



## Installation Instructions

# Tracer® XM90 Expansion Module

Order Numbers: X1365167301

X396413240-01

### SAFETY WARNING

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.

### AVERTISSEMENT DE SÉCURITÉ

Seul le personnel qualifié doit installer et procéder à l'entretien des équipements. L'installation, le démarrage et la réparation des équipements de chauffage, de ventilation et de climatisation peuvent être dangereux et nécessitent une formation et des connaissances spécifiques. Un équipement mal installé, réglé ou modifié par un individu non qualifié peut entraîner des blessures graves, voire mortelles. Lors de toute intervention sur l'équipement, respectez toutes les précautions figurant dans la documentation et sur les étiquettes et autocollants fixés à l'équipement.

July 2020

BAS-SVN211D-EN

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The Tracer XM90 Expansion Module provides additional terminations when needed for Tracer UC400 and Tracer UC600 applications. Each expansion module has a total of 32 terminations: 16 universal inputs, 8 relay outputs, and 8 universal input/analog output terminations. Refer to Table 2 for specifications.

### Packaged Contents

- One (1) XM90 expansion module
- One (1) bag of terminal connectors
- One (1) ground wire
- One (1) ground screw
- One (1) IMC cable

**Important:** Visually inspect contents for obvious defects or damage. All components have been thoroughly inspected before leaving the factory. Any claims for damage incurred during shipment should be filed immediately with the carrier.

### Required Tools for Mounting and Wiring

A 1/8 in. (3 mm), flat-bladed screwdriver is required to perform functions such as setting rotary addressing switches, tightening or loosening screw terminals, and removing or repositioning the controller on DIN rail.

### Warnings, Cautions, and Notices

Warnings, cautions, and notices are provided in appropriate places throughout this document:

#### CAUTION

##### Electrical Shock Hazard!

To observe safety precautions, do not mix Class 1 and Class 2 voltages in an enclosure or on a controller without an approved barrier between the wiring.

#### ATTENTION

##### Risque d'électrocution!

Ne pas mélanger les câblages de tension de classe 1 et de classe 2 dans un boîtier ou sur un régulateur sans une séparation homologuée entre les câblages.

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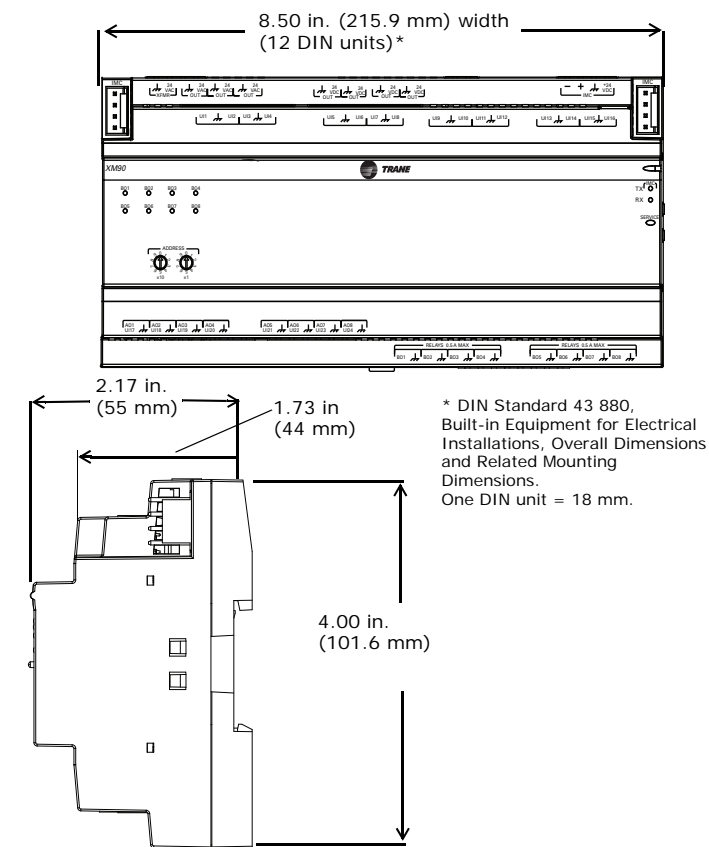
## Storage and Operating Environment Specifications

