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Configuring Conext™ ComBox for Power Meters and PV Inverters

976-0327-01-01/A
July 2015
Application Note

⚠ DANGER

RISK OF FIRE, ELECTRIC SHOCK, EXPLOSION, AND ARC FLASH

This Application Note is in addition to, and incorporates by reference, the relevant product manuals for the Conext ComBox and other Conext products. Before reviewing this Application Note you must read the relevant product manuals. Unless specified, information on safety, specifications, installation, and operation is as shown in the primary documentation received with the product. Ensure you are familiar with that information before proceeding.

Failure to follow these instructions will result in death or serious injury.

Objective

The goal of this Application Note is to provide the reader with instructions on how to configure the Conext ComBox to read data from a PV Inverter and Power Meter.

Use Case Scenario

AC Coupled Multi-Cluster System

- Conext XW+ Inverter/Charger
- Conext RL/TL/CL PV Inverter
- Battery Bank
- Conext AC Combiner Box

The AC Combiner Box integrates the wirings of the XW+ Inverter/Chargers and the RL/TL/CL PV Inverters. The Power Meters are also integrated inside the AC Combiner Box to monitor AC power parameters from the generator and loads.

The Xanbus communication protocol facilitates the communication between XW+ Inverter/Chargers and the ComBox. Modbus is the communication protocol for the RL/TL/CL PV Inverters and Power Meters.

The Modbus devices are configured through the ComBox so that each of these devices can be monitored.

Author: Hon-Fei Lee. For local customer technical support go to: http://solar.schneider-electric.com/tech-support.

Feature

The ComBox is capable of integrating Modbus devices such as Conext RL/TL/CL PV Inverters and Power Meters into the Xanbus network. Through this integration, the Conext ComBox becomes a single point monitoring and configuration system for the installer or power plant user to watch and define device settings remotely.

Procedure

1. Wiring of PV Inverter and Power Meter to ComBox
2. Configuring the Power Meter using ComBox
3. Configuring the PV Inverter using ComBox

Wiring of PV Inverter and Power Meter to Conext ComBox

In the Modbus implementation, the ComBox acts as a slave to an RS-485 master device. The RS-485 connection to the ComBox allows communication between the Xanbus network and the RS-485 master device. This enables Conext devices to link to third party software and building management systems.

If a Modbus device, including the ComBox, is installed as the last device in a daisy chain, a 120-ohm terminator must be used because Modbus devices typically do not have an internal terminator for the RS-485 network. When inserting two wires in one terminal, as in the case of daisy-chained RS-485 Modbus devices, use smaller gauge wires.

