TX-I/O LCD Display by Point Type.

Point Type (LCD Bottom Row)		Normal Operation (LCD Top Row)		Error (LCD Top Row)
Analog Input, Resistance	▲N ▲Pt ▲T1	🌡	Temperature	
Analog Input, Voltage	▲V	▮▯	Low or high value	No voltage Voltage
Analog Input, Current	▲A	▮▯	Low or high value	No sensor
Analog Output, Voltage	▼V	▮▯	Low or high value	No voltage Voltage No output
Analog Output, Current	▼A	▮▯	Low or high value	No sensor No output
Digital Input, N/O Contact	▲ᴥ		Inactive Active	
Digital Input, N/C Contact	▲ϯ		Inactive Active	
Digital Input, Counter	▲Σ	▢▢▪ ▢▪▢ ▪▢▢	Step indicator	

SIEMENS

PXC Modular Series

Danger/Warning/Caution Notation

DANGER: ⚡ Electric shock, death, or severe property damage may occur if you do not perform a procedure as specified.

WARNING: ⚠ Personal injury or property damage may occur if you do not follow a procedure as specified.

CAUTION: ⚠ Equipment damage or loss of data may occur if you do not follow a procedure as specified.

PXC Modular Series Product Numbers

PXC00-PE96.A	RS-485 or Ethernet ALN, 96 FLN nodes
PXC00-E96.A	BACnet/IP ALN, 96 FLN nodes
PXC100-PE96.A	RS-485 or Ethernet ALN, TX-I/O Support, 96 FLN nodes
PXC100-E96.A	BACnet/IP ALN, TX-I/O Support, 96 FLN nodes
PXX-485.3	Expansion Module with three RS-485 FLN connections or one BACnet MS/TP FLN connection
PXA-DIN16KIT	Accessory kit with four 16-inch (406 mm) DIN rails

TX-I/O Product Numbers

TXS1.12F4	TX-I/O Power Supply for the TX-I/O Modules, fused at 4A
TXS1.12F10	TX-I/O Power Supply for the TX-I/O Modules, fused at 10A
TXS1.EF4	TX-I/O Bus Connection Module, fused at 4A
TXS1.EF10	TX-I/O Bus Connection Module, fused at 10A

TX-I/O Module Feature Summary

⚠️ **CAUTION:**

Active inputs and outputs are permitted on the same module when connected sensors are powered for that module. When sensors are externally powered, active inputs and outputs should be on separate modules.

TX-I/O Module Product Number and Name							
TXM1.8X-ML	TXM1.8X	TXM1.8U-ML	TXM1.8U	TXM1.8D	TXM1.16D	TXM1.6R-M	TXM1.6R
8 Super Universal		8 Universal		8 DI	16 DI	6 DO Relay	

Function		TXM1.8X-ML	TXM1.8X	TXM1.8U-ML	TXM1.8U	TXM1.8D	TXM1.16D	TXM1.6R-M	TXM1.6R
General	Local Override	●		●				●	
	LCD Display	●		●					
AI	NI 1000 LS	●	●	●	●				
	PT 1000 385	●	●	●	●				
	PT 1000 375	●	●	●	●				
	NTC 10K (w/out diode)	●	●	●	●				
	NTC 100K	●	●	●	●				
	0-10 Vdc	●	●	●	●				
	4-20 mA	●	●						
AO	0-10 Vdc	●	●	●	●				
	4-20 mA	●a	●a						
DI	Static Contact (NC/NO)	●	●	●	●	●	●		
	Pulse accumulator	●	●	●	●	●	●		
	25 Hz Counter (with debouncing)	●	●	●	●				
	10 Hz Counter (with debouncing)					●	●b		
DO	ON/OFF							●	●
	Pulse ON							●	●

a. 4-20 mA functionality is available only on point terminations 5-8.
b. 10 Hz counter functionality is available only on point terminations 1-8.
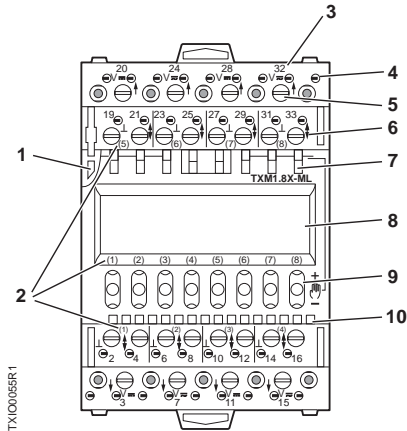
TX-I/O Module Symbols and Status LEDs

	LED, Symbol, or Feature	LED or Symbol	Indication
	⬓ (input arrow)	–	Input (arrow pointing IN toward center of module)
	▬	–	24 Vdc output (field supply)
	▬	–	24 Vac output (field supply)
7	Override status LEDs (yellow)	ON	Manual operation; a local override is active.
		OFF	No voltage **or** manual operation off
		Flashing or pulsing	• Override action • Remote override • **Output:** Local override is off; operation is not possible. • **Input:** Operation is not possible.
8	LCD signal display	–	Only on TX-I/O modules with **-ML** suffix.
9	Local override switch	–	Only on TX-I/O modules with **-M** or **-ML** suffix.
10	I/O status LEDs (green)		Status of the inputs and outputs (peripheral devices). LEDs are labeled with the I/O point number.
		ON	Binary value indication
		OFF	No voltage **or** binary value indication
		Flashing or pulsing	• Fault indication • Activity of field devices • Module unconfigured, no address key • Analog value indication

TX-I/O LCD Symbol Chart

TX-I/O LCD Display for General Errors and Reminders.