Table 1. Storage specifications

Storage	
Temperature:	-67°F to 185°F (-55°C to 85°C)
Relative humidity:	5% to 95% (non-condensing)
Operating	
Temperature:	-40°F to 158°F (-40°C to 70°C)
Humidity:	Between 5% to 95% (non-condensing)
Power:	Input: 18 to 30 Vac (24 Vac nominal) 50 or 60 Hz, 50 VA, 2.08A max @ 500mA load (on 24 Vdc output terminals), plus a maximum of 12 VA for each binary output up to 8 total. Output: 24 Vdc, ±10%, device max load 500mA dc Class 2.
Communication	IMC, 5 Vdc, Class 2, IMC terminals
Mounting weight of controller:	Mounting surface must support 1.3 lb. (0.6 kg)
Environmental rating (enclosure):	NEMA 1
Installation:	UL 840: Category 3
Pollution:	UL 840: Degree 2

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## Dimensions



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## Mounting and Removing the XM90

The Tracer XM90 should be properly mounted on a DIN rail. Control cabinets that include DIN rails are available from Trane.

If using a DIN rail from another manufacturer, follow the recommended installation procedures that accompany it.

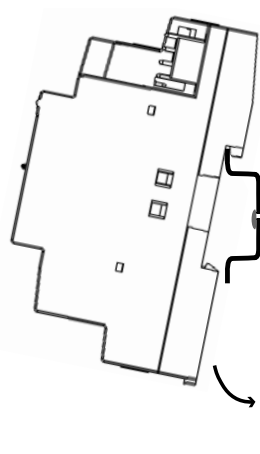
**Important:** When mounting the module in a control cabinet, provide adequate spacing between modules to allow for ventilation and heat dissipation.

#### NOTICE:

##### Avoid Equipment Damage!

Do not use excessive force to install device on to the DIN rail. Excessive force could result in damage to the plastic enclosure.

Figure 1. Mounting the expansion module



#### To mount the expansion module:

1. Hook device over top of DIN rail (figure 1).
2. Gently push on lower half of device in the direction of arrow until the release clip clicks into place.

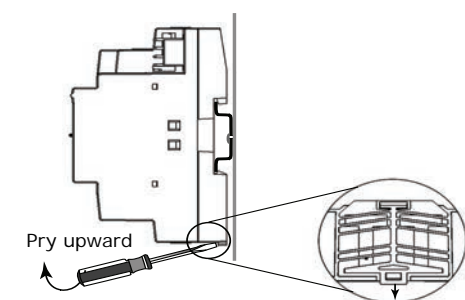
#### To remove or reposition the expansion module:

1. Disconnect all connectors before removing or repositioning.
2. Insert screwdriver into slotted release clip and gently pry upward with the screwdriver to disengage the clip (figure 2).
3. While holding tension on the clip, lift device upward to remove or to reposition.
4. If repositioned, push on the device until the release clip clicks back into place to secure the device to DIN rail.

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## Powering the XM90

Figure 2. Removing the expansion module



Slotted release clip shown from back side

All wiring must comply with the National Electrical Code (NEC)™ and local electrical codes.

#### WARNING

##### Hazardous voltage!

Disconnect all electric power, including remote disconnects, before servicing. Follow proper lockout and/or tagout procedures to ensure the power cannot be inadvertently energized. Failure to disconnect power before servicing could result in serious injury or death.

#### AVERTISSEMENT

##### Risque d'électrocution!

Avant toute intervention, couper toutes les alimentations électriques, y compris des sectionneurs déportés. Respecter les procédures de verrouillage et/ou d'étiquetage appropriées pour éviter tout risque de remise sous tension accidentelle. Le non-respect de cette recommandation peut entraîner des blessures graves voire la mort.

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#### CAUTION

##### Personal Injury and Equipment Damage!

After installation, make sure to check that the 24 Vac transformer is grounded through the module as illustrated in Figure 3 panel 8. Failure to check could result in personal injury and/or damage to equipment. Measure the voltage between chassis ground and any ground terminal on the module. Expected result: Vac ≤ 4.0 V.

#### ATTENTION

##### Dommages corporels et matériels!

Après l'installation, vérifiez que le transformateur 24 V C.A. est mis à la terre via le module comme illustré par la figure 3 du panneau 8. Le non-respect de cette recommandation peut entraîner des blessures corporelles graves et/ou des dommages matériels. Mesurer la tension entre la masse du châssis et toute borne de masse sur le module. Résultat escompté: V C.A. ≤ 4,0 V.

