Five Universal Inputs, Five Binary Outputs Controller

Description
Native BACnet controller with five universal inputs and five binary outputs

Features
Communicates at up to 76.8 Kbps on a BACnet MS/TP LAN or can operate as a stand alone controller.
Programming and setup data is stored in non-volatile flash memory internal logical loop time of 100 msec.
Programmable timers also maintain a resolution of 100 msec.
10-bit analog inputs are field-adjustable for thermistor/dry contact or 0–5 VDC/4–20 mA
An LED for each binary output indicates ON/OFF status, and a separate LED indicates communication activity on the MS/TP LAN.

Technical Data
• **Power** 24 VAC @ 5 VA min., plus binary output loads (65 VA max.). Utilizes a half-wave rectifier, which enables a single transformer to power multiple controllers. One leg of 24 VAC connects to earth (panel) ground.
• **Inputs** 5 inputs with 10-bit resolution. Input 0 can be used for a thermostat. Inputs 1–4 are switch-selectable for thermistor/dry contact or 0–5 VDC/4–20 mA signals.
• **Binary Outputs** 5 outputs, each rated at 24 VAC, 0.5 A. The outputs utilize hot-switched triacs, which have a common connection to the fused 24 VAC supply.
• **24VDC Outputs** Up to 250 mA of 24VDC power is provided to power transducers or other devices.
• **Processor and Memory** Motorola AZ-60 processor with on-board flash memory. Flash memory provides non-volatile program and data storage, and allows for encrypted updates to the program for future product enhancements.
• **Terminations** Removable header-type screw terminals accept 14–24 AWG wire.
• **Environmental** 32–158°F (0–70°C). 0–95% RH, non-condensing.
• **Communications** BACnet MS/TP LAN up to 76.8 Kbps.
• **BACnet Conformance** An application specific controller (ASC); tested and approved by BTL.
• **Ratings**
Listed Underwriters Laboratory for Open Energy Management Equipment (PAZX) under the UL Standard for Safety 916.
EMC Directive 89/336/EEC (European CE Mark).
FCC Part 15, Subpart J, Class A.

Six Universal Inputs, Three Binary Outputs, Two Triac Outputs, One Analog Output Controller

Description

Six universal 10 bit inputs, three binary high current relay outputs, two binary triac outputs, and one analog output native BACnet controller.

Features

Three software controlled high current relays suitable for unit ventilator or fan coil applications

Communicates on a BACnet MS/TP LAN at up to 76.8 Kbps.
Programming and setup data is stored in non-volatile flash memory
Ten bit analog output is field adjustable for thermistor / dry contact, 0-5 VDC / 4-20 mA, or 0 -10 mA.
Ten bit universal inputs are software configurable to accept various input types

Technical Data

- **Power** 24 VAC @ 10 VA min., plus binary output loads (40 VA max.). Utilizes a half-wave rectifier, which enables a single transformer to power multiple controllers. One leg of 24 VAC connects to earth (panel) ground.
- **Inputs** 6 universal inputs with ten bit resolution. Input 0 can be used for a wall sensor/thermostat.
- **Binary Outputs** Two hot switched triac outputs, which have a common connection to the fused 24 VAC supply. Rated at 24 VAC, 0.5 A. Three independently isolated, normally open relay outputs. Motor load rating: 120 VAC 1 HP; 240 VAC 2 HP; 277 VAC 3/4 HP. General purpose rating: 120 VAC @ 15 A; 240/277 VAC @ 10 A.
- **24VDC Outputs** Uncontrolled output to provide up to 100 mA of 24VDC power for transducers or other devices.
- **Processor and Memory** Motorola AZ-60 processor with on-board flash memory. Flash memory provides non-volatile program and data storage, and allows for encrypted updates to the program for future product enhancements.
- **Terminations** Removable header-type screw terminals accept 14–24 AWG wire.
- **Environmental** 0–158°F (0–70°C). 0–95% RH, non-condensing.
- **Communications** BACnet MS/TP LAN up to 76.8 Kbps.
- **BACnet Conformance** An application specific controller (ASC); tested and approved by BTL.
- **Ratings**

Listed Underwriters Laboratory for Open Energy Management Equipment (PAZX) under the UL Standard for Safety 916.
EMC Directive 89/336/EEC (European CE Mark).
FCC Part 15, Subpart J, Class A.

Eight Universal Input, Five Binary Output, Three Analog Output Controller

Description

Eight 10 bit inputs, five binary outputs, and three eight bit analog outputs native BACnet controller

Features

Communicates at up to 76.8 Kbps on a BACnet MS/TP LAN or can operate as a stand-alone controller
Programming and setup data is stored in non-volatile flash memory
Internal logical loop time of 100 msec. Programmable timers also maintain a resolution of 100 msec.
10-bit analog inputs are field-adjustable for thermistor / dry contact, 0–5 VDC/4–20 mA or 0–10 VDC.
Analog outputs are switch selectable for 4–20 mA or 0–10 VDC
An onboard LED for each binary output indicates ON/OFF status, and a separate LED indicates communication activity on the MS/TP LAN.

Technical Data

- **Power** 24 VAC @ 10 VA min., plus binary output loads (80 VA max). Utilizes a half-wave rectifier, which allows a single transformer to power multiple controllers. One leg of 24 VAC connects to earth (panel) ground.
- **Inputs** 8 universal inputs with 10-bit resolution. Input 0 can be used for a wall sensor/thermostat. Inputs 1–7 are jumper-selectable for thermistor/dry contact, 0–5 VDC/4–20 mA or 0–10 VDC.
- **Binary Outputs** 5 outputs, each rated at 24 VAC, 0.5 A. The outputs utilize hot-switched triacs, which have a common connection to the fused 24 VAC supply.
- **Analog Outputs** 3 outputs with 8-bit resolution. Each is switch-selectable for 0–10 VDC or 4–20 mA. 4–20 mA outputs are sourced by the controller. Connected loads must return to the controller ground. 4–20 mA max. load resistance is 1,000 ohms. 0–10 VDC min. load resistance is 500 ohms.
- **24VDC Outputs** Two terminals provide up to 250 mA (total) of 24 VDC to power transducers or other devices.
- **Processor and memory** Motorola AZ-60 processor with onboard flash memory. Flash memory provides non-volatile program and data storage, and allows for encrypted updates to the program for future product enhancements.
- **Terminations** Removable header-type screw terminals accept 14–24 AWG wire. An additional header is provided for easy connection to MS/TP for testing.
- **Environmental** 0–158°F (-17–70°C). 0–95% RH, non-condensing.
- **Communications** BACnet MS/TP LAN up to 76.8 Kbps.
- **BACnet Conformance** An application specific controller (ASC); tested and approved by BTL.
- **Ratings**

Listed Underwriters Laboratory for Open Energy Management Equipment (PAZX) under the UL Standard for Safety 916. Listing includes both U.S. and Canadian certification.
EMC Directive 89/336/EEC (European CE Mark).
FCC Part 15, Subpart J, Class A.

Eleven Universal Inputs, Eight Binary Outputs, Eight Analog Outputs Controller

Description

Eleven universal inputs, eight binary outputs, eight analog outputs native BACnet controller

Features

Communicates on a BACnet MS/TP LAN at up to 76.8 Kbps
Programming and setup data is stored in non-volatile flash memory
10-bit analog inputs are field-adjustable for thermistor / dry contact, 0–5 VDC/4–20 mA, or 0–10 VDC.
Analog outputs are switch selectable for 4–20 mA or 0–10 VDC.

Technical Data

• **Power** 24 VAC @ 20 VA min., plus binary output loads (110 VA max). Utilizes a half-wave rectifier, which allows a single transformer to power multiple controllers. One leg of 24 VAC connects to earth (panel) ground.
• **Inputs** 11 universal inputs with 10-bit resolution. Input 0 can be used for a thermostat. Inputs 1–10 are jumper-selectable for thermistor/dry contact, 0–5 VDC/4–20 mA., or 0–10 VDC signals.
• **Binary Outputs** 8 outputs each rated at 24 VAC, 0.5A. The outputs utilize optically coupled triacs, which have a common connection to the fused 24 VAC supply.
• **Analog Output** 8 outputs with 8-bit resolution. Each is switch-selectable for 0–10 VDC or 4–20 mA. 4–20 mA outputs are sourced by the controller. Connected loads must return to the controller ground. 4–20 mA max. load resistance is 1,000 ohm. 0–10 VDC min. load resistance is 500 ohm.
• **24VDC Output** Up to 250 mA of 24 VDC power is provided to power transducers or other devices.
• **Processor & Memory** Motorola AZ–60 processor with onboard flash memory. Flash memory provides nonvolatile program and data storage, and allows for encrypted updates to the program for future product enhancements.
• **Terminations** Removable header-type screw terminals accept 14–24 AWG wire.
• **Environmental** 0–158 deg. F (-17–70 deg. C). 0–95% RH, non-condensing.
• **Communications** BACnet MS/TP LAN up to 76.8 Kbps.
• **BACnet Conformance** B-ASC level device; tested and approved by BTL.
• **Ratings**
Listed Underwriters Laboratory for Open Energy Management Equipment (PAZX) under the UL Standard for Safety 916. Listing includes both U.S. and Canadian certification.
Suitable for plenum mounting.
EMC Directive 89/336/EEC (European CE Mark).
FCC Part 15, Subpart J, Class A.

Sixteen Universal Input, Sixteen Binary Output Controller

Description

Sixteen universal input, sixteen binary output native BACnet controller

Features

Communicates at up to 76.8 Kbps on a BACnet MS/TP LAN. It can also operate as a stand-alone controller.

Programming and setup data are stored in nonvolatile flash memory

Internal logical loop time of 100 msec. Programmable timers also maintain a resolution of 100 msec.