O Unconfigured	❓ Invalid value	✖ Point in manual override	Open circuit	⇧ Value above range limit
▲◉ Unconfigured point	! V▬	▬ Inactive point	Short circuit	⇩ Value below range limit

TX-I/O Module Product Diagram

TX-I/O Module Symbols and Status LEDs

	LED, Symbol, or Feature	LED or Symbol	Indication
1	Address key and module status LED (green)	–	Module status as a whole (as opposed to the I/O points).
		ON	Normal operation. 24 Vac (supply voltage) input present; fuse is intact.
		OFF	Error. • No 24 Vac (supply voltage) input. • Fuse is blown.
		Flashing or pulsing	• Fault indication • No address key • Remote override
2	I/O point numbers	–	–
3	Terminal number	–	–
4	Test point	–	
5	Connection terminals	–	Use No. 1 screwdriver.
6	⊥	–	System neutral
	↕	–	Configurable point
		–	Output (arrow pointing OUT from center of module)

General Installation Requirements

⚠ **CAUTION:**

All devices not isolated by a TIE or isolation transformer must be connected to the same grounding point.

⚠ **CAUTION:**

TX-I/O components require a system neutral with single point earth ground. Do not connect these components to a floating system neutral.

Third-party Transformer

- If powering from a third-party transformer, earth ground the secondary neutral to the same point for all panels powered by that transformer.

- If powering TX-I/O components from a third-party transformer, connect the transformer neutral to the building-approved earth ground.

I/O Module Insertion Required for Proper Grounding

All measuring/neutral terminals are connected in the plug-in I/O module, not in the terminal base. When the I/O module is removed, these terminals are not connected.
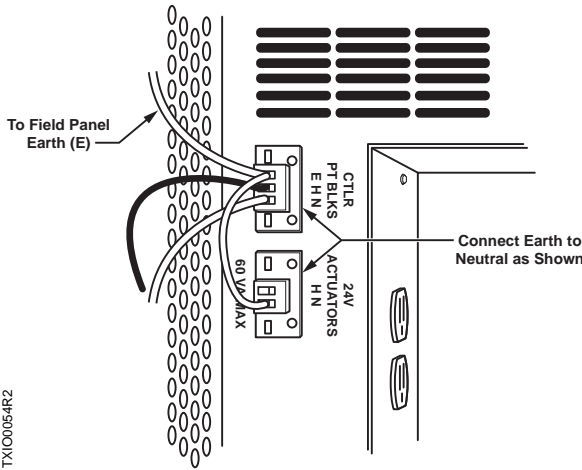
Service Box Grounding Modification

System Neutral (⊥) must be continuous throughout the TX-I/O bus.

- Whenever the entire system is not intentionally floating, including all I/O devices or peripherals, System Neutral is required to be earth-grounded at a single point only.
- The earth ground is installed in the primary field panel by a single jumper between the service box **E** terminal and **N** terminal.
- A jumper is not installed in any secondary field panel.

Energy Management Applications

For energy management only (low voltage Class 2), the PXC Modular may be mounted on a flat surface.

Applications Requiring a Secure Enclosure

For any application requiring a secure enclosure, mount the PXC Modular inside a listed enclosure along with a Service Box and Sidewall Kit, if needed.

Smoke Control Application Requirements
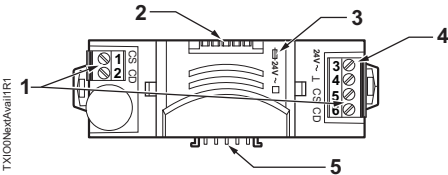
⚠️ **CAUTION:**

The 115V or 230V Service Box is required for UL864 and NFPA92A compliant installations. For more information, see the PX Series Service Box Assemblies Installation Instructions(553-131) or the *Service Box Installation Instructions* (586-135).

For non-UL864 and non-NFPA92A applications, any 24 Vac Class 2 transformer may be used.
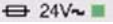
For smoke control applications over Ethernet or BACnet/IP, the PXC Modular must be connected to the Automation Level Network (ALN) through an Ethernet switch that is UL Listed for Fire Signaling. ALN and FLN circuits are supervised.
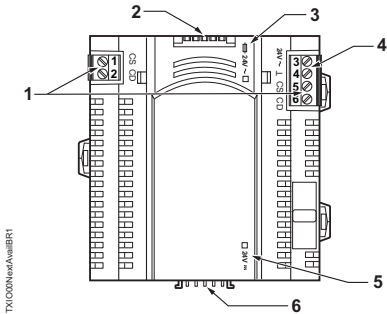
Bus Connection Module Product Diagram

Bus Connection Module Features, Symbols, and Status LEDs

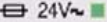|	LED, Symbol, or Feature	Status	Indication
1	CS	–	24 Vdc Communication Supply.
	CD	–	Communication Data (Signal).
2	TX-I/O bus connector (female)	–	Connection for the PXC Modular.
3	⊟ 24V~ ▪ Fuse LED for 24 Vac supply to peripheral devices	ON	Normal operation. 24 Vac (supply voltage) input present; fuse is intact.
		OFF	Error. • No 24 Vac (supply voltage) input. • Fuse is blown.
4	24V~	–	Supply voltage, 24 Vac input.
	⊥	–	System neutral.
5	TX-I/O bus connector (male)	–	Connection for TX-I/O Modules.

Supply Terminal Connections

- 24 Vac supply terminals are fused (replaceable) for Class 2 (24 Vac at 50/60 Hz) through the TX-I/O Power Supply.
- 24 Vdc supply terminals are connected in the I/O module, not in the terminal base. 24 Vdc is supplied and overload protected in the TX-I/O Power Supply and current-limited in the Bus Connection Module.

TX-I/O Power Supply Product Diagram

TX-I/O Power Supply Features, Symbols, and Status LEDs.

	LED, Symbol, or Feature	Status	Indication
1	CS	–	24 Vdc Communication Supply.
	CD	–	Communication Data (Signal).
2	TX-I/O bus connector (female)	–	Connection for the PXC Modular.
3	⊟ 24V~ ▪ Fuse LED for 24 Vac supply to peripheral devices	ON	Normal operation. 24 Vac (supply voltage) input present; fuse is intact.
		OFF	Error. • No 24 Vac (supply voltage) input. • Fuse is blown.
4	24V~	–	Supply voltage, 24 Vac input.
	⊥	–	System neutral.
5	▪ 24V⎓ (green) Module supply/field supply voltage, 24 Vdc (conductor CS, measured on bus).	ON	Normal operation. 24 Vdc bus voltage is in the acceptable range.
		OFF	Error. 24 Vdc bus voltage is outside the acceptable range. • Insufficient or shorted I/O bus supply. • An AC/DC converter is faulty.
6	TX-I/O bus connector (male)	–	Connection for TX-I/O Modules.

Supply Terminal Connections

- 24 Vac supply terminals are fused (replaceable) for Class 2 (24 Vac at 50/60 Hz) through the TX-I/O Power Supply or Bus Connection Module.

- 24 Vdc supply terminals are connected in the I/O module, not in the terminal base. 24 Vdc is supplied and overload protected in the TX-I/O Power Supply and current-limited in the Bus Connection Module.

For smoke control applications, mount the PXC Modular inside a 19" or 34" PX Series enclosure (PXA-ENC19 or PXA-ENC34). For more information, see the *19" and 34" PX Series Enclosure Assemblies Installation Instructions* (553-130).

- The controller must be located at the bottom of the enclosure.

- The controller may be oriented either horizontally or vertically.

- For Ethernet communications, the UL Listed surge protector (Ditek model DTK-MRJ45C5E) is required for Ethernet or BACnet/IP networks. The surge protector must be located in the same enclosure as the controller.

For modems used with smoke control applications:

- The UL864 Listed surge protector (538-600) is required.

- Devices connected between the USB port and the UL Listed surge protector must be located within the same room.

- A USB-to-RS-232 adaptor may be needed for UL Listed modems or UL Listed printers that are not configured for USB communication.

- The modem may be located inside the PX Series enclosure.

Required Tools and Materials

- Wire stripper/side cutter
- Small flat-blade screwdriver
- Phillips screwdriver
- Electric drill and Phillips driver bit
- Level
- Tape measure
- Digital multimeter (DMM)
- Black marker
- Masonry drill bit (to mount on concrete or masonry)
- Four wall anchors (to mount on concrete or masonry)
- Four No. 8-18 × 3/8" self-tapping Phillips screws

Expected Installation Time

20 minutes

Prerequisites

CAUTION:

No power wiring is connected to the PXC Modular or other TX-I/O components at this time.

