-METASYS®

XT-9100 Configuration Guide

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

Introduction

The XT-9100 Extension Module and its expansion modules have been designed to provide additional input and output capacity within Metasys® Networks and specifically for the DX-9100 Extended Digital Controller. The XT-9100 module provides the communication interface and the XP modules provide the analog and digital inputs and outputs.

A Supervisory System communicates with an XT-9100 via the N2 Bus or Bus 91*. Each XT-9100, depending on its expansion module combination, can have up to 16 inputs/outputs, eight of which may be analog.

The DX-9100 communicates with the XT-Bus, and when the DX-9100 is connected to an N2 Bus (or Bus 91), data from the XT-9100 is available to a Supervisory System. Up to eight XT-9100 modules can be connected to the XT-Bus. Each XT-9100 provides, depending on the type of the connected XP expansion modules, either eight analog points or eight digital points, extending the input/output of a DX-9100 by up to 64 remote input/outputs. Modules with 16 input/outputs may also be connected, provided that the total number of remote input/output points on the DX-9100 does not exceed 64.

Configuration of the XT-9100 is achieved by using a personal computer with GX-9100 Graphic Configuration Software (GX Tool) supplied by Johnson Controls. 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.

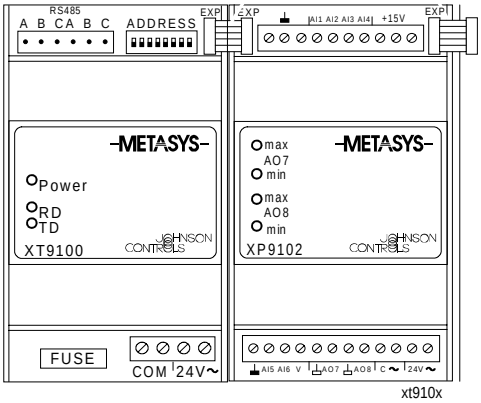

Figure 1: XT-9100 Extension Module and XP-910x Expansion Modules

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

Hardware Configuration

For full details of the hardware configuration, refer to the *XT-9100 Technical Bulletin (LIT-6364040)*.

An XT-9100 combined with expansion modules provides the following configurations, either:

- eight analog inputs/outputs, or
- eight digital inputs/outputs, with digital counters associated with the digital inputs, or
- eight analog inputs/outputs and eight digital inputs/outputs, or
- sixteen digital inputs/outputs, with digital counters associated with the digital inputs within the first eight inputs/output points

The **extension module address** is set with the address switches on the XT-9100. When connected to a DX-9100 controller, this address must also be set in the DX-9100 software configuration. The address must be unique not only on the XT-Bus, but also on the N2 Bus (Bus 91) to which the DX-9100 is connected.

The XT-9100 must be supplied with a 24 VAC power source. All models are suitable for 50 Hz or 60 Hz through software configuration.

For the analog inputs and outputs, the **input and output type** are set by jumpers on the analog expansion module board. These settings must comply with the software configuration settings.

Note: When an extension module is configured with 16 inputs/outputs, the DX-9100 considers the single physical module as two logical modules, each with eight inputs/outputs. A DX-9100 can communicate with up to eight logical modules, with a maximum of 64 inputs/outputs.

Model Codes

Table 1: XT/XP/TR Model Codes

XT-9100-8004	Extension Module	24 VAC supply
XP-9102-8004	Expansion Module	6 analog inputs 2 analog outputs
XP-9103-8004	Expansion Module	8 digital outputs (triacs)
XP-9104-8004	Expansion Module	4 digital inputs 4 digital outputs (triacs)
XP-9105-8004	Expansion Module	8 digital inputs
XP-9106-8004	Expansion Module	4 digital outputs (relay)
TR-9100-8001*	Transformer, 24V/12 VA	Primary: 240 VAC
TR-9100-8002*	Transformer, 24V/12 VA	Primary: 220 VAC

* TR-9100 is not available in North America.

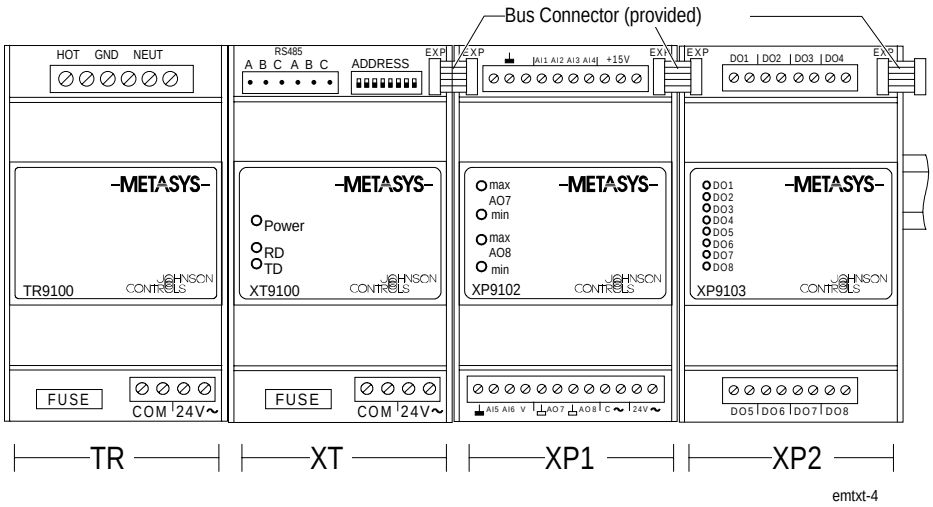

Figure 2: Typical XT-9100 Configuration

Table 2: XT Configurations

TR	Transformer	TR-9100	(optional)
XT	Processor	XT-9100	
XP1	Analog	XP-9102	(See Note 1.)
	or		
	Digital	XP-9103	
		XP-9104	
		XP-9105	
		1 or 2 x XP-9106	(See Notes 2 and 4.)
XP2	Digital	XP-9103	(optional)
		XP-9104	(optional)
		XP-9105	(optional)
		1 or 2 x XP-9106	(optional) (See Notes 2, 3, and 4.)

Notes:

1. The analog XP-9102 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.
4. The first XP-9106 in position XP1 or XP2 controls points DO1-DO4 and the second XP-9106 in either position controls points DO5-DO8.
5. Digital modules with counters must be in position XP1.

Software Configuration

Software configuration involves the setting of all the Items of the extension module to values which correspond to the intended application. Typically, use the GX Tool to configure a system, and the SX Tool to troubleshoot. To use these tools, refer to the *GX-9100 Software Configuration Tool for Windows User's Guide (LIT-6364060)* and the *SX-9100 Service Module User's Guide (LIT-6364070)*. Proceed in the following order:

1. Define XT-9100 type settings.
2. Define XT-9100 configuration.
3. Define analog input characteristics.
4. Define digital input characteristics.
5. Define analog output characteristics.
6. Define digital output characteristics.

XT-9100 Type Settings

Power Line Frequency (50 or 60 Hz)

Via the GX Tool

Select DX-9100 and then Global. Enter the frequency as 50 or 60. The XT frequency and the DX frequency are both defined here.

Via the SX Tool

Set Bit X1 of Item XTS (RI.69).

X1 = 0 50 Hz power line

X1 = 1 60 Hz power line

Output Hold/Reset on Comm. Failure Flag

Via the GX Tool

First configure an XT Module. Select XTn, then Analog or Digital. Then select the just configured XTn, XTn, and Data.

To set this flag, at the "Status on comm. fail" (communication failure) field, enter 0 or 1.

When this bit is set to "0," the digital outputs are switched off upon a serial interface failure, and the corresponding Item values are reset to zero.

When set to "1," the digital outputs hold their current state upon a serial interface failure.

Via the SX Tool

The "Output Hold/Reset on Communication Failure" flag is set at Bit X2 of Item XTS (RI.69).

X2 = 0 Output reset upon communication failure

X2 = 1 Output hold upon communication failure

Maximum Time Between Communications

When communication fails for the period set in this Item, the XT-9100 goes into "communication failure" state, indicated by a blinking power LED on the front of the module. The default value is 60 seconds.

Via the GX Tool

First configure an XT Module. Select XTn, then Analog or Digital. Then select the just configured XTn, XTn, and Data. At the "Comm. timeout (sec)" field, enter the value in seconds.

Via the SX Tool

The "Maximum Time Between Communications" (in seconds) is entered at Item MTBC (RI.86).

Operational Mode (SX Only)

The operational mode of the XT-9100 can be seen at Item OPMO (RI.01) with following status bits:

X8 = 1 PWR Power Failure. This bit is set when a XT is powered up or when there is a serial interface communication failure.

The setting in Item XTS (RI.69) Bit X2 ("Output Hold/Reset on Communication Failure" flag) is repeated in Item OPMO (RI.01) Bit X7 so that it can be read by the DX-9100 or any other monitoring system.

XT Address

Via the GX Tool

In order to download the XT-9100 devices it is necessary to enter the XT addresses. These addresses will also be loaded into the DX-9100. When performing a download through a DX-9100 Controller, the controller only downloads the addresses of its own XT set. The XT address is not stored in the XT-9100 but must be set on the address switches on the module.

First configure an XT Module. Select XTn, then Analog or Digital. Then select the just configured XTn, XTn, and Data. At the "Hardware Address" field, enter the address (1-255) of the XT-9100 module.

Via SX Tool

Refer to the *Extension Module Configuration* section in the *DX-9100 Configuration Guide (LIT-6364030)*.

Settings

Via the GX Tool

The I/O type and map details are automatically generated by the GX-9100 Graphic Configuration Software when all I/O data for extension modules has been entered. It is then downloaded into the XT-9100 directly or via the DX-9100 and XT-Bus. (Refer to the *Download/Upload* section, further in this document.)

When in the GX Tool, select the XT module, then define it as Analog or Digital (if Digital, define it as 8 DI, 4DI/4DO, or 8DO). This defines Module XP1. If an XT has 16 points (XP2 is connected), select the XT box immediately to the right of the configured module, select EXP.DIG and define it as 8DI, 4DI/4DO, or 8DO. "EXP" will appear in the XT box. Then select XT (or EXP) again and define each point in the selected configuration in the same way as when defining the points in the DX-9100. The following pages describe how to define each of the points individually.

Via the SX Tool

Each extension module configuration is defined by the **I/O types and map** which are configured in Extension Module Items **IOMAP** (RI.77), **IOTYP** (RI.78), and **IOMOD** (RI.79).

1. The **I/O map** (IOMAP) defines which inputs/outputs (in pairs) on the extension module are used. Each extension module can be defined with eight used points, which normally reside in the XP1 (first) Expansion Module (points I/O1-I/O8), defined in bits X1-X4.

   When an extension module has an XP2 (second) Expansion Module with a further eight points, these points must be defined in bits X5-X8.

2. The **I/O type** (IOTYP) defines which inputs/outputs (in pairs) are analog and which are digital. As the points on XP2 (if used) must be digital, only bits X1-X4 can be configured.

3. The **I/O mode** (IOMOD) defines points as "input" or "output" (in pairs). Only those points declared as "used" in Item IOMAP will be monitored or controlled.

   The combination of data in the Items IOMAP, IOTYP, and IOMOD completely defines the configuration of an extension module. When connected to a DX-9100 Controller, an identical set of data must be entered into the Item data base in the DX-9100 Controller, so that, when the DX-9100 and XT-9100 are connected and started up, the DX-9100 will compare data bases and only send commands to the extension module if the data is identical, thus avoiding incorrect control actions.

Note: The data base in the XT-9100 has been designed to accept most configuration of inputs and outputs. **All inputs and outputs which are physically connected through expansion modules must be configured, and only those points.** If there is a difference between the physical configuration and the software configuration, the XT-9100 will signal an error condition to the DX-9100 (**XTnERR**).

Analog Input

Configuration

Each analog input is defined and configured by the following parameters:

- Tag name (optional, GX-only)
- Measurement units (for RTD inputs)
- Enable square root
- Alarm on unfiltered value
- Input signal range
- Alarm limits
- Filter time constant

The GX Tool determines the input signal range with a 2-stage process: you must first decide if the input is active or passive; the remaining options depend on this choice. With the SX Tool, this information is entered into a number of Items.

Via the GX Tool

Select XTn, AIn, then either Active or Passive.

Note: All AI points must be configured even if not connected to a sensor to enable the generation of a complete IO Map and to ensure correct operation with the DX-9100 Controller.

AI Input Type: Measurement Units

Via the GX Tool

The selection of Celsius or Fahrenheit, is set in the Global data of the DX-9100 (select DX-9100, then Global. At the "Temperature Units" field, enter "C" for Celsius or "F" for Fahrenheit).

To determine the measurement units of active inputs, select XTn, AIn, Data, and then enter in the "Measurement Units" field:

0 = None

1 = Temperature ("C" or "F" as entered in Global)

2 = Percent (%)

Note: The units of an active input are not read by the DX-9100 Controller, but are available to any other Supervisory System which may be connected.

Via the SX Tool

The input type for the eight possible inputs (n = 1 to 8) can be configured in Item AITn (RI.88, RI.96, RI.104, RI.112, RI.120, RI.128, RI.136, and RI.144).

The unit of each analog input can be selected with following bits: (For RTD inputs, Celsius or Fahrenheit must be selected.)

X4 X3 X2 X1 = 0000 No Units

X4 X3 X2 X1 = 0001 Celsius

X4 X3 X2 X1 = 0010 Fahrenheit

X4 X3 X2 X1 = 0011 Percent

Changing individual temperature units for each AI can only be done in the SX Tool.

AI Input Type: Enable Square Root

This function allows the linearization of the differential pressure signal from a 0-10 VDC or 0/4 - 20 mA active sensor; the function is effective over the selected range:

AI = sqrt(PR%/100) * (HR - LR) + LR

Where %PR = the Analog Value in % of the physical input range;
HR = High Range Value; and LR = Low Range Value.

Via the GX Tool (Option Only Available with Active Sensor)

Select XTn, AIn, and Data. At the “Square Root” field, enter “0” for No, or “1” for Yes (to enable the square root calculation).

Via the SX Tool (Option Only Available with Active Sensor)

Select Item AITn.

X5 = 1 Enable Square Root of Input

X5 = 0 Disable Square Root of Input

AI Input Type: Alarm on Unfiltered Value

An alarm from the High Limit (HIAn) and Low Limit Alarm (LOAn) will be generated from the unfiltered or filtered input. (See *Filter Time Constant*.)

Via the GX Tool

Select XTn, AIn, and Data. At the "Alarm Unfiltered" field, enter "0" for No (Alarm on Filtered Value), or "1" for Yes (Alarm on Unfiltered Value).

Via the SX Tool

Select Item AITn.

X6 = 0 Alarm on Filtered Value

X6 = 1 Alarm on Unfiltered Value

AI Input Type: Input Signal Range

Via the GX Tool

(You must first have selected whether the input is active or passive. See the beginning of *Analog Input--Configuration*.)

For **active** inputs, select XTn, AIn, then Data. At the "Type of Active Input" field, enter:

0 = 0-10 VDC

1 = 4-20 mA

2 = 0-20 mA

Each analog input module channel performs the conversion of the input signal to a numeric value using the high range and low range.

Select XTn, AIn, then Data.

High Range = enter the equivalent number for reading at high input (10V, 20 mA)

Low Range = Enter the reading at low input (0V, 0 mA, 4 mA)

For **passive** inputs, select XTn, AIn, then Data. At the "Type of Passive Input" field, enter:

1 = Ni1000 (JCI Type)

2 = Ni1000 Extended Range

3 = A99 (JCI Type)

4 = Pt 1000 (DIN)

Note: Selections 5 and 6 on the screen are not available in the XT-9100.

For RTD inputs, the range of the displayed value is fixed according to the type of sensor.

Via the SX Tool

Input Type:

X7 = 0 0-10 volts

X7 = 1 0-20 mA

X8 = 1 20% suppression 2-10V or 4-20 mA)

Linearization and Sensor Type:

X11 X10 X9 = 000	Linear (Active Sensor)
X11 X10 X9 = 001	Ni 1000 RTD Passive Sensor (JCI Type) (-45 to +121°C/-50 to +250°F)
X11 X10 X9 = 010	Ni 1000 RTD High Temperature Sensor (+21 to +288°C/70 to +550°F)
X11 X10 X9 = 011	RTD Sensor A99 (-50 to +100°C/-58 to +212°F)
X11 X10 X9 = 100	RTD Sensor Platinum 1000 (+50 to +200°C/-58 to +320°F)

For active inputs, each analog input module channel performs the conversion of the input signal to a numeric value using the **high range** at Item **HRn** (RI.89, RI.97, RI.105, RI.113, RI.121, RI.129, RI.137, and RI.145) and **low range** at Item **LRn** (RI.90, RI.98, RI.106, RI.114, RI.122, RI.130, RI.138, and RI.146).

For RTD inputs, the range of the displayed value is fixed according to the type of sensor.

AI Input Type: Alarm Limits

The **high limit** and the **low limit** define at which levels the analog input reading will generate an alarm, either for remote monitoring or for internal use within the control sequences in the DX-9100.

Note: The limits cannot be deleted. If you do not want alarms, enter limits beyond the range.

Via the GX Tool

Select XTn, AIn, then Data. At the respective field, enter the limit:

High Limit =

Low Limit =

Limit Differential =

Via the SX Tool

The **high limit** is at Item **HIAn** (RI.91, RI.99, RI.107, RI.115, RI.123, RI.131, RI.139, and RI.147), the **low limit** is at Item **LOAn** (RI.92, RI.100, RI.108, RI.116, RI.124, RI.132, RI.140, and RI.148). These Items may also be set by a Supervisory System and will always be set by a DX-9100 Controller.

The **differential** on alarm limits is adjustable with Item ADFn (RI.93, RI.101, RI.109, RI.117, RI.125, RI.133, RI.141, and RI.149).

Filter Time Constant

The Filter Time Constant Ts (seconds) is used to filter out any cyclic instability in the analog input signals. The calculations are:

$FV_t = FV_{t-1} + [1/(1 + T_S)] * [AI_t - FV_{t-1}]$

Where: FV_t = Filtered Analog Value at current time

FV_{t-1} = Filtered Analog Value at previous poll

AI_t = Actual Analog Value at current time

A value of "0" disables the filter.

Via the GX Tool

Select XTn, AIn, and Data. At the "Filter Constant (sec)" field, enter a number within the recommended range 0 to 10.

Via the SX Tool

The Filter Time Constant is entered at Item **FTCn** (RI.94, RI.102, RI.110, RI.118, RI.126, RI.134, RI.142, and RI.150).

AI Notes

1. When the XT-9100 is connected to a DX-9100 Controller, you can view the AI value and alarm limits from the DX front panel. See *Display Panel and Keypads* in the *DX-9100 Extended Digital Controller Technical Bulletin (LIT-6364020)*.
2. Analog input values can be read via the SX Tool at Item AIn (RI.12 to RI.19).
3. Analog input alarm status can be seen via the SX Tool at Item AIS (RI.11), Bit X1, X3....X15 for high alarm condition and X2, X4....X16 for low alarm condition.
4. **Configure all AIs as Active or Passive, whether they are used or not. A configured AI is shown by a thick bar to the left and right of its selection box.**

Digital Input Configuration

An XT-9100 can accept up to 16 digital inputs, which will be considered active when driven to a common digital ground. The first eight digital inputs are connected to XP1 and the next eight digital inputs to XP2.

Each digital input is defined and configured by the following parameters:

- Tag name (optional, GX-9100 only)
- Input type
- Counter prescaler

Inputs may be defined as maintained or pulse type. With maintained type contacts the extension module status follows the status of the contact. With pulse type contacts the extension module sets and resets the status at each pulse of the input contact.

DI: Input Type

Via the GX Tool

Select XTn (or EXP), DIn, then Data. At the "Digital Input Type" field enter 0 for maintained contact or 1 for pulse contact.

Via the SX Tool

The input type for the 2 x 8 possible inputs can be configured in Item DIT1 for XP1 (RI.64) and in Item DIT2 (RI.65) for XP2, bits X1-X8 for D11-DI8, as follows:

0 = Maintained Contact

1 = Pulse Contact

DI: Counter Prescaler

The digital input transitions of XP1 are counted as follows:

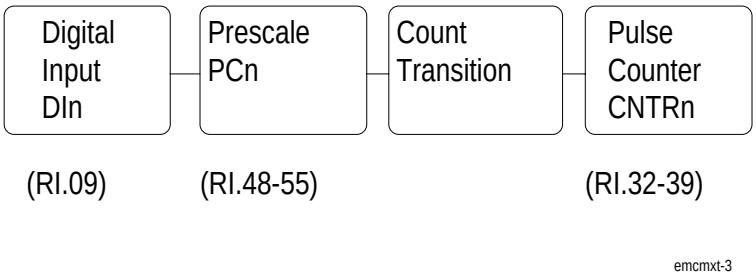

Figure 3: Counter Prescaler

A count transition occurs when the number of positive transitions of the digital input (DIn) equals the value of the prescaler (PCn). The Pulse Counter (CNTn) counts the count transitions (n = 1-8).

Note: Counters are only available in the XP1 location.

Via the GX Tool

Select XTn, DIn, then Data. At the "Prescaler (counts)" field, enter from 1 to 255. When the XT-9100 is connected to a DX-9100 Controller the total counts can be read on the DX-9100 front panel.

Via the SX Tool

Enter the prescaler at Item PCn (RI. 48-55) within the range 1-255.

DI Notes

1. When the XT-9100 is connected to a DX-9100 Controller, you can view the DI status and counter values from the DX-9100 front panel. See the *Display Panel and Keypads* section in the *DX-9100 Extended Digital Controller Technical Bulletin (LIT-6364020).*
2. The status of the digital inputs can be seen at Item DIS1 (RI.09), bits X1-X8, and Item DIS2 (RI.10), bits X1-X8.

Analog Output Configuration

Each analog output is defined and configured by the following parameters:

- Tag name (GX-9100 only)
- Output type

When the XT is connected to a DX-9100 Controller, the following parameters are defined in the DX-9100 for the analog output:

- Source
- Range

AO: Output Type

Via the GX Tool

Select XTn, ANALOG, XTn, AOn, and Data, then enter the output code:

0 = disabled

1 = 0 to 10 VDC

2 = 0 to 20 mA

3 = 4 to 20 mA

Via the SX Tool

The output type can be configured in Item AOT (RI.87) in bit pairs X2 X1, X4 X3, ...X16 X15 for Outputs 1-8). To define the output signal set the bits (for Output 7, for example) as follows:

X14 X13 = 00 Output Disabled

X14 X13 = 01 Output 0-10V

X14 X13 = 10 Output 0-20 mA

X14 X13 = 11 Output 4-20 mA

AO: Range (with DX-9100 only)

The AO range of the analog output is defined in the DX-9100 Controller. The High Range defines the level of control source signal that corresponds to an output of 100%.

The Low Range defines the level of control source signal that corresponds to an output of 0%.

When the source point is equal to the high range, then the output will be at the maximum signal (10V/20 mA). When the source point is equal to low range, then the output will be at the minimum signal (0V, 0/4 mA).

Via the GX Tool

Select XTn, AOn, and Data, then enter the desired values in the "High Range" and "Low Range" fields.

Via the SX Tool

Refer to the *Extension Module Configuration* section of the *DX-9100 Configuration Guide (LIT-6364030)*.

AO: Source (with DX-9100 Only)

The source of the analog output signal is defined in the DX-9100 Controller.

Via the GX Tool

Select XTn, AOn, Data, and the "Source Point" field. Enter * and select the required source variable.

Via the SX Tool

Refer to the *Extension Module Configuration* section of the *DX-9100 Configuration Guide (LIT-6364030).*

AO Notes

1. When the XT-9100 is connected to a DX-9100 Controller, you can view and override the AO value from the DX-9100 front panel. See *Display Panel and Keypads* in the *DX-9100 Extended Digital Controller Technical Bulletin (LIT-6364020).*
2. The analog output values can be read in percent at Item AOn (RI.20-27) with the SX Tool.

Digital Output Configuration

Each digital output is defined and configured by the following parameters:

- Tag name (GX-9100 only)
- Output type
- Pulse time

When the XT is connected to a DX-9100 Controller, the following parameter is defined in the DX-9100 for the digital output:

- Source

DO: Type of Output

Via the GX Tool

Select XTn (or EXP) and DOn, then select either of the On/Off or Pulse fields. For the Pulse type, the output switches for a configurable pulse time for each state transition of the command output.

Via the SX Tool

The output type for outputs DO1-DO8 can be selected in Item DOT1 (RI.66) for XP1 and Item DOT2 (RI.67) for XP2 as follows:

X1 = 0 On/Off Type (Maintained)

X1 = 1 Pulse Type; the output switches for a configurable pulse time for each state transition of the command output

DO: Pulse Time

This parameter is set once for all pulse type outputs in the XT-9100.

Via the GX Tool

Select XTn, XTn, and Data, then enter a value in the "Digital Output Pulse Time" field. The valid range is 1 to 250 (5 msec to 1.25 seconds pulse time).

Via the SX Tool

The digital output pulse time can be defined in Item DOPT (RI.68) in units of 5 msec. The default value is 200, which represents a pulse time of 1 second.

Note: All connected DO points must be configured to ensure correct operation with the DX-9100 Controller. When a single XP-9106 (4DO) relay module is connected, select 8 DO on the GX Tool and define outputs DO1-DO4 only.

DO Source (with DX-9100 Only)

The source of the digital output signal is defined in the DX-9100 Controller.

Via the GX Tool

Select XTn or (EXP), DOn, Data, and then the "Source Point" field. Enter * and select the required source variable.

Via the SX Tool

Refer to the *Extension Module Configuration* section in the *DX-9100 Configuration Guide (LIT-6364030).*

DO Notes

1. When the XT-9100 is connected to a DX-9100 Controller, you can view and override the DO value from the DX-9100 front panel. See *Display Panel and Keypads* in the *DX-9100 Extended Digital Controller Technical Bulletin (LIT-6364020).*
2. The digital output status can be seen at Item DOS1 (DI.07) for XP1 and Item DOS2 (DI.08) for XP2, bits X1-X8 for outputs DO 1-8 with the SX Tool.
3. **A configured DO is shown by a thick bar to the left and right of its selection box.**

   Configure all DOs as ON/OFF or PULSE, whether they are used or not. The only exception is for the 4-output relay module (XP-9106). When only one XP-9106 module is installed, select 8DO, but only configure DO1-DO4. When two XP-9106 modules are installed, configure both as one 8DO module, and configure DO1-DO8.

Download/ Upload

Via the GX Tool

Download via DX-9100 Controller and N2 Bus

Connect an RS-232-C/RS-485 converter (type MM-CVT101-x in North America and type IU-9100-810x in Europe) to one of the serial communication ports (COM1 or COM2) of the personal computer on which the GX Tool is running. Connect the N2 Bus of the DX-9100 to the converter unit connected to the PC.

Set the address switches and jumpers on the DX-9100 and XT/XP devices as required, and connect the XT/XP devices to the XT Bus of the DX-9100. (See the *DX-9100 Extended Digital Controller Technical Bulletin (LIT-6364020)* and *XT-9100 Technical Bulletin (LIT-6364040)* for details.)

If the DX-9100 and XT/XP devices are installed and wired, verify all field wiring and sensor voltage/current signals. It is recommended that controlled devices be isolated during download and initial startup.

Note: Do not download an untested configuration into an installed device. Test the configuration on a simulator panel before downloading.

Apply 24 VAC power to the DX-9100 and XT/XP devices.

On the GX Tool, select DX-9100, DOWNLD, and DX. Enter the DX-9100 address (0-255) in the "Controller Address" field and the PC serial communication port (1 or 2) in the "PC Port" field. Press <Enter>.

Checks are made before the data is downloaded to the controller, and a message is displayed on the screen if a value is outside the normal range for that parameter. The user may abort the download process and change the value in the configuration or press <Enter> to ignore the message and download the entered value.

When the download is complete, select DX-9100, DOWNLD, and XT. Verify that the correct "PC Port" is selected and press <Enter>.

For subsequent downloads, where the XT addresses have not been changed, the loading can be done in one process by selecting DX-9100, DOWNLD, and DX&XT.

Download via DX-9100 Controller (RS-232-C Port)

Connect the serial communication port of the PC directly to the RS-232-C port of the DX-9100 Controller. See *DX-9100 Extended Digital Controller Technical Bulletin (LIT-6364020)* for details. Proceed as for *Download via DX-9100 Controller and N2 Bus* previously in the *Download/Upload* section.

Upload via a DX-9100 Controller

Only complete DX-9100/XT-9100 configurations should be uploaded from the DX-9100. Select DX-9100 and NEW to clear the PC screen. Select DX-9100, UPLOAD, and DX&XT. Enter the DX-9100 Controller address (0-255) and PC port (1 or 2). Press <Enter>.

Download via the N2 Bus

Set the address switches and jumpers on the XT/XP devices as required. Connect the XT/XP devices to the N2 Bus and the N2 Bus to the converter on the PC. (See the *XT-9100 Technical Bulletin (LIT-6364040)* for connection details.)

If the XT/XP devices are installed and wired, verify all field wiring and sensor voltage/current signals. It is recommended that controlled devices be isolated during download and initial startup. Apply 24 VAC power to the XT/XP devices.

Up to eight XT-9100s may be downloaded at one time from the GX Tool over the N2 Bus.

If the XT/XP devices are not used with a DX-9100, it is recommended that one configuration file is created for each XT-9100 in Position XT1.