10-bit analog inputs are software configurable to accept thermistor, dry contact, 0–5 VDC, or 4–20 mA signals

Technical Data

- **Power** 24 VAC @ 20 VA min., plus binary output loads (220 VA max.). Utilizes a half-wave rectifier, which allows a single transformer to power multiple controllers. One leg of 24 VAC connects to earth (panel) ground.
- **Inputs** 16 inputs with 10-bit resolution. Input 0 can be used for a thermostat. All inputs are software configurable to accept thermistor/dry contact, 0–5 VDC, or 4–20 mA signals.
- **Binary Outputs** 16 outputs, each rated at 24 VAC, 0.47 A. The outputs utilize hot-switched triacs, which have a common connection to the fused 24 VAC supply.
- **24VDC Output** Up to 100 mA of 24 VDC power is provided to power transducers or other devices.
- **Processor & Memory** Motorola AZ-60 processor with onboard flash memory. Flash memory provides nonvolatile program and data storage, and allows for encrypted updates to the program for future product enhancements.
- **Terminations** Removable header-type screw terminals accept 14–24 AWG wire.
- **Environmental** 0–158 deg. F (-17–70 deg. C). 0–95% RH, noncondensing.
- **Communications** BACnet MS/TP LAN up to 76.8 Kbps.
- **BACnet Conformance** ASC level device; tested and approved by BTL.
- **Ratings**

Listed Underwriters Laboratory for Open Energy Management Equipment (PAZX) under the UL Standard for Safety 916. Listing includes both U.S. and Canadian certification.
EMC Directive 89/336/EEC (European CE Mark).
FCC Part 15, Subpart J, Class A.

Control Module with Modem

Description
Control Module with V.90/56K serial modem and RJ-11 telephone jack

Features
Enables remote operator dial-in or alarm dial-out.

Technical data
• **Power** No independent power supply required. Conditioned power is provided by the power supply through a ribbon-cable connection.
• **Modem Type** V.90/56K serial interface with RJ-11 jack.
• **Environmental** 32-131 deg. F (0-55 deg. C). 0-95% RH, non condensing.
• **Ratings**
Listed Underwriters Laboratories for Open Energy Management Equipment (PAZX) under the UL Standard for Safety 916.
EMC Directive 89/336/EEC (European CE Mark).
FCC Part 15, Subpart J, Class A.

Blank Stainless Steel Wall Sensor

Description

3" standard, 10 k ohm, wall mounted temperature sensor with stainless steel cover plate

Technical Data

- **Type** Uni-curve Type II
- **Resistance** 10k ohm at 77 deg. F (22 deg. C)
- **Interchangeability** 0.36 deg. F (0.20 deg. C)
- **Time constant** 10 seconds (to 66% of new temperature) under normal operating conditions
- **Stability** 0.036 deg. F (0.020 deg. C) drift per year (under normal operating conditions)
- **Accuracy** ±0.36 deg. F (0.20 deg. C) over range of 32–158 deg. F (0–70 deg. C)

Current Sensing Relay, Fixed

Description
A fixed current sensing relay (switch) is used to monitor status on unit vents, exhaust fans, re-circulation pumps and other fixed loads where belt loss is not a concern.

Features
More reliable for status than relays across auxiliary contacts.
Low .5A turn-on
Mini-solid core
Mounting bracket

Technical Data

Amperage Range: Fixed 0.5 to 200A
Sensor Power: Induced
Output: Digital switch
Insulation Class: 600VAC rms
Frequency Range: 50/60Hz.
Temperature Range: -15° to 60°C.
Humidity Range: 0 - 95% non-condensing
Trip Setpoint: Fixed 0.5A
Hysteresis: 10% typical
Sensor Hole Size: 0.71" diameter
Output Type: N.O., Solid-state
Output Rating (Max.): 1.0A@30VAC/DC
UL listed

Damper Actuator

Description
Proportional damper actuator, spring return fail safe, 24 V for 2 to 10 VDC and 4 to 20 mA control signal. Output signal of 2 to 10 VDC for position. Torque min. 133 in-lb, for control of air dampers.

Features

The actuator is mounted directly to a damper shaft up to 1.05" in diameter by means of its universal clamp.
Provide 95° of rotation with a graduated position indicator showing 0 to 95°.
Provide actuator that uses a brushless DC motor which is controlled by an Application Specific Integrated Circuit (ASIC) and a microprocessor.

Technical Data

Power supply: 24 VAC ± 20% 50/60 Hz; 24 VDC ± 10%
Power consumption running: 6 W; holding: 2 W
Transformer sizing: 10 VA (class 2 power source)

Electrical connection: 3 ft, 18 GA appliance cable1/2" conduit connector

Overload protection: electronic throughout 0 to 95° rotation
Operating range Y: 2 to 10 VDC, 4 to 20 mA
Input impedance: 100 k ohms (0.1 mA), 500 ohms
Feedback output: 2 to 10 VDC (max. 0.5 mA) for 95°
Angle of rotation: mechanically limited to 95°
Torque: 133 in-lb [15 Nm] constant
Direction of rotation: spring: reversible with cw/ccw mounting; motor: reversible with built-in switch
Position indication: visual indicator, 0° to 95° (0° is spring return position)
Manual override: 3mm hex crank (shipped w/actuator)
Running time: 150 sec. constant, independent of load, spring return < 20 sec
Humidity: 5 to 95% RH non-condensing
Ambient temperature: -22°F to +122°F [-30°C to +50°C]
Storage temperature: -40°F to +176°F [-40°C to +80°C]
Housing: NEMA type 2 / IP54
Housing material: zinc coated metal
Agency listings: UL 873 listed, CSA C22.2 No. 24 certified
Noise level: max. 45 dB (A)
Quality standard: ISO 9001

