

## Multi-sensor convenience

The Reliable Controls® MACH-Stat-ND™ is a unique, fully programmable BACnet® Advanced Application Controller (B-AAC) ideal for applications that require any combination of space temperature, humidity, Carbon Dioxide, occupancy sensing, local override, and setpoint adjust, in one convenient package.



Better by design

[www.reliablecontrols.com/MSND](http://www.reliablecontrols.com/MSND)

## TECH SPECS

### Processor

- 25 MHz, high performance, 16-bit embedded microcontroller

### Memory

- 64k RAM, for logs and scratch
- 512k Flash EEPROM for firmware configurations and database
- Minimum 10-year retention

### Real-Time Clock (optional)

- ± 1 second per day

### Supply Voltages

- 24 VAC ±10% 25 VA max.
- 24 VDC ±10% 8 W max.

### Communications

- EIA-485 @ 76.8 kbps max.
- SMART-Net™ (4 SMART-Sensors max.)

### Temperature Sensor

- Thermistor is pre-mounted on
- Input 5 (can be remote mounted)
- Range: 0 °C to 40 °C (32 °F to 104 °F)
- ± 0.1 °C (0.18 °F) resolution
- User calibrated to ± 0.1 °C (0.18 °F) accuracy

### Configuration

- SETUP-Tool™ or X-Port™ required for MSet configuration

### Mounting

- Unit mounts directly to single or dual device box

### Inputs (9 max.)

- 4 universal inputs:
  - 10-bit A/D converter
  - Analog: 0–5 VDC, 4–20 mA, thermistor
  - Digital: dry contact
  - Impedance: 15k Ω on 0–5 VDC range, 250 Ω on 4–20 mA range, 10k Ω on thermistor range
  - 100 Hz pulse counting (supports flow meters)
  - 24 VAC over-voltage protection
- 2 thermistor/dry contact inputs
- Override button linked to Input 5
- Humidity input:
  - 0.1% resolution
  - 10–90% range
  - ± 1.8% RH accuracy
- Occupancy input:
  - Passive Infrared Radiation (PIR) sensor
  - 64 detection zones
  - 100° horizontal / 82° vertical
  - 5 m (16.4 ft.) max. detection distance
- CO<sub>2</sub> input:
  - 0–2000 ppm
  - ± 30 ppm accuracy
  - Auto calibrating
  - Repeatability = ±20 ppm ±1 of measured value
  - Linearity = ±30 ppm
  - Max. drift = ±5% measured value
  - Auto drift correction, 30 ppm/week
  - Maintenance free

### Outputs

- Ships with 6 unpopulated output sockets
- Output Modules (OMs) sold separately

## FEATURES

### Protocol

- BACnet®
- MS/TP (EIA-485)
- Reliable Controls Protocol
- Network (EIA-485/Token Bus)

### 4 Control-BASIC™ Programs

- User programmable control strategy in a readable, BASIC-like language
- 2000 bytes per program

### 9 Inputs (max.)

- Inputs 1–4 universal ranges are jumper selectable: 0–5 VDC, 4–20 mA, thermistor, and dry contact
- Input 5 is 10k thermistor linked to override button
- Input 6 optional 20k setpoint slider or 10k/dry contact
- Input 7 optional humidity sensor
- Input 8 optional occupancy sensor
- Input 9 optional CO<sub>2</sub> sensor

### 8 Outputs

- Sockets 1–6 accept any mix of OMs (relay, TRIAC, or universal)
- Outputs 7–8 are TRIAC and require no OMs
- Universal ranges are scalable between 0–12 VDC
- Single stage relays are jumper selectable NO/NC

### 48 Variables

- Selectable standard and custom ranges, as well as fixed or program-driven values

### 4 PID Loops

- Standard P, PI, or PID controllers for closed loop control

### 3 Trend Logs

- Each Trend Log stores 150 samples of 6 points at programmable time intervals

### 8 Runtime Logs

- Totals the On time and records the On/Off times of a digital point
- Holds 100 samples

### 2 System Groups

- Allows related points to be grouped on one display
- 50 points per group

### 1 Weekly Schedule

- 4 On/Off times for each weekday and 2 override days

### 1 Annual Schedule

- Days of the year designated as holidays

### 5 Custom Tables

- For creating custom input ranges and Control-BASIC™ lookup tables

### 16 Custom Units

- 8 analog engineering units
- 8 digital engineering units

### SMART-Net™ Port

- Networks up to 4 SMART-Sensors™

### 48 Network In Points

### 32 Network Out Points

### Warranty

- 5 years
- 1 year for humidity sensor
- 2 years for CO<sub>2</sub> sensor

### Certification

- BTL Listed (B-AAC)
- UL916 Listed
- FCC CFR 47 Part 15/B

## ORDERING

### MS-ND (base model)

- MACH-Stat™ controller with no LCD display, 4 universal inputs, onboard thermistor, momentary override, 6 output sockets, and 2 dedicated TRIAC outputs

### Options

- C adds real-time clock
- CO<sub>2</sub> adds carbon dioxide sensor
- H adds humidity sensor
- OC adds occupancy sensor
- S adds 20k slider

## ACCESSORIES

### RM

- Relay output module (package of 10)

### TM

- TRIAC output module (package of 10)

### UM

- Universal output module (package of 10)

## APPLICATION DIAGRAM



- Sockets 1–6 include an 8-bit D/A converter and can be configured as analog outputs
- Sockets 1–6 accept any mix of OMs (relay, TRIAC, or universal)
- Outputs 7–8 are TRIAC and require no OMs
- Universal OMs provide 0–12 VDC (analog or digital), 75 mA max, with 24 VAC over-voltage and short circuit protection
- Relay OMs provide a dry contact for switching DC or AC loads up to 24 V, 0–500 mA, NC or NO

- TRIAC OMs switch 24 VAC only with current load between 20–500 mA

### Dimensions

- 12 cm L x 14 cm W x 4.3 cm H (4 3/4" L x 5 1/2" W x 1 5/8" H)

### Weight

- 0.28 kg (0.615 lb.)

### Ambient Limits

- Operating: -20 °C to 55 °C (-4 °F to 131 °F)
- Shipping: -40 °C to 60 °C (-40 °F to 140 °F)
- Humidity: 10% to 90% RH non-condensing

Dealer Information: