

170 ADM 850 10  
10 to 60 VDC Module Base /  
170 ADO 830 30  
6 Pt. Relay Out Module Base

Version 1.0

31005197 00



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## Safety Information

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### NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



## DANGER

DANGER indicates an imminently hazardous situation, which, if not avoided, **will result** in death, serious injury, or equipment damage.



## WARNING

WARNING indicates a potentially hazardous situation, which, if not avoided, **can result** in death, serious injury, or equipment damage.



## CAUTION

CAUTION indicates a potentially hazardous situation, which, if not avoided, **can result** in injury or equipment damage.

### PLEASE NOTE

Electrical equipment should be serviced only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material. This document is not intended as an instruction manual for untrained persons.

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# 170 ADM 850 10 10 to 60 VDC Module Base



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## Overview

### Purpose

This chapter describes the 170 ADM 850 10 Module Base.

### What's in this Chapter?

This chapter contains the following topics.

Topic	Page
Front Panel Components	4
Specifications	6
Internal Pin Connections	9
Field Wiring Guidelines	10
Wiring Diagrams	12
I/O Mapping	17

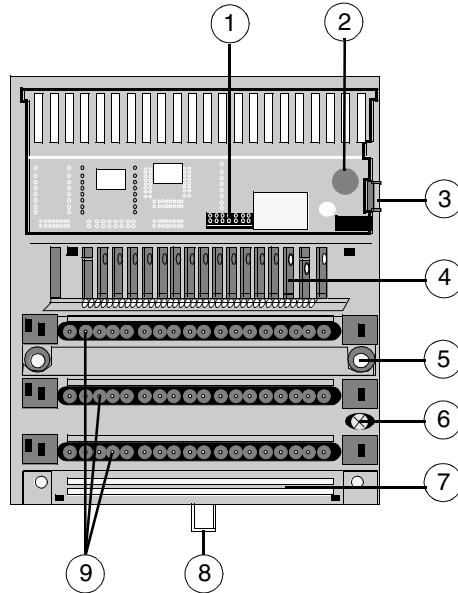
## Front Panel Components

### Overview

This section contains an illustration of the front panel of the 170 ADM 850 10 Momentum I/O base and a description of the LEDs.

### Front Panel Illustration

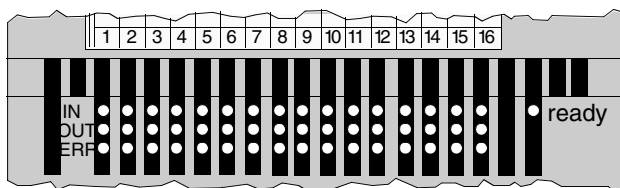
The front panel of the I/O base is shown in the illustration below.



### Components of the I/O Module

Label	Description
1	Internal interface (ATI) connector
2	Ground nut standoff
3	Locking and ground contact for the adapter
4	LED status display
5	Mounting holes for panel mount
6	Grounding screw
7	Busbar Mounting Slot
8	Locking tab for DIN rail mount
9	Sockets for the terminal connectors

**LED Illustration** The LEDs are shown in the illustration below.



**LED Descriptions**

The LEDs are described in the table below.

Indicator	Condition	Message
Ready	Green	Module is ready to communicate. Operating voltage for internal logic (5 V) is present.
	Off	Module not ready.
Upper row IN 1...16	Green	Input status (an LED per input); Input point active, ie. input carries a 1 signal (logically ON)
	Off	Input point inactive, ie. input carries a 0 signal (logically OFF)
Middle row OUT 1...16	Green	Output status (an LED per output); Output point active, ie. output carries a 1 signal (logically ON)
	Off	Output point inactive, ie. Output carries a 0 signal (logically OFF)
Lower row ERR 1...16	Red	Output overload (an LED per output). Short circuit or overload on the corresponding output.
	Off	Outputs 1 ... 16 operating normally.

## Specifications

### Overview

This section contains specifications for the 170 ADM 850 10 Momentum I/O base.

