

**XT-9100 Extension Module
XP-910x Expansion Modules**

Text	Page
<i>English</i>	1
<i>Deutsch</i>	9
<i>Italiano</i>	19
<i>Español</i>	29
<i>Nederlands</i>	39
<i>Česky</i>	49
<i>Français</i>	58

This document is subject to change without notice.

Technische Änderungen vorbehalten.

Questo documento è soggetto a variazioni senza preavviso.

Este documento puede ser modificado sin previo aviso.

Dit document kan zonder kennisgeving gewijzigd worden.

Tento dokument podléhá změnám bez ohlášení.

Document non contractuel pouvant être modifié sans préavis.

**JOHNSON
CONTROLS**

Johnson Controls, Inc.
Westendhof 8
45143 Essen
Germany

Installation Guide
Rev. Level 0997

XT-9100, XP-910x

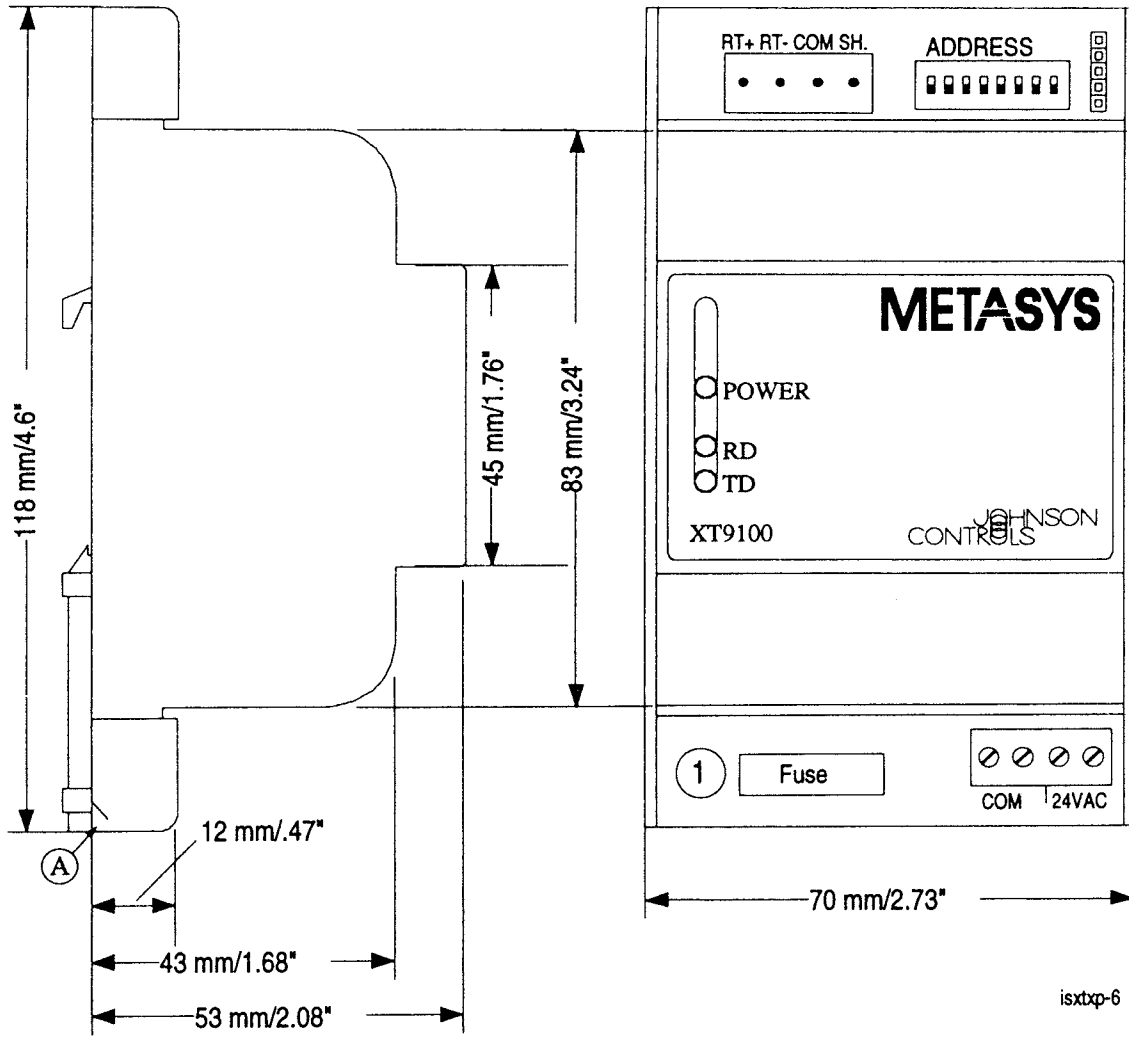


Figure 6: Module Dimensions

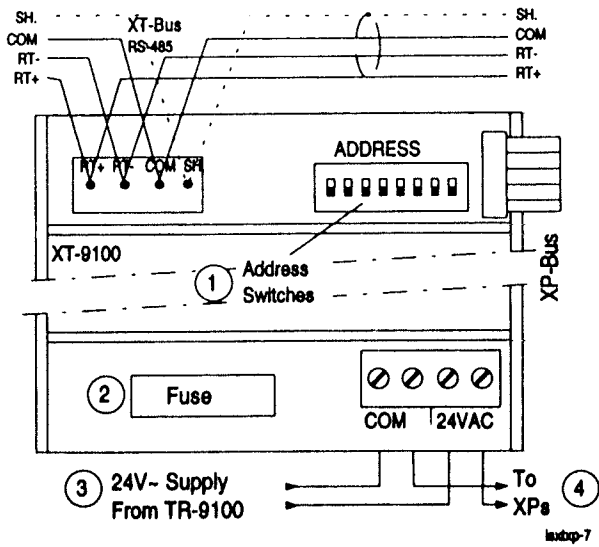


Figure 7: XT-9100

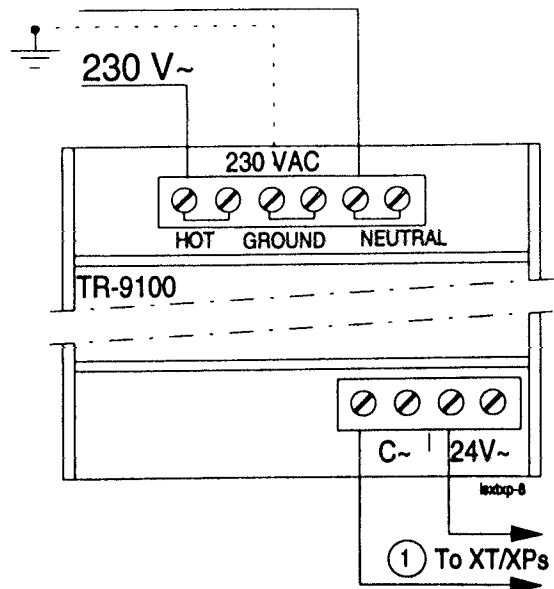


Figure 8: TR-9100

XT-9100, XP-910x

