



# Tracer™ Controllers

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## Tracer MP580/581 Programmable Controllers





# Overview

The Tracer MP580 programmable controller is available factory-installed on the following Trane air handlers:

- M-Series Climate Changer air handlers
- T-Series Climate Changer air handlers
- AireSystems custom air handlers

The Tracer MP581 programmable controller is available for field installation for a variety of heating, ventilation, and air-conditioning (HVAC) applications.

## Applications

Tracer MP580/581 controllers support a wide variety of building control applications, including:

- Air-handler control
- Support of the LonMark Space Comfort Controller (SCC) profile and the Discharge Air Controller (DAC) profile for air handlers
- Control of mechanical-room equipment, including cooling towers, pumps, boilers, and heat exchangers
- Supervisory control of an HVAC network for mid-sized buildings
- Nearly any control process needed in a commercial building

## Product models

The following Tracer MP580/581 models are available:

- Tracer MP580 factory-installed on certain Trane air handlers
- Tracer MP581 in a NEMA-1 enclosure (with or without a touch screen)
- Frame-mounted Tracer MP581 (the termination board and circuit board in a plastic frame assembly)

Touch-screen operator displays are available in the following configurations:

- Door-mounted operator display
- Portable operator display
- Stand-alone operator display

See “Product models and accessories” on page 4 for more information.

## Inputs and outputs

Tracer MP580/581 controllers have the following inputs and outputs (illustrated in Figure 8 on page 9):

- Twelve universal inputs
- Six binary outputs
- Six analog outputs
- One static pressure input

You can add up to four optional expansion modules to a Tracer MP580/581 controller. Each expansion module adds the following points:

- Six universal inputs
- Four binary outputs
- Four analog outputs

Figure 9 on page 10 illustrates input and output wiring on an expansion module.

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# Product models and accessories

## Tracer MP580/581 models

Several models of Tracer MP580/581 controllers are available. Tracer MP581 models are illustrated in Figure 1.

### Tracer MP580 on Trane air handlers

The Tracer MP580 controller is available packaged with the following air handlers:

- M-Series Climate Changer air handlers
- T-Series Climate Changer air handlers
- AireSystems custom air handlers

The controller is factory wired to all sensors, actuators, valves, starters, and other items shipped with the air handler. Factory testing of connected points helps minimize field commissioning time and expense.

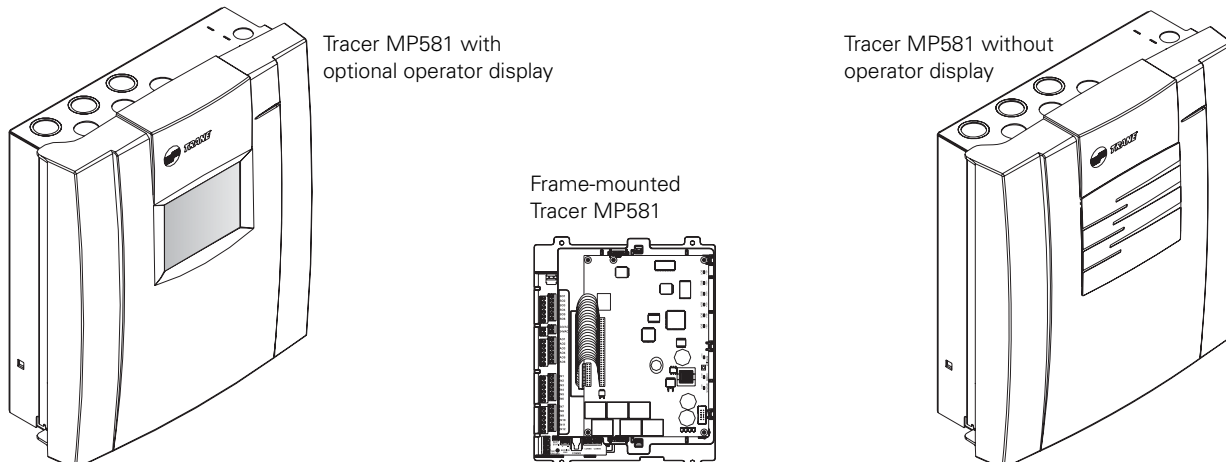
### Frame-mounted Tracer MP581

The frame-mounted Tracer MP581 consists of a circuit board and a termination board mounted in a two-piece modular-frame assembly. This modular design allows the circuit board to be stored separately while installation and wiring are completed. The frame-mounted model can be installed in new equipment or existing enclosures.

### Tracer MP581 with NEMA-1 enclosure

The Tracer MP581 with enclosure consists of the frame assembly mounted in an enclosure compliant with National Electrical Manufacturers Association (NEMA) type-1 standards. A line-to-low voltage transformer is included. The enclosure has a hinged door and plenty of room for input and output wiring. The assembly is UL-listed.

Figure 1. Tracer MP581 models



## Operator display models

Operator-display touch screens are available as options for all Tracer MP580/581 controllers. The operator-display models are illustrated in Figure 2 on page 5.

### Door-mounted operator display

The door-mounted operator display works with any Tracer MP581 or Tracer AH541 controller. A retrofit kit is available to add an operator display to an existing Tracer MP581. The retrofit kit includes a complete enclosure door with an operator display mounted in it. The door-mounted operator display is not available for factory-mounted Tracer MP580 controllers.

### Stand-alone operator display

The stand-alone operator display is designed for permanent local connection to a Tracer MP580/581 or AH540/541 controller. The stand-alone operator display includes a 7-day time clock to provide scheduling for the associated controller. The 10-foot (3 meter) connector cable can be extended up to 150 feet (46 meters).

### Portable operator display

The portable operator display is designed for temporary connection to a Tracer MP580/581 or AH540/541 controller. The operator-display touch screen is mounted in a resin enclosure, which is placed in a padded, protective carrying case. A 10-foot (3 meter) connector cable is included.