## Wiring Requirements

To ensure proper operation of the XM90, install the power supply circuit in accordance with the following guidelines:

- The XM90 should receive AC power from a dedicated power circuit; failure to comply may cause the controller to malfunction.
- A dedicated power circuit disconnect-switch must be near the XM90, easily accessible by the operator, and marked as the disconnecting device for the controller.
- DO NOT run AC power wires in the same wire bundle with input/output wires; failure to comply may cause the expansion module to malfunction due to electrical noise.
- 18 AWG copper wire is recommended for the circuit between the transformer and the expansion module.

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## Transformer Requirements

- AC transformer requirements: UL listed, Class 2 power transformer, 24 Vac ±10%, device max load 60 VA. The transformer must be sized to provide adequate power to the XM90 expansion module (60 VA) and outputs (maximum 12 VA per binary output).
- CE-compliant installations: The transformer must be CE marked and SELV compliant per IEC standards.

#### NOTICE:

##### Avoid Equipment Damage!

Sharing 24 Vac power between controllers could cause equipment damage.

A separate transformer is recommended for each controller. The line input to the transformer must be equipped with a circuit breaker sized to manage the maximum transformer line current.

If a single transformer is shared by multiple XM90/UC600 devices:

- The transformer must have sufficient capacity.
- Polarity must be maintained for every XM90/UC600 device powered by the transformer.

**Important:** If polarity is inadvertently reversed between controllers that are powered by the same transformer, a difference of 24 Vac will occur between the grounds of each controller. The following symptoms

- Partial or full loss of communication on the entire BACnet MS/TP link
- Improper function of XM90 expansion module outputs
- Damage to the transformer or a blown transformer fuse

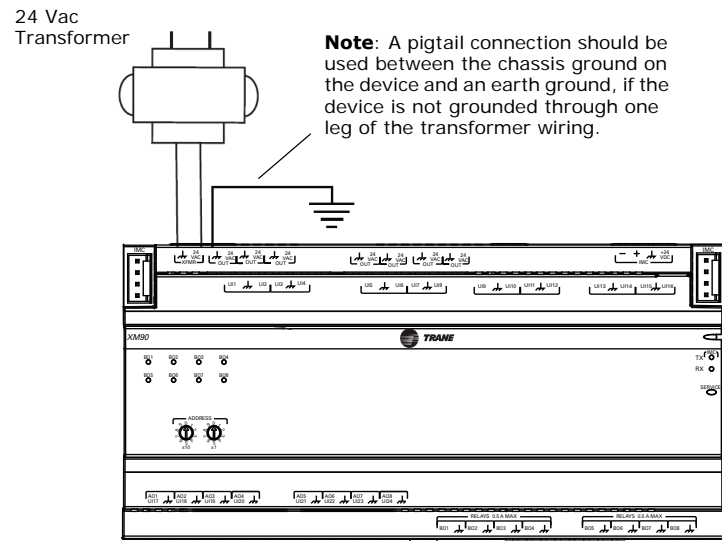
### Wiring AC Power to the XM90

1. Connect both secondary wires from the 24 Vac transformer to the XFMR terminals on the device.
2. Ensure the device is properly grounded.

**Important: This device must be grounded for proper operation!**  
 The factory-supplied ground wire must be connected from any chassis ground connection on the device (⊕) to an appropriate earth ground (⊖). The chassis ground connection used may be the 24 Vac transformer input at the device, or any other chassis ground connection on the device.

**Note:** The device is not grounded through the DIN rail connection.

Figure 3. Wiring AC power to the Controller



### Connecting Communications Wiring

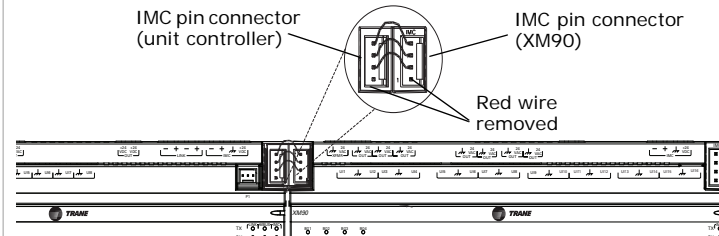
1. Connect the XM90 module and the UC400/600 by using either an IMC cable harness, or by running wire to the IMC screw terminal connectors.
2. If using an IMC cable harness, be sure to remove the bottom red wire as shown in Figure 4.

