



Designed to be an economical choice for variable air volume and room control, the MACH-ProAir™ is a fully programmable BACnet Building Controller (B-BC) with an optional onboard actuator and flow sensor. Available with numerous standard applications, the MACH-ProAir communicates over MS/TP and accommodates several input/output configurations to suit your needs.

Applications range from variable air volume and temperature (VVT) and standard pressure-independent control to dual-duct and full-demand control ventilation. Models with an onboard actuator and flow sensor include a standard VAV algorithm and optimized motor control routine stored in the firmware. All models include dynamic database memory, onboard End-of-Line switch with LED, auto addressing, nonvolatile trend data, optimized network sharing, removable connectors, and support for four SMART-Net™ devices.

Project:	Dealer Information:  EMS Energy Management Systems (Pvt) Ltd.
Engineer:	
Approved by:	

PRODUCT FEATURES

Dynamic Database

- Create up to 160 objects of any supported type in any model of controller.
- Maximum of 128 objects of a single type.
- Refer to the Typical Object Configuration table below for memory usage.

Motor Control

- Standard VAV and optimized motor control algorithms stored in firmware.
- Option to program your own algorithm.
- Download numerous standard application codes from the Reliable Controls website.

Programs

- 16,000 bytes of programmable control strategy in a readable, BASIC-like language.
- 3,200 bytes per program.

Outputs

- Universal ranges.
- 0–12 VDC or solid-state relay, model dependent.

Values

- Select standard and custom ranges as well as fixed or program-driven values.

Single-point Trend Logs

- Store 128 samples at programmable time intervals.

Runtime Report

- Totals the on time and records the on/off times of every binary object.
- A 50-sample runtime log is automatically enabled for each binary object.

Calendars

- Designate days of the year as holidays.

Protocol

- BACnet MS/TP (EIA-485).

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 you to complete detailed configuration over the network.
- Robust capacitor-backed SRAM nonvolatile memory preserves trend data on power cycle.
- BACnet change of value support provides optimized network sharing.

Inputs

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

Loops

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

Multipoint Trend Logs

- Store up to eight objects in each trend log.
- Record values as user-defined intervals.
- Dynamically assigned.

System Groups

- Group related points on one display.
- 80 objects per group.

Schedules

- Up to 7 on/off cycles for each weekday or exception.

Arrays

- Up to 128 elements in a one-dimensional array.

PRODUCT FEATURES

Tables

- For creating custom input ranges and program lookup tables.

SMART-Net Port

- Network up to four SMART-Net devices.

32 Net Outs

- The maximum number of writes to other devices.

Warranty

- 5 years.

Custom Units

- Eight analog engineering units.
- Eight binary engineering units.
- Eight multistate units with eight states.

64 Net Ins

- The maximum number of shares from other devices.

TECHNICAL SPECIFICATIONS

Processor and Memory

- 66 MHz high-performance 32-bit embedded microcontroller with onboard Flash memory.
- Controller database stored in robust nonvolatile memory. Values and log data are stored in 3-day capacitor-backed memory.
- Easily update operating system firmware at any time over the network.

Universal Inputs

- 12-bit A/D converter.
- Use software to select 0-10 VDC, 4-20 mA, thermistor/dry-contact.
- Impedance:
 - 3 M Ω on 0-10 VDC range.
 - 250 Ω on 4-20 mA range.
 - 20 k Ω on thermistor range.
- Pulse counting up to 40 Hz. Supports flow meters.
- 24 VAC overvoltage protection.

Universal Outputs

- 10-bit D/A converter.
- Analog: 0-12 VDC.
- Binary: Software configurable between 0-12 VDC.
- Output power: 75 mA at 12 VDC.
- 24 VAC overvoltage and short protection.

Mount Hardware Included

- #8 screw.

Weight

- 0.7 kg (1.8 lb).

Enclosure

- ABS.
- UL 94-5V.

Supply Voltages

- 24 VAC $\pm$ 10% 32 VA maximum, 50/60 Hz.
- 24 VDC $\pm$ 10% 12 W maximum.

Communication Options

- One EIA-485 (RS-485) port that supports a baud rate up to 76.8 kbps with auto-baud detection.
- Two SMART-Net ports, one RJ-11 and one 4-wire terminal block, that support up to four devices.