Set the address switches and jumpers on the XT/XP devices as required. Connect the XT/XP devices to the N2 Bus and the N2 Bus to the converter on the PC. (See the *XT-9100 Technical Bulletin (LIT-6364040)* for details.)

If the XT/XP devices are installed and wired, verify all field wiring and sensor voltage/current signals. It is recommended that controlled devices be isolated during download and initial startup. Apply 24 VAC power to the XT/XP devices.

Up to eight XT-9100s may be downloaded at one time from the GX Tool over the N2 Bus.

If the XT/XP devices are not used with a DX-9100, it is recommended that one configuration file is created for each XT-9100 in Position XT1.

Select DX-9100, DOWNLD, and XT. Enter the PC serial communication port (1 or 2) in the “PC Port” field and press <Enter>.

Upload via the N2 Bus

Only one XT-9100 may be uploaded at one time and the configuration will be stored under XT1. Select DX-9100, UPLOAD, and XT. Enter the XT-9100 address (1-255) in the “Controller Address” field and the PC serial communication point (1, 2) in the “PC Port” field. Press <Enter>.

Via the SX Tool

XT-9100 configuration data can only be changed item by item with the SX Tool. It is not possible to download or upload a complete configuration.

Appendix 1: SX Tool Item Description and Tables

The following information is important when commissioning with the SX Service Module.

General

Each constant, variable, or value in an XT-9100 Extension Module can be addressed via an Item code. All Items are contained in the Item List.

Note: It is important to note that EEPROM Items can only be written approximately 10,000 times, so that write commands from cyclical processes in Supervisory Systems must be avoided.

Item Address

A configuration comprises a set of parameters which are stored in a series of memory locations in the XT-9100. These parameters are called Items. Each Item is assigned an Item Address.

Active parameters such as analog values are stored in RAM. Configuration parameters are stored in EEPROM. Data stored in EEPROM is retained when the power is switched off.

The Item List at the end of this manual gives a brief description of each Item available within the module.

Item Type

The format of any XT-9100 Item is described by the following types:

Number:	Floating point number (2 bytes)
1 Byte:	Unsigned 8-bit hexadecimal number used to transfer logic states or integer numbers 0-255
2 Bytes:	Unsigned 16-bit hexadecimal number used to transfer logic states or unsigned integer numbers
4 Bytes:	Unsigned 32-bit hexadecimal number used to transfer logic states or unsigned integer numbers

The information stored in the Items can have one of several formats:

1. **Floating Point Numerical Items** are real numbers, with a +/- sign. They refer to input or output values, limit values, etc. They are displayed and entered as numbers, with a sign and a decimal point. These Items are shown in the Item List with “Number” in the Type column.
2. **Integer Items** are positive whole numbers used as scale factors. These Items are shown in the Item List with “1 Byte Int” in the Type column.

3. **Totalized Numerical Items** are actual positive numbers. They refer to totalized values of pulse counters. They are displayed and entered as whole numbers, without a sign or decimal point. These Items are shown in the Item List with "4 Bytes" in the Type column.
4. **Status Items** are either 1-byte or 2-byte Items giving information on the actual status or configuration of the inputs, outputs and modules, where each bit has a specific meaning as described in the Item List. These Items are shown in the Item List with the number of bytes in the Type column. Data is displayed and entered as bytes. In the list the bytes will be represented using X1-X8 or X1-X16.

   1 Byte = X8 X7 X6 X5 X4 X3 X2 X1

   2 Bytes = X16 X15 X14 X13 X12 X11 X10 X9 X8 X7 X6 X5 X4 X3 X2 X1

Item Tag

Each Item in the Item List has a unique name or "tag," which summarizes the description and the meaning of the data which is stored in the XT-9100 memory.

The Items are shown in the Item List with their respective names in the Tag column.

Read/Write Data (R/W)

The Items shown in the Item List can be divided into three basic categories:

1. **Input values and status** of the XT-9100 can be read but not changed by a Supervisory System. These Items are shown in the Item List with an "R" in the R/W column.
2. **Variables** in the XT-9100 can be read and modified by the GX-9100 Graphic Configuration Software or Supervisory System. These Items are shown in the Item List with an "R/W" in the R/W (read/write) column. (E) indicates that the Item is stored in EEPROM.
3. All other Items in the XT-9100 refer to **configuration parameters** of the controller and contain information such as analog ranges, output type, etc., and they can only be changed with the GX-9100 Graphic Configuration Software. These Items are shown in the Item List with a "CNF" (configuration) in the R/W column.

All Items can be accessed by the SX Tool via a DX-9100 Controller.

Floating Point Numbers

A DX-9100 floating point number consists of two bytes with following format:

```
15 14 13 12 11 10  9  8  7  6  5  4  3  2  1  0
E3 E2 E1 E0  S M10 M9 M8 M7 M6 M5 M4 M3 M2 M1 M0
```

where: EEEE = 4 bits exponent

S = sign (1=negative)

MMMMMMMMMMM = 11 bits mantissa

Note: 2^{16} = 32,768; subtracting 4 bits for the exponent, 1 bit for the sign, and 11 bits for the mantissa leaves a maximum value of 2047 for most numeric entries with single digit resolution.

- A number is normalized when the most significant bit is true (M10 = 1).
- The value of the n.th mantissa bit (n from 0-10) is: 2 exp -(<EXPONENT>-n)
- A number is zero when all bits of the mantissa are 0.
- The value of a number is:

  <NUMBER> = <SIGN> * .<MANTISSA> * 2 exp <EXPONENT>

  Examples:

  1 = 1400H or B001H

  -1 = 1C00H or B801H

  100 = 7640H or B064H

Item List

Symbols used in the Item List:

DI. Decimal Item Address

HI. Hexadecimal Item Address

Type Item Type

R/W Read Write conditions:

R	Read only Item
R/W	Read/Write Item
R/W (E)	Read/Write Item (EEPROM)
CNF	Configuration Item (EEPROM)

Tag Label for Item or bit written within an Item

Table 3: Item List

RI.	HI.	Type	R/W	Tag	Description
00	00	1 Byte	R	MODL	Device Model : 08H
01	01	1 Bytes	R/W	OPMO	Operation Mode (status)
		X8 X7 X6 X5 X4 X3 X2 X1			
		X1 = 1			Watchdog text
		X2 =			DO Error
		X3 =			DI Error
		X4 =			AI Error
		X5 =			AO Error
		X6 =			Not Used
		X7 =		FAIL	XT Fail Mode (= XTS, bit X2)
		X8 = 1		PWR	Power Fail or Comm. Failure
02	02	1 Byte	R	I2CE	Bus Error
		X8 X7 X6 X5 X4 X3 X2 X1			
		X1 = 1			XP1: DO Error
		X2 = 1			XP2: DO Error
		X3 = 1			XP1: DI Error
		X4 = 1			XP2: DI Error
		X5 = 1			Analog or Counter Error (1-4)
		X6 = 1			Analog or Counter Error (5-8)
		X7 = 1		FAIL	EEPROM Error
		X8 = 1		PWR	XP Hardware Fault
03	03	1 Byte			Spare
04	04	1 Byte			Spare
05	05	1 Byte			Spare
06	06	1 Byte			Spare

RI.	HI.	Type	R/W	Tag	Description
07	07	1 Byte	R/W	DOS1	Digital Output Status XP1
		X8 X7 X6 X5 X4 X3 X2 X1			
		X1 = 1			XP1 : Output 1 is On
		X2 = 1			XP1 : Output 2 is On
		X3 = 1			XP1 : Output 3 is On
		X4 = 1			XP1 : Output 4 is On
		X5 = 1			XP1 : Output 5 is On
		X6 = 1			XP1 : Output 6 is On
		X7 = 1			XP1 : Output 7 is On
		X8 = 1			XP1 : Output 8 is On
08	08	1 Byte	R/W	DOS2	Digital Output Status XP2
		X8 X7 X6 X5 X4 X3 X2 X1			
		X1 = 1			XP2 : Output 1 is On
		X2 = 1			XP2 : Output 2 is On
		X3 = 1			XP2 : Output 3 is On
		X4 = 1			XP2 : Output 4 is On
		X5 = 1			XP2 : Output 5 is On
		X6 = 1			XP2 : Output 6 is On
		X7 = 1			XP2 : Output 7 is On
		X8 = 1			XP2 : Output 8 is On
09	09	1 Byte	R	DIS1	Digital Input Status XP1
		X8 X7 X6 X5 X4 X3 X2 X1			
		X1 = 1			XP1 : Digital Input 1 is On
		X2 = 1			XP1 : Digital Input 2 is On
		X3 = 1			XP1 : Digital Input 3 is On
		X4 = 1			XP1 : Digital Input 4 is On
		X5 = 1			XP1 : Digital Input 5 is On
		X6 = 1			XP1 : Digital Input 6 is On
		X7 = 1			XP1 : Digital Input 7 is On
		X8 = 1			XP1 : Digital Input 8 is On

RI.	HI.	Type	R/W	Tag	Description
10	0A	1 Byte	R	DIS2	Digital Input Status XP2
		X8 X7 X6 X5 X4 X3 X2 X1			
		X1 = 1			XP2 : Digital Input 1 is On
		X2 = 1			XP2 : Digital Input 2 is On
		X3 = 1			XP2 : Digital Input 3 is On
		X4 = 1			XP2 : Digital Input 4 is On
		X5 = 1			XP2 : Digital Input 5 is On
		X6 = 1			XP2 : Digital Input 6 is On
		X7 = 1			XP2 : Digital Input 7 is On
		X8 = 1			XP2 : Digital Input 8 is On
11	0B	2 Byte	R	AIS	Analog Input Status
		X16 X15 X14 X13 X12 X11 X10 X9 X8 X7 X6 X5 X4 X3 X2 X1			
		X1 = 1		AIH1	High Alarm Condition
		X2 = 1		AIL1	Low Alarm Condition
		X3 = 1		AIH2	High Alarm Condition
		X4 = 1		AIL2	Low Alarm Condition
		X5 = 1		AIH3	High Alarm Condition
		X6 = 1		AIL3	Low Alarm Condition
		X7 = 1		AIH4	High Alarm Condition
		X8 = 1		AIL4	Low Alarm Condition
		X9 = 1		AIH5	High Alarm Condition
		X10= 1		AIL5	Low Alarm Condition
		X11= 1		AIH6	High Alarm Condition
		X12= 1		AIL6	Low Alarm Condition
		X13= 1		AIH7	High Alarm Condition
		X14= 1		AIL7	Low Alarm Condition
		X15= 1		AIH8	High Alarm Condition
		X16= 1		AIL8	Low Alarm Condition

RI.	HI.	Type	R/W	Tag	Description
12	0C	Number	R	AI1	Analog Input Value 1
13	0D	Number	R	AI2	Analog Input Value 2
14	0E	Number	R	AI3	Analog Input Value 3
15	0F	Number	R	AI4	Analog Input Value 4
16	10	Number	R	AI5	Analog Input Value 5
17	11	Number	R	AI6	Analog Input Value 6
18	12	Number	R	AI7	Analog Input Value 7
19	13	Number	R	AI8	Analog Input Value 8
20	14	Number	R/W	AO1	Analog Output Value 1
21	15	Number	R/W	AO2	Analog Output Value 2
22	16	Number	R/W	AO3	Analog Output Value 3
23	17	Number	R/W	AO4	Analog Output Value 4
24	18	Number	R/W	AO5	Analog Output Value 5
25	19	Number	R/W	AO6	Analog Output Value 6
26	1A	Number	R/W	AO7	Analog Output Value 7
27	1B	Number	R/W	AO8	Analog Output Value 8
28	1C				Spare
29	1D				Spare
30	1E				Spare
31	1F				Spare
32	20	4 Bytes	R/W	CNT1	DI1 Pulse Count*
33	21	4 Bytes	R/W	CNT2	DI2 Pulse Count*
34	22	4 Bytes	R/W	CNT3	DI3 Pulse Count*
35	23	4 Bytes	R/W	CNT4	DI4 Pulse Count*
36	24	4 Bytes	R/W	CNT5	DI5 Pulse Count*
37	25	4 Bytes	R/W	CNT6	DI6 Pulse Count*
38	26	4 Bytes	R/W	CNT7	DI7 Pulse Count*
39	27	4 Bytes	R/W	CNT8	DI8 Pulse Count*
40	28				Spare
41	29				Spare
42	2A				Spare
43	2B				Spare
44	2C				Spare
45	2D				Spare
46	2E				Spare
47	2F				Spare

* Pulse Count Items are stored in EEPROM upon power failure and restored to RAM upon power restoration.

RI.	HI.	Type	R/W	Tag	Description
48	30	1 Byte Int	CNF	PC1	Prescaler DI1 Counter
49	31	1 Byte Int	CNF	PC2	Prescaler DI2 Counter
50	32	1 Byte Int	CNF	PC3	Prescaler DI3 Counter
51	33	1 Byte Int	CNF	PC4	Prescaler DI4 Counter
52	34	1 Byte Int	CNF	PC5	Prescaler DI5 Counter
53	35	1 Byte Int	CNF	PC6	Prescaler DI6 Counter
54	36	1 Byte Int	CNF	PC7	Prescaler DI7 Counter
55	37	1 Byte Int	CNF	PC8	Prescaler DI8 Counter
56	38	1 Byte	CNF	DIL1	Internal use only
57	39	1 Byte	CNF	DIL5	Internal use only
58	3A	1 Byte	CNF	DIL9	Internal use only
59	3B	1 Byte	CNF	DILD	Internal use only
60	3C	1 Byte	CNF	DOL1	Internal use only
61	3D	1 Byte	CNF	DOL5	Internal use only
62	3E	1 Byte	CNF	DOL9	Internal use only
63	3F	1 Byte	CNF	DOLD	Internal use only
64	40	1 Byte	CNF	DIT1	Digital Input Type XP1
		X8 X7 X6 X5 X4 X3 X2 X1			
		X1 = 0			XP1 : DI1 = Maintained Contact
		X1 = 1			XP1 : DI1 = Pulse Contact
		X2 = 0			XP1 : DI2 = Maintained Contact
		X2 = 1			XP1 : DI2 = Pulse Contact
		X3 = 0			XP1 : DI3 = Maintained Contact
		X3 = 1			XP1 : DI3 = Pulse Contact
		X4 = 0			XP1 : DI4 = Maintained Contact
		X4 = 1			XP1 : DI4 = Pulse Contact
		X5 = 0			XP1 : DI5 = Maintained Contact
		X5 = 1			XP1 : DI5 = Pulse Contact
		X6 = 0			XP1 : DI6 = Maintained Contact
		X6 = 1			XP1 : DI6 = Pulse Contact
		X7 = 0			XP1 : DI7 = Maintained Contact
		X7 = 1			XP1 : DI7 = Pulse Contact
		X8 = 0			XP1 : DI8 = Maintained Contact
		X8 = 1			XP1 : DI8 = Pulse Contact