### General Specifications

#### General Specifications

Module type	16 discrete inputs in 1 group 16 discrete outputs in 1 group
Supply voltage	10-60 VDC
Supply voltage range	10-60 VDC
Supply current consumption max	500 mA at 12 VDC 250 mA at 24 VDC 125 mA at 48 VDC
Power dissipation	$6 \text{ W} + ( (\# \text{ of input points on } \times .144 \text{ W}) + (\# \text{ of output points on } \times .25 \text{ W}) )$
I/O map	1 input word or 16 discrete inputs 1 output word or 16 discrete outputs

### Isolation

Input to input	none
Output group to output group	none
Input to output	707 VDC
Logic to output	707 VDC
Field to protective earth	707 VDC
Input to output	707 VDC
Field to communication adapter	Defined by Communication Adapter type

### Fuses

Internal	none
External: operating voltage (row 1)	12 VDC-630 mA fast-blow 24 VDC-315 mA fast-blow 48 VDC-200 mA fast-blow
External: input reference voltage (row 3)	315 mA fast-blow
External: output voltage (row 2)	According to the supply of the connected actuators—not to exceed 10 A fast-blow.

**EMC**

Immunity	IEC 1131-2 Surge on auxiliary power supply, 500V
Emissions	EN 50081-2 (limitation A)
Agency approvals	UL, CSA, CE, FM Class 1, Div. 2 pending

**Physical dimensions**

Width	125 mm (4.9 in)
Depth (with no adapter)	40 mm (1.54 in)
Length	141.5 mm (5.5 in) with or without one busbar 159.5mm (6.3in) two busbars 171.5 mm (6.75in) three busbars
Weight	200 g (0.44 lb)

**Discrete Inputs**

Number of points	16
Number of groups	1
Points per group	16
Signal type	True High
IEC 1131 type	1+ (See Appendix for definitions of IEC input types.)
Input Voltage Level	
12 VDC +20%,-15%	>7.5 VDC On, <2.5 VDC Off
24 VDC +25%,-20%	>11 VDC On, <5 VDC Off
48 VDC +25%,-20%	>30 VDC On, <10 VDC Off
OFF State Leakage Current	
12 VDC	1.5 mA and lower
24 VDC	1.5 mA and lower
48 VDC	1.5 mA and lower
Input Operating Current	
12 VDC ON Current	2.3 mA
24 VDC ON Current	2.7 mA
48 VDC ON Current	2.9 mA
Input voltage range	10-60 VDC
Input voltage surge	75 volts peak for 10ms
Response time	2.2 ms OFF to ON 3.3 ms ON to OFF

**Note:** Discrete 10-60 VDC inputs require an Input Voltage Reference (row 3 terminal block, terminals 17 and 18). The Input Voltage Reference must be the same voltage level as the voltage level as supplied to the inputs. This reference is required for the module to select the correct Turn On and Turn Off thresholds for the inputs.

## Discrete Outputs

Output type	Solid state switch
Output supply voltage	10-60 VDC
Number of points	16
Number of groups	1
Current capacity	0.5 A/point maximum 8 A/module up to 50 degrees C 7 A/module from 50 degrees C to 60 degrees C
Signal type	True High (sourcing)
Leakage current (output out)	< 1 mA @ 60 VDC
Surge (inrush) current	5 A for 1 ms
On state voltage drop	< 1.0 VDC @ 0.5 A
Fault sensing (See Note Below)	Outputs are electronically safeguarded to assist in short circuit and overload protection
Fault reporting	1 red LED/point (row 3) ON when short current/overload occurs
Error indication	Output overload for at least one output (I/O-Error) to communication adapter
Response time (resistive load / 0.5 A)	< 2.5 ms OFF to ON < 2.5 ms ON to OFF
Maximum switching cycles	1000/h for 0.5 A inductive load 100/s for 0.5 A resistive load 8/s for 1.2 W Tungsten load

**Note:** Discrete 10-60 VDC outputs incorporate thermal shutdown and overload protection. The output current of a shortened output is limited to a nondestructive value. The short circuit heats the output driver and the output will switch off. The output will switch on again if the driver drops below the overtemperature threshold. If the short circuit still exists, the driver will reach the overtemperature condition again and will switch off again.



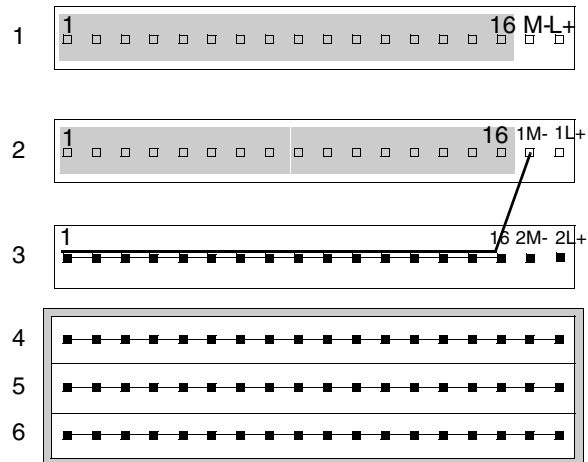
## Internal Pin Connections

### Overview

This section contains an illustration showing the internal connections between terminals on the I/O base and an optional busbar.

