

Reliable Controls MACH-System

# Reliable controls

...people and technology you can rely on™

- BACNET® LISTED DEVICE (PENDING)
- MOUNTS DIRECTLY TO WALL OR EQUIPMENT
- FULLY PROGRAMMABLE, AND NETWORKABLE THERMOSTAT
- 8 INPUTS AND 8 OUTPUTS WITH OPTIONAL CLOCK, SLIDER, HUMIDITY, AND OCCUPANCY
- DISPLAY/CHANGE 42 USER SELECT POINTS ON 7 VISION GROUPS
- DATA ACQUISITION AND DATA STORAGE ONBOARD
- ACCESS AND CHANGE SCHEDULES EASILY
- 5 YEAR WARRANTY

## MACH-Stat™ SPACE CONTROLLER



Shown with slider and occupancy options.



The Reliable Controls® MACH-Stat™ space controller is an excellent solution to any new or replacement thermostat application, and ships with the Reliable Controls® industry best 5 year warranty.



The Reliable Controls<sup>®</sup> MACH-Stat<sup>™</sup> is a fully programmable, versatile BACnet<sup>®</sup> controller designed for space control applications where user access is required without the need of a PC. The built-in large LCD screen allows operators to access/view/change/override up to 42 different points within a Reliable Controls<sup>®</sup> MACH-System<sup>™</sup>. The MACH-Stat<sup>™</sup> can be ordered with optional realtime clock for stand alone applications, setpoint slider, humidity sensor, and occupancy sensor.

### TECHNICAL SPECIFICATION

#### Processor

- 50 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 with battery backup

#### Supply Voltages

- 24 VAC/VDC, 25 VA max.

#### Communications

- EIA-485 @ 76.8 kbps max.
- SMART-Net<sup>™</sup> (4 SMART-Sensors max.)

#### Display

- 128 x 64 dot matrix LCD with white backlight
- View area 62 x 44 mm
- Contrast adjust, backlight select

#### Keypad

- 5-button conductive rubber

#### Temperature Sensor

- Thermistor comes pre-mounted on Input 5 (can also 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<sup>™</sup> or X-Port<sup>™</sup> required for MSet configuration

#### Mounting

- Unit mounts directly to single or dual device box

#### Inputs (8 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
- Humidity Input: 10-90% range 0.1% resolution ± 1.8% RH accuracy replaceable sensing element
- Occupancy Input: Passive infrared radiation (PIR) 5 m/16.4 ft. max detection distance 100° horizontal / 82° vertical 64 detection zones

#### Output Sockets (8 max.)

- Controller ships with 8 unpopulated, output sockets which require modules that are sold separately
- 6 Universal Output Sockets: 8-bit D/A converter Analog: 0-12 VDC Digital: 0-12 VDC Output power: 75 mA @ 12 VDC 24 VAC over voltage and short protection
- 2 Relay Output Sockets: 24 VAC/VDC @ 0.5 A Common return

#### Dimensions

- 12 cm L x 14 cm W x 4.2 cm H (4.72" L x 5.5" W x 1.65" H)

#### Weight

- 0.28 kg (0.615 lb.)

#### Ambient Limits

- Operating: 0 °C to 40 °C (32 °F to 104 °F)
- Shipping: -20 °C to 60 °C (-40 °F to 140 °F)
- Humidity: 10% to 90% RH non-condensing

### FEATURES

#### Protocol

- BACnet<sup>®</sup>
  - MS/TP (EIA-485)
- Reliable Controls<sup>®</sup>
  - Network (EIA-485/Token Bus)

#### 4 Control-BASIC<sup>™</sup> Programs

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

#### 8 Inputs (max.)

- Inputs 1-4 Universal ranges Jumper selectable: 0-5 VDC, 4-20 mA, thermistor, and dry contact
- Input 5 comes with 10k thermistor
- Input 6 optional 20k setpoint slider or 10k/dry contact
- Input 7 optional Humidity sensor
- Input 8 optional Occupancy sensor

#### 8 Output Sockets

- Outputs 1-6 accommodate universal or relay modules
- Outputs 7 & 8 accommodate relay modules only
- Universal ranges scalable 0-12 VDC
- Single stage relay - 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

#### 7 Vision Groups

- Allows 6 points to be displayed in the LCD window
- Point names can have custom display names