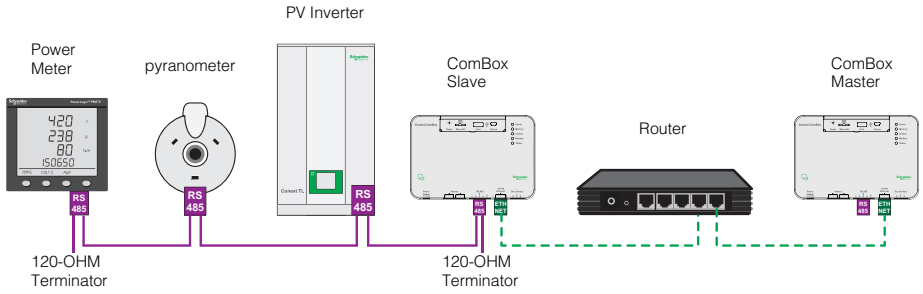

Figure 1 Daisy-Chain RS-485 Network Illustration

Configuration of a Power Meter (PM 870) in Conext ComBox

1. Go to Power Meter screen menu and select the Maintenance setup page.

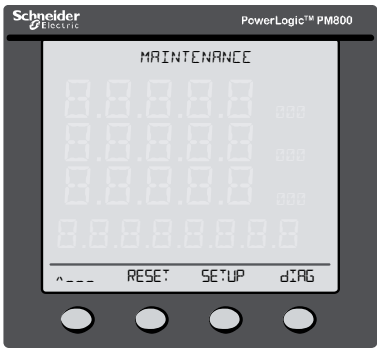

Figure 2 Power Meter Maintenance Page

2. Enter the Maintenance page and the screen will request for Setup Password.

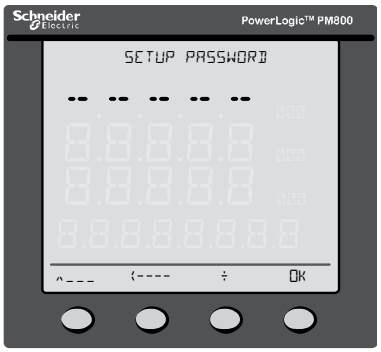

Figure 3 Setup Password Page

3. Enter the Setup Password (Default Value:0000 for PM 870) and press OK.

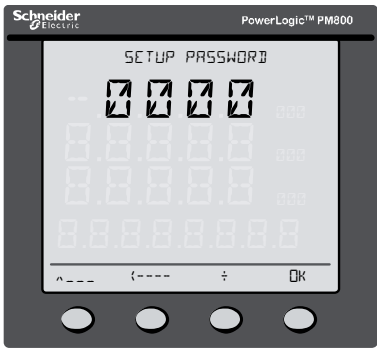

Figure 4 Setup Password Page

Once the password is accepted, the Setup Mode page will appear on the screen.

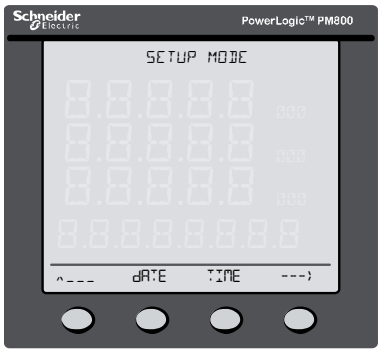

Figure 5 Setup Mode Page

4. Select COM on the bottom menu and press Enter.

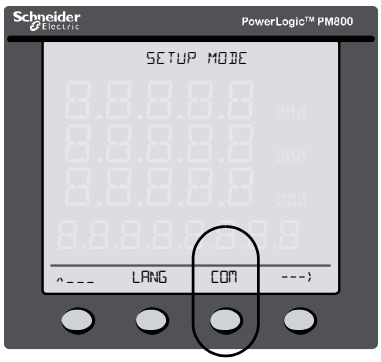

Figure 6 Select COM

The COMM : SETUP page shows up.

5. Record the assigned address, baud rate, and parity of the Power Meter.
NOTE: The assigned address and baud rate vary for different Power Meters. Record the address and baud rate of the actual Power Meter at the power plant site.

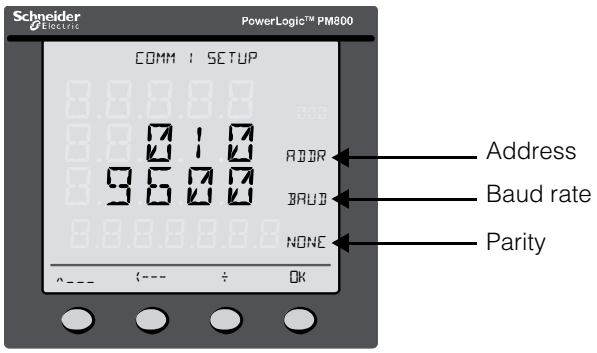

Figure 7 Address, Baud Rate, and Parity

6. Log in to the Conext ComBox Master's web user interface using the default User name and Password.

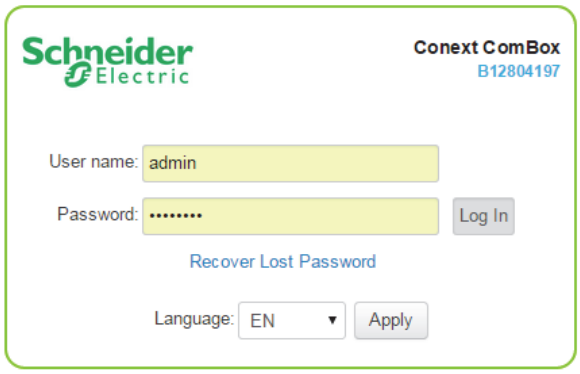

Figure 8 ComBox Master Web User Interface Log In

⚠WARNING

HAZARD OF PHYSICAL INJURY AND UNEXPECTED OPERATION

Refer to the Owner's Guide for more detailed information when making any changes to settings or sending commands. Commands sent to this device may affect other components in the system. Ensure that anyone working with the system is aware of the result of your changes before sending a command.