- If mounting in an enclosure:
  - Enclosure is installed.
  - The power source is installed, as applicable.
  - The power is OFF.
- All necessary wiring is pulled and terminated per the layout drawing.
- Power and communication wiring is terminated to the removable plugs supplied with the devices.
- Power Requirements are met. See the *Power Requirements* section.
- Common Ground Requirements are met. See the *General Installation Requirements* section.
- Optional requirements are met. See the appropriate following sections:
  - *Smoke Control.*
  - *Energy Management Applications.*
  - *Applications Requiring a Secure Enclosure.*
- For TX-I/O™ Modules:
  - Point wiring is terminated on the TX-I/O Terminal Base.
  - TX-I/O Module labels have been printed from System Profile.
  - TX-I/O Modules are either removed from or parked in the terminal bases. See the *Separating a TX-I/O Module from Its Base* section.

See the *APOGEE Wiring Guidelines for Field Panels and Equipment Controllers* (125-3002) for detailed information on the following:

- Power requirements.
- Setting up smoke control applications.
- CE compliance wiring requirements.
- TX-I/O Module wiring diagrams.

Expansion Module Product Diagram
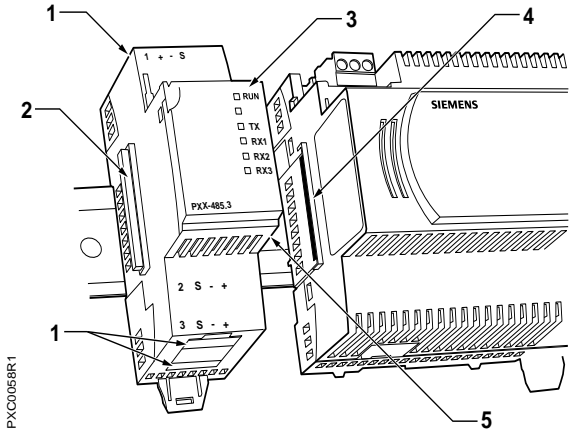
RS-485 Expansion Module Features, Symbols, and Status LEDs.

	LED, Symbol, or Feature	Status	Indication
1	↓ − +	–	P1 FLN ports.
2	Expansion connector	–	Connection for future expansion devices.
3	RUN (green)	ON	Normal operation. 24 Vac power is ON and the module firmware has booted.
		OFF	Error. • 24 Vac input is not present. • Power is ON, but the module firmware has not booted.
	TX (yellow) and RX (yellow)	Flashing	Normal operation. Transmitting (TX) or receiving (RX) over the RS-485 ALN trunk.
		OFF or ON solid	Error. No device, no connection, or bad connection.
4	PXC Modular Expansion port	–	PXC Modular connection for an RS-485 Expansion Module or future expansion devices.
5	Expansion connector	–	Connection to the PXC Modular.

PXC Modular Features, Symbols, and Status LEDs.

	LED, Symbol, or Feature	Status	Indication
1	24V~	–	Supply voltage, 24 Vac input.
2	⊥	–	System neutral.
3	⏚	–	Functional earth ground.
4	⯆ (USB symbol)	–	USB Host port. (Ancillary smoke control applications only.)
5	⬇ – +	–	P2 or RS-485 ALN port.
6	▭ (for future use)	–	SDIO card slot.
7	⛁ (Ethernet symbol)	–	Ethernet ALN port.
8	RUN (green)	ON	Normal operation. 24 Vac power is ON and the application firmware has booted.
		OFF	Error. • 24 Vac input is not present. • Power is ON, but the application firmware has not booted.
	FLT (red) (for future use)	–	–
	BAT (red)	ON	Error. Backup battery is low.
		OFF	Normal operation.
	COM (yellow)	ON	Linked to Ethernet hub.
		OFF	No link to Ethernet hub.
		Flashing	Linked to Ethernet hub and communicating.
	TX (yellow) and RX (yellow)	Flashing	Normal operation. Transmitting (TX) or receiving (RX) over the RS-485 ALN trunk.
		OFF or ON solid	Error. No device, no connection, or bad connection.
9	Tool/HMI	–	Human-Machine Interface port (RJ-45, service only).
10	AA (LR6) alkaline battery	–	SDRAM backup battery.
11	Coin cell (CR2032) battery	–	Real Time Clock backup battery.
12	FW (for future use)	–	Firmware reset button.
13	Reset	–	Coldstarts the PXC Modular.
14	⯆ (USB symbol)	–	USB Device port. For non-smoke control applications only.
15	Expansion port	–	Connection for an RS-485 Expansion Module or future expansion devices.
16	TX-I/O bus connector (male)	–	Connection for a TX-I/O Power Supply or Bus Connection Module, which powers TX-I/O Modules.

Power Requirements

Powering TX-I/O Primary Panels

One of the following power sources is pulled to the enclosure:

- 120 Vac, 60 Hz and terminated at the 115V PX Series Service Box.
- 230 Vac, 50/60 Hz and terminated at the 230V PX Series Service Box.
- 24 Vac, 50/60 Hz Class 2 from a third-party transformer and connected to a terminal block.

Powering TX-I/O Expansion Panels

Power wiring is run from the transformer in the primary panel to the expansion panel, if needed.

Separating a TX-I/O Module from Its Base

At the time the base is wired, the module should be either parked or removed.