Velocity Sensor

- $\pm$ 0-500 Pa (0"-2" WC).
- Maximum zero point accuracy 0.2 Pa (0.0008" WC).
- Resolution: 0.122 Pa (0.0005" WC).
- Span accuracy 3% of reading.

Flow Pickup

- 5.2 mm OD barbed fittings.
- Suitable for 1/4" standard pneumatic control tubing.

Solid-State Relay Outputs

- Switch 24 VAC/VDC.
- 500 mA max.

Actuator

- Torque 5 Nm (45 in-lb).
- Brushless D.C.
- Compatible with 3/8" to 1/2" damper blade shaft.
- Maximum throw of 95 degrees.
- Actuator speed: 1 degree per second.

TECHNICAL SPECIFICATIONS

Certifications

- BTL Listed (B-BC).
- CE.
- CFR47 Part 15 Class B.
- UL916 Listed.
- WEEE.

Dimensions

- Base model:
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 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).
- With MPA-C:
22.7 cm L x 15 cm W x 7.7 cm H
(8 15/16" L x 5 7/8" W x 3" H).

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%–90% RH noncondensing.

ORDERING

Models

MPA-111-A-F

- MACH-ProAir with one universal input, one solid-state relay output, one universal output, actuator, and flow sensor.

MPA-12-A-F

- MACH-ProAir with one universal input, two solid-state relay outputs, actuator, and flow sensor.

MPA-12-F

- MACH-ProAir with one universal input, two solid-state relay outputs, and flow sensor.

Accessories

MPA-C

- Accessory kit to retrofit your MACH-ProAir with a conduit cover.

FS

- Flow sensor for standalone and dual-duct VAV applications.

LM24E5 RCC

- Replacement actuator. Contact Reliable Controls Customer Care for ordering options.

TYPICAL OBJECT CONFIGURATION

There are physical limitations on the number of inputs, outputs, and SMART-Sensor devices you can connect to a MACH-ProAir controller. For other object types, create up to 128 objects of a single type. The total number of objects, including inputs, outputs, and SMART-Sensor devices, is limited to 160 and also limited by the onboard memory. The table below details typical databases that fit in all models.

Variables	Loops	Schedules	Calendars	Tables*	Groups	Multipoint Trend**	Runtime	Arrays	Program	SMART-Sensor devices
64	8	4	2	4	4	10	128	4	16	4

* Runtime reports and tables are not counted in the 160 object limit. Inputs and outputs are counted in the 160 object limit.

