

# 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 two pilot projects OPPD completed installing the Digital Roof Top Unit (RTU) 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 Optimizer?** A Digi-RTU optimizer is a control kit designed to improve 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 50%. Reduced compressor cycling frequency. Maintained room temperature and humidity level. Reduced noise.
3. **What is the typical payback for a Digi-RTU ?** The typical payback period 2 to 4 years depending on utility rates, climate zones, rooftop unit capacities, incentives and rebates from utility companies
4. **How does a Digi-RTU work?** Digi-RTU modulates the capacity of a rooftop air conditioning unit to match cooling or heating loads by regulating both supply air fan and compressor speed.
5. **Can Digi-RTU optimizers be installed in any rooftop units?** Digi-RTU is a standard product that can be installed on any rooftop unit regardless of single or multi-zone.
6. **Is the Digi-RTU sized according to roof top unit?** Yes, the Digi-RTU is sized based on rooftop unit.
7. **How long does it take to install a Digi-RTU ?** It typically takes about 3 hours to install and test a Digi-RTU, typically installed by an electrician or mechanical contractor.
8. **What is the communication protocol coming with Digi-RTU ?** It comes with the industrial standard Modbus RTU communication, and is compatible with others using a communications bridge.
9. **What is the user interface that allows occupants to operate a rooftop?** Digi-RTU can be configured for operation using a conventional programmable thermostat or integrated into the existing building automation system.

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# Digi-RTU™

Reducing peak demand and  
energy consumption  
of rooftop units

Cooling costs average 30-50% of total energy costs for a commercial building. More than 60% of all commercial buildings, 9 million units, in the US have rooftop units. Of these 75% are oversized, do not running efficiently and consume far more energy than necessary. They are widely used to control the inside climate of small to medium office buildings, clinics and medical facilities, schools, strip malls, and industrial buildings. Reducing the energy consumption of rooftop units significantly lowers the carbon foot print of a building and thereby benefits our society.

## Benefits of Digi-RTU

As a technology break-through product, Digi-RTU effectively reduces peak demand and energy consumption of rooftop units. Benefits include:

- » **Reduces electrical consumption by up to 50%**
- » **Reduces peak electricity demand by up to 50%**
- » **Better maintains set-point room temperature and humidity**
- » **Reduces compressor cycling and extends the unit service life**
- » **Reduces maintenance costs**

Digi-RTU modulates the rooftop unit capacity 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 principle, Digi-RTU achieves greater savings than any other product on the market.

## Specifications for the Digi-RTU

- » Input Voltage –230 VAC/3/60Hz, 460VAC/3/60Hz
- » Inputs/Outputs –RS-485, Modbus RTU communication protocol or 24VAC binary outputs to rooftop units
- » Communication Bus –RS-485, Modbus RTU communication protocol, 18-AWG twisted pair wire with stranded tinned copper conductors protocol
- » Wireless feature

## Digi-RTU is Right for Your Building

- » Installed on rooftop units with a capacity between 5 and 20 tons
- » Excellent answer for building owners and tenants, the Digi-RTU will save significant expenses by reducing energy consumption up to 50%
- » Also ideal, for the utility company, the Digi-RTU is an excellent Demand Management tool that reduces demand by up to 50%
- » Scalable turn-key approach with sustainable annual results,



## Results Speak for Themselves

A 5-ton rooftop unit serving a fitness center was retrofitted with a Digi-RTU. After the Digi-RTU was installed, the peak demand was reduced by up to 60%, with energy consumption being reduced by up to 70%.

Depending on unit tonnage, ambient temperature, and utility rate; the typical payback period of a Digi-RTU is 2 to 4 years.

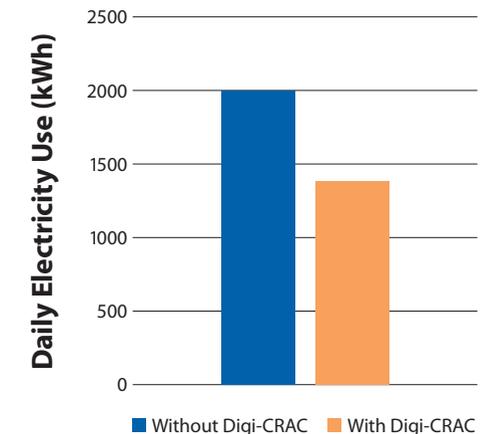
## Digi-CRAC™

U.S. data centers consumed 61 billion kWh in 2006, and the energy consumption increased by 36% from 2005 to 2010. Digi-CRAC is an aftermarket innovation for the data center environment. Digi-CRAC can be installed for both DX and chilled water coil units.

Digi-CRAC is an aftermarket product designed specifically for data centers. It will provide energy savings of up to 30% or more for the compressor and fan efficiency of a DX unit, and up to 60% in fan power savings for chilled water units.

Digi-CRAC matches the dynamic nature of the data center's cooling loads with capacity modulation. Because of its longer run-cycles, it best manages temperature and humidity within the center's environment. When the Digi-CRAC is installed, it is expected to:

- » Reduce electricity use up to 30% or more for DX units
- » Reduce fan power 60% or more for chilled water units
- » Reduce compressor cycling and extend the unit service life
- » Reduce overall maintenance cost of the data center cooling control units
- » Reduce noise levels



### Case Study detail (Digi-CRAC with capacity up to 30-tons):

- » Five (5) 20-ton DX CRAC units
- » Single floor data center and computer room
- » Manufacturing facility
- » Compressor and fan power consumption decreased by 32%