**Important:** Do not connect 24 Vdc power between the UC400/600 and the XM90.

**Notes:**

- An alternative wiring method is described in the Expansion Module IOM, BAS-SVX046.

Figure 4. IMC connections from an XM90 to a UC400/UC600/XM90



### Startup and Power Check

1. Verify that the 24 Vac connector and the chassis ground are properly wired.
  2. Set a unique and valid address for each device.
  3. Remove the lockout/tagout from the line voltage power to the electrical cabinet.
  4. Apply power to the XM90 and the UC400/UC600.
- The following table describes the XM90 LED activity and indicators.

Power LED	Indicates...
Green	Powered application is running, no faults or alarms present.
Solid Red	Low power, malfunction, no application, processor not running.
<b>Sequence on Powerup:</b> Illuminates red, then green.	
Service LED	Indicates...
Green	LED has been pressed and remains on until powered down.
Not illuminated	Normal operation.
<b>Sequence on Powerup:</b> One short green blink upon power-up or during memory test; will remain green if memory test fails. When the service LED is pressed, a module will continue using its normal node number for communication. However, it will communicate as node 0 if possible (this does not affect operation).	
<b>Note:</b> Immediately following discovery by the UC400/UC600, the service LED goes off.	

5. Open the Tracer TU™ service tool and then establish a direct connection to the UC400/600 by using a USB cable.  
**Note:** Do not connect through a zone sensor with Tracer TU for installation and discovery of the XM90 module, due to communication conflict on the IMC link.
6. On the right-hand side of the Tracer TU screen, click on the **Controller Settings Utility** tab and then select the **Controller Settings** tab from the top of the screen.
7. Open the **Expansion Module** group box and select the appropriate XM module from the drop down list, then select **Go** to add module.
8. Verify that the correct address is displayed for each module in the **Address** field. A rotary dial setting of **01 equals 1** in the **Address** field.
9. Click the **Send to Device** button. This action will reset the XM90 and the transmitting/receiving (TX/RX) LEDs will blink when communication occurs between the devices.

### Input and Output Wiring

**NOTICE:**

**Avoid Equipment Damage!**  
 Remove power to the XM90 before making input or output connections. Failure to do so may cause damage to the controller, power transformer, or input/output devices due to inadvertent connections to the power circuits.

Pre-power checks of input/output devices should be performed according to the *Tracer UC400 IOM (BAS-SVX20)* or the *Tracer UC600 IOM (BAS-SVX45)*. Maximum wire lengths are as follows:

Type	Maximum Wire Lengths	
	Inputs	Outputs
Binary	1,000 ft (300 m)	1,000 ft (300 m)
0–20 mA	1,000 ft (300 m)	1,000 ft (300 m)
0–10 Vdc	300 ft (100 m)	300 ft (100 m)
Thermistor/Resistive	300 ft (100 m)	Not Applicable

- All wiring must be in accordance with the NEC and local codes.
- Use only 18–22 AWG (1.02 mm to 0.65 mm diameter), stranded, tinned-copper, shielded, twisted-pair wire.
- Analog and 24 Vdc output wiring distances are dependent on the receiving unit specifications. Use shielding for analog and 24 Vdc outputs.
- DO NOT run input/output wires or communication wires in the same wire bundle with AC power wires.