** Trends are configured to store 128 samples.

PRODUCT IMAGES

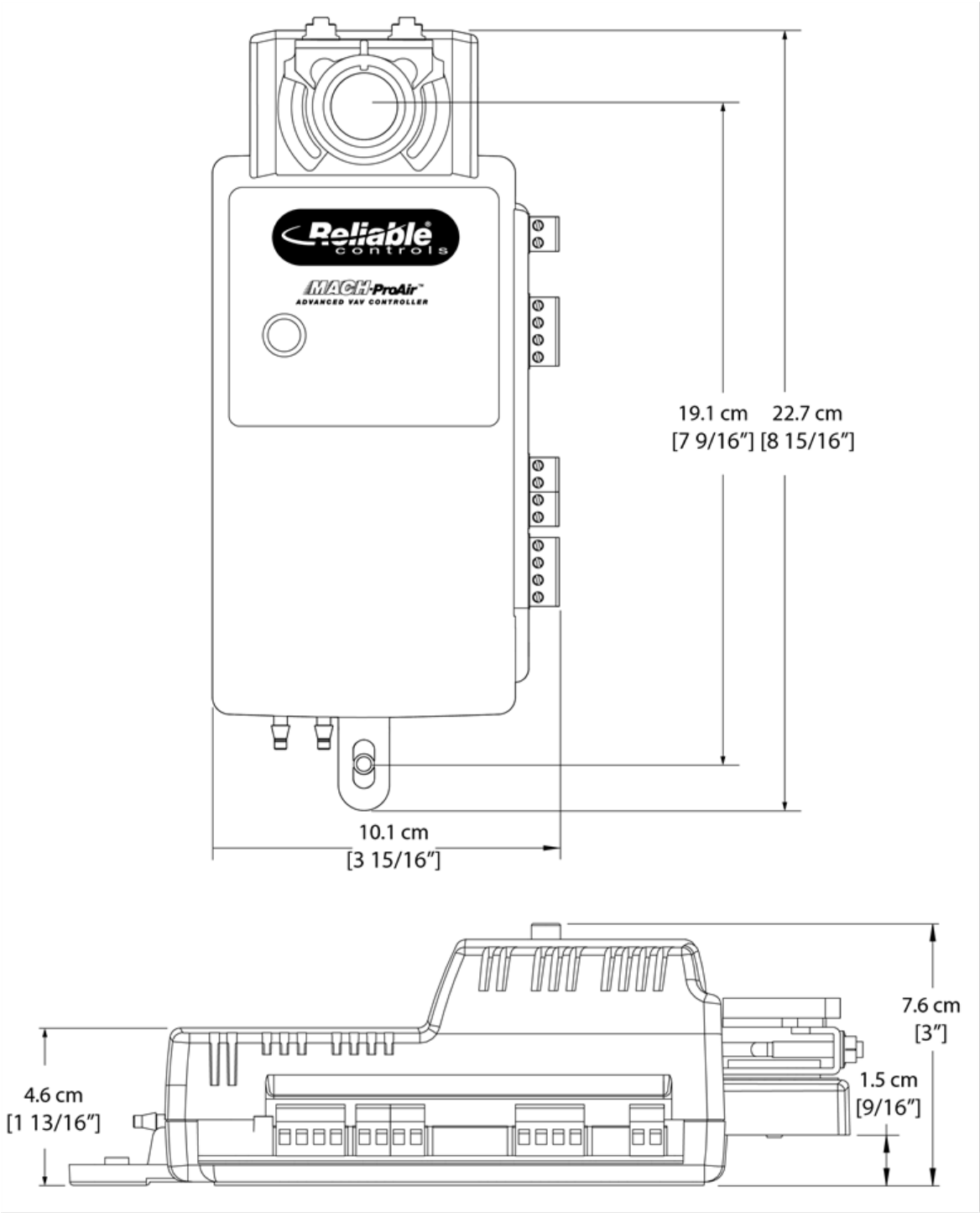


MACH-ProAir model MPA-111-A-F

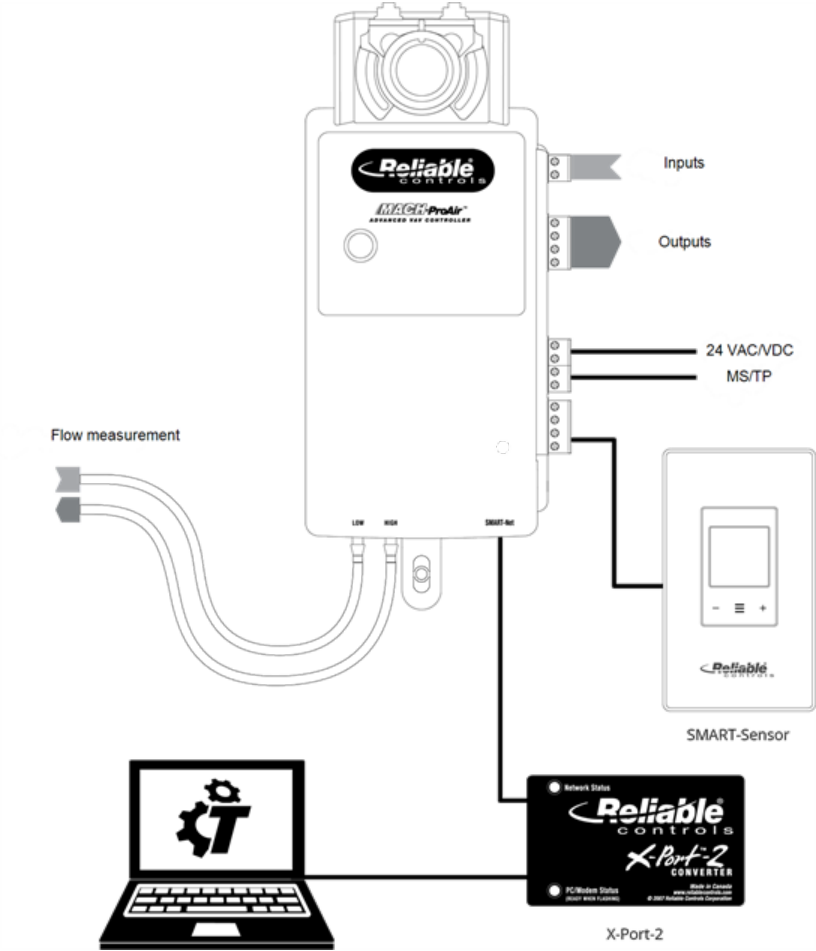


MACH-ProAir with cover

DIMENSIONS

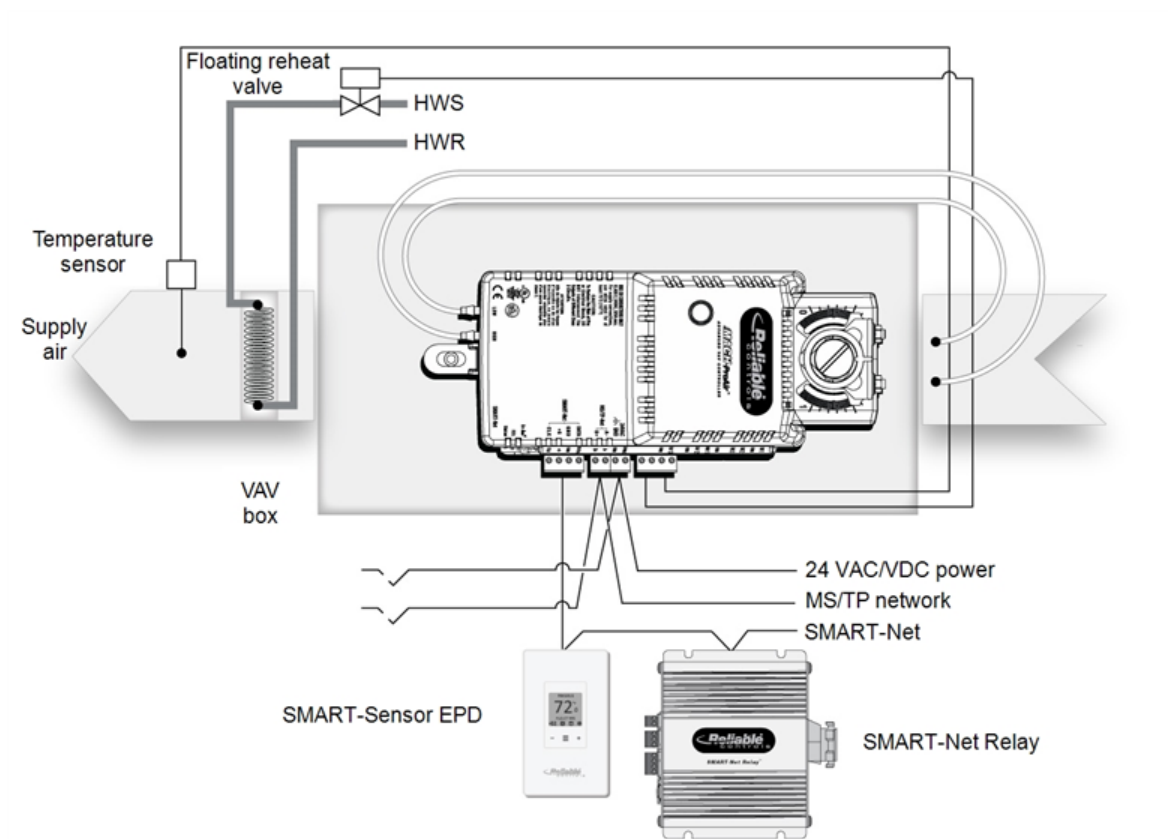


DIAGRAMS



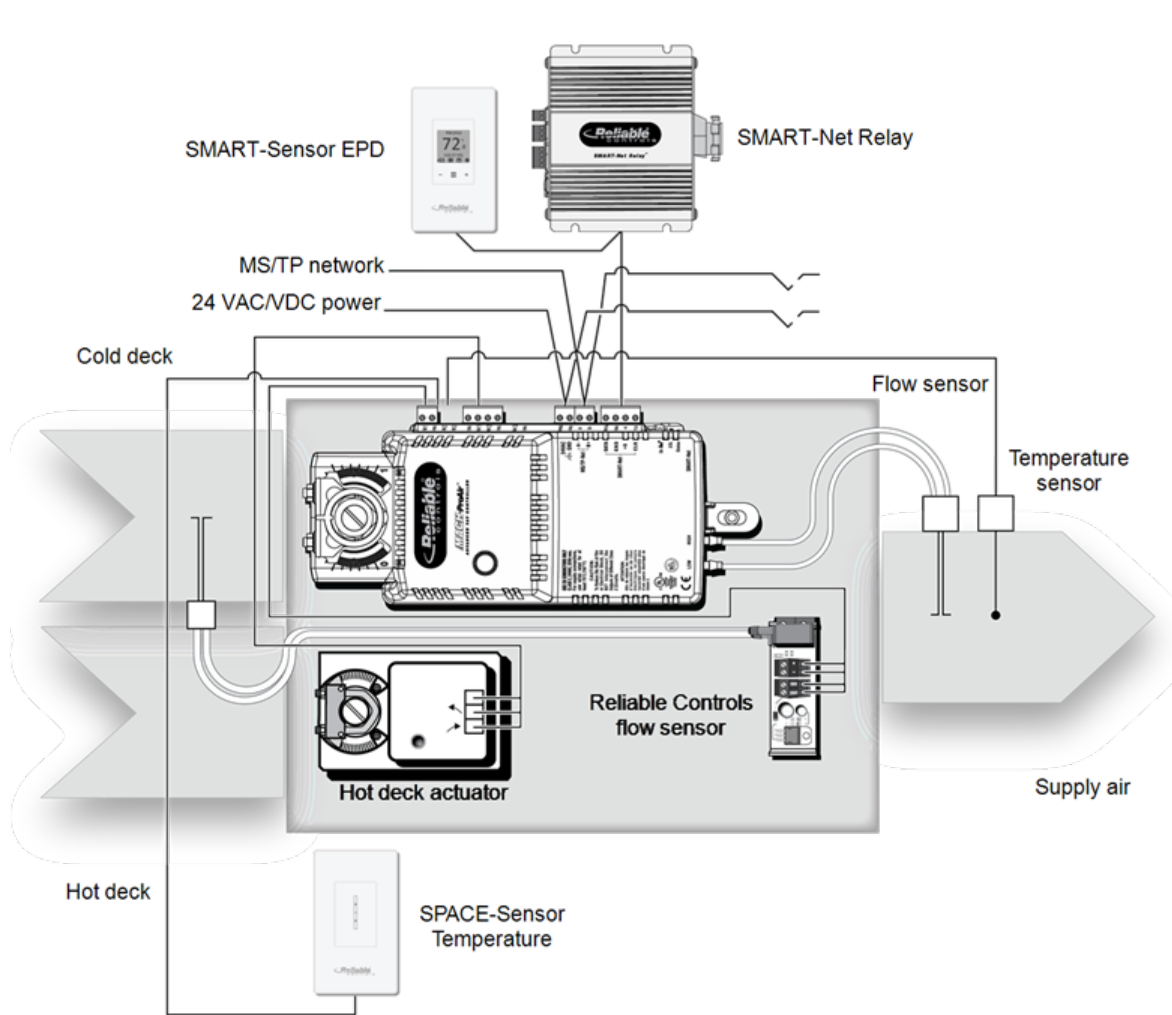
SMART-Net connection

DIAGRAMS



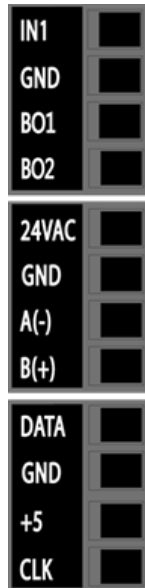
Pressure independent VAV with reheat coil, shown with MACH-ProAir 12-A-F model

DIAGRAMS

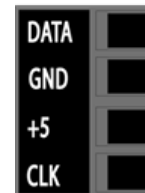
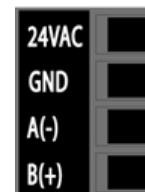
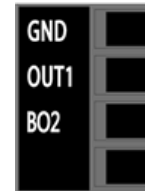
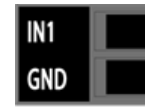


Dual-duct VAV

TERMINAL LAYOUTS



MACH-ProAir 12 model



MACH-ProAir 111 model

- Terminals labeled as BO# are solid-state relay outputs.
- Terminals labeled as OUT# are universal outputs.
- MACH-ProAir 12 and 111 models have solid-state relays internally connected to the 24 VAC/VDC terminal.