RF Code R170 PDU Sensor Tag for Schneider Electric

Technical Guide

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Copyright Statement

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Regulatory and Compliance Information

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

RF Code is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

The system is designed to operate with RF Code RFID Tags – whose operating frequency is 433.92 MHz which have been certified or are in the certification process. These devices comply with part 15 of the FCC rules. Operation is subject to the following two conditions:

(1) These devices may not cause harmful interference, and

(2) These devices must accept any interference received, including interference that may cause undesired operation.

   a. FCC ID: P6F2005433 for beacon intervals greater than, or equal to 10 seconds.

   b. FCC ID: P6F433MHZ for the security tag with beacon intervals less than 10 seconds.

Industry Canada Compliance Statement

This Class A digital apparatus meets the requirements of the Canadian Interference-Causing Equipment Regulations.

Avis de conformité à la réglementation d'Industrie Canada. Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

CE Compliance

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures. This equipment complies with the requirements relating to electromagnetic compatibility, EN 55022 Class A, the essential protection requirement of Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility.

WEEE Compliance

Do Not Dispose of the Product with Municipal Waste. Special Collection and Disposal is Required.

Battery Statement

RF Code warrants all tags to be free from defects in materials and workmanship for a period of one (1) year. Based on the ratings and specifications from the battery manufacturers, RF Code develops usage models to calculate the life of the active RFID Tags. Like all models, there are assumptions and approximations involved. The values are to be taken as engineering estimates and not as guarantees of performance.

RF Code tags with a 10-second beacon rate have a useful life of five (5) to seven (7) years in most deployment environments. However, exposure to extreme temperatures will shorten the battery life of any sensor tag.

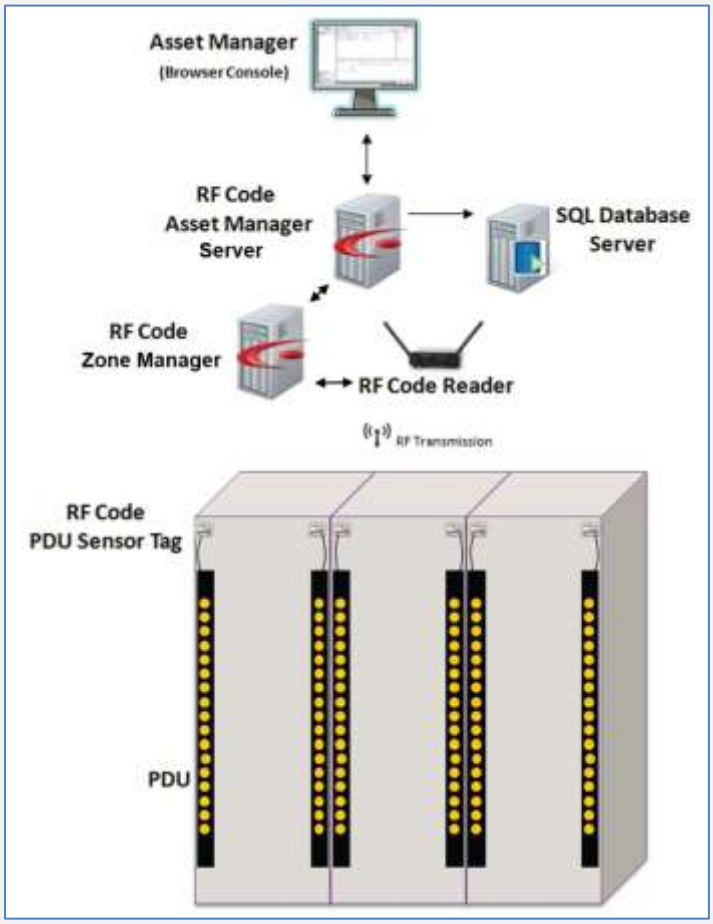
Technical Details

Introduction

The R170 PDU Sensor Tag for Schneider Electric enables data center managers to monitor real-time power consumption and utilization within RF Code Asset Manager, Zone Manager, or other 3rd-party software. The R170 PDU Sensor Tag works in concert with APC 8xxx series PDUs with firmware version 6.0.9 or greater.

IT racks can be instrumented quickly for power monitoring with the R170 sensor tags without the time and cost associated with expensive wired Ethernet connections. The simple turn-key solution requires only installing the PDU into an IT rack and then plugging the R170 PDU Sensor Tag into the PDU. Contrary to other alternatives, IP address association, IP configuration, and IP address maintenance is eliminated.

