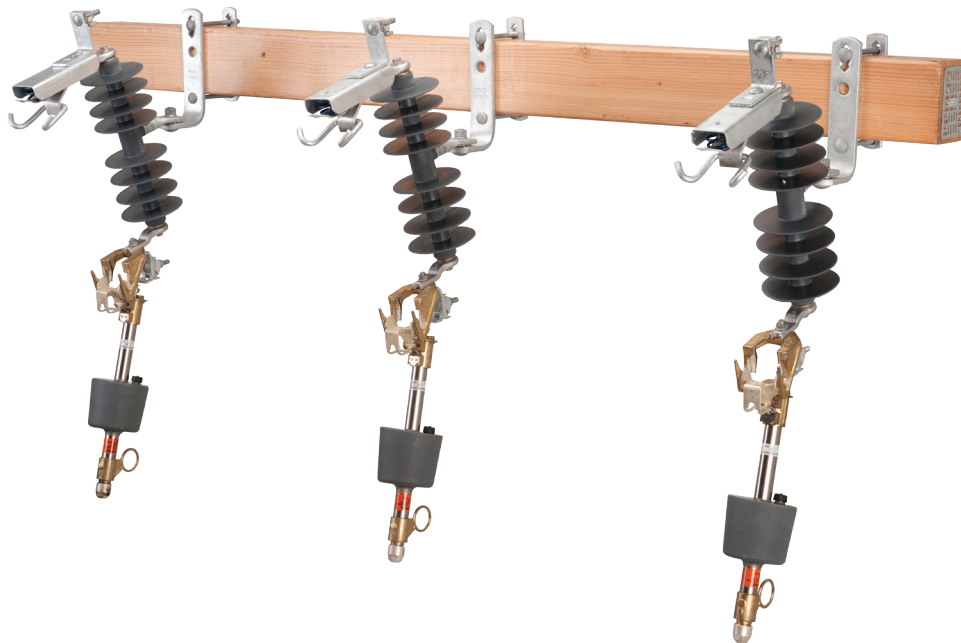

Figure 7   Synchronous drop of the three 3Ø PRS units on a permanent fault

The 3Ø PRS Programmer user interface is provided in the enclosed USB memory stick. Three (3) standard USB type B mini male connector cables and one(1) USB hub (the cables with the hub set must be ordered separately) are necessary to interface between the three 3Ø PRS units and the programmer.

PROGRAMMING

Insert the USB memory stick supplied into computer and follow the on-screen instructions to install the 3Ø PRS interface on the computer. A shortcut "Hubbell Three Phase Sectionalizer will be displayed on the Desktop upon installation.
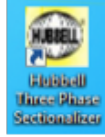
1. Unscrew the protective caps on the 3Ø PRS mini USB ports and connect the three USB cable male sides to the Sectionalizer USB port hub and the USB hub to the computer as shown in Figure 9.