RI.	HI.	Type	R/W	Tag	Description
65	41	1 Byte	CNF	DIT2	Digital Input Type XP2
		X8 X7 X6 X5 X4 X3 X2 X1			
		X1 = 0			XP2 : DI1 = Maintained Contact
		X1 = 1			XP2 : DI1 = Pulse Contact
		X2 = 0			XP2 : DI2 = Maintained Contact
		X2 = 1			XP2 : DI2 = Pulse Contact
		X3 = 0			XP2 : DI3 = Maintained Contact
		X3 = 1			XP2 : DI3 = Pulse Contact
		X4 = 0			XP2 : DI4 = Maintained Contact
		X4 = 1			XP2 : DI4 = Pulse Contact
		X5 = 0			XP2 : DI5 = Maintained Contact
		X5 = 1			XP2 : DI5 = Pulse Contact
		X6 = 0			XP2 : DI6 = Maintained Contact
		X6 = 1			XP2 : DI6 = Pulse Contact
		X7 = 0			XP2 : DI7 = Maintained Contact
		X7 = 1			XP2 : DI7 = Pulse Contact
		X8 = 0			XP2 : DI8 = Maintained Contact
		X8 = 1			XP2 : DI8 = Pulse Contact
66	42	1 Byte	CNF	DOT1	Digital Output Type XP1
		X8 X7 X6 X5 X4 X3 X2 X1			
		X1 = 0			XP1 : DO1 = ON/OFF Type
		X1 = 1			XP1 : DO1 = Pulse Type
		X2 = 0			XP1 : DO2 = ON/OFF Type
		X2 = 1			XP1 : DO2 = Pulse Type
		X3 = 0			XP1 : DO3 = ON/OFF Type
		X3 = 1			XP1 : DO3 = Pulse Type
		X4 = 0			XP1 : DO4 = ON/OFF Type
		X4 = 1			XP1 : DO4 = Pulse Type
		X5 = 0			XP1 : DO5 = ON/OFF Type
		X5 = 1			XP1 : DO5 = Pulse Type
		X6 = 0			XP1 : DO6 = ON/OFF Type
		X6 = 1			XP1 : DO6 = Pulse Type
		X7 = 0			XP1 : DO7 = ON/OFF Type
		X7 = 1			XP1 : DO7 = Pulse Type
		X8 = 0			XP1 : DO8 = ON/OFF Type
		X8 = 1			XP1 : DO8 = Pulse Type

RI.	HI.	Type	R/W	Tag	Description
67	43	1 Byte	CNF	DOT2	Digital Output Type XP2
		X8 X7 X6 X5 X4 X3 X2 X1			
		X1 = 0			XP2 : DO1 = ON/OFF Type
		X1 = 1			XP2 : DO1 = Pulse Type
		X2 = 0			XP2 : DO2 = ON/OFF Type
		X2 = 1			XP2 : DO2 = Pulse Type
		X3 = 0			XP2 : DO3 = ON/OFF Type
		X3 = 1			XP2 : DO3 = Pulse Type
		X4 = 0			XP2 : DO4 = ON/OFF Type
		X4 = 1			XP2 : DO4 = Pulse Type
		X5 = 0			XP2 : DO5 = ON/OFF Type
		X5 = 1			XP2 : DO5 = Pulse Type
		X6 = 0			XP2 : DO6 = ON/OFF Type
		X6 = 1			XP2 : DO6 = Pulse Type
		X7 = 0			XP2 : DO7 = ON/OFF Type
		X7 = 1			XP2 : DO7 = Pulse Type
		X8 = 0			XP2 : DO8 = ON/OFF Type
		X8 = 1			XP2 : DO8 = Pulse Type
68	44	1 Byte	CNF	DOPT	Digital Output Pulse Time (*5 ms.) (default = 200)
69	45	1 Byte	CNF	XTS	XT-9100 Type Settings
		0 0 0 0 0 X3 X2 X1			
		X1 = 0			50 Hz Power Line
		X1 = 1			60 Hz Power Line
		X2 = 0			Output Reset on communication failure
		X2 = 1			Output Hold on communication failure
		X3			Internal use only
70	46	1 Byte	CNF		Spare
71	47	1 Byte	CNF		Spare
72	48	1 Byte	CNF		Spare
73	49	1 Byte	CNF		Spare
74	4A	1 Byte	CNF		Spare
75	4B	1 Byte	CNF	AI2C	Internal use only
76	4C	1 Byte	CNF	AMOD	Internal use only

RI.	HI.	Type	R/W	Tag	Description	
77	4D	1 Byte	CNF	IOMAP	Extension Module I/O Map	
		X8 X7 X6 X5 X4 X3 X2 X1				
		X1 = 0			XP1	: I/O1 and I/O2 Not Used
		X1 = 1			XP1	: I/O1 and I/O2 Used
		X2 = 0			XP1	: I/O3 and I/O4 Not Used
		X2 = 1			XP1	: I/O3 and I/O4 Used
		X3 = 0			XP1	: I/O5 and I/O6 Not Used
		X3 = 1			XP1	: I/O5 and I/O6 Used
		X4 = 0			XP1	: I/O7 and I/O8 Not Used
		X4 = 1			XP1	: I/O7 and I/O8 Used
		X5 = 0			XP2	: I/O1 and I/O2 Not Used
		X5 = 1			XP2	: I/O1 and I/O2 Used
		X6 = 0			XP2	: I/O3 and I/O4 Not Used
		X6 = 1			XP2	: I/O3 and I/O4 Used
		X7 = 0			XP2	: I/O5 and I/O6 Not Used
		X7 = 1			XP2	: I/O5 and I/O6 Used
		X8 = 0			XP2	: I/O7 and I/O8 Not Used
		X8 = 1			XP2	: I/O7 and I/O8 Used
78	4E	1 Byte	CNF	IOTYP	Extension Module I/O Type	
		0 0 0 0 X4 X3 X2 X1				
		X1 = 0			XP1	: I/O1 and I/O2 Digital
		X1 = 1			XP1	: I/O1 and I/O2 Analog
		X2 = 0			XP1	: I/O3 and I/O4 Digital
		X2 = 1			XP1	: I/O3 and I/O4 Analog
		X3 = 0			XP1	: I/O5 and I/O6 Digital
		X3 = 1			XP1	: I/O5 and I/O6 Analog
		X4 = 0			XP1	: I/O7 and I/O8 Digital
		X4 = 1			XP1	: I/O7 and I/O8 Analog

RI.	HI.	Type	R/W	Tag	Description
79	4F	1 Byte	CNF	IOMOD	Extension Module I/O Mode
		X8 X7 X6 X5 X4 X3 X2 X1			
		X1 = 0			XP1 : I/O1 and I/O2 Input
		X1 = 1			XP1 : I/O1 and I/O2 Output
		X2 = 0			XP1 : I/03 and I/O4 Input
		X2 = 1			XP1 : I/O3 and I/O4 Output
		X3 = 0			XP1 : I/O5 and I/O6 Input
		X3 = 1			XP1 : I/O5 and I/O6 Output
		X4 = 0			XP1 : I/O7 and I/O8 Input
		X4 = 1			XP1 : I/O7 and I/O8 Output
		X5 = 0			XP2 : I/O1 and I/O2 Input
		X5 = 1			XP2 : I/O1 and I/O2 Output
		X6 = 0			XP2 : I/O3 and I/O4 Input
		X6 = 1			XP2 : I/O3 and I/04 Output
		X7 = 0			XP2 : I/O5 and I/O6 Input
		X7 = 1			XP2 : I/O5 and I/O6 Output
		X8 = 0			XP2 : I/O7 and I/O8 Input
		X8 = 1			XP2 : I/O7 and I/O8 Output
80	50	1 Byte	CNF		Spare
81	51	1 Byte	CNF		Spare
82	52	1 Byte	CNF		Spare
83	53	1 Byte	CNF		Spare
84	54	1 Byte	CNF		Spare
85	55	1 Byte	CNF		Spare
86	56	2 Byte	CNF	MTBC	Maximum Time Between Communications (default = 60 sec.)
87	57	2 Byte	CNF	AOT	Analog Output Type
		X16 X15 X14 X13 X12 X11 X10 X9 X8 X7 X6 X5 X4 X3 X2 X1			
		X2 X1			Signal Analog Output 1
		= 00			Output Disabled
		= 01			Output 0 to 10V
		= 10			Output 0 to 20 mA
		= 11			Output 4 to 20 mA
		X4 X3			Signal Analog Output 2 (as X2 X1)
		X6 X5			Signal Analog Output 3 (as X2 X1)
		X8 X7			Signal Analog Output 4 (as X2 X1)
		X10 X9			Signal Analog Output 5 (as X2 X1)
		X12 X11			Signal Analog Output 6 (as X2 X1)
		X14 X13			Signal Analog Output 7 (as X2 X1)
		X16 X15			Signal Analog Output 8 (as X2 X1)

RI.	HI.	Type	R/W	Tag	Description
88	58	2 Bytes	CNF	AIT1	Input Type of Analog Input 1
		0 0 0 0 0 X11 X10 X9 X8 X7 X6 X5 X4 X3 X2 X1			Unit of Measure
		X4 X3 X2 X1			
		= 0000			No Units
		= 0001			Degrees Celsius or Kelvin
		= 0010			Degrees Fahrenheit
		= 0011			Percent
		X5 = 1			Enable Square Root of Input
		X6 = 1			Alarm on Unfiltered Value
		X7 = 0			0-10 Volts
		X7 = 1			0-2 Volts, 0-20 mA or RTD
		X8 = 1			20 % Suppression
		X11 X10 X9			Linearization and Sensor Type
		= 000			Linear (active sensor)
		= 001			Nickel 1000 (JCI)
		= 010			Nickel 1000 Ext. Rng
		= 011			A99 Sensor
		= 100			PT1000 Sensor
89	59	Number	CNF	HR1	High Range Analog Input 1
90	5A	Number	CNF	LR1	Low Range Analog Input 1
91	5B	Number	R/W (E)	HIA1	High Alarm Limit Analog Input 1
92	5C	Number	R/W (E)	LOA1	Low Alarm Limit Analog Input
93	5D	Number	R/W (E)	ADF1	Differential on Alarm Limit [units]
94	5E	Number	CNF	FTC1	Filter Constant Analog Input 1
95	5F	2 Bytes			Spare
96	60	2 Bytes	CNF	AIT2	Input Type of Analog Input 2 (bits as AIT1)
97	61	Number	CNF	HR2	High Range Analog Input 2
98	62	Number	CNF	LR2	Low Range Analog Input 2
99	63	Number	R/W (E)	HIA2	High Alarm Limit Analog Input 2
100	64	Number	R/W (E)	LOA2	Low Alarm Limit Analog Input 2
101	65	Number	R/W (E)	ADF2	Differential on Alarm Limit [units]
102	66	Number	CNF	FTC2	Filter Constant Analog Input 2
103	67	2 Bytes			Spare

RI.	HI.	Type	R/W	Tag	Description
104	68	2 Bytes	CNF	AIT3	Input Type of Analog Input 3 (bits as AIT1)
105	69	Number	CNF	HR3	High Range Analog Input 3
106	6A	Number	CNF	LR3	Low Range Analog Input 3
107	6B	Number	R/W (E)	HIA3	High Alarm Limit Analog Input 3
108	6C	Number	R/W (E)	LOA3	Low Alarm Limit Analog Input 3
109	6D	Number	R/W (E)	ADF3	Differential on Alarm Limit [units]
110	6E	Number	CNF	FTC3	Filter Constant Analog Input 3
111	6F	2 Bytes			Spare
112	70	2 Bytes	CNF	AIT4	Input Type of Analog Input 4 (bits as AIT1)
113	71	Number	CNF	HR4	High Range Analog Input 4
114	72	Number	CNF	LR4	Low Range Analog Input 4
115	73	Number	R/W (E)	HIA4	High Alarm Limit Analog Input 4
116	74	Number	R/W (E)	LOA4	Low Alarm Limit Analog Input 4
117	75	Number	R/W (E)	ADF4	Differential on Alarm Limit [units]
118	76	Number	CNF	FTC4	Filter Constant Analog Input 4
119	78	2 Bytes			Spare
120	74	2 Bytes	CNF	AIT5	Input Type of Analog Input 5 (bits as AIT1)
121	79	Number	CNF	HR5	High Range Analog Input 5
122	7A	Number	CNF	LR5	Low Range Analog Input 5
123	7B	Number	R/W (E)	HIA5	High Alarm Limit Analog Input 5
124	7C	Number	R/W (E)	LOA5	Low Alarm Limit Analog Input 5
125	7D	Number	R/W (E)	ADF5	Differential on Alarm Limit [units]
126	7E	Number	CNF	FTC5	Filter Constant Analog Input 5
127	7F	2 Bytes			Spare

RI.	HI.	Type	R/W	Tag	Description
128	80	2 Bytes	CNF	AIT6	Input Type of Analog Input 6 (bits as AIT1)
129	81	Number	CNF	HR6	High Range Analog Input 6
130	82	Number	CNF	LR6	Low Range Analog Input 6
131	83	Number	R/W (E)	HIA6	High Alarm Limit Analog Input 6
132	84	Number	R/W (E)	LOA6	Low Alarm Limit Analog Input 6
133	85	Number	R/W (E)	ADF6	Differential on Alarm Limit [units]
134	86	Number	CNF	FTC6	Filter Constant Analog Input 6
135	87	2 Bytes			Spare
136	88	2 Bytes	CNF	AIT7	Input Type of Analog Input 7 (bits as AIT1)
137	89	Number	CNF	HR7	High Range Analog Input 7
138	8A	Number	CNF	LR7	Low Range Analog Input 7
139	8B	Number	R/W (E)	HIA7	High Alarm Limit Analog Input 7
140	8C	Number	R/W (E)	LOA7	Low Alarm Limit Analog Input 7
141	8D	Number	R/W (E)	ADF7	Differential on Alarm Limit [units]
142	8E	Number	CNF	FTC7	Filter Constant Analog Input 7
143	8F	2 Bytes			Spare
144	90	2 Bytes	CNF	AIT8	Input Type of Analog Input 8 (bits as AIT1)
145	91	Number	CNF	HR8	High Range Analog Input 8
146	92	Number	CNF	LR8	Low Range Analog Input 8
147	93	Number	R/W (E)	HIA8	High Alarm Limit Analog Input 8
148	94	Number	R/W (E)	LOA8	Low Alarm Limit Analog Input 8
149	95	Number	R/W (E)	ADF8	Differential on Alarm Limit [units]
150	96	Number	CNF	FTC8	Filter Constant Analog Input 8
151	97	2 Bytes			Spare

Notes

Notes

Notes

JOHNSON CONTROLS

Controls Group
507 E. Michigan Street
P.O. Box 423
Milwaukee, WI 53201

FAN 636.4
System 9100 Technical Manual
Printed in U.S.A.