



MACH-ProAir™  
BACnet® Controller

# Versatile VAV

Engineered to exceed the specifications for a wide variety of Variable Air Volume (VAV) applications, the Reliable Controls® MACH-ProAir™ is a fully programmable BACnet® Building Controller (B-BC) with numerous downloadable standard codes and flexible I/O options, all priced to meet a modest budget.



5 year  
Warranty

Better by design

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



## TECH SPECS

### Processor & Memory

- 66 MHz, high-performance, 32-bit embedded microcontroller with onboard Flash memory
- Controller database, values, log data, and configuration held in robust non-volatile memory
- Operating System firmware easily updated at any time over network

### Supply Voltages

- 24 VAC  $\pm$ 10% 32 VA max. 50/60 Hz
  - 24 VDC  $\pm$ 10% 12 W max.
- Note: MPA-12 requires 24 VAC only to support internal power to TRIACs

### Communications

- MS/TP
  - EIA-485 @ 76.8 Kbps max.
  - Auto-baud detection
- SMART-Net™
  - 4 SMART-Sensors max.
  - RJ-11 port on all models
  - 4 wire terminal connector on all models

### Universal Inputs

- 12-bit A/D converter
- Soft selectable: 0–10 VDC, 4–20 mA, thermistor/dry contact
- Impedance:
  - 3M  $\Omega$  on 0–10 VDC range
  - 250  $\Omega$  on 4–20 mA range
  - 20k  $\Omega$  on thermistor range
- Pulse counting up to 40 Hz (supports flow meters)
- 24 VAC over-voltage protection

### Universal Outputs

- 10-bit D/A converter
- Analog: 0–12 VDC
- Binary: 0/12 VDC
- Output power: 75 mA @ 12 VDC
- 24 VAC over-voltage and short protection

### TRIAC Outputs

- 24 VAC @ 0.5 A

### SETUP-Tool™

- SETUP-Tool optional for MS/TP configuration

### Dimensions

- With actuator:
  - 22.7 cm L x 10.1 cm W x 7.7 cm H (8 15/16" L x 3 15/16" W x 3" H)
- Without actuator:
  - 19.9 cm L x 10.1 cm W x 7.3 cm H (7 13/16" L x 3 15/16" W x 2 7/8" H)
- With MPA-C:
  - 22.7 cm L x 15.0 cm W x 7.7 cm H (8 15/16" L x 5 7/8" W x 3" H)

### Mounting

- Supplied with #8 screw
- Compatible with 3/8" to 1/2" damper blade shaft

### Weight

- 0.7 kg (1.8 lb.)

### Ambient Limits

- Operating: 0 °C to 50 °C (32 °F to 122 °F)
- Shipping: -40 °C to 60 °C (-40 °F to 140 °F)
- Humidity: 10% to 90% RH non-condensing

## Features

### Dynamic Database

- Shared memory allows creation of supported objects as required (up to memory max, or 128 object limit, whichever is reached first)
- All models provide 32K of database memory and 28K of trend memory
- Typical Object Configuration table shown on next page

### Protocol

- BACnet
  - MS/TP (EIA-485)

### Motor Control

- Standard VAV and optimized motor control algorithms stored in firmware
- Numerous standard application codes can be downloaded from the Reliable Controls website
- Optional user-programmed algorithm

### Engineered Enhancements

- Onboard End Of Line (EOL) switch with LED indication provides easy EOL configuration and visual verification
- Remote addressing and software selectable inputs allow detailed configuration to be completed over the network
- Robust MRAM non-volatile memory preserves trend data on power cycle
- BACnet COV support provides optimized network sharing

### Control-BASIC™ Programs

- 8500 bytes programmable control strategy in a readable, BASIC-like language
- 3200 bytes per program

### Inputs

- Universal ranges
- Soft-selectable 0–10 VDC, 4–20 mA, thermistor/dry contact

### Outputs

- Universal ranges
- 0–12 VDC or TRIAC, model dependent

### Variables

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

### Velocity Sensor

- $\pm$ 0–500 Pa (0–2" WC)
- Maximum zero point accuracy 0.2 Pa (0.0008" WC)
- Resolution: 0.133 Pa (0.0005" WC)
- Span accuracy 3% of reading

### Actuator

- Torque 45 in-lb (5 Nm)
- Brushless D.C.

### Enclosure

- ABS
- UL94-5V

### PID Loops

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

### Single-point Trend Logs

- Samples created at polled, COV, or triggered intervals
- Default 128 samples, configurable to allow trending over a longer period of time

### Multipoint Trend Logs

- Each Trend Log includes 8 points at polled or triggered intervals
- Default 128 samples, configurable to allow trending over a longer period of time

### Runtime Report

- Records the total On time and the total number of transitions, as well as daily transitions for every binary point
- A 50-sample runtime log is optional for each binary point

### System Groups

- Allows related points to be grouped onto one display
- 80 points/group

### Schedules

- 7 On/Off times for each weekday or exception

### Calendars

- Days of the year designated as holidays

### Arrays

- Up to 128 elements in a one-dimensional array

### Tables

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

### Custom Units

- 8 analog engineering units
- 8 binary engineering units
- 8 multistate units with 8 states, 32 characters each

### SMART-Net Port

- Networks up to 4 SMART-Sensors

### 32 Network In Points

### 16 Network Out Points

- The total maximum number of writes and shares to other devices

### Warranty

- 5 years

### Certification

- BTL Listed (B-BC)
- UL916 Listed

## ORDERING

### MPA-12-A-F

- MACH-ProAir with 1 universal input, 2 TRIAC outputs, actuator, and flow sensor

### MPA-12-F

- MACH-ProAir with 1 universal input, 2 TRIAC outputs, and flow sensor

### MPA-33-A

- MACH-ProAir with 3 universal inputs, 3 universal outputs, and actuator

### MPA-33-A-F

- MACH-ProAir with 3 universal inputs, 3 universal outputs, actuator, and flow sensor