2. Launch the Hubbell Three phase Sectionalizer programmer. The software automatically searches for the connected devices. With all the three 3Ø PRS connected and the same PAN ID pairing is established for successful communication. If no devices are updated click Rescan for Devices to make sure the PAN ID matches .Once the communication is established the status of the units is highlighted in green on the programmer.
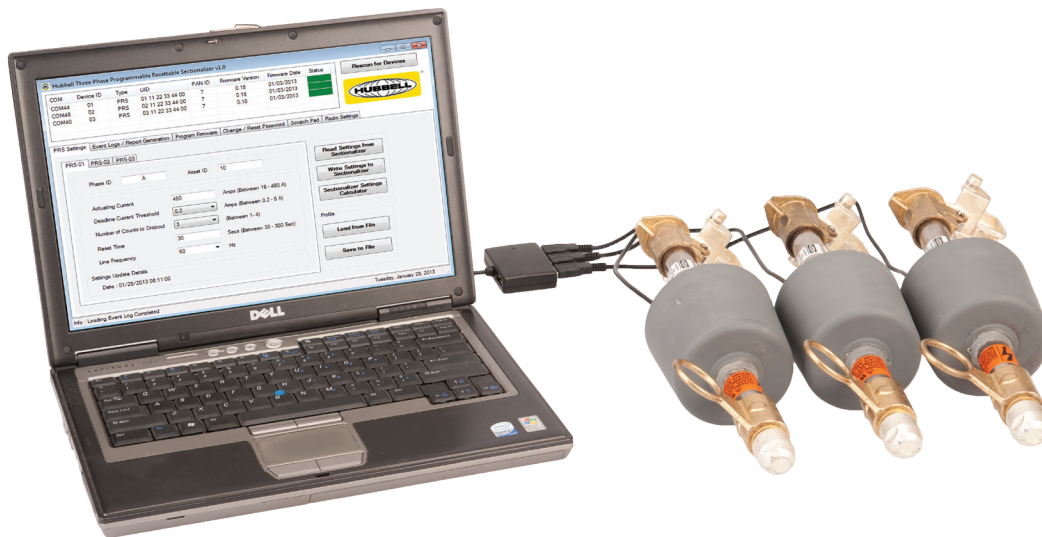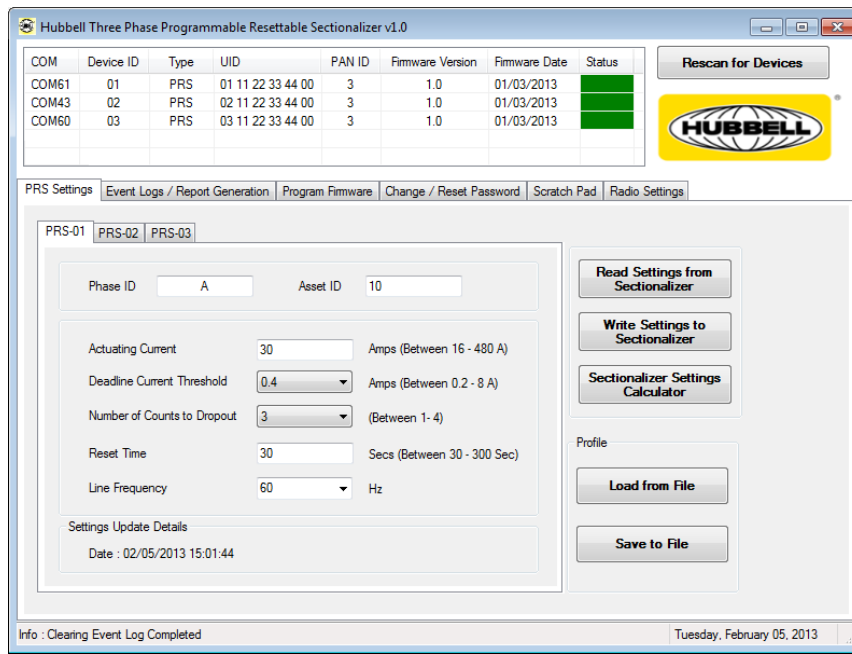

Figure 8

**Figure 9   Three 3Ø PRS units connected to the system through the 3 port USB hub**

3. User can change settings on the units only when all 3 units that share the same PAN ID are connected but the user is allowed to Read Settings ,Generate Reports and Event Logs when connected to the devices individually or altogether.

4. The main settings screen called the " PRS Settings" (Figure 10) includes settings of all the 3 units connected to the computer. Settings of the 3 units in one set are displayed in separate tabs. Settings can be modified in "PRS-01" tab and upon clicking the "Write Settings to Sectionalizer" button, the same settings will be written to the other 2 units in the set. The modified settings on the other two units can be seen in the tabs "PRS-02" and "PRS-03" in a grayed out manner under their individual settings tab. User can label Phase ID and Asset ID as needed. Phase ID can be one ASCII character (letters, numbers or special characters)