Duct Averaging Temperature Sensor

Description

24', 10k ohm, duct temperature sensor, rigid probe with in-box terminals

Technical Data

- **Type** Uni-curve Type II
- **Resistance** 10k ohm at 77 deg. F (22 deg. C)
- **Interchangeability** 0.36 deg. F (0.20 deg. C)
- **Time constant** 10 seconds (to 66% of new temperature) under normal operating conditions
- **Stability** 0.036 deg. F (0.020 deg. C) drift per year (under normal operating conditions)
- **Accuracy** ±0.36 deg. F (0.20 deg. C) over range of 32–158 deg. F (0–70 deg. C)

Duct Temperature Sensor

Description

8", 10k ohm, duct temperature sensor, galvanized box with in-box terminals

Technical Data

- **Type** Uni-curve Type II
- **Resistance** 10k ohm at 77 deg. F (22 deg. C)
- **Interchangeability** 0.36 deg. F (0.20 deg. C)
- **Time constant** 10 seconds (to 66% of new temperature) under normal operating conditions
- **Stability** 0.036 deg. F (0.020 deg. C) drift per year (under normal operating conditions)
- **Accuracy** ±0.36 deg. F (0.20 deg. C) over range of 32–158 deg. F (0–70 deg. C)

Ethernet Module

Description

BACnet router and global controller with one connection to MS/TP network and one connection to BACnet Ethernet

Features

Supports 10Base-T or 100Base-TX connection to BACnet Ethernet and one BACnet MS/TP network
Supports BACnet/IP and can operate as BACnet broadcast managment device (BBMD) for integration on enterprise and wide area networks.
Runs DDC programming and global automation routines.
Onboard Ethernet network interface card (NIC) that supports 10Base-T (10 Mbps) or 100Base-TX (100 Mbps) Ethernet connections to the BACnet internetwork.
The BCM-ETH hosts automation features such as schedules, trendlogs, alarms, optimum start, demand limiting, and tenant activity for up to 65 field controllers connected to its MS/TP LAN.
Supports a maximum of 1000 BACnet AVs and 1000 BACnet BVs
Supports a maximum of 80 schedules and 80 calendars
Supports a maximum of 320 alarm setups—system destination and actions individually configurable.
Supports a maximum of 320 trendlogs to store data point histories for analysis.
Supports two demand limiter objects, each with 100 loads defined.
Supports 80 zones and 80 tenant activity logs to monitor afterhours energy usage.

Technical data

- **Power** No independent power supply required. Conditioned power is provided by the power supply through a ribbon-cable connection.
- **Data Backup** 7.2V 700mA-h maintenance free battery in the power supply provides interim power for orderly shutdown and backup to flash memory in the event of power loss. Real-time clock retains date and time for up to 20 days without power.
- **Memory & CPU** 8 MB flash RAM. 32 MB SDRAM for program execution. 32-bit, high-integration Motorola CPU.
- **Real-time Clock** Onboard real-time clock supports schedule operations, trendlogs, and timed DDC functions.
- **BACnet Ethernet** Integrated Ethernet adapter circuitry with RJ-45 jack for connection to 10Base-T or 100Base-TX Ethernet networks.
- **BACnet/IP** IP support for interoperability on enterprise and wide area networks (WANs). Functions as a BACnet broadcast management device (BBMD) in accordance with Annex J BACnet/IP.
- **BACnet MS/TP** Removable, header-style screw terminals for 1 BACnet MS/TP (shielded, twisted-pair bus) LAN. Supports a maximum of 65 field controllers. Configurable from 9.6 to 76.8 Kbps.
- **Environmental** 32-131 deg. F (0-55 deg. C). 0-95% RH, non condensing.
- **Ratings**

Listed Underwriters Laboratories for Open Energy Management Equipment (PAZX) under the UL Standard for Safety 916.
EMC Directive 89/336/EEC (European CE Mark).
FCC Part 15, Subpart J, Class A.

Natural Gas Meter Pulse Head

Description
Pulse head units for existing gas meters.

Features
Provides pulsed output to building controllers for remote reading capability.

Technical Data

Provide pulse head to match existing gas meters with the following gas input capacities:

Building 1: 900 MBH
Building 3: 950 MBH
Building 610: 1500 MBH
Building 2005: 1400 MBH
Building 2007: 1400 MBH
Building 2071: 900 MBH
Building 2075: 150 MBH
Building 2163: 6300 MBH

Graphics Publishing Server

Description

Server converts BACnet system graphics to HTML format and publishes as web pages accessible via the intranet using Microsoft Internet Explorer. Incorporates a fire wall that provides additional security to the BACnet system front end computer.