Failure to follow these instructions can result in death or serious injury.

7. Once logged in, go to the sidebar menu, click at ComBox Configuration and select the ComBox the Power Meter is connected to. Click the side arrow and choose the Modbus Master under Configuration.

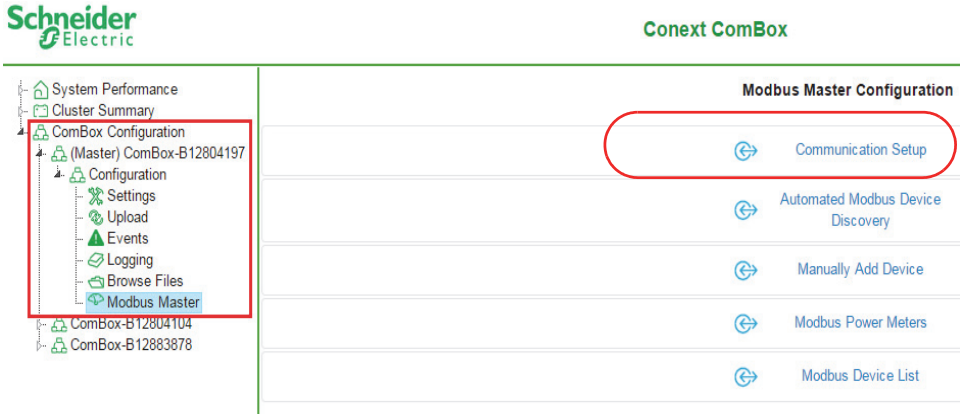

Figure 9 Modbus Master Configuration Page

8. Click at Communication Setup to configure the following parameters and save them:
   a. Enable Modbus Master Mode: Enabled
   b. Enable Modbus Master Serial Port: Enabled
   c. Enable Modbus Slave Serial Port: Disabled
   d. RS-485 Baud Rate: 9600

      NOTE: The PM 870 Power Meter also has a baud rate of 19200.
   e. RS-485 Parity: N
   f. RS-485 Stop Bits: 1

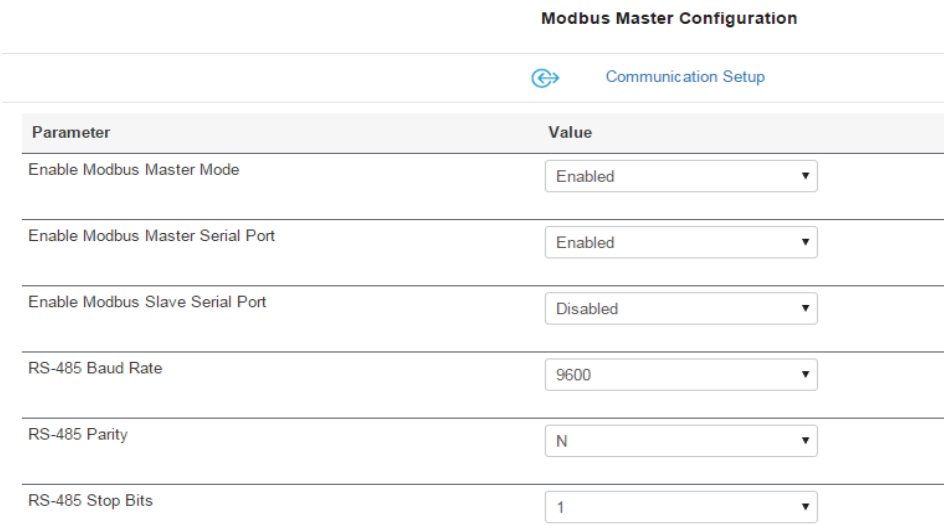

Figure 10 Modbus Communication Setup

10. Proceed to Automated Modbus Device Discovery and enter the Start Address and End Address which would be the range of addresses to automatically detect the Power Meter. For example, if the Power Meter's address is 10, you may enter the values 1 as the Start Address and 12 as End Address to make sure the Power Meter is discoverable.

