

Winner of the American Public Power Association's 2011 DEED Energy Innovator Award

Omaha Public Power District, Nebraska OPPD Digital Roof Top Unit Pilot Project

The award was given based on the completion of two pilot projects by OPPD (Omaha Public Power District) in which the Digital Roof Top Unit (Digi-RTU®) was installed into rooftop air conditioners. The typical HVAC roof top system consumes 30% - 40% more energy than needed and is generally equipped with a constant speed compressor and an oversized fan system.

By adding a Digi-RTU®, the energy savings per air conditioning unit ranged from 30% – 70% while compressor cycling diminished by up to 80%. Occupant comfort was also maintained.

For more info on the Digi-RTU®, see the 2015 study by a leading California Utility

http://www.etcc-ca.com/sites/default/files/reports/et13sce1110_lab_assessment_of_vfd_for_rtu_final.pdf

FAQs

1. What is a Digi-RTU®?

A Digi-RTU® is an aftermarket control kit designed to improve the energy efficiency of a rooftop air conditioning unit.

2. What are the benefits of using a Digi-RTU®?

- About 30-70% reduction in energy consumption and 30-50% reduction in peak demand.
- Reduced short cycling of the compressor.
- Soft start of compressor and indoor fan motors.
- Well maintained room temperature and humidity levels.
- Reduced noise pollution.

3. What is the typical payback period for a Digi-RTU®?

The simple payback period varies from 1 to 4 years depending on factors such as the local utility rate, the area climate zone, the rooftop unit capacity, and available incentives and rebates provided by the utility companies.

4. How does a Digi-RTU® work?

The Digi-RTU® modulates the capacity of a rooftop air conditioning unit to match the cooling or heating loads by regulating both the supply air fan (VAF) and compressor speed (VRF).

5. Can a Digi-RTU® be installed in any rooftop unit?

The Digi-RTU® can be installed on any rooftop unit.

6. Is a Digi-RTU® sized according to the roof top unit?

Yes, the Digi-RTU® is sized based on the rooftop unit.

7. How long does it take to install a Digi-RTU®?

It takes about 3-6 hours to install and test a Digi-RTU®.

8. What is the communication protocol that comes with a Digi-RTU®?

It comes with a native Modbus-RTU communication protocol. A Gateway can be used for the BacNet and Lon Work communication protocols. It is suitable for direct t-stat connections and can communicate with any BAS system.

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Digi-RTU®

Reducing the Peak Demand and Energy Consumption of Rooftop Units

The Digi-RTU®

The Digi-RTU® modulates the capacity of rooftop units, air/water source heat pumps to match the dynamic nature of building cooling or heating loads. As a result, energy waste is minimized and indoor comfort is improved. Because of its unique operating principles, the Digi-RTU® achieves greater savings than any other product on the market.

- » **The existing Building Automation System (BAS), thermostat & HVAC controllers remain in place.**
- » **Reduces total electrical consumption by 30 - 70% & peak demand by 30-50%**
- » **Reduces gas consumption by 10-50%**
- » **Better maintains the room temperature setpoint and humidity**
- » **Reduces compressor cycling**
- » **Reduces operating and maintenance costs**

Digi-RTU® Advanced Functionalities

- » Variable refrigerant flow; compressor optimization
- » Variable air flow; fan speed control
- » Integrates with the existing economizer
- » Fault Detection & Diagnostics
- » Demand Response (DR) Functionality; load limit capable
- » Remote Monitoring
- » Demand Response (DR) signal enabled
- » Up to 4 cooling and 2 heating stages
- » Demand Control Ventilation satisfies ASHRAE 62.1 & CA Title 24 Requirements

Digi-RTU® Applications

- » Packaged rooftop units, water and air source heat-pumps, split units
- » Installed on HVAC rooftop units of between 3-50 tons
- » Integrates with any existing thermostat or BMS

Fault Detection & Diagnostics

The Digi-RTU® can detect and diagnose the following faults:

- » The space temperature and humidity outside of the setpoint
- » Loose fan belt
- » Duct blockage and a dirty filter
- » Low or high compressor refrigerant charge
- » Outside air damper failures
- » Heater Failures

Demand Response

- » The Digi-RTU® responds to all space heating/ cooling calls according to established set-points
- » With prior notice of a Demand Event, the Digi-RTU® can “pre-cool” a space and then maintain the established space temperature according to setpoints established by the BAS
- » A load limit factor for the rooftop unit is sent through the BAS to the Digi-RTU® and can range from 50-100%, thereby limiting the speed of the rooftop unit

Remote Monitoring & Control

The Digi-RTU can remotely monitor and control the following variables:

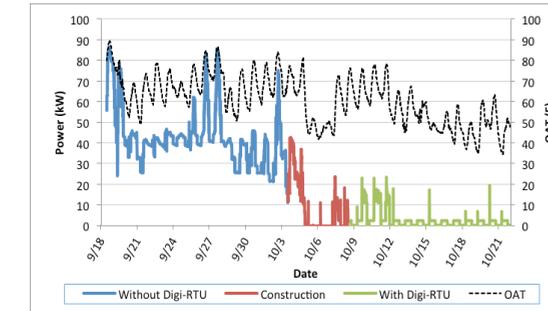
- » kWh consumption
- » Temperature and setpoint
- » VFD speed
- » Damper position
- » Space CO₂ level
- » Anytime measurement periods
- » HVAC unit ON/OFF

Digi-RTU® : 3-6 Hour Install

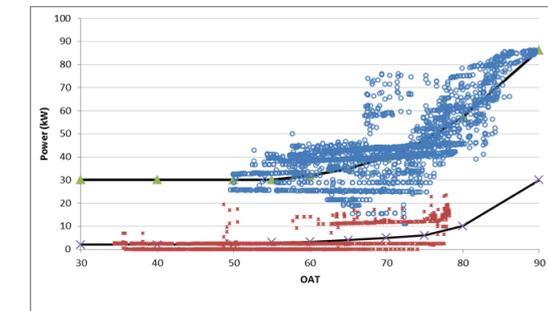


Case Studies - HVAC Roof Top

DISTRIBUTION CENTER



71% kW Decrease



85% kWh Decrease

Water Source Heat Pumps

PUBLIC SCHOOL

- » Consumption: **45% kWh Decrease**
- » Peak Demand: **40% kW Decrease**