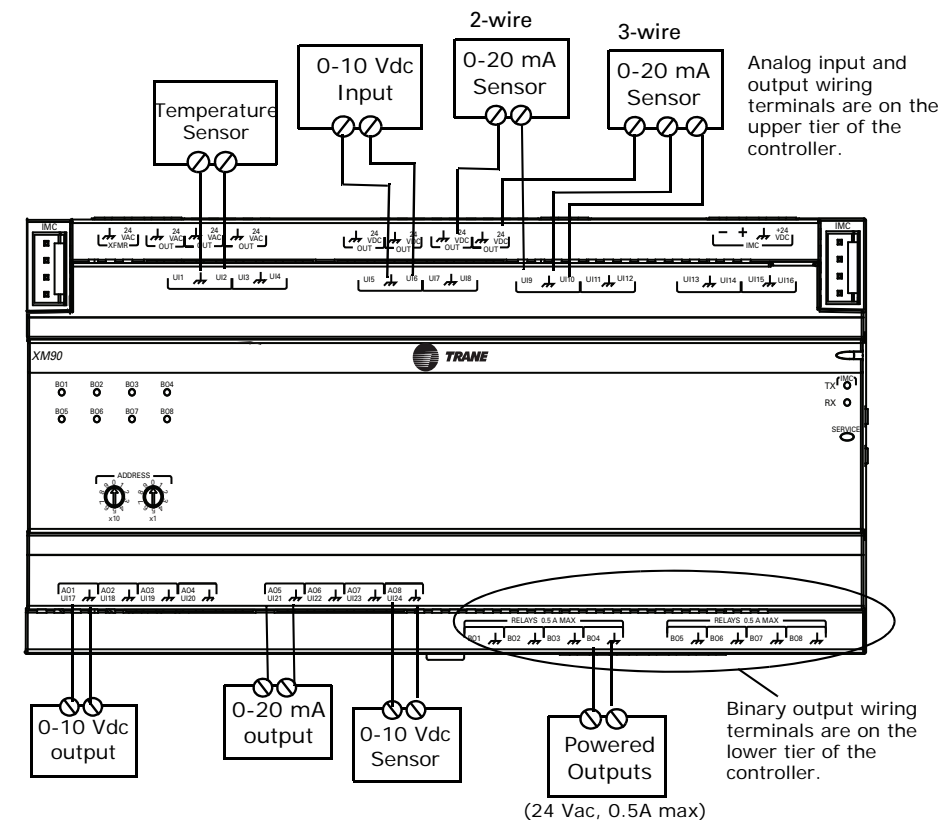
### Input and Output Specifications

Table 2. Expansion module input and output specifications

Input/Output type	Quantity	Types	Range	Notes
Universal input	16	Thermistor	10kΩ – Type II, 10kΩ – Type III, 2252Ω – Type II, 20kΩ – Type IV, 100 kΩ	The XM90 is limited to 10 combined 0–20 mA current inputs/outputs when powering up to two expansion modules (XM30/32).
		Resistive (Setpoint)	100Ω – 1MΩ	
		RTD	1kΩ: 385, 375 platinum, Balco™ or 672 nickel	
		Current	0–20 mA (linear)	
		Voltage	0–20 Vdc (linear)	
		Binary	Dry contact	
		Pulse Accumulator	Minimum 20 ms, opened or closed	Universal inputs require the following to meet the 25Hz requirement: duty cycle between 30% to 70% relay output - no load present when open.
Universal Input/Analog Output	Configure using any combination of analog or binary inputs/analog outputs			The XM90 is limited to 10 combined 0–20 mA current inputs/outputs when powering up to two expansion modules (XM30/32).
Inputs	8	Thermistor	10kΩ – Type II, 10kΩ – Type III, 2252Ω – Type II, 20kΩ – Type IV, 100 kΩ	The XM90 is limited to 10 combined 0–20 mA current inputs/outputs when powering up to two expansion modules (XM30/32). AO1/UI17 to AO8/UI24
		Resistive (Setpoint)	100Ω – 1MΩ	
		RTD	1kΩ: 385, 375 platinum, Balco™ or 672 nickel	
		Current	0–20 mA (linear)	
		Voltage	0–20 Vdc (linear)	
		Binary	Dry contact	
		Pulse Accumulator	Minimum 20 ms, opened or closed	Universal inputs require the following to meet the 25Hz requirement: duty cycle between 30% to 70% relay output - no load present when open.
Outputs	8	Current	0–20 mA @16 Vdc, Class 2	The XM90 is limited to 10 combined 0–20 mA current inputs/outputs when powering up to two expansion modules (XM30/32). AO1/UI17 to AO8/UI24
		Voltage	0–10 Vdc @20 mA, Class 2	Limited to 0–10 Vdc by software. AO1/UI17 to AO8/UI24
		Pulse	12.5ms to 1 second (12.5ms resolution), 1 second to 60 seconds (0.5 second resolution), 80Hz, <15V, Class 2	Limited to 0–10 Vdc by software. AO1/UI17 to AO8/UI24
Binary output	8	Relay – SPST (form A) Wet Contact	24 Vac, 0.5A maximum	Ranges are given per contact. BO1 to BO8
<b>Total terminations</b>	<b>32</b>			

### Input and Output Wiring Examples

Figure 4. XM90 input and output wiring examples



### Agency Listings and Compliance

The European Union (EU) Declaration of Conformity is available from your local Trane® office.

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