Remote Monitoring and Control

DNP-RTM™

Satec PM172E Power Meter Integration Guide

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Revision Log

Date	Revision	Changes
6/23/03	1.0	Initial version

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Overview

The Telemetric DNP-Remote Telemetry Module (DNP-RTM™) is a cost-effective communications solution for remote monitoring and control of Intelligent Electronic Devices (IED's) such as the Satec PM172E Power Meter. The DNP-RTM continuously polls the IED through a local serial connection. When a reportable change is detected, the DNP-RTM transmits an event report. This minimizes the cost of communication, yet provides near real-time information. Access to the IED with the DNP-RTM can be gained from the utility's SCADA system by using the Telemetric SCADA-Xchange™.

Integrating the Telemetric DNP-RTM with the Satec PM172E Power Meter provides immediate control and status indication of operating conditions to improve system operation and protect investments.

The Satec DNP configuration software PCOMTEST V2.4.4 or later, will be needed to program the required DNP point list for this integration. If you do not have the software, contact your Satec representative to obtain the proper software version.

This integration provides monitor and control capability over many of the Satec points. See Table 1, Table 2, and Table 3 for the monitor and control points provided in this integration.

Features

Integrating the Telemetric DNP-RTM with the Satec PM172E Power Meter provides remote notification of Satec PM172E Power Meter events and internal parameter status. The following monitor and control points are provided in this integration:

Table 1 – Digital Input Points

Point Number	Point Name	Enabled on RTM	Report on Change	Report Interval	Trigger Time
0	Status Input #1			24 hours	0
1	Status Input #2			24 hours	0
2	Relay Status #1			24 hours	0
3	Relay Status #2			24 hours	0

Table 2 – Digital Output Points

Point Number	Point Name	Enabled on RTM	Report on Change	Report Interval	Trigger Time
80	Relay 1			0	0
81	Relay 2			0	0

Table 3 – Analog Input Points

Point Number	Point Name	Enabled on RTM	Report Interval	Low Limit	Low-Mid Limit	High-Mid Limit	High Limit
0	Voltage L1-L12	**X**	0	Low	Normal	High	Very High
1	Voltage L2-L23	**X**	0	Low	Normal	High	Very High
2	Voltage L3-L31	**X**	0	Low	Normal	High	Very High
3	Current L1	**X**	0	Low	Normal	High	Very High
4	Current L2	**X**	0	Low	Normal	High	Very High
5	Current L3	**X**	0	Low	Normal	High	Very High
6	KW L1		0	Low	Normal	High	Very High
7	KW L2		0	Low	Normal	High	Very High
8	KW L3		0	Low	Normal	High	Very High
9	KVAR L1		0	Low	Normal	High	Very High
10	KVAR L2		0	Low	Normal	High	Very High
11	KVAR L3		0	Low	Normal	High	Very High
12	KVA L1		0	Low	Normal	High	Very High
13	KVA L2		0	Low	Normal	High	Very High
14	KVA L3		0	Low	Normal	High	Very High
15	PF L1		0	Low	Normal	High	Very High
16	PF L2		0	Low	Normal	High	Very High
17	PF L3		0	Low	Normal	High	Very High
18	Total PF	**X**	0	Low	Normal	High	Very High
19	Total kW	**X**	0	Low	Normal	High	Very High
20	Total kVAR	**X**	0	Low	Normal	High	Very High
21	Total kVA	**X**	0	Low	Normal	High	Very High
22	Neutral Current	**X**	0	Low	Normal	High	Very High

Point Number	Point Name	Enabled on RTM	Report Interval	Low Limit	Low-Mid Limit	High-Mid Limit	High Limit
23	Frequency	**X**	0	Low	Normal	High	Very High
24	Maximum Sliding Window kW Demand	**X**	0	Low	Normal	High	Very High
25	Accumulated KW Demand	**X**	0	Low	Normal	High	Very High
26	Maximum Sliding Window kVA Demand	**X**	0	Low	Normal	High	Very High
27	Present Sliding Window kW Demand	**X**	0	Low	Normal	High	Very High

Points can be enabled or disabled using the Telemetric web site interface or the Telemetric local configuration program provided with the DNP-RTM. The other settings for the DNP points, such as report interval or trigger time, can be changed only by using the local configuration program.

See Appendix A in the DNP-RTM Users' Guide for complete instructions on using the local configuration program.

Integration Parts List

Please verify that all the parts pictured in Figure 1 and listed in Table 4 are provided in the Integration Kit.

Table 4 - Integration kit parts list. Telemetric part number DNP/SATECINTGKIT.