⚠️ **CAUTION:**

Swing the address key away from the I/O module before removing an I/O module from its terminal base.

To remove, squeeze sides of module and pull

"Parked" position　　　　　Normal position

TXIO0056R1
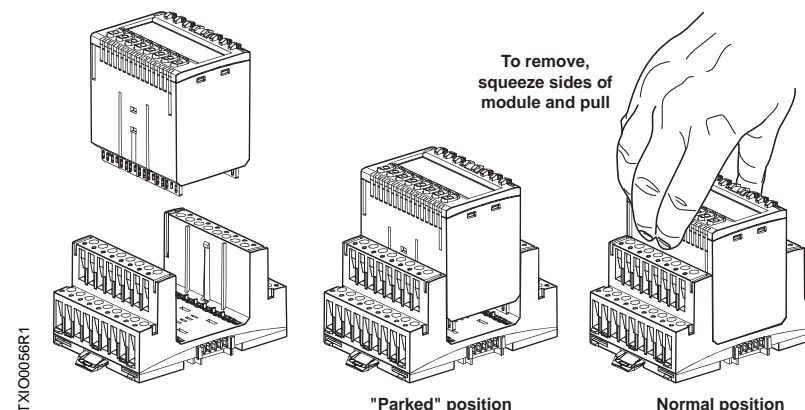
Installation Instructions

⚠️ **WARNING:**

Turn OFF power at the ON/OFF switch in the Service Box or transformer enclosure.

CAUTION:

Do not install the PXC Modular on a vibrating surface (for example, an air handler or ductwork).

This device includes electrical and electronic components and must not be disposed of as domestic waste. **Current local legislation must be observed.**

Class 1 and Class 2 Wiring Separation

CAUTION:

UL Listings require that NEC Class I and Class II wiring be kept separate from each other. Use separate conduit and cable tie bars to separate Class I Digital Output (DO) wires from all other Class II wiring.

Installing the DIN Rail

Use the following procedure if the DIN rail is not already installed.

Position the DIN rails either horizontally or vertically. Allow a minimum of 4.5 inches (11.43 cm) from obstructions on either side in order to provide a 2.5-inch (6.35 cm) minimum clearance for wiring.

1. Align and level the DIN rail on the mounting surface or the backplane of the enclosure.

2. Mark the position of the mounting holes at either end of the DIN rail.

    For longer DIN rails, use one mounting screw per running foot of DIN rail.

3. Using wall anchors, if necessary, attach the DIN rail to the surface or the backplane.

Removing the Connector Covers (If required)

Do not remove covers from the unused TX-I/O bus connectors at the ends of the self-forming bus.
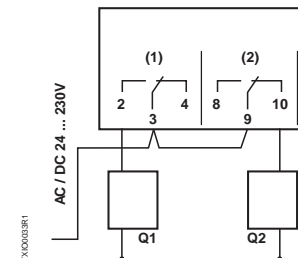
➤ Remove the connector covers from the hardware being installed.

Separate knockouts should be used for high voltage and low voltage wiring. Leave at least 2 inches (50.8 mm) of space between the Class 2 wires and other wires in the panel.
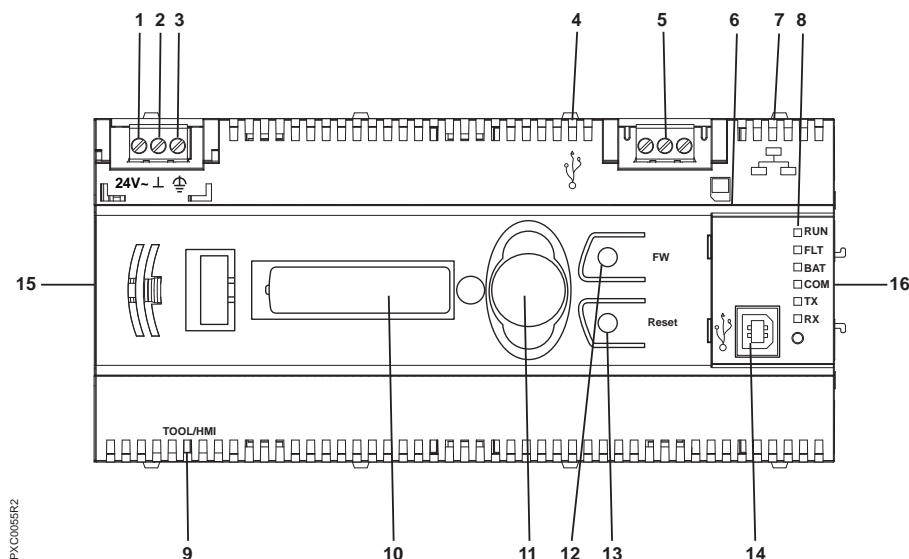
Latched Contact (NO and NC).

Q1   Switched load (N/O contact)
Q2   Switched load (N/C contact)

Digital Output Module (TXM1.6R or TXM1.6R-M).