### MPA-34-A

- MACH-ProAir with 3 universal inputs, 1 universal output, 3 TRIAC outputs, and actuator

### MPA-34-A-F

- MACH-ProAir with 3 universal inputs, 1 universal output, 3 TRIAC outputs, actuator, and flow sensor

### MPA-35-F

- MACH-ProAir with 3 universal inputs, 3 universal outputs, 2 TRIAC outputs, and flow sensor

### MPA-36-F

- MACH-ProAir with 3 universal inputs, 1 universal output, 5 TRIAC outputs, and flow sensor

## ACCESSORIES

### LM24E5 RCC

Replacement actuator - must be installed by Reliable Controls service department

### MPA-C

Cover for wiring terminals with 1/2" knockouts for cables - two on side, one on top, one on bottom



MPA-33-A-F with MPA-C

## Typical Object Configuration

There are physical limitations to the number of inputs, outputs, and SMART-Sensors that can be connected to a MACH-ProAir. For other object types, there are no imposed limits for the maximum number of objects of a single type. The main constraint for created objects is onboard memory, however, the total number of objects that can be created (including inputs, outputs, and SMART-Sensors) is limited to 128. The table below details a typical database that fits in the memory module for any model.

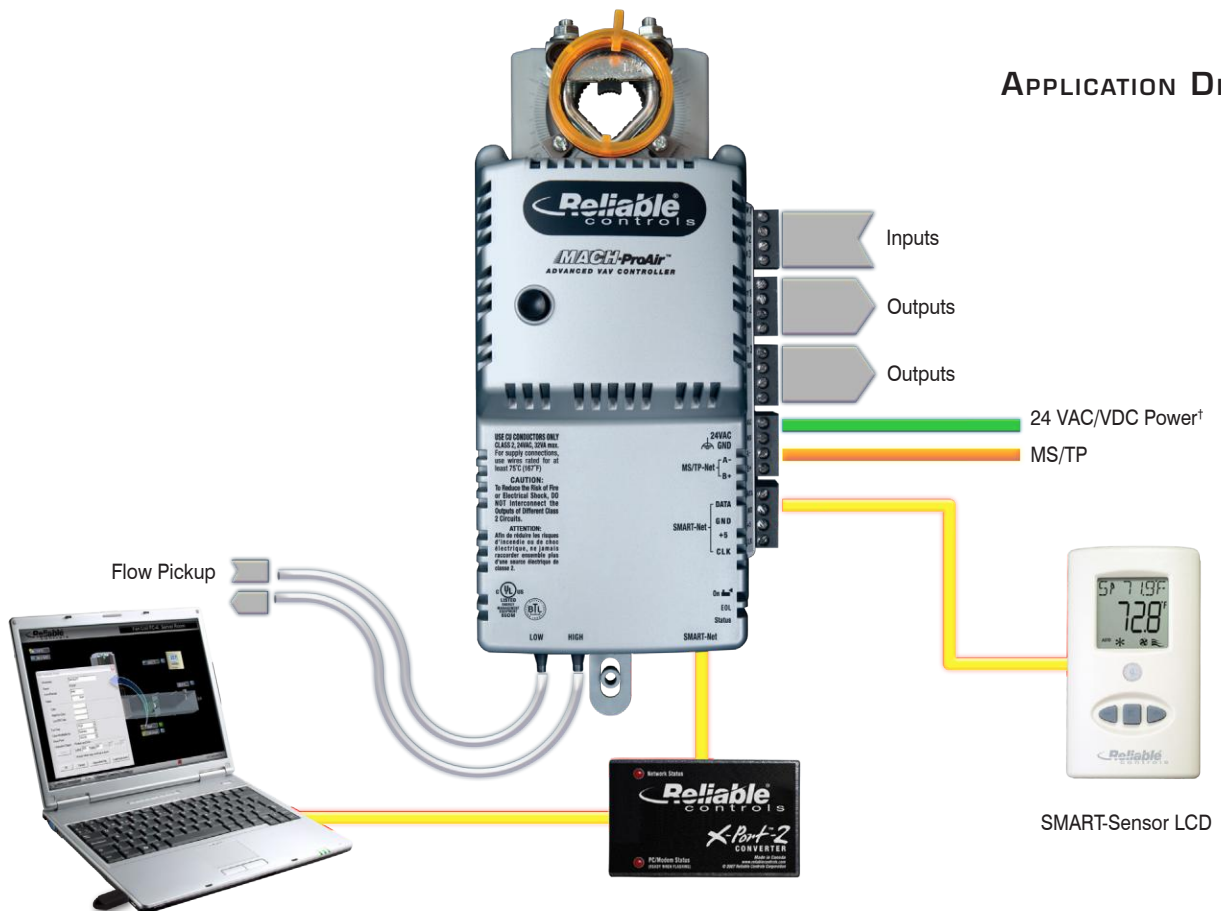
Variables	Loops	Schedules	Calendars	Tables*	Groups	Multipoint Trend**	Runtime*	Arrays	Program	SMART-Sensor***
48	4	2	1	2	2	2	32	2	8	4

\* Tables and Runtime Logs are not counted in the 128 object limit. Inputs, outputs, and the device object are counted in the 128 object limit.

\*\* Trends are configured to store 128 samples.

\*\*\* All models accommodate a maximum of 4 SMART-Sensors.

## APPLICATION DIAGRAM



†MPA-12 requires 24 VAC only