Description	*Quantity*
Conduit and wiring harness	1

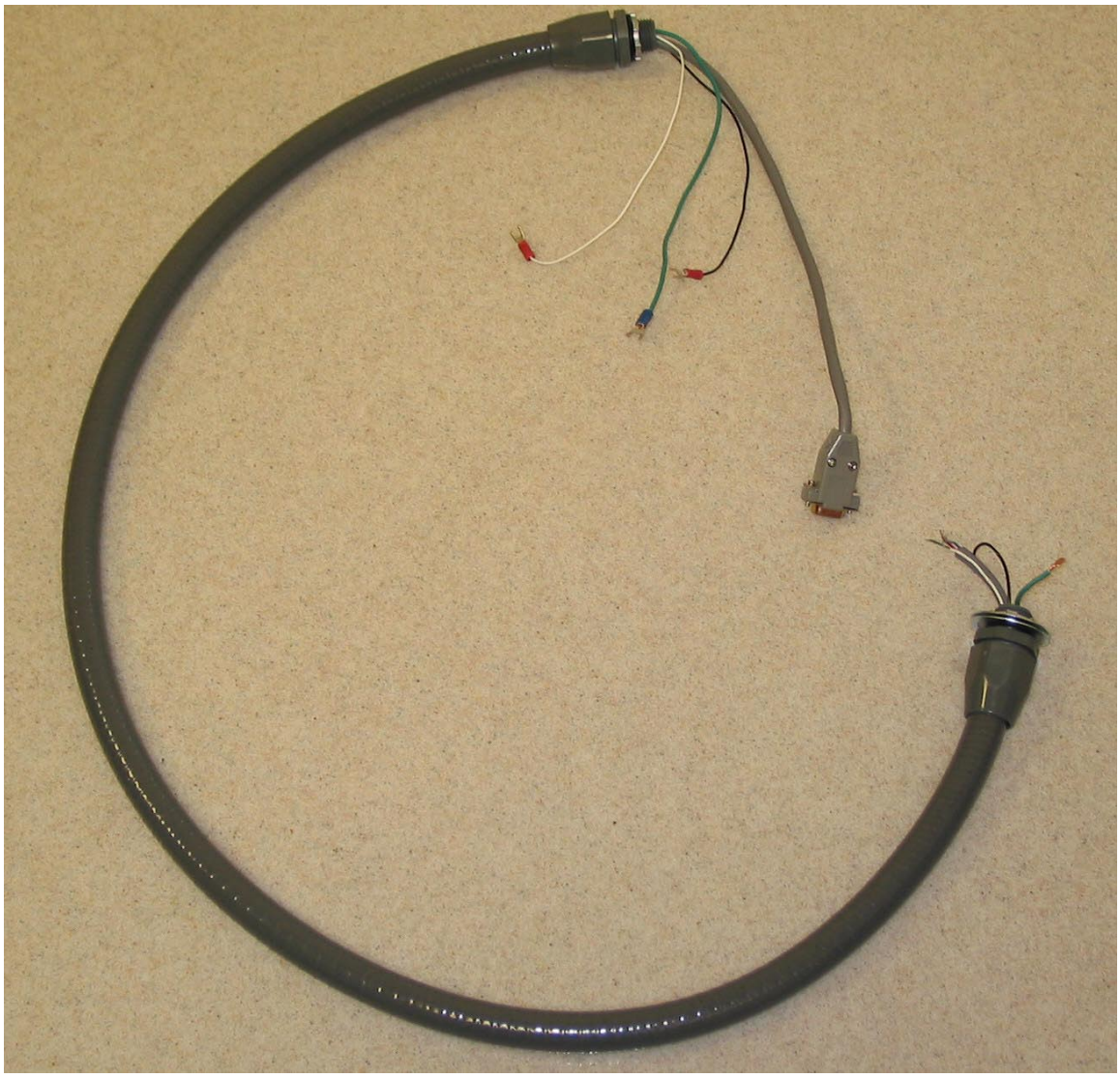

Figure 1 – Integration Kit Contents

Safety Information

The instructions in this manual are not intended as a substitute for proper training or adequate experience in the safe operation of the equipment described. Only competent technicians who are familiar with this equipment should install, operate, and service it. We strongly urge that you follow all locally approved safety procedures and safety instructions when working around high voltage lines and equipment.