Hardware

- **Power** 120/240 VAC, uninterruptible power supply.
- **Mounting** Rack mounted version, 4 standard rack units
- **Network interface cards** Two Ethernet 10/100 NICs.
- **Computer** Pentium 4 Class machine
- **Simultaneous users** Up to 150 simultaneous connections

Immersion Temperature Sensor

Description

4", 10k ohm, galvanized box, ½" NPT, immersion temperature sensor

Technical Data

- **Type** Uni-curve Type II
- **Resistance** 10k ohm at 77 deg. F (22 deg. C)
- **Interchangeability** 0.36 deg. F (0.20 deg. C)
- **Time constant** 10 seconds (to 66% of new temperature) under normal operating conditions
- **Stability** 0.036 deg. F (0.020 deg. C) drift per year (under normal operating conditions)
- **Accuracy** ±0.36 deg. F (0.20 deg. C) over range of 32–158 deg. F (0–70 deg. C)

Medium Control Enclosure

General Description
Control Cabinet to conveniently group control system components. Control components can be mounted on the door or mounted within the cabinet enclosure using the perforated mounting plate.

Features

- Provide symmetrical cabinet so door hinge can be mounted on the left or right hand side.
- Removable door.
- Gray finish for use in occupied areas.
- Removable perforated mounting plate permits mounting controls inside the cabinet without drilling holes.
- Wall or floor mounted.
- Knockouts for electrical or pneumatic piping.
- Cabinets listed under UL 508 Industrial Control Panel Enclosures.
- NEMA TYPE 1 style of enclosure.
- Height and width dimensions and cabinet color are the same for automation and pneumatic cabinets for a uniform look and mounting.

Specifications

Size: 24-5/16" x 24-3/8" x 9-3/8" (H x W x D).

Knockouts-Electrical Conduit Size:
Medium Cabinet
Top (1) 2, (3) 1-1/4 or 1-1/2, (1) 3/4 or 1, (1) 1/2 or 3/4, (1) 7/16
Bottom (1) 2, (3) 1-1/4 or 1-1/2, (1) 3/4 or 1, (1) 1/2 or 3/4, (1) 7/16
Right Side (2) 2
Left Side (2) 2

Material (Steel):
Cabinet (Medium): 16 ga. 0.0598
Door (Medium): 16 ga. 0.0598
Mounting Plate: 16 ga. 0.0598
Supports: 14 ga. 0.0747
Finish: Gray
Weight: Medium Cabinet Assembly 39 lbs.

MS/TP Controller

Description

Global MS/TP controller supporting field controllers

Features

Supports up to 65 field controllers on a single BACnet MS/TP LAN

Uses the EIA–485 signaling standard on twisted-pair cabling in a simple bus configuration.

Runs DDC and hosts automation features such as schedules, trendlogs, alarms, optimum start, demand limiting, and tenant activity for the controllers on its MS/TP LAN.
Control algorithms execute locally every second.
Supports a maximum of 1000 BACnet AVs and 1000 BACnet BVs.
Supports a maximum of 80 schedules and 80 calendars.
Supports a maximum of 320 alarm setups—system destination and actions individually configurable.
Supports a maximum of 320 trendlogs to store data point histories for analysis.
Supports two demand limiter objects, each with 100 loads defined.
Zones and tenant activity logs: Supports 80 zones and 80 tenant activity logs to monitor after-hours energy usage

Technical data
• **Power** No independent power supply required. Conditioned power is provided by the power supply through a ribbon-cable connection.
• **Data Backup** 7.2V 700mA-h battery in the power supply provides interim power for orderly shutdown and backup to flash memory in the event of power loss. Real-time clock retains date and time for up to 20 days without power.
• **Memory & CPU** 8 MB flash RAM. 32 MB SDRAM for program execution.
32-bit, high-integration Motorola CPU.
• **Real-time Clock** Onboard real-time clock supports schedule operations,
trendlogs, and timed DDC functions.
• **BACnet MS/TP** Removable, header-style screw terminals for 1 BACnet MS/TP (shielded, twisted-pair bus) LAN. Configurable from 9.6 to 76.8 Kbps.
• **Environmental** 32-131 deg. F (0-55 deg. C). 0-95% RH, non condensing.
• **Ratings**
Listed Underwriters Laboratories for Open Energy Management Equipment
(PAZX) under the UL Standard for Safety 916.
EMC Directive 89/336/EEC (European CE Mark).
FCC Part 15, Subpart J, Class A.

MS/TP Repeater

Description

MS/TP LAN repeater

Features

Star-wired bus topology

Terminals for four LAN segments

Uses the RS–485 signaling standard over twisted-pair wiring, which runs 4000 feet per segment

Communication rates of up to 76.8 Kbps

Technical data
- **Power:** 24 VAC @ 5 VA. Utilizes a full-wave rectifier (do not ground secondary), and requires power from a dedicated transformer.
- **Communication:** 4 BACnet MS/TP LAN segments. Switch selectable baud rate from 9.6 to 76.8 Kbps.
- **Signaling:** RS–485.
- **Environmental:** 32–158°F (0–70°C). 0–95% RH, non-condensing.
- **Battery:** 6 volts @ 2.5 AHR, sealed-lead. Radio Shack #23–181.
- **Alarm Output:** Transistor output rated 24 VDC, 50 mA.
- **Ratings:**

Listed Underwriters Laboratory for Open Energy Management Equipment (PAZX) under the UL Standard for Safety 916. Listing includes both U.S. and Canadian certification.
EMC Directive 89/336/EEC (European CE Mark).
FCC Part 15, Subpart J, Class A.