Figure 10   Settings Windows screen

5. There are three ways to update the parameters to the 3Ø PRS :

a. Write Settings to Sectionalizer: User can vary all the programmable settings within the specified ranges and write settings to the Sectionalizer with all the 3 units connected .When 3Ø units are individually connected the "Write Settings to Sectionalizer" option is unavailable.

b. Load PRS Settings Profile: Click the "Load From File" button and select "PRS Profiles Files (*.prs)" in the filter section of file open dialog window. Then select the PRS settings file to load Actuating Current, Number of Counts to Drop-out, Deadline Current Threshold and reset time (in seconds) in the appropriate fields on the left side of the form.
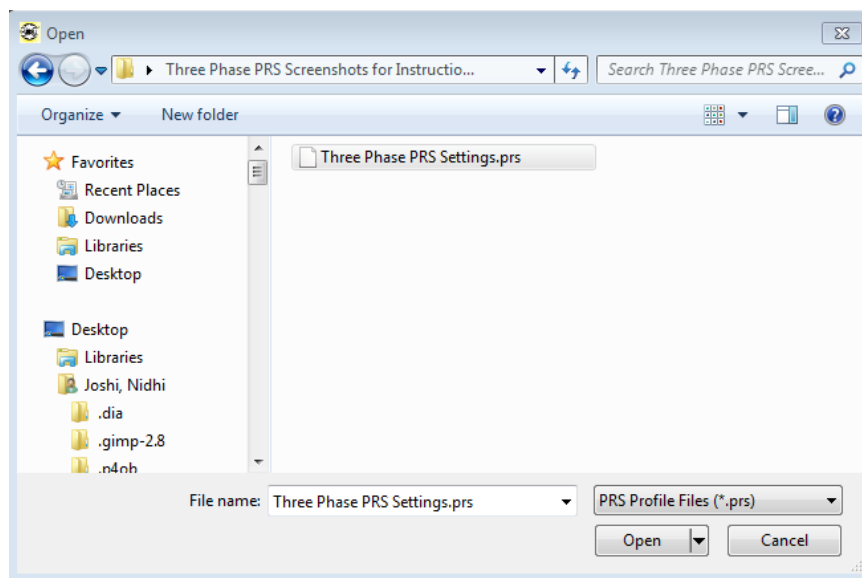
Figure 11   Opening .prs file from Load a File tab

c. Sectionalizer Settings Calculator: Click the "Sectionalizer Settings Calculator" button and enter the minimum trip value, number of operations to lockout, and reset time (in seconds) of recloser then click on "Generate" button to populate the recommended PRS settings in the right side of the form.

Click "Apply" button (Figure 12)to apply the Actuating Current, Number of Counts to Drop-out, and reset time (in seconds) in the appropriate fields on the left side of the "Settings" window .After applying the parameters, write the settings to the Sectionalizer to finish programming the units.

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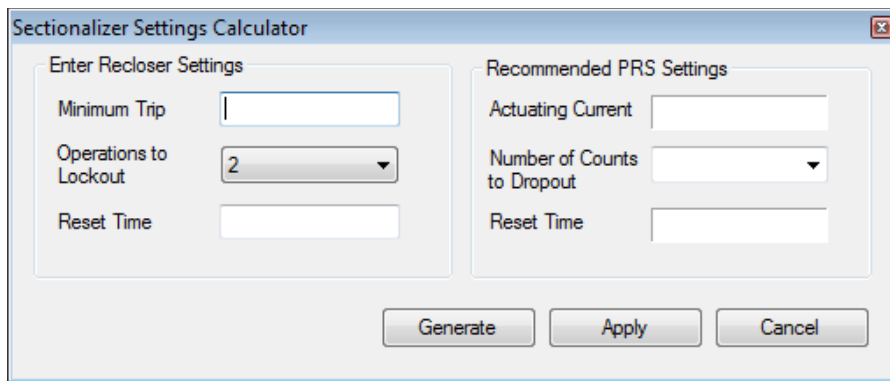
Figure 12   Sectionalizer Settings Calculator