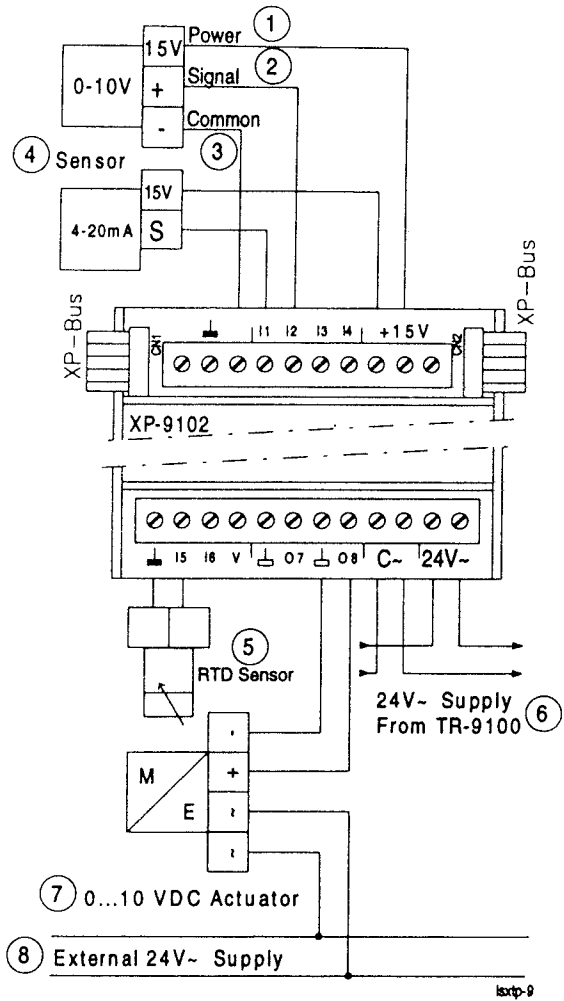


Figure 9: XP-9102

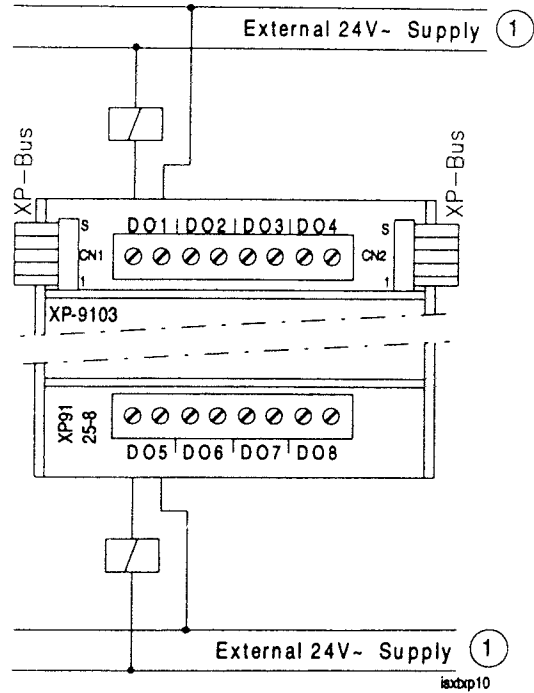


Figure 10: XP-9103

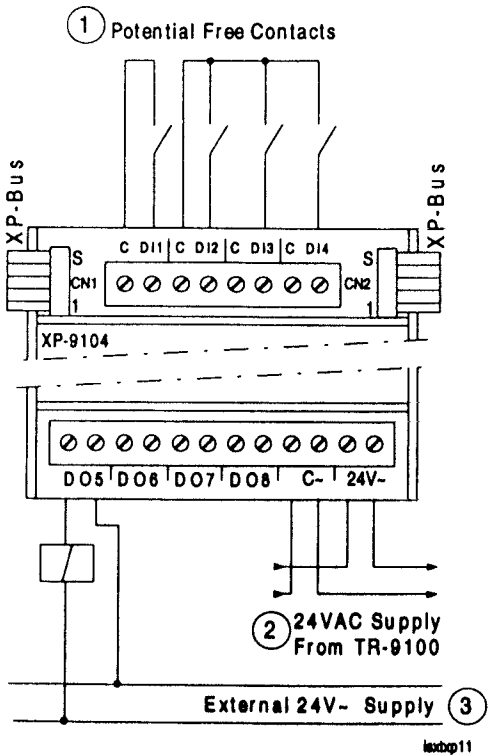


Figure 11: XP-9104

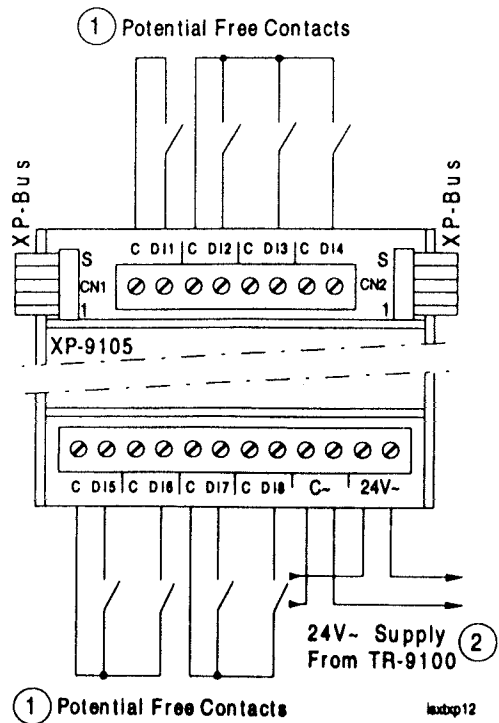


Figure 12: XP-9105

XT-9100, XP-910x

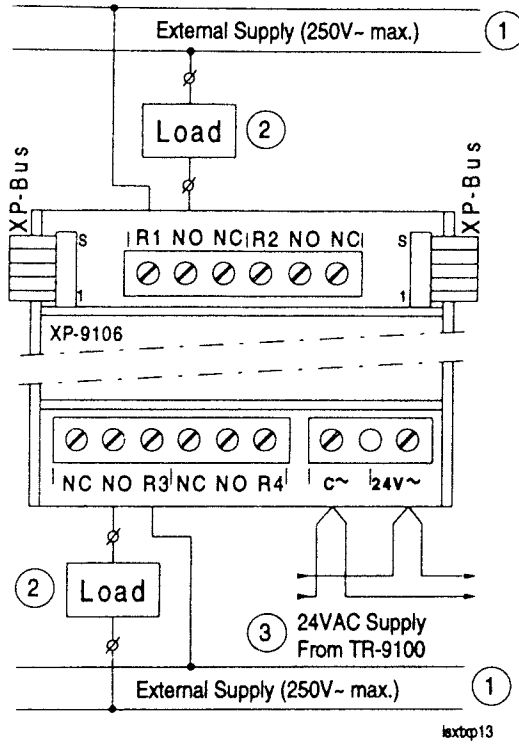


Figure 13: XP-9106

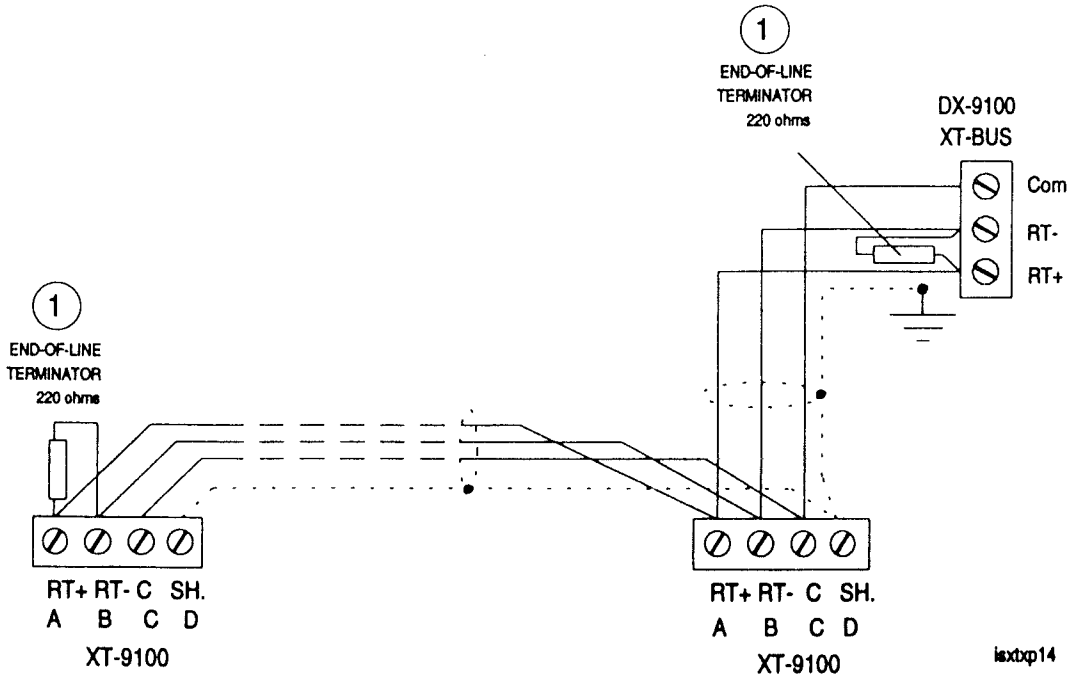


Figure 14: Connection Details for the XT-Bus

XT-9100 Extension Module XP-910x Expansion Modules

Theory of Operation

The XT-9100 Extension Module and XP-910x Expansion Modules have been designed to provide additional input and output capacity within Metasys networks, specifically for the DX-9100 Extended Digital Plant Controller. The XT-9100 module provides the communications interface, and the XP modules provide the analog and digital inputs and outputs.

A Supervisory System communicates with the XT-9100 via the N2 Bus or Bus 91.* See *Figure 1: General Application*.