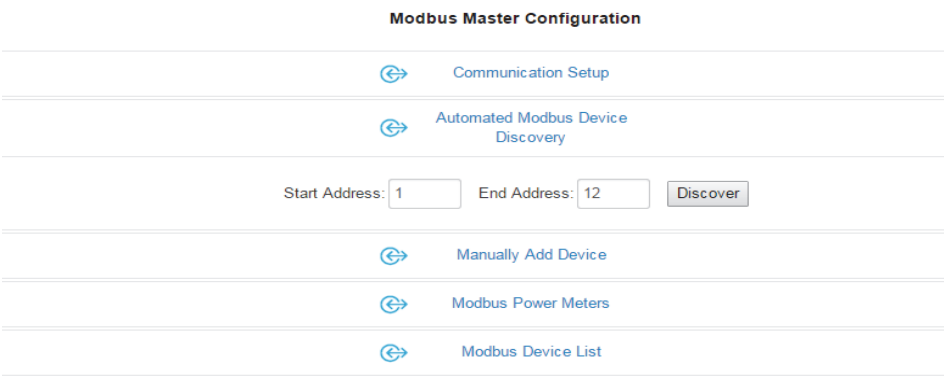

Figure 11 Modbus Device Discovery

Once ComBox successfully discovers the Power Meter, it will show on the Modbus Device List.

Figure 12 Modbus Device List

11. Select an Association under Modbus Power Meters which would allow the Power Meter to monitor either of these devices: Generator, Loads, Grid.

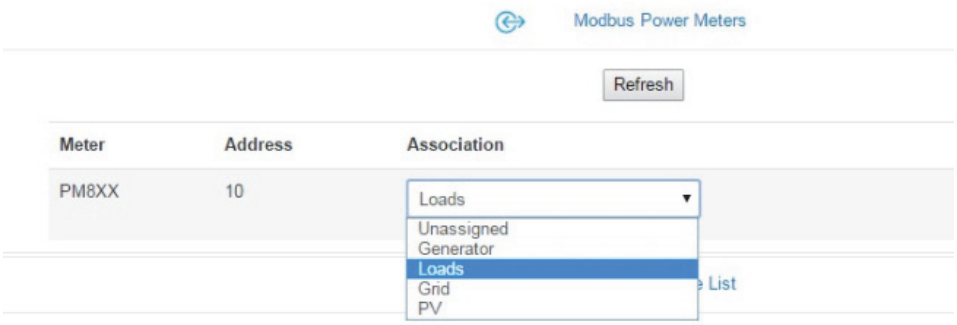

Figure 13 Modbus Device List

Configuration of PV Inverter in Conext ComBox

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1. Click ComBox Configuration and select the ComBox the PV Inverter is connected to.