## Expansion module

You can use up to four EX2 expansion modules to add extra points to a Tracer MP580/581 controller. The expansion modules communicate with the controller on an IEEE-485 I/O bus up to 1000 ft (300 m) from the controller. The EX2 expansion module is available in two models:

- EX2 module in a metal enclosure
- EX2 module with a plastic cover

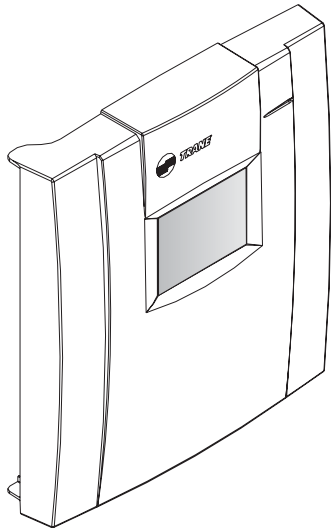
The EX2 models are illustrated in Figure 3 on page 5.

Table 1 lists the points available on Tracer MP580/581 controllers and the expansion modules. Refer to "Specifications" on page 14 for details about each type of point.

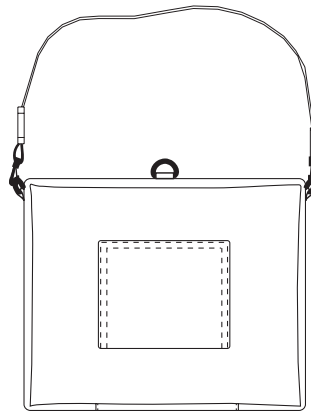
Table 1. Total points available

Type of point	Tracer MP580/581	Each EX2 (up to 4)	Total points
Universal inputs	12	6	36
Binary outputs	6	4	22
Analog outputs	6	4	22
Static pressure input	1	0	1

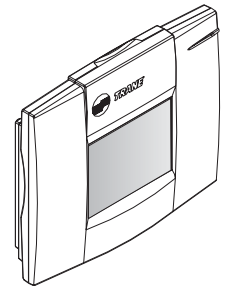
Figure 2. Operator display models



Door-mounted operator display for Tracer MP581 controllers

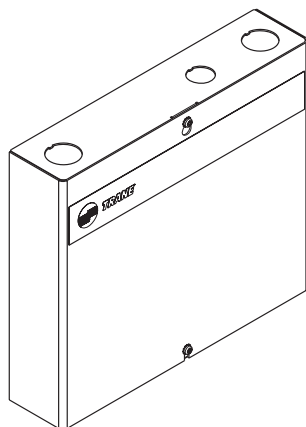


Portable operator display

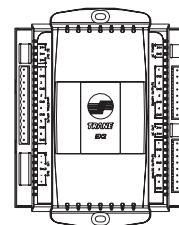


Stand-alone operator display

Figure 3. EX2 expansion modules



EX2 in metal enclosure



EX2 with plastic cover

**Note:** Expansion modules factory-installed with Tracer MP580s consist of the circuit board only. The modules shown here are available for field installation.

# Features

## Graphical programming

The Tracer graphical programming (TGP) editor, shown in Figure 5 on page 7, eliminates the need for line-by-line programming. The TGP editor is a software component of the Trane Rover service tool. TGP has the following advantages:

- Easy to learn—programming is as easy as assembling logic blocks with a computer mouse, much like creating a flow chart.
- Powerful—the TGP editor has built-in PID functions and more than 50 logic blocks for building programs.
- Self documenting—programs can be printed and used as pictorial representations of sequences of operation (see Figure 6 on page 7).
- Programs are stored in the controller along with their graphical representation, and can be uploaded, viewed, and re-used.
- Offline programming—configuration and TGP programming can be done without connecting to a Tracer MP580/581 controller.
- Program simulation—programmers can simulate TGP programs offline. The programmer can verify, test, and troubleshoot controller operation at a remote location, simplifying setup, maintenance, and service.

## Operator display

The optional operator-display touch screen is an intuitive operator interface for monitoring and changing building control functions. With the operator display, you can:

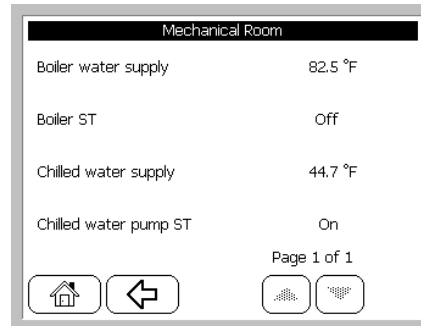
- Monitor space temperature, relative humidity, and other variables
- Change setpoints and scheduled occupancy times
- Identify and troubleshoot problems
- View and reset controller alarms
- Manually override outputs

The operator display includes a 7-day time clock that gives Tracer MP580/581 controllers the ability to manage time-of-day scheduling, with two on/off times per day and up to 20 exception schedules per year.

Figure 2 on page 5 illustrates the operator-display models available for Tracer MP580/581 controllers.

Figure 4 shows a typical operator display screen.

Figure 4. Typical status screen



## Engineered smoke control

Tracer MP580/581 controllers and EX2 expansion modules can be used to control an engineered smoke control system. When used with a fire alarm control panel (provided by other suppliers), the smoke-control system can help protect occupants by controlling the flow of smoke during a fire.

In addition to smoke control, with a firefighter's control panel, a firefighter can see the status of smoke control and implement overrides as required. The Tracer MP580/581 and EX2 expansion module are UL-864-UUKL listed for this application. For details, see the Engineered Smoke Control System for Tracer Summit applications guide, BAS-APG001-EN.

## Interoperability

Tracer MP580/581 controllers communicate by means of the LonTalk protocol. The controllers can be configured to conform to the LonMark® Space Comfort Controller (SCC) profile or the Discharge Air Controller (DAC) profile. You can integrate Tracer MP580/581 controllers with any control system that supports these LonTalk protocols and FTT10-A communications.

## Security

You can use up to eight security passwords to limit access to a Tracer MP580/581 controller.

Use the security passwords to prevent unauthorized access to:

- TGP programs stored in the controller
- Operator display functions, such as setpoints and schedules
- Configuration downloads from a LonTalk service tool

For each of the security passwords, you can choose what can and cannot be accessed, including specific screens on the operator display. The controller ships with security disabled.