Nitrogen Dioxide (NO_2) Sensor

Description
Electrochemical gas sensor factory configured to measure Nitrogen Dioxide (diesel exhaust).

Features
Linear 4-20mA output over complete range.
No temperature or humidity interference
NEMA 4X enclosure
Easily field calibrated

Technical Data

General:
Sensor Type: Electrochemical
Approval: CSA/NRTL (UL Equivalent)
Sensing Method: Diffusion
Sensor Rated Life: 2 years
Enclosure Rating: NEMA 4X
Temp Operating Conditions: -4 to 122° F (-20 to 50°C),
Humidity Operating Conditions: 0 to 90% RH
Storage Conditions: -40 to 158°F (-40 to 70°C)
Gas Measured: Nitrogen Dioxide

Performance:
Repeatability: +/- 5% of measured value
Linearity: +/- 5% of measured value
Recommended Calibration: 6 months
Response Time: T90 = <1 minutes (diffusion)
Warm Up Time: < 2 minutes
Range: 0-10 ppm

Power:
Input: 12-30 VDC,
Power Consumption: 20 mA

Outputs:
Adjustment: Span & Zero
Output Signal: 4 - 20 mA
Terminal Wire Size: 16 – 22 AGW

Outside Air Temperature Sensor

Description

10k ohm outside air temperature sensor, die cast box with in-box terminals

Technical Data

- **Type** Uni-curve Type II
- **Resistance** 10k ohm at 77 deg. F (22 deg. C)
- **Interchangeability** 0.36 deg. F (0.20 deg. C)
- **Time constant** 10 seconds (to 66% of new temperature) under normal operating conditions
- **Stability** 0.036 deg. F (0.020 deg. C) drift per year (under normal operating conditions)
- **Accuracy** ±0.36 deg. F (0.20 deg. C) over range of 32–158 deg. F (0–70 deg. C)

Power Meter

Description
BACnet Energy Meter combines highly accurate industrial grade split-core CT's and precision microprocessor based metering electronics in a single package to provide exceptional metering accuracy.

Features
Meets ANSI C12.1 metering accuracy standards.
CT load orientation concerns are eliminated because the meter automatically detects phase reversal.
Low voltage outputs, do not require shorting blocks.

Technical Data

LCD Display: 1.2" x 3.8" viewing area,160 segments, back lit with green LEDs.
Insulation Class: 600VAC
Sample Rate: 1280Hz.
Internal Isolation: 2500VAC
Operating Temp. Range: 0 to 50°C (<95%RH, non-condensing)
Storage Temp. Range: -40°C to 70°C
Systems Accuracy: ±1% of reading from 2% to 100% of the rated current of the CTs...accomplished by matching the CTs with a meter and calibrating them as a system.
Power Consumption: 50VA
Voltage Tolerance: (90-300VAC line-to-neutral)
Electrical Services:
Any service where the phase A-N voltage is ≤300VAC, and the phase-to-phase voltage is 480VAC nominal with neutral.
Frequency: 50/60Hz.
Pulse Output: N.O., Opto-FET, 100mA @ 24VAC/DC
Pulse Rate: 0.10, 0.25, 0.50, or 1.00 kWh per pulse
Pulse Width: 200msec closed
Phase Loss Alarm Output: N.C., Opto-FET, 100mA @ 24VAC/DC. Fixed threshold 25% below any other phase. Always open as long as alarm persists.
Safety: UL 3111-1 Cat. III polution degree 2, alt. 0-2000 meters
Data Output Required:
kWh, Consumption
kW, Real power
kVAR, Reactive power
kVA, Apparent power
Power factor
Voltage, line to line
Voltage, line to neutral
Amps, Average current
kW, Real Power ØA
kW, Real Power ØB
kW, Real Power ØC
Power factor ØA
Power factor ØB
Power factor ØC
Voltage, ØA to ØB
Voltage, ØB to ØC
Voltage, ØA to ØC
Voltage, ØA to Neutral
Voltage, ØB to Neutral
Voltage, ØC to Neutral
Amps, Current ØA
Amps, Current ØB
Amps, Current ØC

Power Supply Module

Description

Power supply with backup NiCad battery

Features

Supports up to seven building controllers providing power through a ribbon-cable connection.
7.2 volt NiCad battery provides power for orderly shutdown and data backup
Requires a 24 VAC power supply.
Uses a half-wave rectifier, which enables it to share a power supply with other half-wave devices

Technical data

- **Power** 19–30 VAC @ 30 VA, 47–63 Hz. Uses a half-wave rectifier, which enables it to share power with other half-wave devices.
- **Battery** 7.2 volt NiCad battery provides interim power for orderly shutdown and data backup during power outages.
- **Environmental** 32-131 deg. F (0-55 deg. C). 0-95% RH, non condensing.
- **Ratings**

Listed Underwriters Laboratories for Open Energy Management Equipment (PAZX) under the UL Standard for Safety 916.
EMC Directive 89/336/EEC (European CE Mark).
FCC Part 15, Subpart J, Class A.

Programmable Thermostat Salient Characteristics

Description
Wall mounted programmable thermostat with temperature sensor.