The R170 PDU Sensor Tag plugs into the sensor port of the PDU via RJ-12 connector. When connected, the R170 PDU Sensor Tag collects vital power usage statistics as reported by the PDU and transmits the information using the patented RF Code radio frequency technology to an RF Code Reader which is connected to your corporate network. RF Code Readers decode all of the RF data which is relayed to the RF Code Zone Manager application and then to RF Code Asset Manager or to another custom software application for alerting, reporting, and advanced and/or historical analysis.



Features

The R170 PDU Sensor Tag for Schneider Electric has the following features:

- Data transmissions are encoded and broadcast via RF at 433 MHz.
- The following broad categories of power consumption and usage attributes are received by RF Code Readers and relayed via Ethernet to consuming applications (Zone Manager, Asset Manager, and/or other third-party software):
    - Main PDU Data
    - PDU Phase Data
    - PDU Outlet Data
    - PDU Breaker Data
    - PDU Line Feed Data
- Real-time reporting of switched outlets and line feed overloads upon a state change
- 10-minute interval data such as active power and apparent power
- Hourly interval data such as per outlet volts, amperage, and volt-hours

R170 PDU Sensor Tag for Schneider Electric: Package Contents

The R170 Wire-Free PDU Sensor Tag for APC package contents are:

- R170 PDU Sensor Tag for APC with a 7-foot RJ-12 connector cable
- One zip-tie and one zip-tie mount

Reporting Cycles and Power Attributes

The data collection and reporting cycles for R170 PDU Sensor Tag for Schneider Electric occurs at two levels of timeliness. The most critical power information is reported every 10 minutes and data that is less time-sensitive is reported every hour. These cycles are summarized by the following reporting periods:

- Per-Phase voltage, amperage, and active power transmitted every 10 minutes
- PDU active power, apparent power and energy use every hour
- Per-outlet voltage, amperage, and energy use every hour
- Feed line overload and bank overload status is sent in real-time upon a state change
- Switched outlet status is sent in real-time upon a state change

The PDU Sensor Tag can consume any or all of the following power attributes which are surfaced in the RF Code Zone Manager middleware and then in Asset Manager:

- **Main PDU Data:**
  - PDU Model
  - PDU Disconnected
  - PDU Serial Number
  - PDU Active Power
  - PDU Apparent Power
  - PDU Data Collection Start Time
- **PDU Outlet Data:**
  - Outlet Voltage
  - Outlet Amperage
  - Outlet Total Active Power Used
  - Outlet Data Collection Start Time
  - Outlet Label
  - Outlet Switched State
  - Outlet Bank ID
  - Outlet Phase Source
- **PDU Phase Data:**
  - Phase Active Power
  - Phase Amperage
  - Phase Total Active Power Used
  - Phase Data Collection Start Time
  - Phase Configuration
  - Phase Voltage (L-L)
  - Phase Voltage (L-N)
- **PDU Breaker Data:**
  - Breaker Overload
  - Breaker Phase Source
  - Bank Breaker ID
- **PDU Line Feed Data:**
  - Feed Line ID
  - Feed Line Amperage

- Feed Line Overload
- Feed Line Configuration

All of the power information described above is available for use by Asset Manager in the following forms of display, reporting, and/or alerts:

- Live table views
- Map views
- Interactive graphing
- Scheduled reporting and graphing
- Alerting and thresholds

Operational and Reporting Cycle Details

During data collection, the PDU internally queues the data packets needed for delivery through the RF Code Tag, with 10-minute interval data taking priority over hourly interval data. As each packet is transmitted by the RF Code Tag, the PDU requests transmission of the next packet (if any are pending). If the PDU has no data collection packets to transmit, it will cycle through the PDU Model, Serial Number, and PDU Bank Configuration packets until more data collection packets are queued. Considering that one packet can be transmitted per minute, a total of 60 packets can be sent each hour. At the extreme, a PDU with 64 outlets and three phases sends the following transmissions in a given hour:

- Three (3) Per-Phase Load Voltage/Amperage/Power reports every 10 minutes (18 messages/hour)
- 16 Per-Outlet Watt-Hour/Switch State reports every hour (16 messages/hour)
- 16 Per-Outlet Average RMS Current reports every hour (16 messages/hour)
- 1 Device Power/Energy Use report every hour (1 message/hour)
- 2 Phase Outlet Voltages/Bank Overload State reports every hour (2 message/hour)
- From 1 to 7 PDU Model, Serial Number, and PDU Bank Configuration report(s) every hour

For less demanding PDUs, the reduced data collection requirements results in more frequent reporting of PDU Model and Serial Number reports, while maintaining the same frequency of data reporting.