## PXC Modular Product Diagram

Digital Input

Potential free (dry contact) for all points.

The neutral of a digital input (on Digital Input, Universal and Super Universal modules) can be connected to any neutral terminal on the same module. Several digital inputs can also share a neutral terminal on the same module.
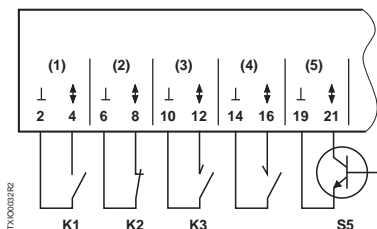
Latched or Pulsed Accumulator (NO and NC).

K1   Status contact (N/O)
K2   Status contact (N/C)
K3   Pulsed accumulator
S5   Electronic switch (rated for 30 V)
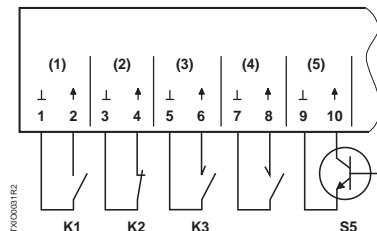
DI Module (TXM1.8D or TXM1.16D).

Latched or Pulsed Accumulator (NO and NC).

K1   Status contact (N/O)
K2   Status contact (N/C)
K3   Pulsed accumulator
S5   Electronic switch (rated for 30 V)

**Universal Module (TXM1.8U or TXM1.8U-ML) and
Super Universal Module (TXM1.8X or TXM1.8X-ML).**

Digital Output

Digital Output common is isolated for each relay and must be externally wired to other DO common if needed.

DANGER:

Digital Output modules connected to high voltage should incorporate a readily accessible disconnect device outside the panel. All low voltage and high voltage wiring must be routed separately within an enclosure so that low voltage and high voltage wiring cannot come in contact with each other. High- and low-voltage circuits cannot be located on adjacent terminals within a module.
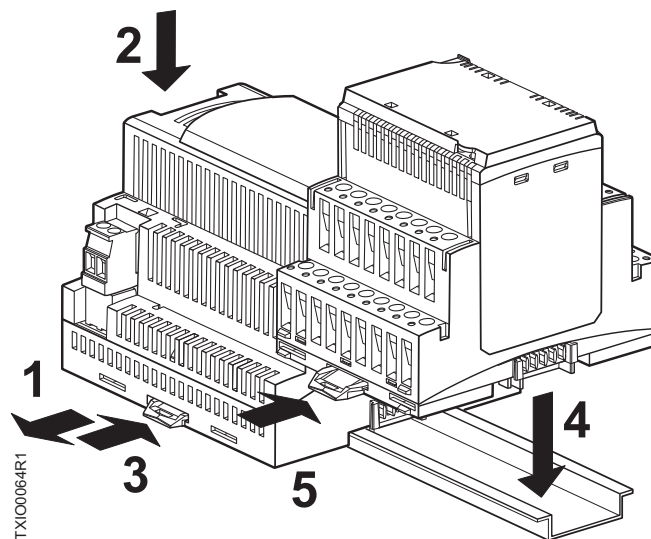
Installing Devices on the DIN Rail

PXC Modular Series and TX-I/O Product Range hardware must be mounted on a DIN rail.

Only insert or remove the PXC Modular, Power Supply, and Bus Connection Module when the power is OFF.

Basic Procedure

1.   Gently slide out the mounting tabs.

2.   Align the channel on the back of the device with the DIN rail.

3.   Using a flat-blade screwdriver, push in each mounting tab until it clips onto the DIN rail.

4.   For devices on the TX-I/O bus, align the new device above the adjacent bus connector and slide it down over the DIN rail and TX-I/O bus connector.

Installing the PXC Modular

1.   If an Expansion Module is used, plug it into the PXC Modular Expansion bus.

2.   Install the PXC Modular and optional Expansion Module on the DIN rail.

3. Connect one of the following devices to the TX-I/O bus connector on the PXC Modular:

   - TX-I/O Power Supply.
   - TX-I/O Bus Connection Module.

   The PXC Modular is now able to communicate on the TX-I/O bus.

Creating the TX-I/O Bus

➤ Create the TX-I/O bus by connecting the following devices one-after-another on a DIN rail:

   - TX-I/O Power Supply.
   - TX-I/O Bus Connection Module.
   - Any type of TX-I/O Module.

   > Each row of the TX-I/O bus must start with either a TX-I/O Power Supply or a TX-I/O Bus Connection Module.
   >
   > The male bus connector on these devices carries the bus communication signal and power for the TX-I/O modules.

   - For a horizontal DIN rail, TX-I/O bus communication and module power flows from left-to-right.
   - For a vertical DIN rail, TX-I/O bus communication and module power flows from top-to-bottom.