Features
Displays setpoint, room temperature, outside air temperature, and fan status. Temperature is displayed in Farenheit and Centigrade.
Allows the occupant to change setpoint within limits otherwise programmed into the controls system and allows the occupant to turn the zone HVAC equipment on and off
Field service mode, access coded to allow access to zone HVAC controller by service technicians but not occupants. Field service mode allows service technicians to view and adjust control parameters residing in the zone HVAC controller entirely from the thermostat.

Technical Data
Thermistor The thermistor is integrated with the device. The unit is a microprocessor with a built-in analog to digital converter for temperature which is designed to communicate directly to controllers.
Type Uni-curve Type II
Resistance 10KΩ at 77°F (22°C).
Interchangeability 0.36°F (0.2°C).
Time Constant 10 seconds (to 66% of new temperature).
Stability 0.036°F (0.02°C) drift per year.
Accuracy ± 0.36°F (0.2°C) over range of 32–158°F (0–70°C).
Power 24 VAC @ 25 mA for backlit display. Sensor draws 5 VDC @ 10 mA from controller.
Controller Connection 18–22 AWG, shielded, 3-conductor. 1000 ft. max. Black wire to Controller IN, white to Controller input COM, orange is optional 24 VAC for backlit display. Low capacitance wire recommended.
Environmental 32–158°F (0–70°C). 0–90% RH, non-condensing.
Ratings
• Listed Underwriters Laboratory as an accessory for VAVs and controllers.

Programmable Thermostat Salient Characteristics

Description
Wall mounted programmable thermostat with temperature and humidity sensors.

Features
Displays setpoint, room temperature, outside air temperature, room humidity, and fan status.
Temperature is displayed in Farenheit and Centigrade.
Allows the occupant to change setpoint within limits otherwise programmed into the controls system and allows the occupant to turn the zone HVAC equipment on and off
Field service mode, access coded to allow access to zone HVAC controller by service technicians but not occupants. Field service mode allows service technicians to view and adjust control parameters residing in the zone HVAC controller entirely from the thermostat.

Technical Data
Thermistor The thermistor is integrated with the device. The unit is a microprocessor with a built-in analog to digital converter for temperature and humidity which is designed to communicate directly to controllers.
Type Uni-curve Type II
Resistance 10KΩ at 77°F (22°C).
Interchangeability 0.36°F (0.2°C).
Time Constant 10 seconds (to 66% of new temperature).
Stability 0.036°F (0.02°C) drift per year.
Accuracy* ± 0.36°F (0.2°C) over range of 32–158°F (0–70°C).
Power 24 VAC @ 25 mA for backlit display. Sensor draws 5 VDC @ 10 mA from controller.
Controller Connection 18–22 AWG, shielded, 3-conductor. 1000 ft. max. Black wire to Controller IN, white to Controller input COM, orange is optional 24 VAC for backlit display. Low capacitance wire recommended.
Environmental 32–158°F (0–70°C). 0–90% RH, non-condensing.
Humidity Sensor
± 2% RH, 0–100% RH @ 25°C, with saturated salt calibration.
-40–185°F (-40–85°C).
± 0.5% RH.
± 5% RH up to 60%RH, ± 8% RH at 90% RH (typical humidity).
Ratings
• Listed Underwriters Laboratory as an accessory for VAVs and controllers.

Single Duct Variable Air Volume Controller Characteristics

Description
Single duct native BACnet variable air volume controller

Features
Communicates at up to 76.8 Kbps on a BACnet MS/TP LAN
Integral airflow sensor provides pressure independent operation of the VAV box. Each airflow sensor is factory-calibrated at multiple velocity points.
Minimum, maximum, and reheat airflows can be entered either at a wall unit or an operator workstation.
Control algorithms are factory-loaded into non-volatile Flash memory and can be field-modified
Can execute control algorithms independently of other equipment

Technical Data
• **Power** 24 VAC @ 5 VA min., plus binary output loads (65 VA max). Utilizes a half-wave rectifier, which allows a single transformer to power multiple controllers. One leg of 24 VAC connects to earth (panel) ground.
• **Inputs** 4 universal inputs with 10-bit resolution. Input 0 can be used for a thermostat. Inputs 1–3 support thermistor/dry contact.
• **Binary Outputs** 5 outputs, each rated at 24 VAC, 0.5 A. Three outputs utilize hot-switched triacs. Two outputs utilize ground switching triacs for damper motor control. All outputs have a common connection to the fused 24 VAC supply.
• **Pressure sensor** 0–1.25 inches water column differential pressure sensor.
• **Processor and memory** Motorola AZ-60 processor with onboard Flash memory. Flash memory provides non-volatile program and data storage and allows for encrypted updates to the program for future product enhancements.
• **Terminations** Removable header-type screw terminals accept 14–24 AWG wire. An additional header is provided for easy connection to MS/TP for testing.
• **Environmental** 0–158°F (-17–70°C). 0–95% RH, non-condensing.
• **Communications** BACnet MS/TP LAN up to 76.8 Kbps.
• **BACnet conformance** An application specific controller (ASC); tested and approved by BTL.
• **Ratings**
Listed Underwriters Laboratory for Open Energy Management
Equipment (PAZX) under the UL Standard for Safety 916. Listing includes both U.S. and Canadian certification.
EMC Directive 89/336/EEC (European CE Mark).
FCC Part 15, Subpart J, Class A.

