

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

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 kW savings per air conditioning unit ranged from 25% - 60% while the compressor cycling diminished by up to 70% and occupant comfort was maintained.

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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™?** Reduced electricity energy consumption of up to 60%. Reduced electricity peak demand of up to 60%. Reduced compressor cycling frequency. Maintenance of room temperature and humidity levels. Reduced noise.
3. **What is the typical payback for a Digi-RTU™?** The typical payback period is 2 years depending on utility rates, climate zones, rooftop unit capacities, and incentives and rebates from 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 and compressor speed.
5. **Can Digi-RTU's™ be installed in any rooftop unit?** The Digi-RTU™ can be installed on any single zone rooftop unit.
6. **Is the 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 typically takes an electrician or mechanical contractor about 3 hours to install and test a Digi-RTU™.
8. **What is the communication protocol that comes with the Digi-RTU™?** It comes with an industrial standard Modbus RTU communication protocol and is compatible with others using a communications bridge. It is suitable for direct t-stat connections.

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Digi-RTU™

Reducing Peak Demand and Energy Consumption of Rooftop Units

The Digi-RTU™

Cooling costs average 30-50% of the total energy costs of a commercial building. The Digi-RTU™ modulates the rooftop unit and the capacity of the air and 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.

- » Existing Building Automation System (BAS), Thermostat & HVAC controllers remain
- » Reduces total electrical consumption & peak demand by up to 60%
- » Reduces gas consumption by 10-15%
- » Better maintains the room temperature set-point and humidity
- » Reduces compressor cycling
- » Reduces operating and maintenance costs

Is the Digi-RTU™ Right for Your Building?

- » Installed on rooftop units having a capacity of between 3 and 30 tons
- » Installed on water source heat pumps
- » The Digi-RTU™ saves significant expenses by reducing energy consumption by up to 60%. This makes it ideal for building owners and tenants.
- » The Digi-RTU™ is an excellent Demand Management tool that reduces demand by up to 60%. This makes it ideal for the utility company.
- » Scalable turn-key approach with sustainable annual results

The Digi-RTU™ Addresses All Four Areas of DOE Advanced Controls for Rooftop Units

- » Integrates with the existing economizer
- » Modulates the supply fan
- » Modulates the compressor speed
- » Regulates the indoor air CO₂ level

Digi-RTU™ Applications

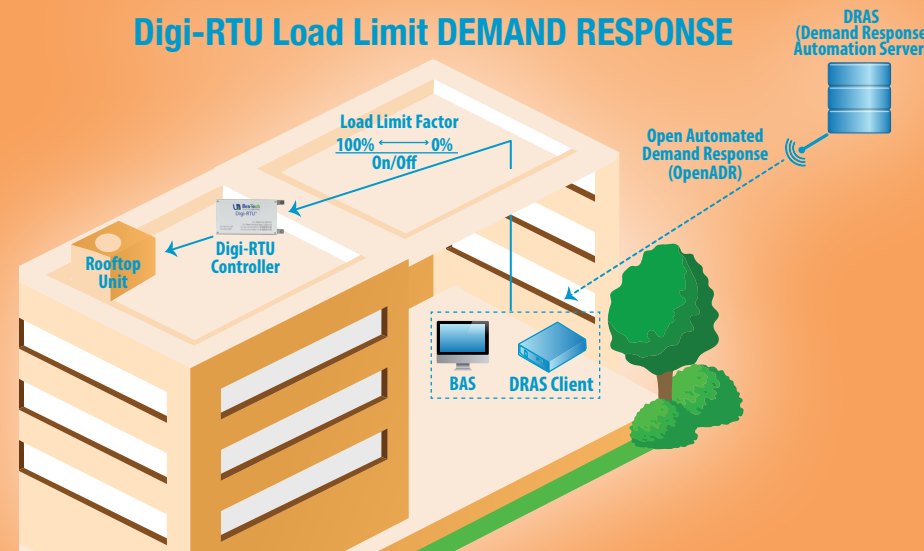
- » Rooftop HVAC, air and water source heat pumps, split units
- » 3-30 ton units
- » Up to 4 cooling and 2 heating stages
- » Integrates with any existing thermostat and Building Automation System (BAS)
- » Demand Control Ventilation CO₂ satisfies ASHRAE 62.1 and California Title 24 Requirements
- » Economizer
- » Demand Response (DR) signal enabled

Fault Detection & Diagnostics

- » Space temperature and humidity outside of set-point
- » Fault detection; fan mode, room temperature set-point, and operations schedule
- » Loose fan belt
- » Duct blockage and dirty filter
- » Low or high compressor refrigerant charge
- » Outside air damper failure
- » Heater failure



Digi-RTU Load Limit DEMAND RESPONSE

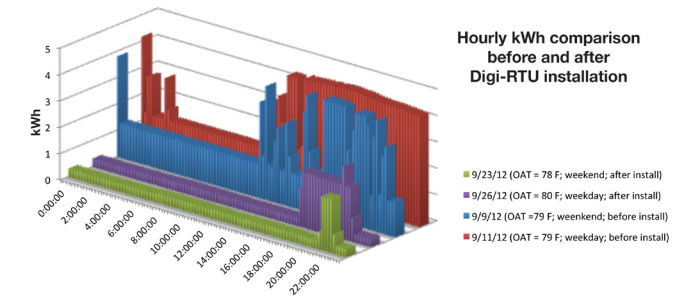


Case Study - HVAC Roof Top

BIG BOX RETAIL

ASHRAE ZONE #2

- » Two days with the Digi-RTU™, two days without the Digi-RTU™
- » Energy savings:
 - » Consumption: **74% kWh**
 - » Demand: **29.5% kW**



Case Study - Water Source Heat Pumps

PUBLIC SCHOOL

ASHRAE ZONE #5

- » A geothermal water-source heat pump system, 24/7 operation
- » Energy savings:
 - » Consumption: **45% kWh**
 - » Peak Demand: **40% kW**