Upon initial implementation and configuration of a newly added PDU, e.g., during initial power-up or upon upgrade, the PDU Model and Serial Number packets are sent 2-3 times before the PDU begins to report operational data; this happens to ensure that power utilization data is accurate and accurately associated with the correct PDU.

Zone Manager accumulates data reported on each interval (per-phase data on 10 minute intervals, other data on 1 hour intervals), and reports accumulated updates as a single transaction. Consequently, the reported data maintains consistency in time in order to allow meaningful comparison of values across the data within a given time period. Note again that there is a delay corresponding to a single time interval in order to maintain accuracy.

Installation and Configuration

To integrate the R170 PDU Sensor Tag with RF Code hardware and software (Zone Manager and Asset Manager), perform the following steps:

1. If you have not already done so, install the APC PDU in your enterprise hardware rack and then power it on.

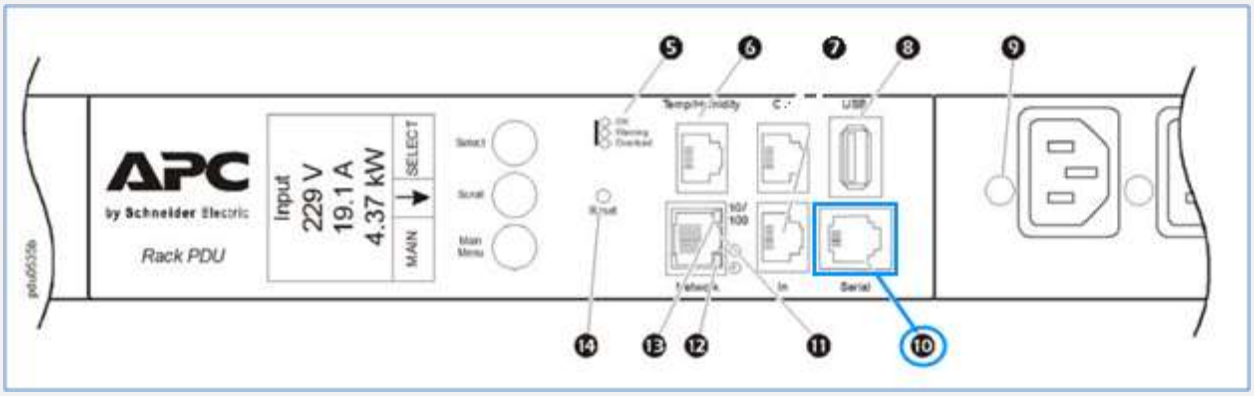
   NOTE: For more information about installing your APC PDU, refer to the APC documentation that came with it.

2. If you have not already installed an RF Code Reader, please do so.

   NOTE: For information about installing RF Code Readers, please refer to the user manual for your reader, which is available on the RF Code Support website: http://support.rfcode.com/customer/portal/articles/722910

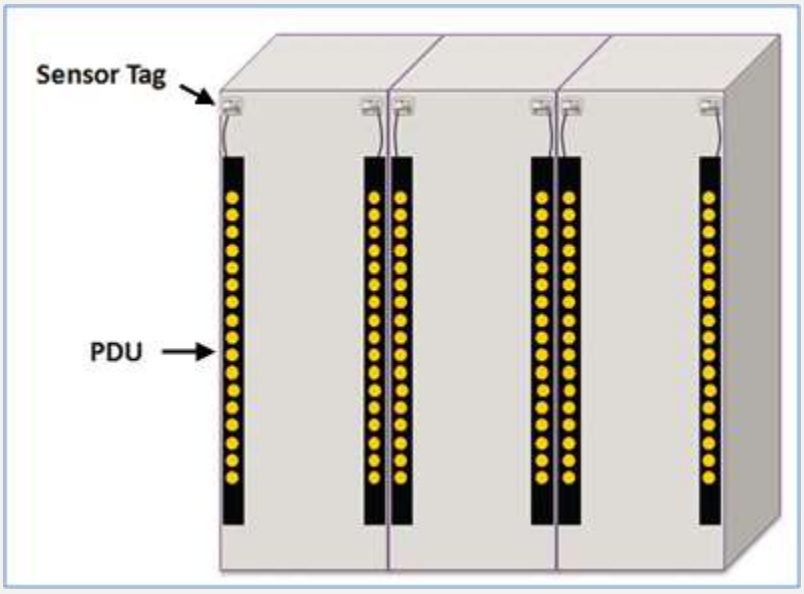
3. Connect the R170 PDU Sensor Tag (illustrated directly below) to the PDU by plugging the cable attached to the sensor tag into the RJ-12 **Serial** port (jack) on the APC PDU (The port indicated by **#10** in the subsequent APC PDU illustration of ports).

