Tracer™ Controllers

Tracer MP580/581
Programmable Controllers

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Product overview

The Tracer MP580 programmable controller is factory-installed on Trane Modular and T-Series Climate Changer air handlers.

The Tracer MP581 programmable controller is available for field installation for a variety of heating, ventilating, 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
Several models of Tracer MP580/581 controllers are available. Tracer MP581 models are illustrated in Figure 1 on page 5. Operator-display touch screens are available as an option for all models.

Tracer MP580 on Trane air handlers
The Tracer MP580 controller is available packaged with Trane Modular and T-Series Climate Changer 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 programmed at a different location while installation and wiring are completed. The frame-mounted Tracer MP581 can be mounted in new equipment or an existing enclosure.

Tracer MP581 in a 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 provides power to the electronics. The enclosure has a hinged door and plenty of room for input and output wiring. The complete assembly is UL-listed.

Inputs and outputs
Tracer MP580/581 controllers have the following inputs and outputs (illustrated in Figure 8 on page 11):

- **12 universal inputs**
  Dry contact binary (including pulse accumulation), 0–20 mA, 0–10 Vdc, linear resistance, or thermistor. Four of the twelve inputs can be used directly with resistance temperature detectors (RTDs).

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

- **6 binary outputs**
  12 VA at 24 Vac powered relay contacts.

- **6 analog outputs**
  0–10 Vdc or 0–20 mA.
Figure 1: Tracer MP581 and operator display models

- Tracer MP581 with optional operator display
- Tracer MP581 without operator display
- Portable operator display
- Stand-alone operator display
- Frame-mounted Tracer MP581
Features

Graphical programming
The Tracer graphical programming (TGP) editor, shown in Figure 3 on page 7, eliminates the need for line-by-line programming. The TGP editor is a software component of Trane’s 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 4 on page 7).
- Programs are stored in the controller along with their graphical representation, and can be uploaded, viewed, and re-used.

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. Tracer MP580/581 controllers can work with any control system that supports the LonTalk protocol and uses FTT10-A communications.

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 shows a typical operator display screen.

Figure 2: Typical status screen

The operator display is available in the following configurations:

- Door-mounted on the Tracer MP581
- Stand-alone operator display for mounting up to 20 ft (7 m) away from a Tracer MP580 or MP581
- Portable operator display for temporary connections to the Tracer MP580/581 or Tracer AH540/541

Figure 1 on page 5 illustrates the operator displays available for the Tracer MP581.
Figure 3: TGP editor showing a supply fan program

Figure 4: TGP printout of a hot water valve program
Figure 5 shows the dimensions of the frame-mounted Tracer MP581 controller. Figure 6 on page 9 shows the dimensions of the Tracer MP581 NEMA-1 enclosure.

Figure 5: Frame-mounted Tracer MP581 dimensions
**Figure 6:** Tracer MP581 enclosure dimensions

Knockout for 1-inch (25 mm) conduit
Knockout for ¾-inch (19 mm) conduit
Knockout for ½-inch (13 mm) conduit (for ac wiring)

- 3 ¼ in. (80 mm)
- 14 ¼ in. (373 mm)
- 2 ¼ in. (56 mm)
- 16 ½ in. (418 mm)
- 15 in. (381 mm)
- 5 ½ in. (140 mm)
- 13 ¼ in. (337 mm)
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
Figure 8 shows typical input and output connections to the termination board. For details on inputs and outputs, see “Inputs and outputs” on page 4.

**Figure 8: Wiring diagram**

- **Powered output**
  - <1000 ft (300 m)

- **0–10 Vdc output**
  - Load > 500 Ω
  - <1000 ft (300 m)

- **Temperature sensor**
  - <300 ft (100 m)

- **0–20 mA sensor**
  - <1000 ft (300 m)
Enclosure interior

Figure 9 shows the interior of the Tracer MP581 NEMA-1 enclosure.

**Figure 9**: Tracer MP581 enclosure interior

- Line-to-low voltage power transformer
- Main circuit board
- Mounting location for optional static pressure sensor
- Termination board
## Specifications

### Power requirements
Nominal rating: 24/120/230 Vac; 50/60 Hz; 1 phase
Voltage utilization range
- 24 Vac (frame-mounted): 19–30 Vac
- 120 Vac nominal: 98–132 Vac
- 230 Vac nominal: 184–254 Vac

### Operating environment
**Temperature**
- Without display: From –40°F to 158°F (–40°C to 70°C)
- With display: 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

### Available enclosures
- Tracer MP580: metal enclosure packaged with air handler
- Tracer MP581 NEMA-1 enclosure
- Frame-mounted (no enclosure)

### Dimensions
- **Tracer MP580 enclosure**
  - 15 in. × 8 ½ in. × 5 in. (381 mm × 215 mm × 127 mm)
- **Tracer MP581 NEMA-1 enclosure**
  - 16 ½ in. × 14 ¼ in. × 5 ½ in. (418 mm × 373 mm × 140 mm)
- **Frame-mounted Tracer MP581**
  - 10 ¼ in. × 8 in. × 3 ½ in. (260 mm × 203 mm × 89 mm)

### Minimum clearances
- **NEMA-1 enclosure**
  - 12 in. (30 cm) top, bottom, and right
  - 24 in. (60 cm) left
  - 36 in. (90 cm) front
- **Frame-mounted**
  - ½ in. (1.3 cm) top, right, and front
  - 6 in. (15 cm) left (for I/O wiring)
  - 3 in. (8 cm) bottom (for communications wiring)

### Weight
- With NEMA-1 enclosure: 15 lb (7 kg)
- Frame-mounted: 2 lb (1 kg)

### Mounting
- NEMA-1 enclosure: wall-mounted with #10 (5 mm) screws
- Frame-mounted: #8 (4 mm) screws

### 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

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

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

### Agency listings/compliance
- 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
Since The Trane Company has a policy of continuous product and product data improvement, it reserves the right to change design and specifications without notice.