The DX-9100 communicates with the XT-9100 via the XT-Bus, and data from the XT-9100 is updated and stored in the DX-9100. When the DX-9100 is connected to the N2 Bus (or Bus 91), data from the XT-9100 is available to a Supervisory System. See *Figure 2: DX-9100 Application*.

GX-9100 Graphic Configuration Software is used to configure the XT-9100. When the serial interface of the XT-9100 is connected directly to the N2 Bus (Bus 91), the GX-9100 will download and upload configurations over the N2 Bus (Bus 91). When the serial interface of the XT-9100 is connected to the XT Bus, the GX-9100 will download and upload configurations via the N2 Bus (Bus 91) connected to the DX-9100 to which the XT-Bus is connected. The DX-9100 retransmits configuration data to the XT-9100 on its XT-Bus.

The XT-9100 may also be configured item by item, using an SX-9100 Service Module (SX Tool) connected to the DX-9100 Controller.

The XT-9100 and XP-910x modules can be used with a DX-9120 Controller in exactly the same way as with a DX-9100 Controller.

CE Compliance

All Modules:	Directive 89/336/EEC	EN 50081-1, EN 50082-1
XP-9106, TR-9100:	Directive 73/23/EEC	EN 60730

Tool Needed

- flat-head screwdriver

Physical Dimensions

Size (H x W x D): 118 mm x 70 mm x 53 mm /
4.65 in. x 2.76 in. x 2.09 in.

Weight: varies, depending on the device type. See *Specifications*.

*The term "Bus 91" is not used in North America.

This document is subject to change without notice.

Environmental Information

Ambient Operating Conditions: 0 to +50 °C / +32° to 120 °F
10 to 90% RH, noncondensing
Ambient Storage Conditions: -20 to +70 °C / 0° to 160 °F
Housing Material: ABS - polycarbonate, self-extinguishing VO UL94
Housing Protection: IP30 (IEC529)

XT-9100 Hardware Configurations

See Figure 3: Typical XT-9100 Configuration

Table 1: XT Configuration

TR	Transformer	TR-9100-8101 (Not available in North America)	(optional)
XT	Processor	XT-9100-8204	
XP1	Analog or Digital	XP-9102-8204 XP-9103-8004 XP-9104-8004 XP-9105-8004 1 or 2 x XP-9106-8004	(See Note 1) (See Note 2)
XP2	Digital	XP-9103-8004 XP-9104-8004 XP-9105-8004 1 or 2 x XP-9106-8004	(optional) (optional) (optional) (optional) (See Notes 2 and 3)

Notes:

1. Analog XPs must be placed in Position XP1.
2. Two XP-9106 modules are considered as one XP module when installed next to each other in Position XP1 or XP2. When a single XP-9106 is installed in Position XP1 and another type of XP module is installed in Position XP2, the total number of I/Os is restricted to 12.
3. The XP-9106 can only be placed in Position XP2 when Position XP1 is filled by an analog XP, or two XP-9106 modules.