A competent technician has these qualifications:
• Is thoroughly familiar with these instructions.
• Is trained in industry-accepted high-voltage and low-voltage safe operating practices and procedures.
• Is trained and authorized to energize, de-energize, clear, and ground power distribution equipment.
• Is trained in the care and use of protective equipment such as flash clothing, safety glasses, face shield, hard hat, rubber gloves, hotstick, etc.
Following is important safety information. For safe installation and operation of this equipment, be sure to read and understand all cautions and warnings.

Following are general caution and warning statements that apply to this equipment.

WARNING: *This equipment is not intended to protect human life. Follow all locally approved procedures and safety practices when installing or operating this equipment. Failure to comply can result in death, severe personal injury and equipment damage.*
DANGER: *Hazardous voltage. Contact with hazardous voltage will cause death or severe personal injury. Follow all locally approved safety procedures when working around high and low voltage lines and equipment.*
WARNING: *Before installing, operating, maintaining, or testing this equipment, carefully read and understand the contents of this manual. Improper operation, handling or maintenance can result in death, severe personal injury, and equipment damage.*
WARNING: *Power distribution equipment must be selected for the intended application. It must be installed and serviced by competent personnel who have been trained and understand proper safety procedures. These instructions are written for such personnel and are not a substitute for adequate training and experience in safety procedures. Failure to properly select, install, or maintain this equipment can result in death, severe personal injury, and equipment damage.*

Installation

Required tools: Very small standard screwdriver.

Follow the instructions below to connect serial and power cabling to the DNP-RTM:

1. Attach the conduit side that has the bare wires to the RTM enclosure by threading the wires through the knockout at the bottom of the RTM and securing the conduit with the conduit nut.

2. To wire the conduit 120VAC wiring, use the Wal-Nut pre-wired to the RTM black wire to connect to the conduit black wire. Repeat using the other Wal-Nut and the white wires. To create a connection using a Wal-Nut, fully insert the pre-stripped wire into the Wal-Nut and tug to make sure the connection is secure.

3. Attach the conduit green wire to the RTM ground lug.

4. Plug in the conduit DB-9 RS-232 connector to the back of the Satec meter. Tighten the DB-9 screws to secure the connection.

5. Wire the RTM serial connection to the green 3-terminal block labeled IED. Connect the Red wire to Rx, the Orange wire to Tx and the Green wire to Gnd.

6. See Figure 2 for completed integration.

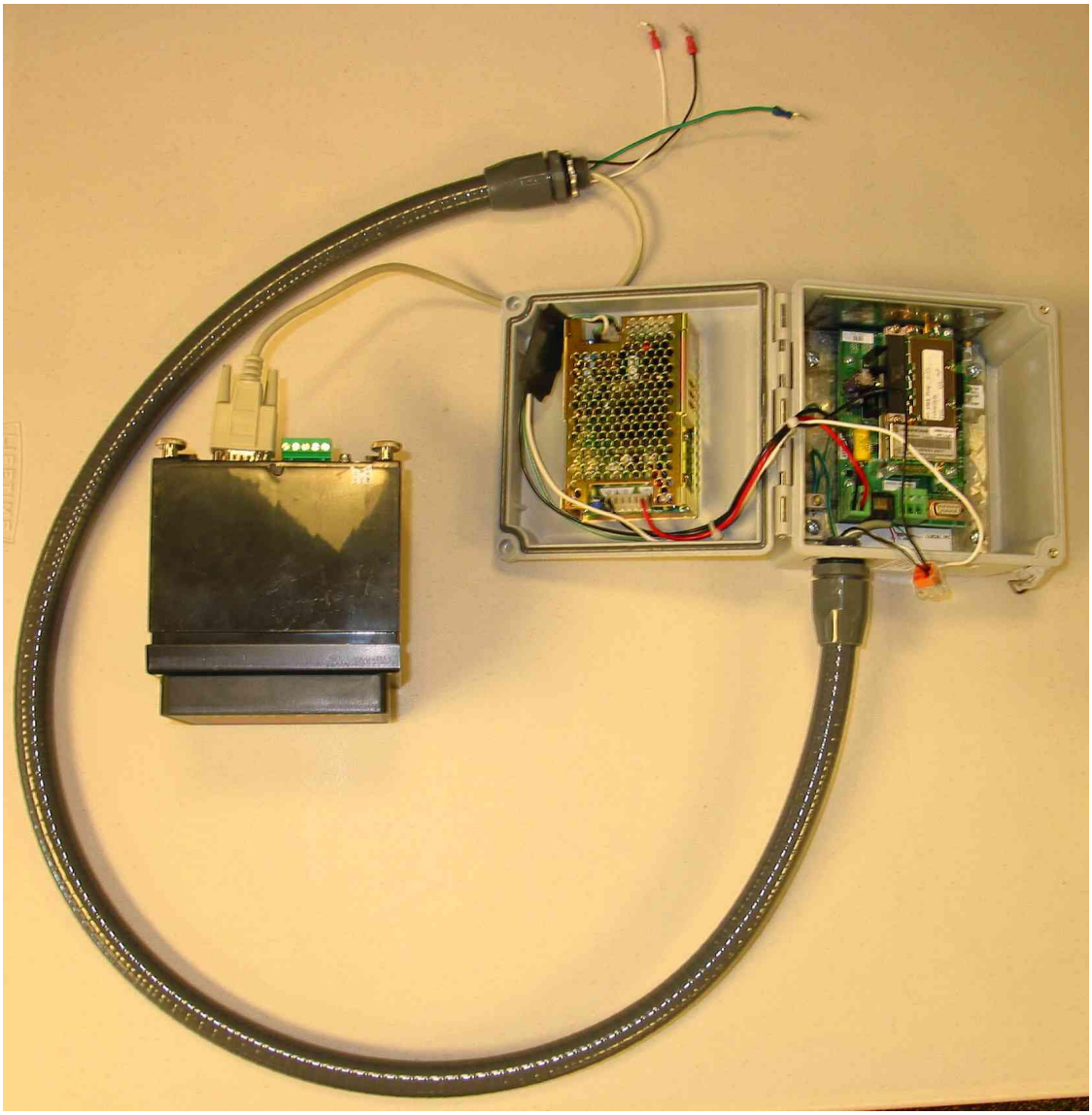

Figure 2 – Satec PM172E Power Meter integration

Satec PM172E Programming

Please consult the PM172E Installation and Operation Manual for instructions on how to connect the power meter to a PC and link to the PcomTest program. You will need a 9-pin null-modem adapter, standard 9-pin serial cable and a 9-pin male-male adapter. Consult the Satec Instruction and Operation Guide for cabling diagrams. Using the PM-172E front panel interface, set the following Port 1 communication parameters:

- Set the protocol to DNP3.
- Set serial interface to 232.
- Set the DNP address to match the DNP-RTM Slave Addr value, or make note of the value to program the RTM later.
- Set the BAUD rate to match the PcomTest program value. You may need to reduce the BAUD rate as low as 2400 to successfully connect.
- Set handshaking to None.
- Set Ctrl to None.
- Connect a serial cable between a PC serial port and the Satec PM172 using a null-modem connection.
- Ensure the PcomTest program has matching values for Protocol, BAUD and Address.

After a connection is established between the power meter and a PC, complete the following steps:

1. Click on **Options** and **Preferences** and make sure Setup Mode is set to On-Line.
2. Click on **General Setup** and then **DNP Options Setup**.
3. Click on **File** and load the DNP setup file **Tel-Options.do1** from the Telemetric CD. (This file is located in the \Configuration_Files\Satec-PM172E directory.)
4. After opening the file, click the **Send** button to load the settings to the power meter. When prompted “Do you want to download setup to the instrument?” click **Send**.
5. Close the DNP Options Setup screen.
6. Click on **DNP Events Setup**.
7. Click on **File** and load the DNP setup file **Tel-Setup.dv1** from the Telemetric CD.
8. After opening the file, click the **Send** button to load the settings to the power meter. When prompted “Do you want to download setup to the instrument?” click **Send**.
9. Close the PcomTest application and disconnect the serial connection.
10. Using the PM172 front panel, change the BAUD setting to 9600.
11. Attach the serial cable between the DNP-RTM and the Satec PM172. This will be a straight serial connection with no null-modem adapter.
12. Verify DNP communication by observing the RTM IED Comm LED. The LED will momentarily illuminate green when a DNP request is sent by the RTM. The same LED will momentarily illuminate red upon receiving the DNP response from the IED.

DNP-RTM Programming

You will need to use the DNP-RTM local programming utility to properly set the device baud rate and the master/slave addresses. On the Satec PM172E, find and record the Baud and Slave Address as described above. Make the following changes in the DNP-RTM Configuration program:

- Set **Slave** address to match the **DNP Address** value mentioned above. Leave the Master address set to 1.

The local programming utility is included on the Telemetric CD provided with the DNP-RTM device. Reference the DNP-RTM Users' Guide for instructions on interfacing to a device locally.

Additional Information

Product manuals, installation manuals, application notes, application guides and technical specifications are available for download at the Telemetric web site.

http://www.telemetric.net/documentation.htm

For more information, questions or feedback, please feel free to contact Telemetric technical support.

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