Figure 5. TGP editor showing a supply fan program

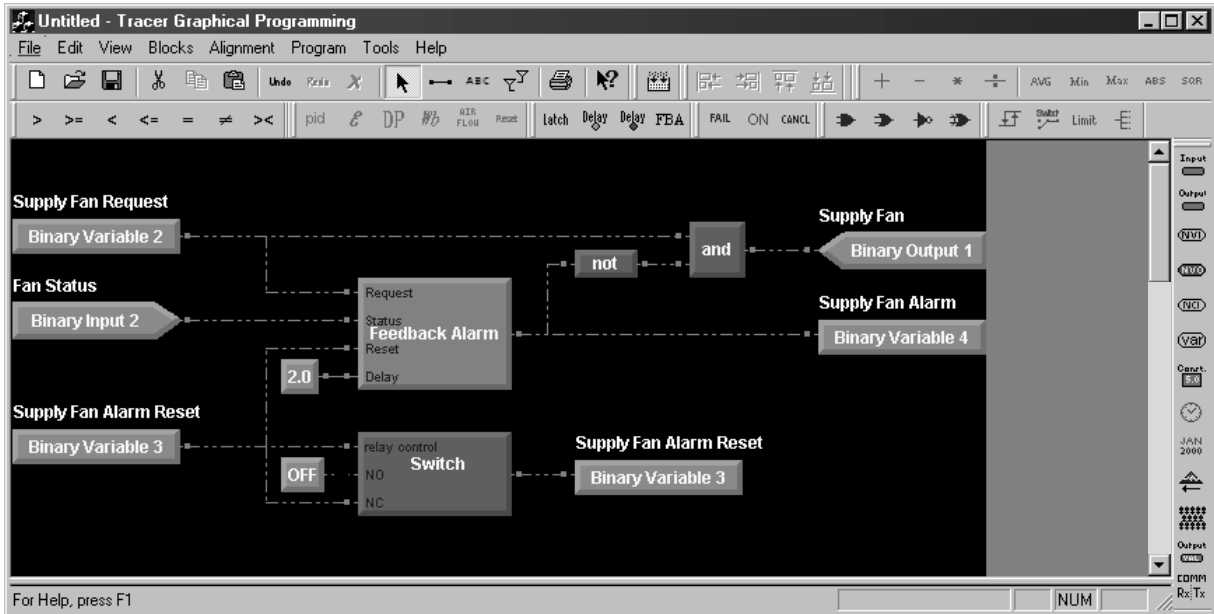
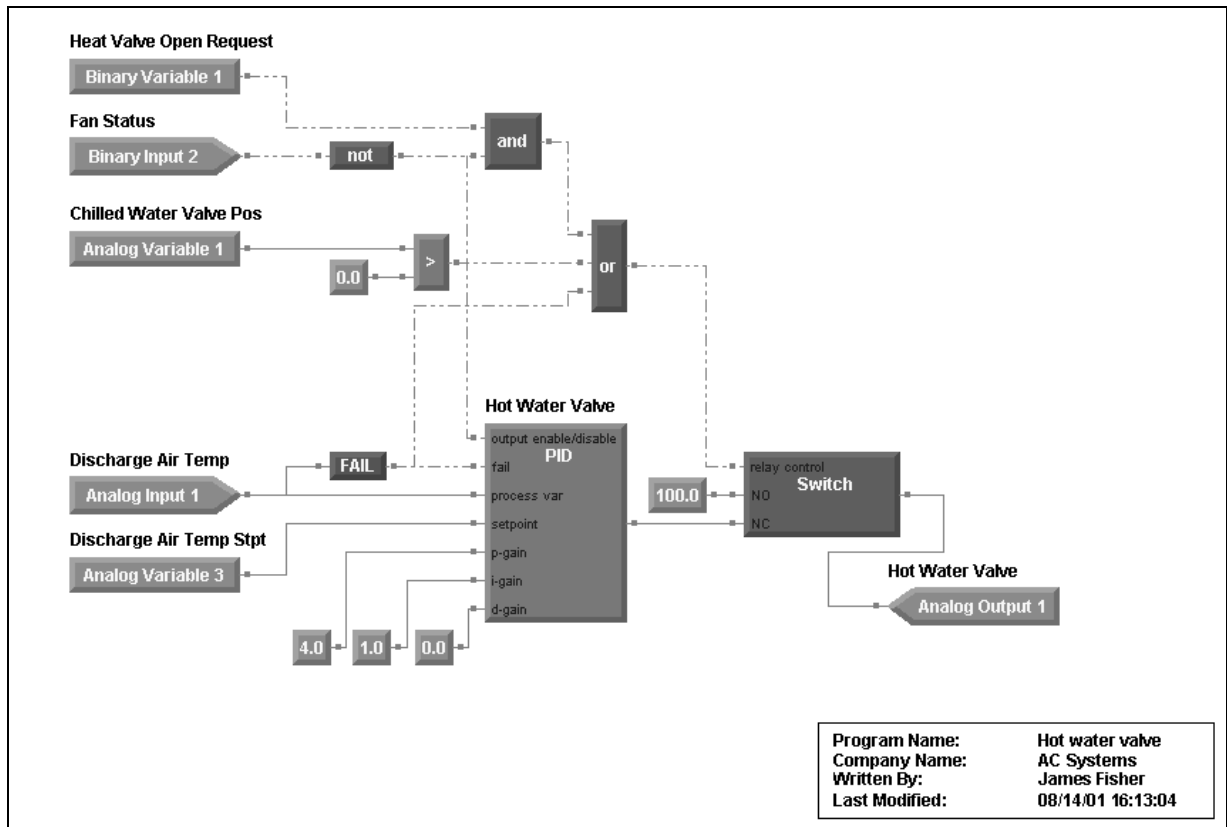