Guidelines

While every reasonable precaution has been taken to prevent electrical disturbances from adversely affecting the operation of modules, lack of attention to generally accepted control wiring installation practices can lead to module problems in high electromagnetic field environments. In general, follow the guidelines below.

- Do not mount the modules in heavy-duty switch gear cabinets or in cabinets with frequency converting or phase-cutting equipment.
- Low-voltage wiring in electrical cabinets must be physically separated from line-voltage and power wiring, and a distinctive color (e.g., white or pink) is recommended.

- To avoid electrical interference in field cables:
 - Keep input and output point cable runs as short as possible (<50 m/160 ft).
 - Use twisted pair cables.
 - Run low-voltage cables separately from line-voltage/power cables. Maintain a minimum separation of > 30 cm/12 in. from 230 V 30 A circuits.
 - Do not run low-voltage cables parallel to power cables for long distances (>3 m/10 ft).
 - Do not run cables close to transformers or high frequency generating equipment.
 - In high electromagnetic field environments, use shielded cable, grounding the shield at one end, preferably to the modules cabinet only.
 - For the communication bus (N2 Bus or Bus 91) and extension module bus (XT-Bus) use a cable recommended for RS-485 transmission. The cable must be shielded and grounded at one end only. (See Technical Bulletin on Metasys N2 Bus or System 91 Bus Converter and Repeater.)
- If a TR-9100 transformer is used for the XT-9100 and the XPs, an additional supply should be used for the external devices. Do not connect switched inductive loads to the 24 V transformer that supplies the modules, and cable each connected load from the transformer separately.

See Figure 4: Wiring of Module to a 24 V Transformer

**XP-9102
Hardware
Settings**

See Figure 5: Jumper Details For the XP-9102

All jumper selections must be made *before* installing the module and *before* power is applied to the module.

Remove the cover of the module and select the **Analog Input Type** using *one* jumper per input in the respective position RTD or 0 to 20 mA inputs. Remove the jumper completely to select 0 to 10 V.

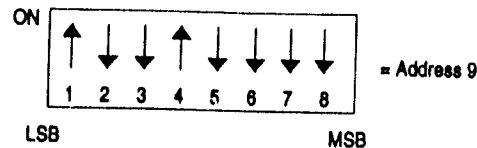


CAUTION: A maximum of 30 mA is available from the 15 V supply of the module.

Select **Analog Output Type** using the jumpers as shown in Figure 5. Two jumpers are required for 0 to 20 mA and one jumper for 0 to 10 V output.

XT-9100 Hardware Settings

Select **Module Address** (for the Supervisory System) on the address switches in 8-bit binary format. An address of 0 is not permitted on the XT-Bus.




Mounting Instructions


See Figure 6: Module Dimensions

Snap the module onto the 35-mm/1 3/8-inch DIN rail. To release the module, insert a screwdriver at the base of the module (A) to release the retaining clip and pull forward. *Or* lift the module upwards against the spring of the retaining clip and pull forward from the top.



Wiring

 **CAUTION:** Connections to the terminals of XP-9106 and TR-9100 may carry up to 250 VAC. Isolate before servicing.

1. Terminations are made via the terminal blocks on the upper and lower parts of the modules that accept 1 x 1.5 mm²/16 AWG cable. See figures 7 to 13 for details.
2. Terminations of the serial link bus cable are via the connectors provided with the XT-9100 module.
3. Interconnections between XT and XP modules for the extension bus are via the connector cables provided with each XP module.
4. Complete all wiring and connections to the XT and XP modules before applying power. The XT processor will then automatically configure itself for the connected XPs.

 **CAUTION:** The CMOS integrated circuits in the modules are sensitive to static. Take suitable precautions.

Legend for Figures 7-13

AIn	Analog input signal
	Analog input common
AOn	Analog output signal
	Analog output common
DIn	Digital input
C	Digital input common
DOn	Digital output (triac)
C~	24 VAC common

Rn	Relay output common
NO	Normally open contact
NC	Normally closed contact

Notes:

1. Loads connected to digital outputs should be supplied from a separate, properly sized transformer and not from the TR-9100 transformer.
2. The following commons are electrically independent:
 - Analog Input Common (for AI1 to 6)
 - Analog Output Common (for AO7 and 8)
 - 24 V Common/Digital Input Common (for DI1 to 8)
 - Communications Common (N2 Bus / XT-Bus)

XT-Bus Guidelines

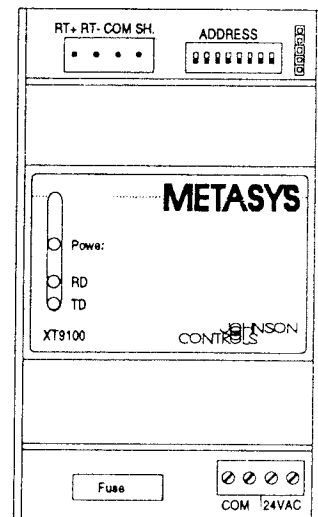
See Figure 14: Connection Details for the XT-Bus

1. Maximum: 8 x XT-9100 per DX-9100.
2. Maximum bus length: 1200 meters/4000 feet.
3. When the bus length is greater than 100 meters/330 feet, install 220-ohm end-of-line resistors at each end of the XT-Bus line. When the bus length is less than 100 meters/330 feet, install a 220-ohm end-of-line resistor at the DX-9100 only.

Specifications

XT-9100-8204

Electrical Requirements	24 VAC +10% - 15%, 50/60 Hz
Power Consumption	5.5 VA
Fuse	315 mA slow blow
Terminations:	
Power Supply	1 x 1.5 mm ² (maximum) cable
Serial Interface	RS-485 cable
XP-BUS	Connector cable provided with XP
Serial Interface	RS-485; 9600 baud; opto-isolated
LED Indicators	Power On (Flashing = no communication.) Receive Data Transmit Data
Weight	221 grams / 7.8 oz.



CAUTION: Connections to terminals of the TR-9100 may carry up to 250 VAC. Isolate before servicing.

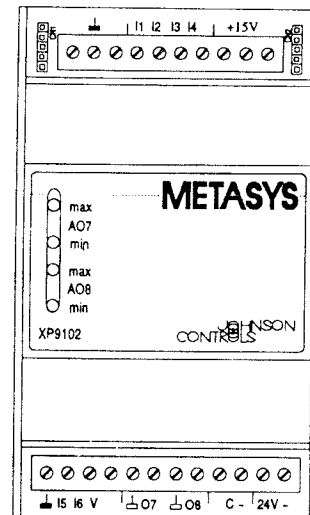
Electrical Requirements	230 VAC +/- 10%, 50/60 Hz
Electrical Output	24 VAC, 50/60 Hz
Power Capacity	Up to 12 VA
220/230 V Fuse	200 mA slow blow (Internal)
24 V Fuse	800 mA slow blow
Terminations	1 x 1.5 mm ² / 16 AWG (maximum) cable
Weight	468 grams / 16.5 oz.



*The TR-9100 Transformer Module is not available in North America.

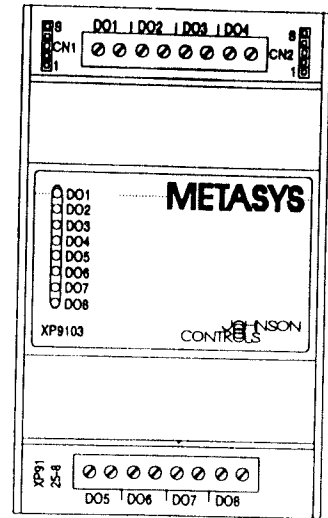
XP-9102-8204

Electrical Requirements	24 VAC +10% - 15%, 50/60 Hz
Power Consumption	3 VA
Terminations:	
Inputs/Outputs	1 x 1.5 mm ² / 16 AWG (maximum) cable
Power Supply	1 x 1.5 mm ² / 16 AWG (maximum) cable
XP-BUS	Connector cable provided
Analog Inputs	6 inputs, 10-bit resolution Inputs jumper selectable: <ul style="list-style-type: none"> • 0 to 10 VDC, > 300 Kohm impedance • 0/4 to 20 mA, 100 ohm impedance • RTD (Ni1000 (JCI type), Pt1000, A99)
Analog Outputs	2 outputs, jumper selectable: <ul style="list-style-type: none"> • 0 to 10 VDC, (10 mA) • 0/4 to 20 mA, max. 500 ohm
LED Indicators	Each output level indicated by two LEDs, one for 0% and one for 100%. The LEDs are equally bright at 50% output.
Weight	257 grams / 9.1 oz.



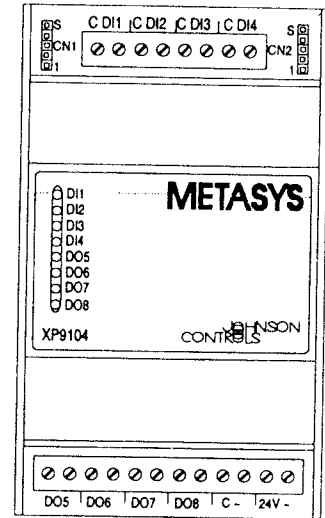
XP-9103-8004

Electrical Requirements	Powered from XT-9100
Terminations:	
Outputs	1 x 1.5 mm ² / 16 AWG (maximum) cable
XP-BUS	Connector cable provided
Digital Outputs	8 triac outputs, 500 mA RMS, On/Off or Pulse Type
LED Indicators	Each output indicated by an LED
Weight	117 grams / 4.1 oz.



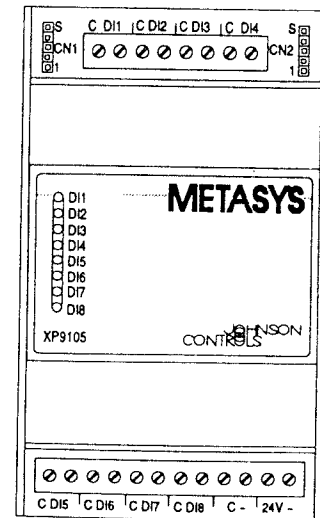
XP-9104-8004

Electrical Requirements	24 VAC +10% - 15%, 50/60 Hz
Power Consumption	0.5 VA
Terminations:	
Inputs/Outputs	1 x 1.5 mm ² / 16 AWG (maximum) cable
Power Supply	1 x 1.5 mm ² / 16 AWG (maximum) cable
XP-BUS	Connector cable provided
Digital Input	4 digital inputs from potential-free contacts, Maintained or Pulse Type
Digital Outputs	4 triac outputs, 500 mA RMS, On/Off or Pulse Type
LED Indicators	Each input indicated by an LED Each output indicated by an LED
Weight	116 / 4.1 oz.



XP-9105-8004

Electrical Requirements	24 VAC +10% - 15%, 50/60 Hz
Power Consumption	1 VA
Terminations:	
Inputs	1 x 1.5 mm ² / 16 AWG (maximum) cable
Power Supply	1 x 1.5 mm ² / 16 AWG (maximum) cable
XP-BUS	Connector cable provided
Digital Input	8 digital inputs from potential-free contacts, Maintained or Pulse Type Transition counter function; min. 20 ms ON, 20 ms OFF
LED Indicators	Each input indicated by an LED
Weight	135.5 grams / 4.8 oz.



CAUTION: Connections to the terminals of XP-9106 expansion modules may carry up to 250 VAC. Isolate before servicing.

Electrical Requirements	24 VAC +10% - 15%, 50/60 Hz
Power Consumption	4 VA
Terminations:	
Outputs	1 x 1.5 mm ² / 16 AWG (maximum) cable
Power Supply	1 x 1.5 mm ² / 16 AWG (maximum) cable
XP-BUS	Connector cable provided
Digital Outputs	4 relay outputs, SPDT relay 250 VAC/5 Amp., On/Off or Pulse Type
LED Indicators	Each output indicated by an LED
Weight	173 grams / 6.1 oz.

