Wireless Sensor System
Automation • Monitoring • Control
The benefits of wireless solutions for monitoring and control applications are well-documented, including multiple studies by the U.S. Department of Energy.
Wireless Deployment Considerations

How far will it work?

Will the data be received reliably?

How often do devices have to be maintained?

Can this system scale for my enterprise?
Battery Life Impacts Operating Expense and Performance

Impact of Battery Failures and Replacement

- Forgotten devices
- Sub-optimal system performance, wasted energy
- Expensive “truck roll” to replace a battery
- Manage on-going battery replacement program
- Battery recycling (and training)

The IDEAL Wireless Sensor System eliminates battery replacement
IDEAL Wireless Sensor System

- Indoor environmental monitoring
  - Temp, Humidity, Light, CO₂, DP, etc...

- Completely wireless
  - Labor cost savings and rapid deployment

- Network-centric
  - Industry Standard Interoperability
  - BACnet, Modbus, LonWorks, SNMP, XML

- No/low maintenance
  - Up to 25+ year battery operation
  - Battery-powered CO₂ sensor (3.5 – 15 years)
Fast installation / Easy relocation
No wiring, network ports, or power
Scales from 10s to 1000s of points
Long battery life (up to 25+ years)
Connect to any HVAC or IT network
Unlimited Range (with repeaters)
Wireless Sensor Options

Temperature
Humidity / Dew point
Light Level
Differential Pressure
Carbon Dioxide
Dry Contacts

Device size as small as 4”x2”x1”
System Overview

Wireless Gateway

- BACnet
- Modbus
- LonWorks
- Local Monitoring

Wireless Sensors

- Temperature
- Humidity
- Dew Point
- Light
- External Temp (2)
- External Contacts
- CO₂
- Diff. Pressure

915MHz or 2.4GHz options
Multi-Function Sensor

Configurations

T  Temperature
TH Temperature/Humidity/Dewpoint
TX Temperature w/2 ext. 10K ports
L  Light level (lux)
C  Contact Closure / Digital Input

Packaging Option A
- 4.2” x 2.1” x 1.1” enclosure
- Non-replaceable battery (-N)

Packaging Option B
- 4.2” x 2.1” x 1.7” enclosure
- Replaceable batteries (-R)

Battery Life
25+ years* with pre-installed battery,
15 years* with replaceable batteries
@ 1 minute intervals

No battery replacement during typical lifecycle!

* When used under rated environmental conditions
Wireless CO₂ Sensor

- Self-calibrating
- 0 – 5,000 ppm range
- Configurable intervals: 1 – 10 minutes
- Battery-life: 3.5 – 15 years*
- Internal antenna
- Wall-mount

*Easy retrofit for enabling Demand-Controlled Ventilation (DCV)*

Battery Life

- 3.5 years* @ 1 minute intervals
- 15 years* @ 5 minute intervals

*When used under rated environmental conditions

5.8” x 3.2” x 1.5” enclosure
Wireless Differential Pressure Sensor

1102–DP1 / 1202–DP1

- Battery-life: 15 years*
- ± 2" W.C. / ± 500pa
- 5/32” fittings (156 mils)
- Wall–mount enclosure, internal antenna

Battery Life
3.5 – 15 years* @ 30 sec – 8 min intervals

* When used under rated environmental conditions

5.8” x 3.2” x 1.5” enclosure
IDEAL Sensors Deliver Wired-like Performance

Sample Interval (Minutes)

Temperature/Humidity Sensor Battery Life

Battery Life (Years)

Data obtained from published datasheets (Dec 2011)
Wireless BAS Gateway

- Receives data from wireless sensors
  - Up to 100 devices
  - Up to 800 sensor points

- Interface to BAS or IT network
  - Ethernet, RS-485, FTT-10

- Maintains network performance info
  - RSSI, Hop Count, Routes, Packet Timers

- USB Interface to PC
  - Configuration
  - Local monitoring and data logging via serial / HyperTerminal connection

BAS Network Interfaces and Protocols

<table>
<thead>
<tr>
<th>Ethernet</th>
<th>RS-485</th>
<th>FTT-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>• BACnet/IP</td>
<td>• BACnet MS/TP</td>
<td>• LonWorks</td>
</tr>
<tr>
<td>• Modbus TCP</td>
<td>• Metasys N2</td>
<td></td>
</tr>
<tr>
<td>• Ethernet/IP</td>
<td>• Modbus RTU</td>
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<tr>
<td>• Omron FINS</td>
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<tr>
<td>• DNP3</td>
<td>• DNP</td>
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<tr>
<td>• SNMP</td>
<td>• YorkTalk</td>
<td></td>
</tr>
<tr>
<td>• XML</td>
<td>• A-B DF1</td>
<td></td>
</tr>
</tbody>
</table>

USB
- Serial Gateway/Repeater
Wireless Repeaters Provide Extended Range

- **Real-time** repeater mesh – no multi-hop delays, no hop-count limit
- Plug-n-play, **self-forming network**, any topology (linear, ring, mesh)
- Smart buffers eliminate duplicate packets

**Indoor Range:**
915MHz 300ft
open space

**R = Repeater**
**G = Gateway**
Gateway Redundancy Protects Against Failures

Power Circuit A

G1

Router A

BAS
Network

Router B

G2

Power Circuit B

R = Repeater
G = Gateway
Applications

- Data Center Monitoring
- Building Automation / HVAC control
- Energy Management
- Data Logging (real-time, cloud-based)
- Compliance Monitoring
  - Medical/JHACO, Food/FDA, etc.
- More…
Data Center Monitoring

- Measure server intake and exhaust temperature
- Reduce energy consumption
- No wiring, easy deployment
- No maintenance
- Real-time data
Demand-Controlled Ventilation

DCV Benefits
• Reduced energy cost by avoidance of over-ventilation
• Improved IAQ and humidity control, minimized moisture intake
• Qualifies for LEED rating points
• Reduced operational running times for major HVAC equipment

IDEAL System Benefits
• Reduced installation cost
• Low maintenance with long battery life and self-calibration
• Add to any BAS network
• Data-logging of air quality data
Multi-Story Apartment Buildings

- Monitor every apartment to obtain building thermal footprint
- Use controller to intelligently control boiler system

Diagram:
- Repeaters
- Gateways
- Wireless sensors

- Ethernet or RS-485 network
- Boiler
- Controller or BAS
Multi-Building Monitoring

Wireless Sensor  Wireless Repeater  Wireless Gateway

Rapid deployment across multiple buildings, single network termination
# Products

<table>
<thead>
<tr>
<th>Type</th>
<th>915MHz System</th>
<th>2.4GHz System</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>58-N-1201-T 58-N-1201-TX</td>
<td>58-N-1101-T 58-N-1101-TX</td>
<td>Temperature Temperature w/2 External Inputs (10K Type II)</td>
</tr>
<tr>
<td>Carbon Dioxide (CO₂)</td>
<td>58-N-1202-CO2 58-N-1102-CO2</td>
<td>58-N-1102-CO2 58-N-1102-CO2</td>
<td>0 – 5,000ppm CO₂</td>
</tr>
<tr>
<td>Wireless Gateways and Repeaters</td>
<td>58-G2 58-G2</td>
<td>58-G1 58-G1</td>
<td>Options for BACnet, Modbus, LonWorks, Metasys N2, SNMP, XML, etc. See datasheets for more details.</td>
</tr>
</tbody>
</table>

SENSORS: See suffixes below Add –N suffix for pre-installed, 25+ year battery
Add –R suffix for replaceable battery. CO₂ & DP only Avail in –R
For more information, please visit

www.idealwirelesssensors.com