Figure 6. TGP printout of a hot-water valve program

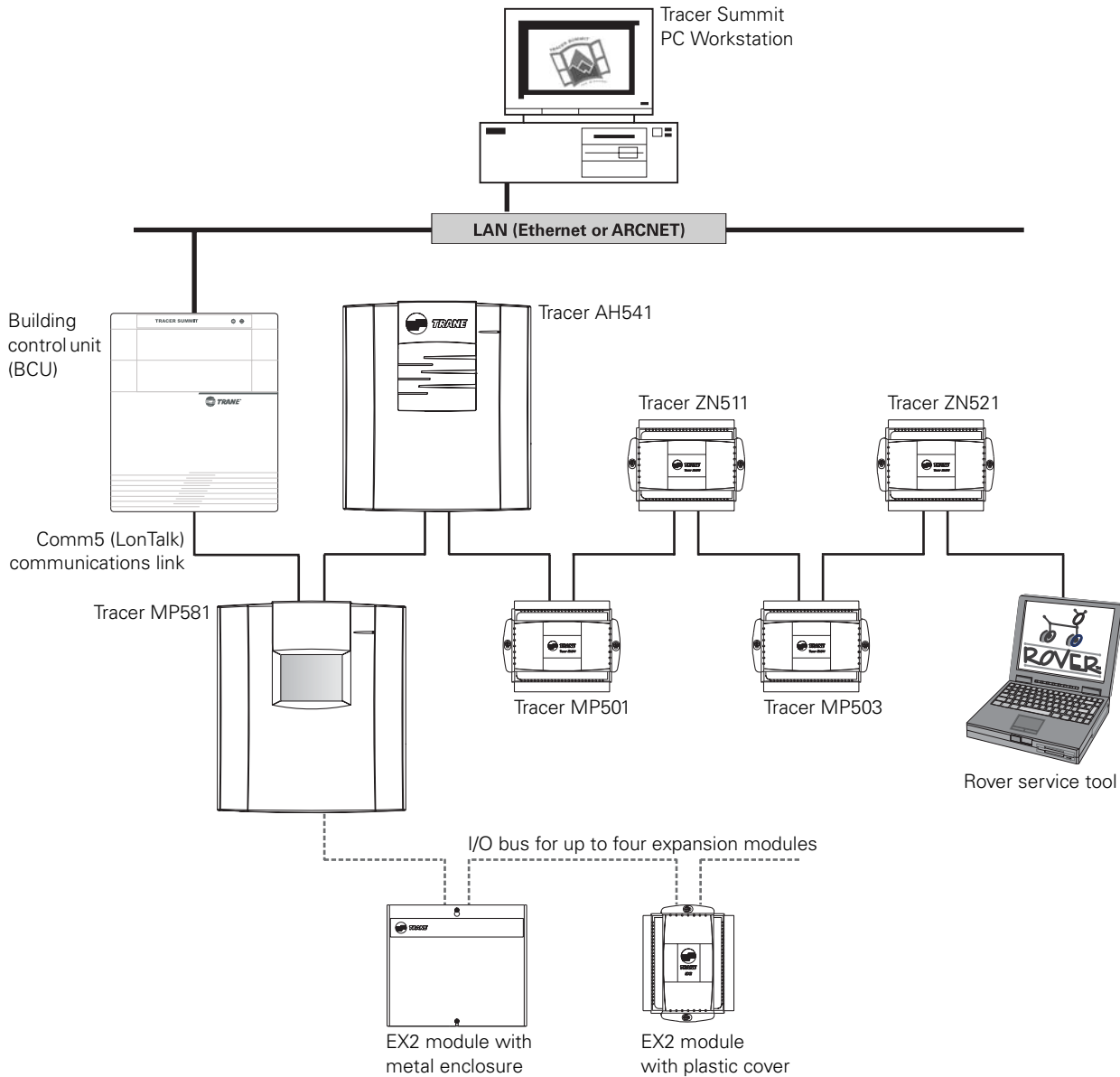


# Network architecture

Tracer MP580/581 controllers can operate as stand-alone controllers, on a peer-to-peer network, or as part of a Tracer Summit building automation system (see Figure 7).

With an operator display, you can monitor information and make control changes on a peer-to-peer network.

Figure 7. Tracer MP581 controller as part of a building automation system with Trane LonTalk controllers





# Wiring diagrams

Figure 8 shows typical input and output connections to the Tracer MP581 termination board. The Tracer MP581 termination board uses screw terminals. The Tracer MP580 termination board uses 0.25-inch quick-connect terminals.

For wiring within a smoke control system, see *Applications Guide, Engineered Smoke Control System for Tracer Summit*, BAS-APG001-EN.

Figure 9 on page 10 shows typical input and output connections to the EX2 expansion module.