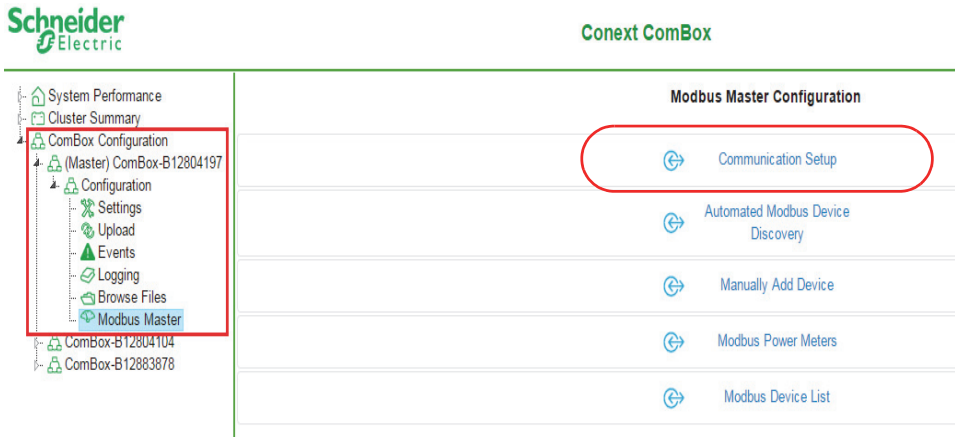

Figure 14 Modbus Master Configuration Page

2. Click Communication Setup to configure the following parameters. The parameters will be different depending on which PV Inverter is connected to the system.
   a. Enable Modbus Master Mode: Enabled
   b. Enable Modbus Master Serial Port: Enabled
   c. Enable Modbus Slave Serial Port: Disabled
   d. RS-485 Baud Rate: Depends on which PV Inverter
   e. RS-485 Parity: Depends on which PV Inverter
   f. RS-485 Stop Bits: Depends on which PV Inverter

Table below describes the RS-485 data format for Conext RL, TL, and CL.

Table 1 RS-485 Data Format

Parameter	Conext RL Value	Conext TL Value	Conext CL Value
Baud Rate	9600	9600	19200

Table 1 RS-485 Data Format

Parameter	Conext RL Value	Conext TL Value	Conext CL Value
Data Bits	8	8	8
Stop Bits	1	1	1
Parity	None	None	None

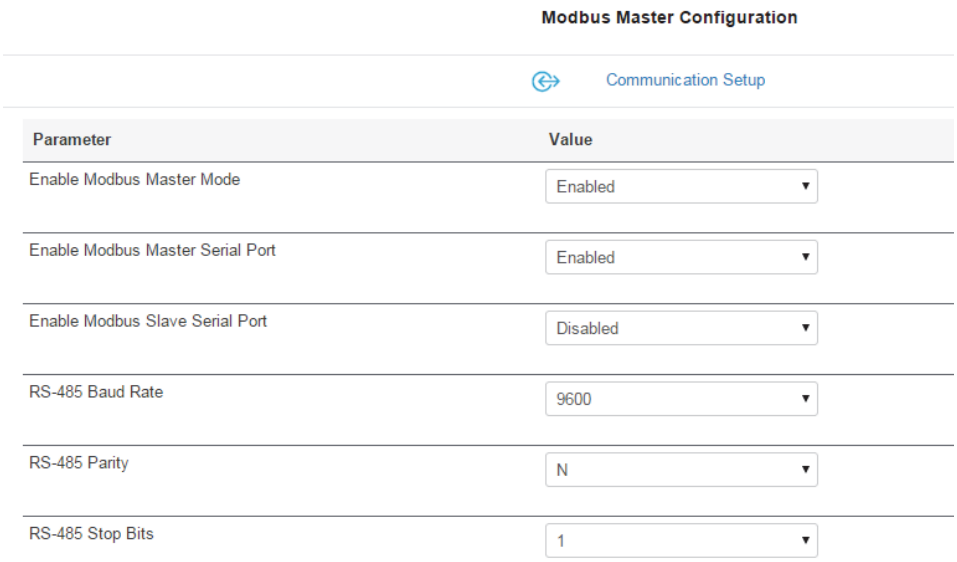

Figure 15 Modbus Communication Setup

3. Click at the Manually Add Device. The Address and a list of device Types appear. Enter the address and choose from the drop down list the model of the PV Inverter to add in the system.