Notes:
- The suggested actuating current of the sectionalizer should be 80% of the minimum trip value of the upstream recloser. Where hydraulics are used, this value is 1.6 times the continuous current rating of the recloser.
- The count to drop out MUST be at least 1 operation less than the number operations to lock-out of the upstream recloser.
- The reset time of the sectionalizer should be less than the reset time of the upstream recloser.
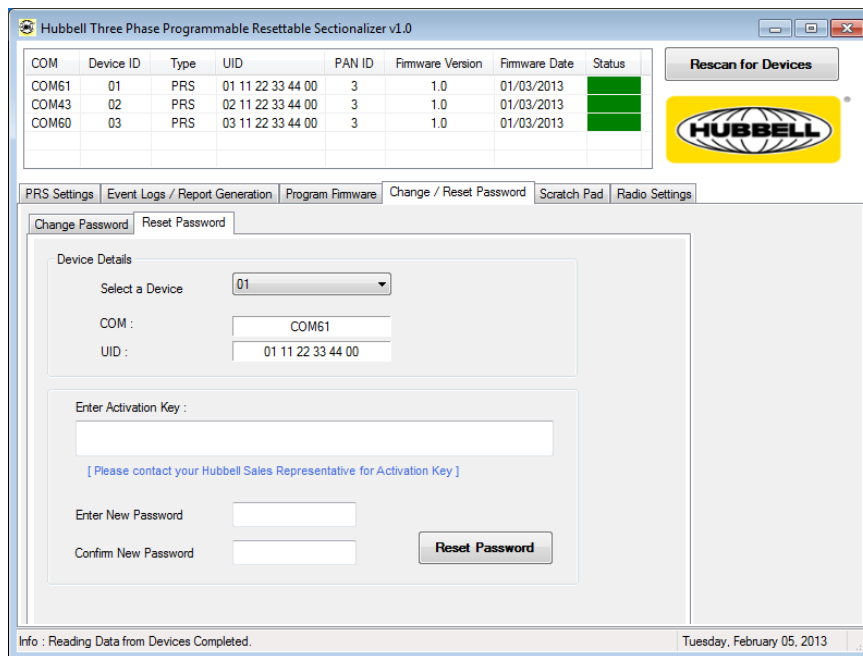
Change / Reset Password
Change Password Tab
1. User can write the settings to the Sectionalizer by entering the factory default password   " PASS#123 " when prompted.
2. User can create a new password based on the password criteria as in the Programmer.
3. User can confirm this new Password by clicking Change Password.
4. User can keep track of the date when the password was last changed as recorded in Password Changed on.

Reset Password Tab
1. In a situation when the users forget the password ,user can reset the Password to the default factory password by entering the Activation Key.
2. Contact your factory representative for more information on your Security Activation Key.

Figure 13   Reset Password Screen

Scratchpad Tab
1. Scratchpad option is used to take notes on the Sectionalizer .A maximum of 256 characters is supported.
2. User can save and clear notes on the device. User can also Load file and the save file to a location for future use or to loading onto other 3Ø PRS's.
3. User can save the same set of notes on all the units by clicking "Send to Device"
4. Supported format extensions .psp(PRS Scratchpad files).
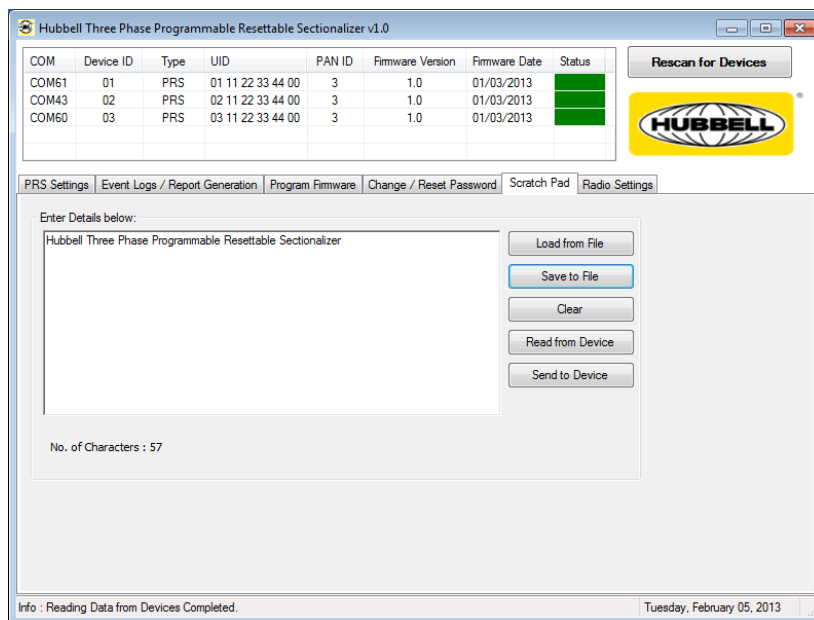
Figure 14   Scratchpad option