Figure 8. Wiring diagram for the Tracer MP580/581

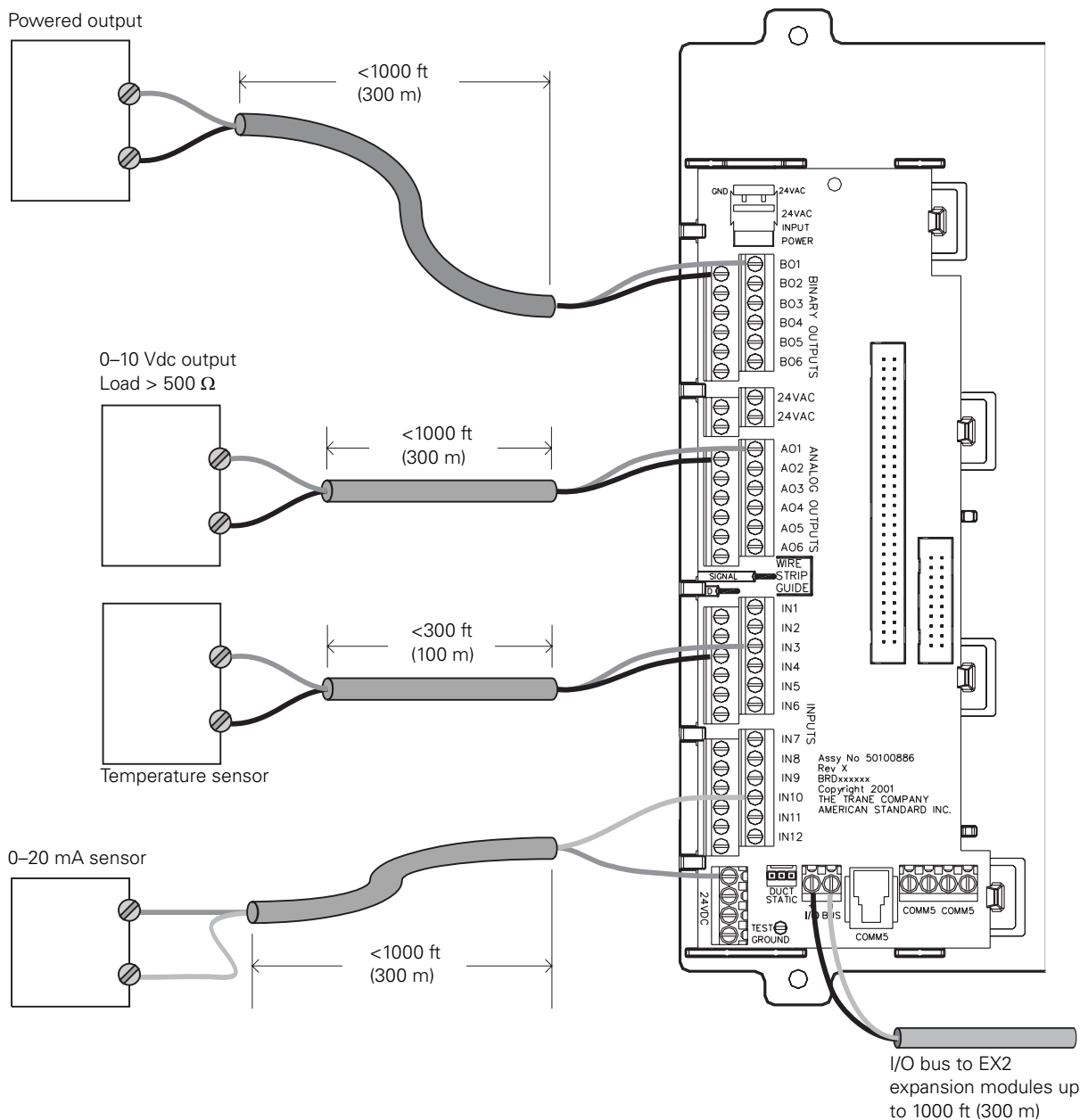
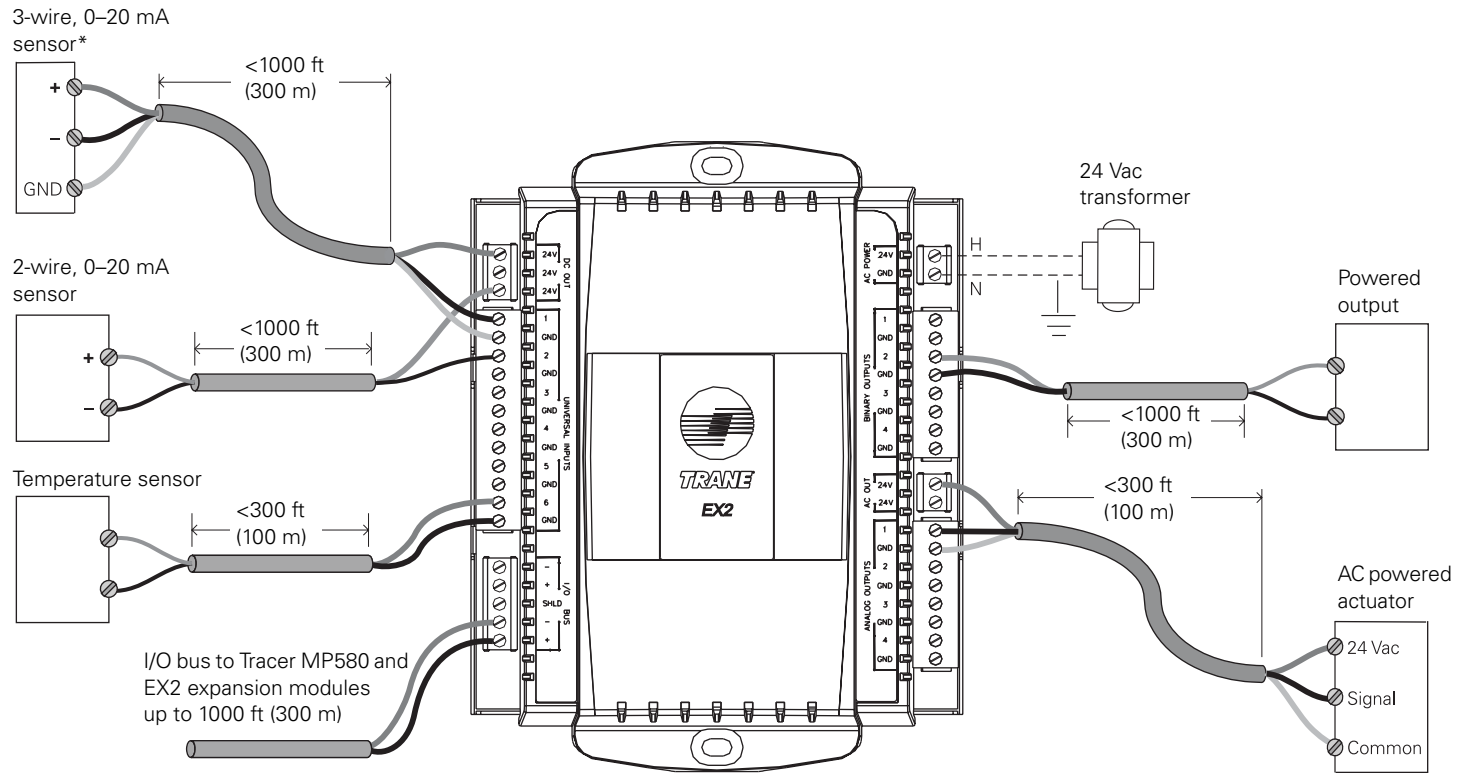