NOTE: Depending on the model of your APC PDU, the location and/or label of the port may be different; if so, please refer to the APC PDU user guide for the specific model in order to locate the proper port.



4. After powering on the PDU, you need to enable communications with the R170 PDU Sensor Tag.
   a. Press the **Scroll** button next to the LCD display on the PDU until **RF Code Control** appears.
   b. Press the **Select** button beside the LCD to select this menu.
   c. If the **RF Code Console** option is set to *Disable*, press **Select** again to **Enable** it. The PDU will reboot and the new setting will take effect.

5. Mount the R170 PDU Sensor Tag. according to the instructions presented below in the Mounting Guidelines section.



Mounting Guidelines

The following guidelines will help to ensure that you mount the R170 Sensor Tag for optimal functioning.

- Mount the R170 Sensor Tag on the outside and near the top or above the IT rack where the APC PDU is installed; this helps to reduce interference with the radio frequency signal that can be caused by metal objects and structures.

- Remove the release liner from the back of the tag and press firmly to mount the tag to an upper exterior surface of the rack.

- To help prevent potential problems that could result from the tag being bumped or snagged, employ a strain relief method using the supplied tie-wrap and tie-wrap mount.

Operational Notes

The following notes about the general operating characteristics of PDUs and PDU tags should be taken into consideration:

- Allow at least two hours for power information to become available in the RF Code software due to the time delay inherent in collection and transmission of data, which helps to ensure its accuracy and usability.

- Missed beacons will cause further time delays in the reporting cycle so they should be eliminated as much as possible by proper positioning of the tags.

- High levels of noise and/or tag densities in the deployment environment may require the installation of additional readers in order to assure successful delivery of data from the R170 to Zone Manager and subsequently to Asset Manager.

Warranty and Service

Limited Standard Warranty Terms

RF Code warrants its products to be free from defects in materials and workmanship for a period of 1 year (12 months) for hardware and software from the date of purchase from RF Code. Its obligation under this warranty is limited to repairing or replacing, at its own sole option, any such defective products. This warranty does not apply to equipment that has been damaged by accident, negligence, or misapplication or has been altered or modified in any way. This warranty applies only to the original purchaser (end-user) and is not transferable.

Standard Warranty Limitations

Except as provided herein, the entire liability of RF Code and its suppliers under this limited warranty will be that RF Code will use reasonable efforts to repair or replace, without charge, all defective Products returned to RF Code by Customer, all as more particularly described in the End User Warranty. Except for the express warranties STATED HEREIN, RF Code makes no other representations or warranties and RF Code hereby disclaims, all other warranties, express, implied, statutory, or otherwise, including without limitation, any warranty of merchantability, non-infringement of third party intellectual property rights, fitness for a particular purpose, performance, satisfactory quality, or arising from a course of dealing, usage or trade practice.

Obtaining Service and Support

For in-warranty service, customers have several options. Customers having difficulty with RF Code products should attempt to solve those problems through RF Code's Technical Support Problem Escalation Process:

1. Take advantage of the wealth of information, advice, and solutions available on the RF Code Support website: http://support.rfcode.com
2. Contact RF Code Customer Support via e-mail: support@rfcode.com. Provide as much information as you can about any issues you are having or questions to which you would like answers. A representative will respond to you promptly.
3. If you have an RF Code representative or purchased RF Code hardware or software solutions from a distributor, please contact that individual for guidance.
4. If you have a business-critical issue or your problem is complex and/or needs a more immediate solution, please don't hesitate to call the RF Code Customer Support Line.

NOTE: For product returns, the support engineer will give you a return material authorization (RMA) number. No returns will be accepted without an RMA number. If the warranty expired, there is a charge for repair or replacement per RF Code's out-of-warranty policy. For full details of the RF Code RMA policy, please review the "RF Code Warranty, RMA, and Extended Warranty Policy" document.

The Support Line is available to provide General Support during normal business hours: Monday through Friday, 8:00am to 5:00pm CT, excluding national holidays.

Local: 512.439.2244
Toll-free: 866.830.4578

www.RFCode.com
http://Support.RFCode.com

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