#### 1 Application Specific Group

- Display 6 fixed points typical of thermostat

#### 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<sup>™</sup> lookup tables

#### 16 Custom Units

- 8 analog engineering units
- 8 digital engineering units

#### SMART-Net<sup>™</sup> Port

- Networks up to 4 SMART-Sensors<sup>™</sup>

#### 32 Network In Points

#### 32 Network Out Points

#### Warranty

- 5 years
- 1 year on humidity sensor

#### Certification

- BTL Listed (B-AAC) (Pending)
- ISO 16484-5 (Pending)

### ORDERING

#### MS (base model)

- MACH-Stat<sup>™</sup> controller with LCD display, 4 universal inputs, onboard thermistor, and 8 output module sockets

#### Options

- add -C for Real Time Clock
- add -S for Slider
- add -H for Humidity
- add -OC for Occupancy

#### Examples

##### MS-C

- Base model with real time clock

##### MS-S-OC

- Base model with slider and occupancy

##### MS-C-S-H-OC

- Base model with all options

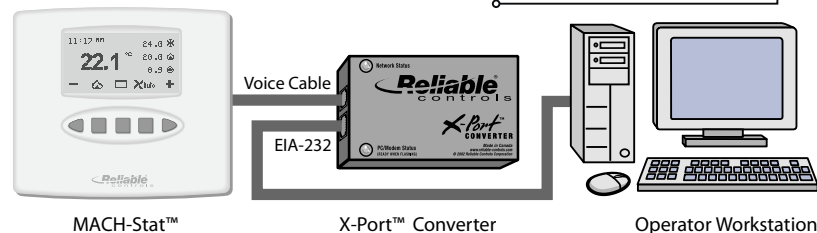
##### RM

- Relay Output Module (package of 10)

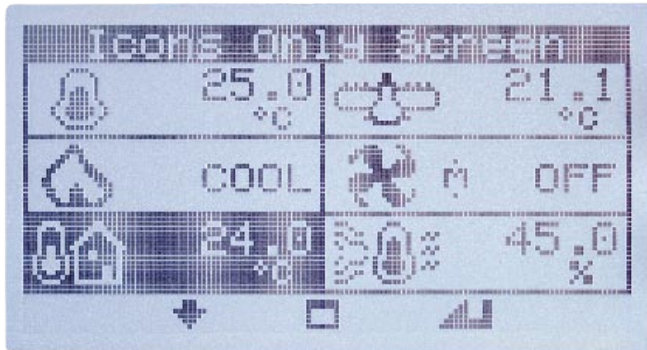
##### UM

- Universal Output Module (package of 10)

### APPLICATION DIAGRAM

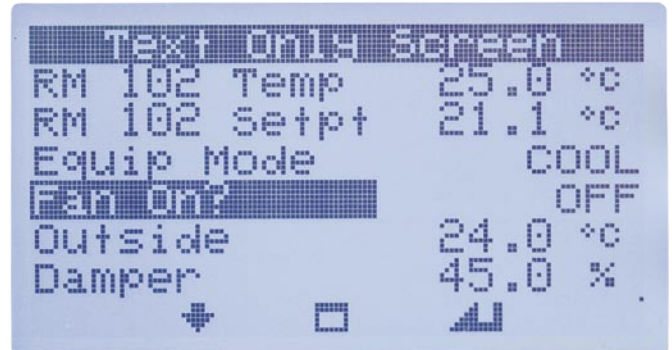


### VISION GROUP - Sample Screens



Vision Group with Icons only

showing: 1 Room Temperature 2 Room Setpoint  
 3 Mode 4 Fan  
 5 Outdoor Air Temperature 6 Damper

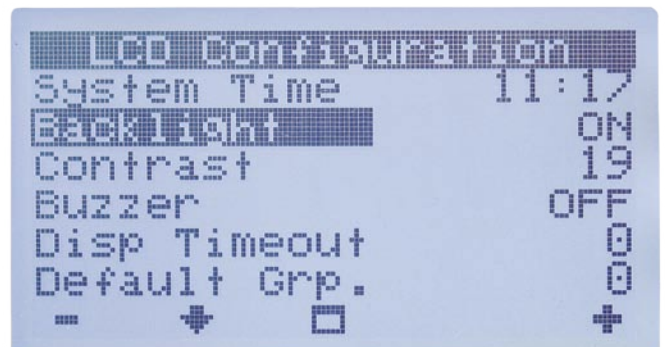


Vision Group with Text only

showing: 1 Room Temperature 2 Room Setpoint  
 3 Mode 4 Fan  
 5 Outdoor Air Temperature 6 Damper



Edit Point Screen



LCD Configuration Screen



Edit Weekly Schedule Screen



Application Specific Screen