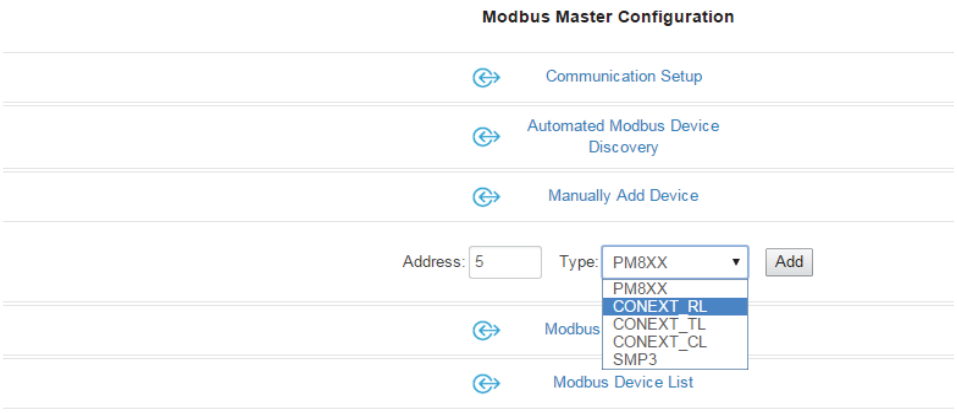

Figure 16 Manually Add Device List

Once the selected PV Inverter is successfully added to the ComBox, the PV Inverter model appears under the Modbus Device List.

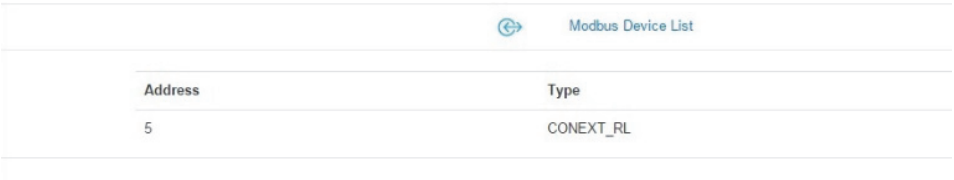

Figure 17 PV Inverter Model

Expected Result

You may observe the following results once the Power Meter and PV Meter are configured properly in Conext ComBox.

1. Power Meter
   a. The Power Meter icon is displayed on the System Performance page of the Conext ComBox.

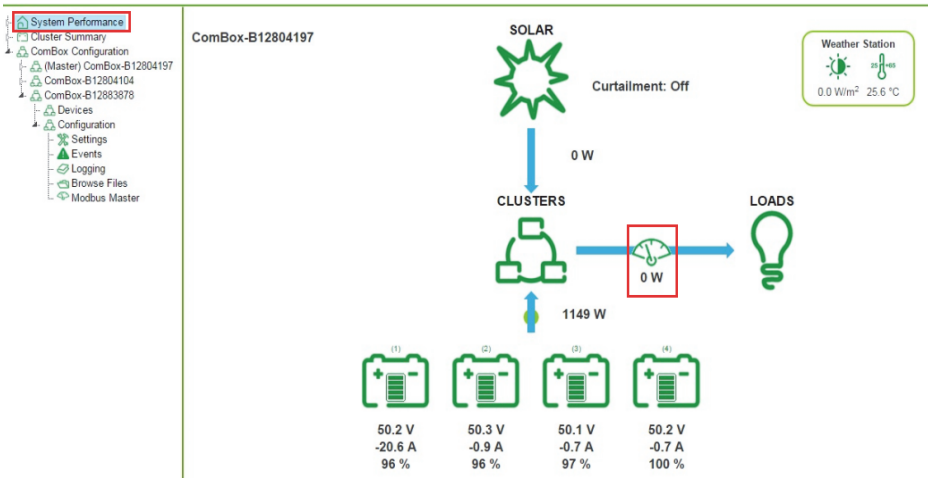

Figure 18 System Performance page displaying Power Meter

   b. The values measured by the Power Meter (Power, Voltage, Current, and Frequency) are displayed under System Performance.

      The displayed value depends on which parameter the Power Meter is assign to measure. See the example on Figure 19 when the Power Meter is assigned to measure the loads.

Figure 19 Loads page displaying Power Meter readings

2. PV Inverter

   The PV Inverters appear under System Performance. Once you click at the PV Inverters, the PV Inverter Summary page is displayed.

Figure 20 PV Inverter Summary