Event Log

A convenient event log of 40 events is included to provide diagnostic data. The log records the Cumulative Blinks, the Blink number ,the source where the event occurred (A phase as in below), an RMS current(A) magnitude whenever the Sectionalizer is triggered (a fault current above actuating current followed by deadline current. The Load and Clear event Log applies to all the 3 units with the same PAN ID when connected.

To retrieve log:

1. Connect the Sectionalizer(s) to the computer via the USB cable.
2. Launch the Hubbell 3Ø PRS programmer.
3. Make sure the status is highlighted in green to ensure successful communication.
4. Click on "Event Log" tab and then click on "Load Event Log" button.
5. The log can then be exported to Microsoft Excel by clicking on "Export Log to Excel" button.
6. Click "Clear Event Log" button to clear or erase the event log on all the units.
7. The respective event logs are displayed when connected to that particular phase unit, for example as shown in Figures 15, 16 and 17.
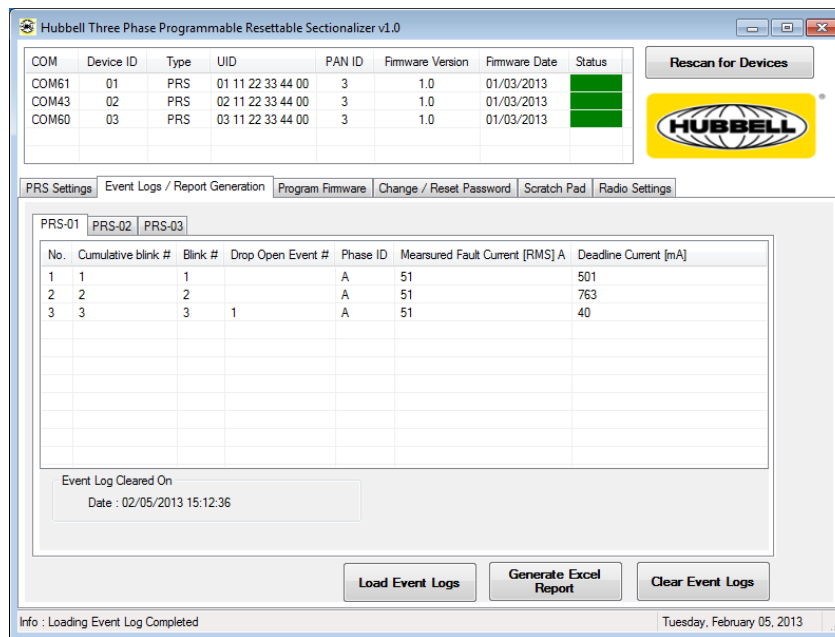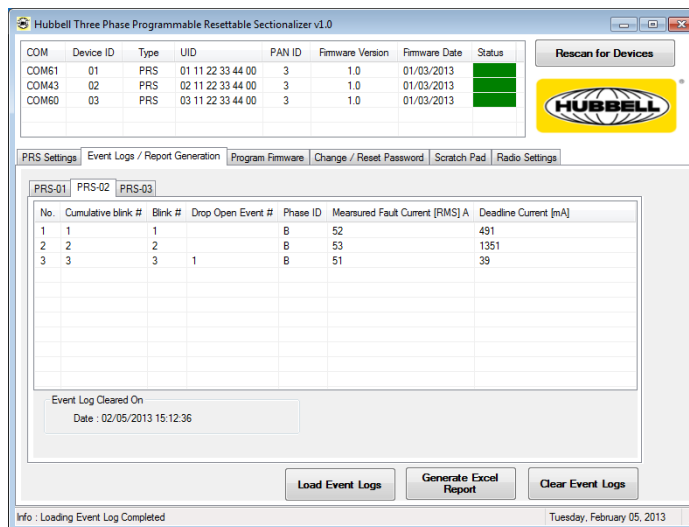