Figure 9. Wiring diagram for the EX2 expansion module



**\*Note:** Or a 3-wire 0–10 Vdc sensor with a distance limitation of 300 ft (100 m).

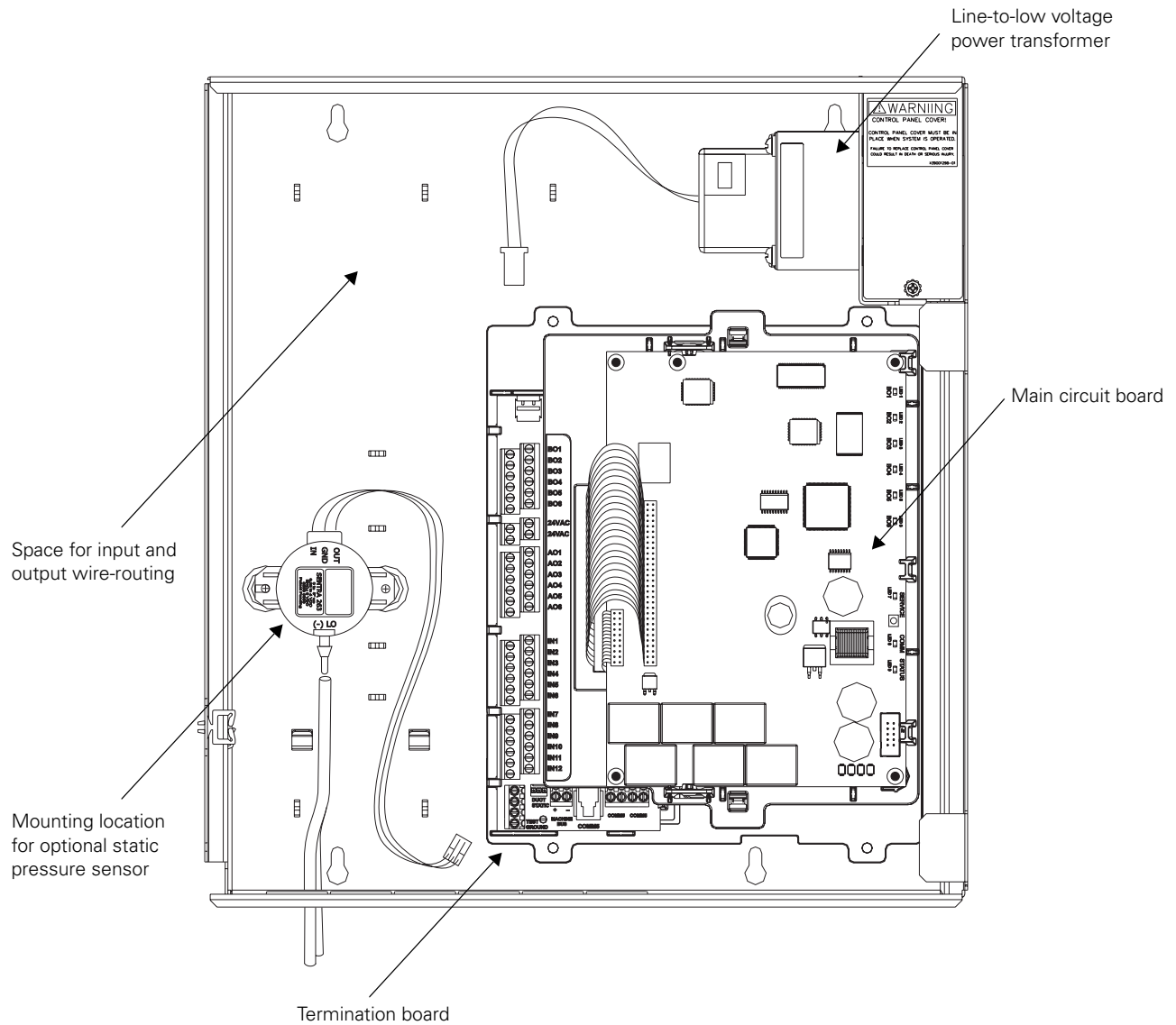
# Enclosure interior

Figure 10 shows the interior of the Tracer MP581 NEMA-1 enclosure. Significant space is available for wiring inputs and outputs. Wires should be routed after the optional pressure sensor is installed.

Tracer MP580 enclosure configurations are customized in the factory to meet customer requirements.

For interior details of a Tracer MP581 used in a smoke control system, see *Applications Guide, Engineered Smoke Control System for Tracer Summit*, BAS-APG001-EN.

Figure 10. Tracer MP581 enclosure interior



# Dimensions

Figure 11 shows the dimensions of the Tracer MP581 NEMA-1 enclosure. Figure 12 shows the dimensions of the frame-mounted Tracer MP581 controller.

The dimensions of the operator display models are listed in "Specifications" on page 14.