Small Control Cabinet

General Description
Control Cabinet to conveniently group control system components. Control components can be mounted on the door or mounted within the cabinet enclosure using the perforated mounting plate.

Features

•Provide symmetrical cabinet so door hinge can be mounted on the left or right hand side.
•Removable door.
•Gray finish for use in occupied areas.
• Removable perforated mounting plate permits mounting controls inside the cabinet without drilling holes.
• Wall or floor mounted.
• Knockouts for electrical or pneumatic piping.
• Cabinets listed under UL 508 Industrial Control Panel Enclosures.
• NEMA TYPE 1 style of enclosure.
• Height and width dimensions and cabinet color are the same for automation and pneumatic cabinets for a uniform look and mounting.

Specifications

Size: 19-1/2" x 16-3/8" x 5-3/4" (H x W x D).

Knockouts-Electrical Conduit Size:
Small Cabinet
Top (3) 1-1/4 or 1-1/2, (1) 3/4 or 1, (2) 1/2 or 3/4, (1) 7/16
Bottom (3) 1-1/4 or 1-1/2, (1) 3/4 or 1, (2) 1/2 or 3/4, (1) 7/16
Right Side (2) 2
Left Side (2) 2

Material (Steel):
Cabinet (Small): 16 ga. 0.0598
Door (Small): 16 ga. 0.0598
Mounting Plate: 16 ga. 0.0598
Supports: 14 ga. 0.0747
Finish: Gray
Weight: Small Cabinet Assembly 20 lbs.

Stainless Steel Immersion Well

Description

4", stainless steel, ½" NPT, internal thread, ¾" NPT external thread, immersion well

Transformer Assembly Enclosure with Power Supply

General Description
Enclosure to house Transformer Assembly and Power Supply.

Features

- Enclosure and Sub-Panel.
- T-Hook Holes for power supplies.
- Posts for sub-panel mounting.
- Holes for mounting track.
- Wall mounted.
- Knockouts for electrical.
- UL listed.
- NEMA TYPE 1 style of enclosure.
- Reversible Hook Hinge Key Latch Door

Specifications

Size: 24.5"H x 12.5"W x 6.5"D
Material (Steel): 18 ga.

Transformer: Two 100 VA Split-Bobbin
Over Current Protection: Circuit Breaker
Frequency: 50/60 Hz
24 Vac ON/OFF: On / Off Switch & Breaker
Main Breaker ON/OFF: Switch / Breaker (10 Amp)
(Kills power to entire unit: Outlets, Aux.
Output, and Transformer)* Total Combined Output 9A
Approvals: Class II UL Listed, UL916, C-UL, CE
Dimensions: 4.500" x 8.625" x 4.500"

Valve Retrofit Kit

Valve retrofit kits will be determined by the contractor in the field based on accurate and precise measurements of existing valves to suit field conditions using the 2008 Belimo Product Guide and Price List. Accurate and precise measurements are not possible while valves are installed and systems are operating.

Water Meter with Pulse Head

Description
Water meter with pulse head.

Features
Provides pulsed output of water usage to building controllers for remote reading capability.
Disc meters meet or exceed registration accuracy for the low flow rates (95%), normal operating flow rates (100 ± 1.5%), and maximum continuous operation flow rates as specifically stated by AWWA Standard C700.
Construction complies with ANSI/AWWA standard C700.
Direct magnetic drive provides positive, reliable and dependable register coupling for straight-reading, remote or automatic meter reading options.
Sealed register consists of a straight-reading,odometer-type totalization display, 360° test circle with center sweep hand and flow finder to detect leaks.

Technical Data
Typical Operating Range (100% ± 1.5%): 2 1/2 -170 GPM
Low Flow (Min. 95%): 1 1/2 GPM
Maximum Continuous Operation: 100 GPM
Pressure Loss at Maximum Continuous Operation: 3.3 PSI at 100 GPM
Maximum Operating Temperature: 80°F
Maximum Operating Pressure: 150 PSI
Measuring Element: Nutating disc, positive displacement
Register Type: Straight reading, permanently sealed magnetic drive standard. Remote reading or Automatic Meter Reading units optional.
Registration: 100 Gallons, 10 Cubic Feet, 1 m3
Register Capacity: 100,000,000 Gallons, 10,000,000 Cubic Feet. 6 odometer wheels.
Meter Connections: 2" AWWA two bolt elliptical flange, drilled, or 2" - 11 1/2 NPT internal pipe threads.
Optional Test Plug: 1" NPT test plug (TP) available on elliptical long and short versions.

MATERIALS
Meter Housing: Cast Bronze, Low Lead Alloy
Housing Top Plates: Bronze, Low Lead Alloy
Measuring Chamber: Thermoplastic
Disc: Thermoplastic
Trim: Stainless Steel/Bronze
Strainer: Thermoplastic
Disc Spindle: Stainless Steel
Magnet: Ceramic
Magnet Spindle: Stainless Steel
Register Lid and Box: Thermoplastic or Bronze
Generator Housing: Thermoplastic