Figure 15   Event log of Phase A

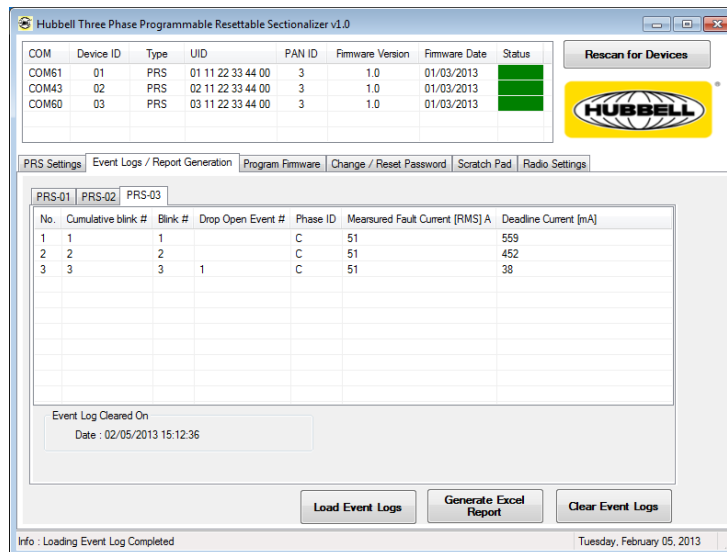**Figure 16   Event Log of Phase B**

Figure 17   Event Log of Phase C

Notes

- If all 3 devices with the same PAN ID are connected, the Programmer automatically loads the event logs.

- **Blink:** Fault current followed by opening of the upstream recloser; During each blink, the internal count of the unit increments.

- **Cumulative Blink #:** This will be a running total of all blinks seen by the device and is an indication of overall line activity. Clearing the event log will reset the Cumulative Blink # to 0.

- **Blink #:** These are blinks seen one after the other before the expiry of the Reset Timer. In other words the Blink # is the number of counts measured by the device. So if the device is set for 3 counts, the device sees 3 blinks and will drop-out after the 3rd blink.

- **Drop Open Event #:** This number will increment each time the sectionalizer is fired (i.e. drops out). If the device is set for 3 counts, in the entry for the 3rd blink the Drop Open Event # is incremented. The drop open event number would appear and increment only in the log of the unit which has actually seen the fault and not on the units that didn't see the fault. Although in a situation of a single phase, double line or a Three phase fault all the 3 units would drop synchronously.

Once programming and/or event log download is complete, simply remove the USB cable from the PRS unit and screw on the mini-USB port protective cap by hand