Figure 11. Tracer MP581 enclosure dimensions

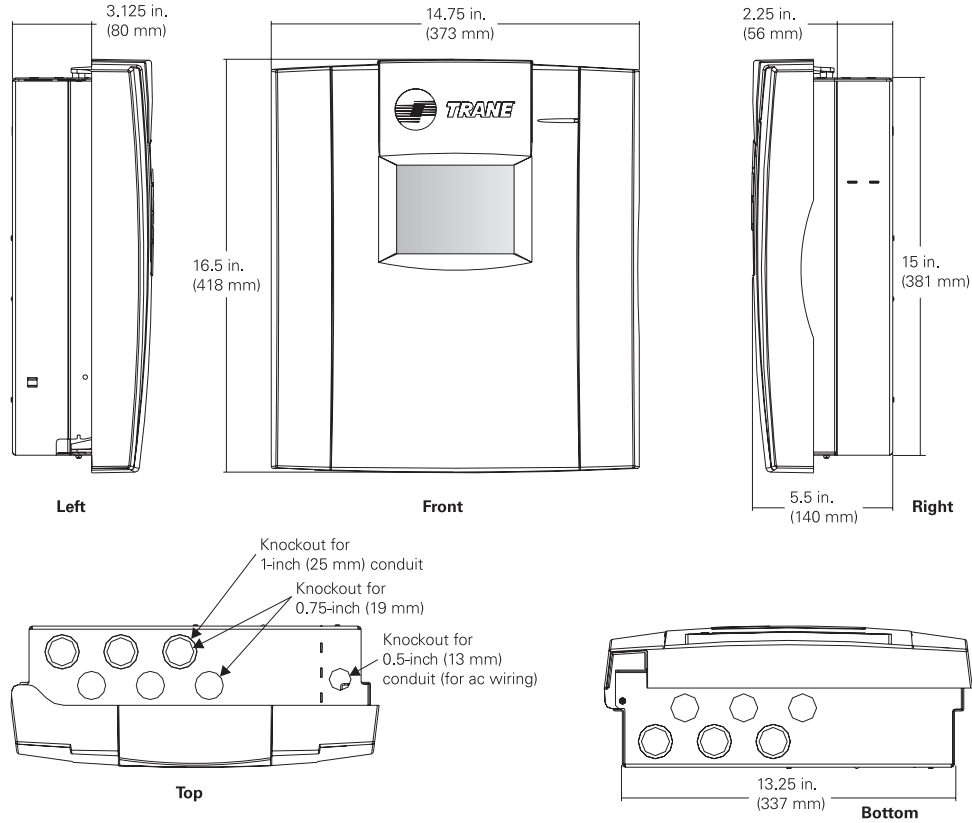


Figure 12. Frame-mounted Tracer MP581 dimensions

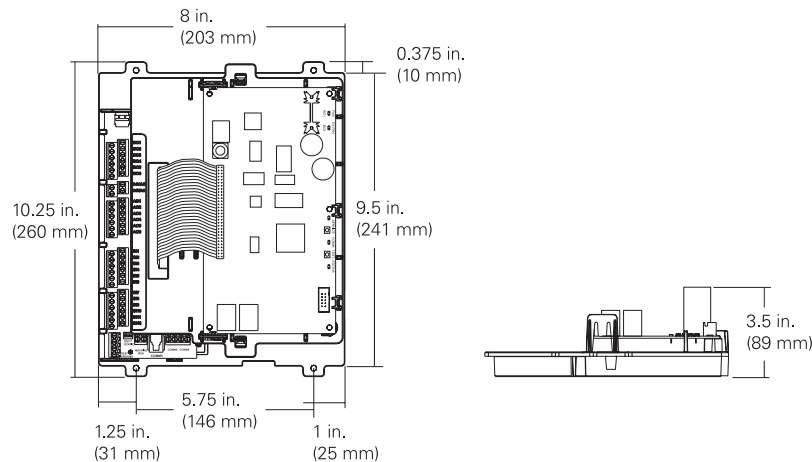


Figure 13. EX2 plastic-cover module dimensions

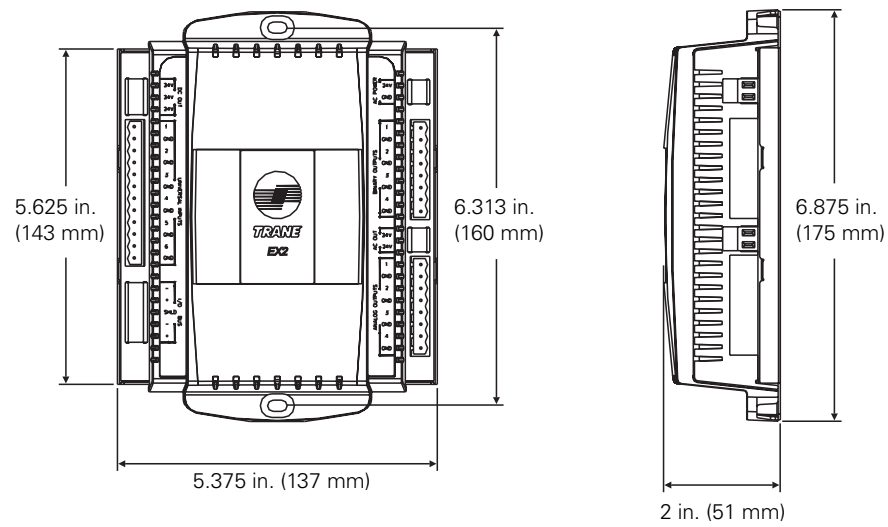
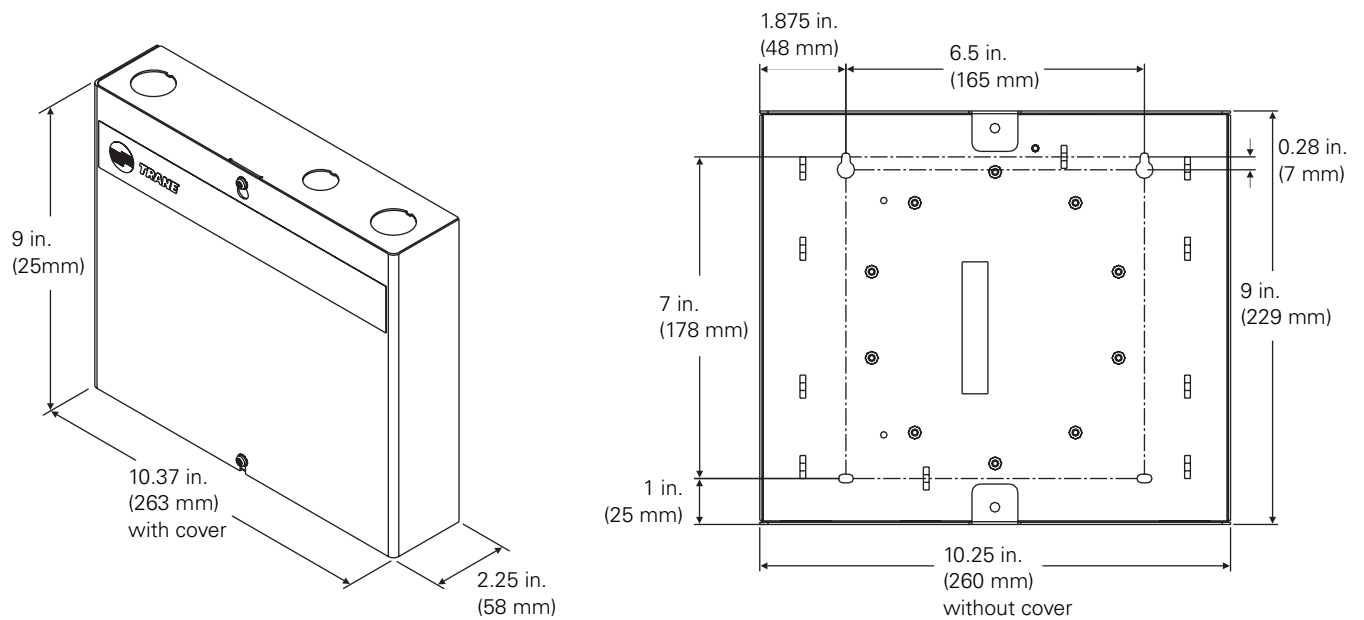


Figure 14. EX2 metal-enclosure module dimensions





# Specifications

## Tracer MP580/581

The specifications in this section apply to all Tracer MP580/581 models.