**Required Module Placement For Smoke Control**
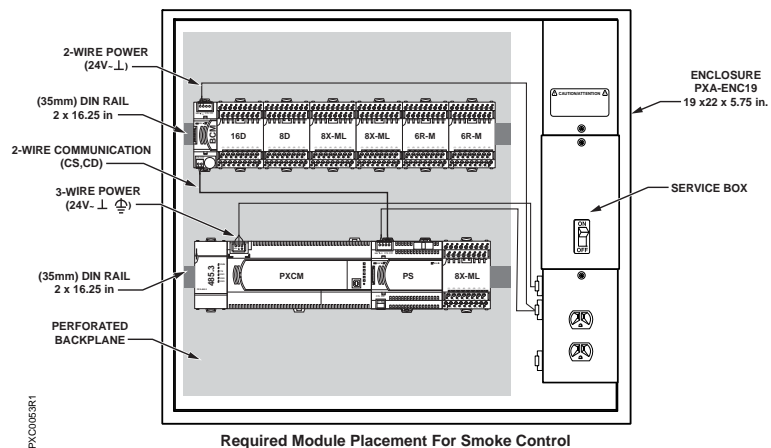
0-10 Vdc Sensors.

B4　0-10V sensor with external supply
B5　0-10V sensor with 24 Vac supply
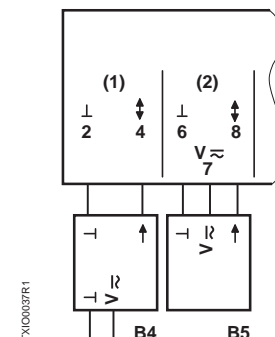
**Universal Module (TXM1.8U or TXM1.8U-ML) and
Super Universal Module (TXM1.8X or TXM1.8X-ML).**

2-Wire and 3-Wire Active Sensors.

B4　Active sensor with 24 Vdc supply
B5　Active sensor with 24 Vac supply
B6　Active sensor 4 to 20 mA (2 wire)
B7　Active sensor with external supply (Earth ground only at Service Box)
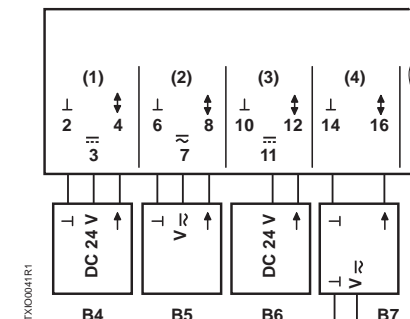
Super Universal Module (TXM1.8X or TXM1.8X-ML).

Analog Output Wiring Example.

Y1　Actuator with control input only, 0-10 Vdc (or 4-20 mA, Super Universal, points 5-8 only)
Y2-　General powered device with control, 0-
Y4　10 Vdc (or 4-20 mA, Super Universal, points 5-8 only)
Y2　24 Vac internal
Y3　24 Vdc internal
Y4　24 Vac external
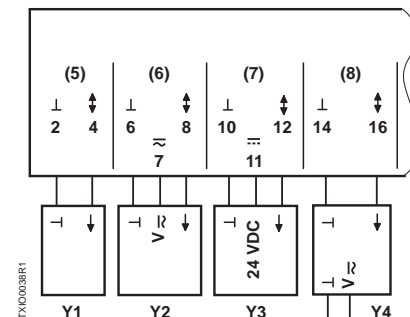
**Universal Module (TXM1.8U or TXM1.8UML) and
Super Universal Module (TXM1.8X or TXM1.8X-ML).**

Wiring Examples

⚠️ **DANGER:**

Do not install externally-powered Universal Inputs on the same module as Universal Outputs. Having both on the same module may cause inadvertent control of the output when power to the TX-I/O is off.

☝️ All supply terminals are connected in the I/O module, not in the terminal base.

Active Input and Output

⚠️ **DANGER:**

Do not install externally-powered Universal Inputs on the same module as Universal Outputs. Having both on the same module may cause inadvertent control of the output when power to the TX-I/O is off.

⚠️ **CAUTION:**

Active inputs and outputs are permitted on the same module when connected sensors are powered from that module. When sensors are externally powered, active inputs and outputs should be on separate modules.

☝️ The neutral of analog inputs and outputs must always be connected to the terminal associated with that I/O point.

### Temperature and Resistance Sensors.

B1   Ni 1000 LS temperature sensor
B2   Pt 1000 385 and Pt 1000 375 temperature sensors
R3   Resistance-type sensor
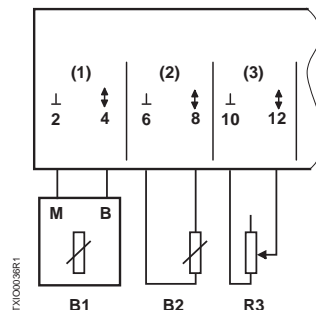
Universal Module (TXM1.8U or TXM1.8UML) and Super Universal Module (TXM1.8X or TXM1.8X-ML).