Each 3Ø PRS unit is equipped with (5) yellow decal sheets as shown below. After programming is complete, wipe the surface of the bottom of the current transformer housing with water and cloth. Once the surface is clean and dry, affix the appropriate adhesive label for both actuating current and count to the bottom of the sectionalizer current transformer housing.
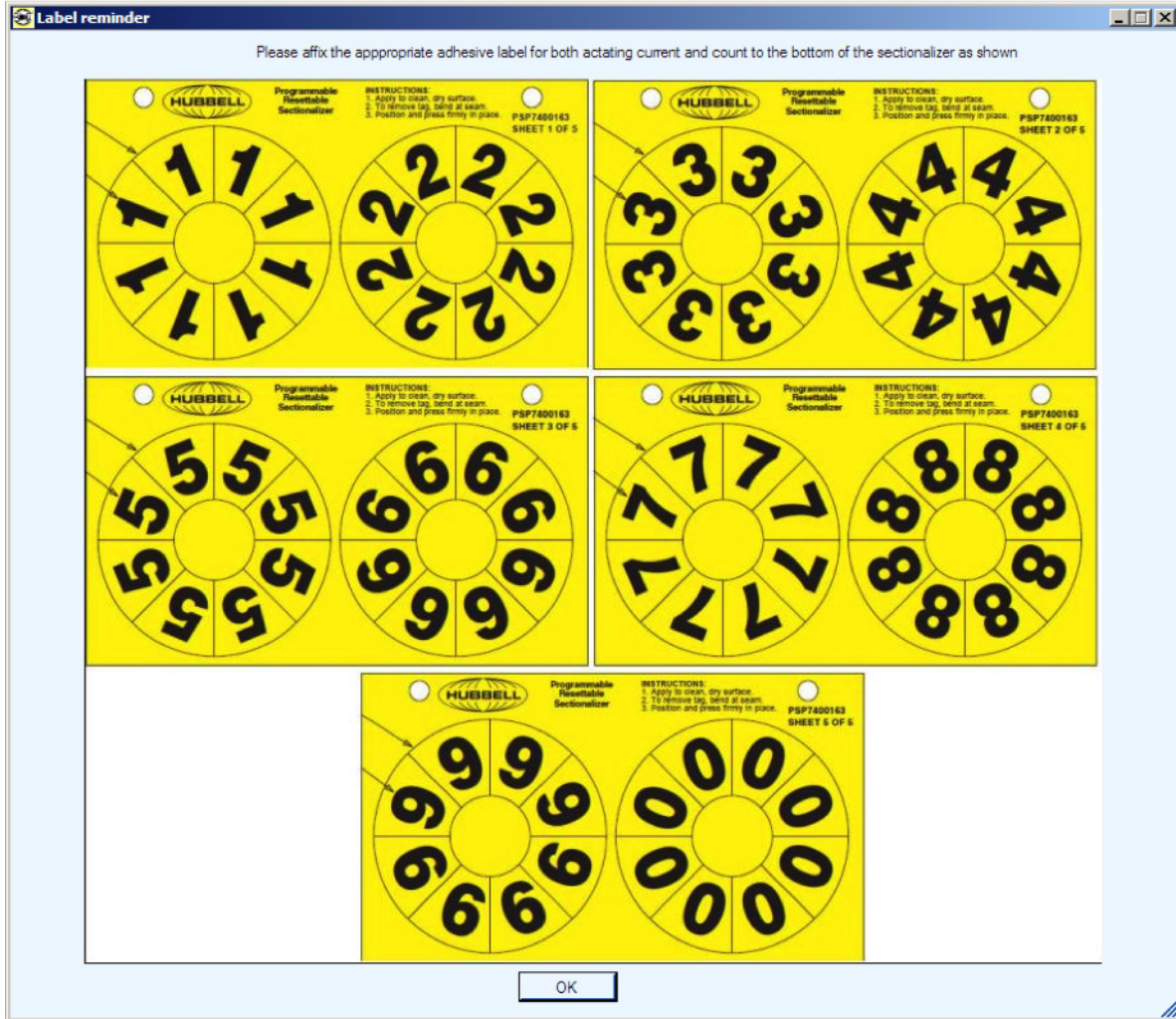
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC ID: SKL-3PHPRS

FCC CAUTION: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

If additional information is needed, contact your Hubbell Territory Manager or call:
Hubbell Power Systems
8100 Churchill Avenue
Leeds, Alabama 35094
(205) 699-0840