### Inputs and outputs

Twelve universal inputs

Dry contact binary (including pulse accumulation), 0–20 mA, 0–10 Vdc, linear resistance, or thermistor. The first four inputs can be used directly with resistance temperature detectors (RTDs).

Six binary outputs

Tracer MP580: 3 VA per ordered binary output isolation relay  
Tracer MP581: 12 VA at 24 Vac powered relay contacts

Six analog outputs

0–10 Vdc or 0–20 mA

Static pressure input

Specialized input for a Trane differential pressure sensor (5 Vdc, 0–5 in. wc)

### Analog-to-digital conversion

Resolution: 12 bits

### Digital-to-digital conversion

Resolution: 12 bits

### Microprocessor

Motorola MC68332 20 MHz

### Memory

RAM: 512 K  
ROM: 2 MB Flash  
EEPROM: 256 K

### Time clock

Included with operator display; crystal controlled, super-capacitor backed

### Battery

Not required—backed by super capacitor for 7 days under normal operating conditions; all other programs backed by non-volatile memory

### Agency listings/compliance

CE—Immunity (directive 89/336/EEC)  
EN 50090-2-2:1996

CE—Emissions (directive 89/336/EEC)  
EN 50090-2-2:1996  
EN 61000-3-2:1995  
EN 61000-3-3:1995

UL and C-UL listed

Energy management system

UL 916

FCC approved: Part 15, Class A

UL864-UUKL

Engineered smoke control

## Tracer MP581 with NEMA-1 enclosure

### Power requirements

Nominal rating

120/230 Vac; 50/60 Hz; 1 phase

Voltage utilization range

120 Vac nominal: 98–132 Vac  
230 Vac nominal: 196–264 Vac

### Operating environment

From 32°F to 122°F (0°C to 50°C)

Humidity: 10–90% non-condensing

### Storage environment

Temperature

Without display: From –58°F to 203°F (–50°C to 95°C)

With display: From –13°F to 149°F (–25°C to 65°C)

Humidity: 10–90% non-condensing

### Dimensions

16.5 in. × 14.75 in. × 5.5 in.  
(418 mm × 373 mm × 140 mm)

### Minimum clearances

12 in. (30 cm) top, bottom, and right  
24 in. (60 cm) left  
36 in. (90 cm) front

### Weight

15 lb (7 kg)

### Mounting

Wall-mounted with #10 (5 mm) screws

## Frame-mounted

### Tracer MP581

Specifications not repeated here are the same as for the NEMA-1 enclosure.

### Power requirements

Nominal rating

24 Vac; 50/60 Hz; 1 phase

Voltage utilization range

24 Vac nominal: 19–30 Vac

### Operating environment

From –40°F to 158°F (–40°C to 70°C)

Humidity: 10–90% non-condensing

### Dimensions

10.25 in. × 8 in. × 3.5 in.  
(260 mm × 203 mm × 89 mm)

### Minimum clearances

0.5 in. (1.3 cm) top, right, and front

6 in. (15 cm) left (for I/O wiring)

3 in. (8 cm) bottom (for comm wiring)

### Weight

2 lb (1 kg)

### Mounting

Requires #8 (4 mm) screws

## Factory-installed

### Tracer MP580

Specifications not repeated here are the same as for the NEMA-1 enclosure.

### Enclosure

On M-Series air handlers, the Tracer MP580 controller is mounted in a galvanized steel enclosure to minimize costs, facilitate factory mounting, and match unit construction. On T-Series air handlers, the Tracer MP580 controller is mounted in a control panel inside the unit.

### Operator display

On M-Series air handlers, the operator display can be mounted at the factory or shipped loose for field installation. Operator displays are shipped loose for T-Series air handlers. Door-mounted operator displays are not available for the Tracer MP580.

## Operator display

### Touch screen

Video graphics adapter (VGA) backlit liquid crystal display (LCD) with touch screen; 4.5 in. × 3.4 in. (115 mm × 86 mm) viewable area; resolution of 320 × 240 pixels

### Operating environment

From 32°F to 122°F (0°C to 50°C)  
Humidity 10–90% non-condensing

### Portable and stand-alone enclosure dimensions

10.25 in. × 8.75 in. × 2.25 in.  
(260 mm × 222 mm × 58 mm)

### Mounting distance for stand-alone operator display

10 ft (3 m) with attached cable; extendable to 150 ft (46 m) as described in the installation sheet for the stand-alone operator display (3270 3338).

## EX2 expansion module

### Inputs and outputs

Six universal inputs; four binary outputs; four analog outputs

### Mounting distance

Up to 1000 ft (300 m) from controller

### Power requirements

Nominal rating  
24 Vac; 50/60 Hz; 1 phase

Voltage utilization range  
24 Vac nominal: 19–30 Vac

### Operating environment

From –40°F to 158°F (–40°C to 70°C)  
Humidity 5–95% non-condensing

### Storage environment

From –40°F to 185°F (–40°C to 85°C)  
Humidity 5–95% non-condensing

### Dimensions

Metal-enclosure module:  
10.25 in. × 9 in. × 2.25 in.  
(260 mm × 229 mm × 58 mm)

Plastic-cover module:  
6.875 in. × 5.375 in. × 2 in.  
(175 mm × 137 mm × 51 mm)

### Minimum clearances

Metal-enclosure module:  
1 in. (25 mm) top, bottom  
2 in. (51 mm) left, right  
24 in. (610 mm) front

Plastic-cover module:  
1 in. (25 mm) top, bottom  
4 in. (102 mm) left, right, front

### Weight

Metal-enclosure module: 8 lb (4 kg)

Plastic-cover module: 2 lb (1 kg)



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