Required Module Placement For Smoke Control
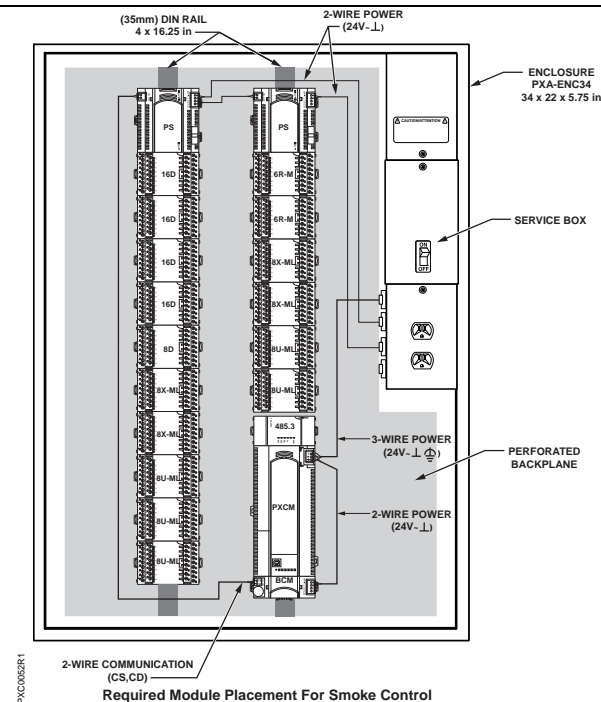
- The TX-I/O Power Supply and Bus Connection Module only supply 24 Vac to TX-I/O Modules on the male bus connector.

- TX-I/O Modules on the female bus connector do not receive power and have a fault condition.

- Do not connect TX-I/O modules directly to the PXC Modular Controller. The PXC Modular Controller does not have a bus power supply.

PXC0054R1
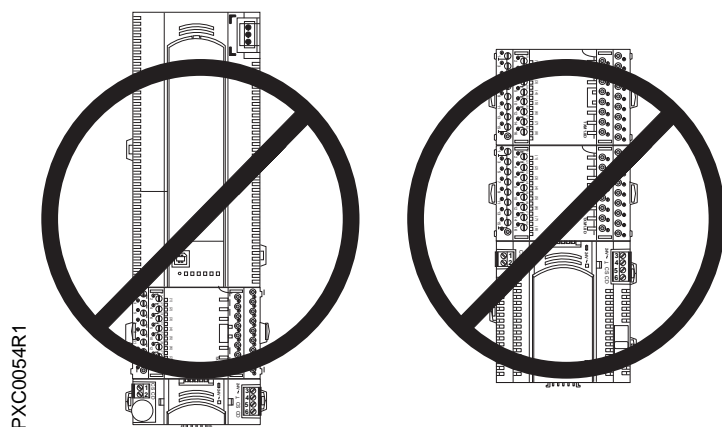
Problems: 1) TX-I/O Module is connected to the PXC Modular. 2) TX-I/O Module is connected to the female bus connector of the Bus Connection Module.

Problem: TX-I/O Modules are connected to the female bus connector of the TX-I/O Power Supply.

Connecting the Power and Communication Wires

1. Plug in the 24 Vac power from the Service Box or transformer terminal block.
2. Plug in the TX-I/O communication and power wires.
3. Plug in the FLN wires (if used).

Completing the TX-I/O Module Installation

1. Fully seat each TX-I/O module in its Terminal Base.
2. Remove the address keys from the strip, and then insert as shown.

   The TX-I/O address keys must be correctly seated and closed in order to function. Make sure the top of the address key is flush with the top of the module.
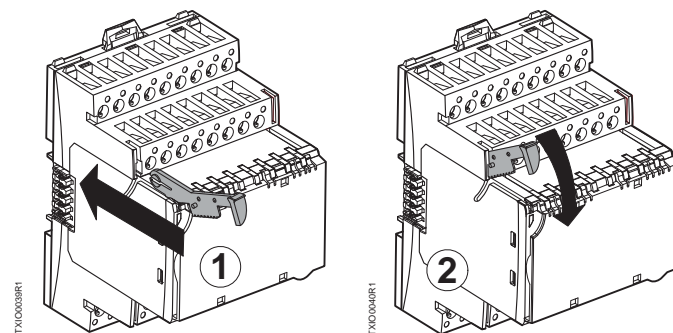
3. Insert the TX-I/O Module labels.
   a. Tear out and fold the labels.
   b. Match each label to the address key and slide the label into the detachable label holder.

Completing the Installation

   Do not connect the network communication cable until start-up is complete.

1. Ensure that AC power is turned ON at the circuit breaker panel.
2. Turn the power switch ON at the Service Box or transformer enclosure.
3. Verify the LEDs.

For more information, see the *PXC Modular Series Product Diagram* and *TX-I/O Module Product Diagram*.

The installation is now complete.