### Illustration

Rows 1 through 3 show the internal connections between terminals on the I/O base. Row 4 through 6 show the internal connections on the optional busbar.



## Field Wiring Guidelines

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### Overview

Inputs are field wired to row 1 of the base. The outputs are field wired to row 2. This section contains wiring guidelines and precautions.

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### Terminal Connector

To connect field devices to the I/O base, you need a field wiring terminal connector. Schneider Automation sells terminal connectors in sets of three.

Type	Part Number
Screw-in	170 XTS 001 00
Spring-clip	170 XTS 002 00

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### Busbar May Be Required

Depending on the type of field devices you are using, you may need a 1-, 2-, or 3-row busbar. The following busbars are available from Schneider Automation.


Type	Number of Rows	Part Number
Screw-in	1 - row	170 XTS 006 01
	2 - row	170 XTS 005 01
	3 - row	170 XTS 004 01
Spring-clip	1 - row	170 XTS 007 01
	2 - row	170 XTS 008 01
	3 - row	170 XTS 003 01

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## Mapping Terminal Blocks

The following table shows mapping terminal blocks and optional busbars.

Row	Terminal	Function
1	1 through 16	Inputs 1 through 16
1	17	Power supply return for module (M-)
1	18	+10 to 60 VDC power for module (L+)
2	1 through 16	Outputs 1 through 16
2	17	Power supply return for outputs (1M-)
2	18	+10 to 60 VDC power for outputs (1L+)
3	1 through 16	Return connections for outputs
3	17	Power supply return for input voltage reference (2M-)
3	18	+10 to 60 VDC input reference voltage (2L+)
4	1 through 18	Input voltage for I1...I16 or PE
5	1 through 18	Return (M-)
6	1 through 18	Protective Earth (PE)

	<b>CAUTION</b>
	<p><b>POTENTIAL FOR SHORT CIRCUITS AND/OR POWER-UP SPIKES</b></p> <p>Provide external fuses on the operating voltage to protect the module. Appropriate fuse values are shown in the wiring illustration. An unprotected module may be subject to short circuits and/or power-up spikes.</p> <p><b>Failure to follow this precaution can result in injury or equipment damage.</b></p>

## Protective Circuit May Be Required

When contacted switches are used on the input lines or when lines to the peripherals are very long, the outputs of inductive loads require protective circuitry with a clamping/suppressor diode. Install the protective circuit parallel to the operating coil.

## Wiring Diagrams

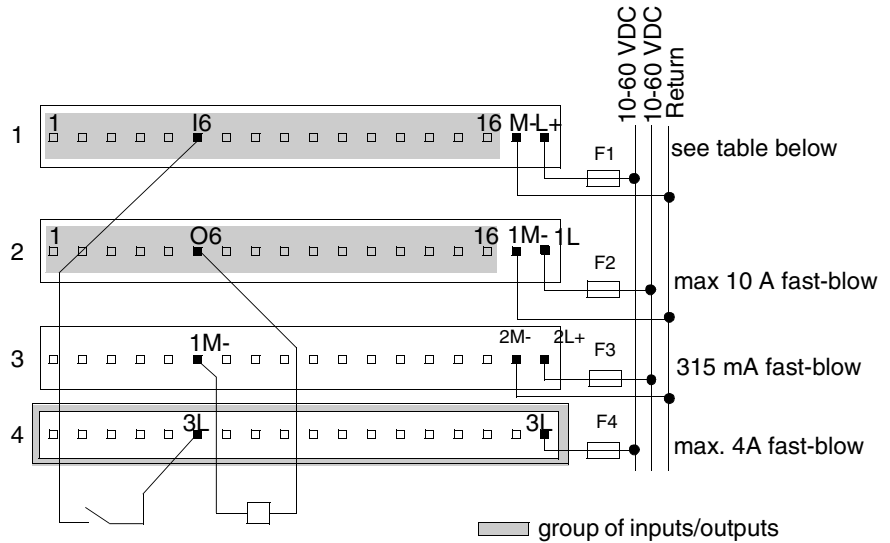
### Overview

This section provides diagrams to assist you in wiring the following types of devices:

- 2-wire devices
- Sensors activated by an output
- 4-wire sensors with a 2-wire actuator
- Broken wire detection

### 2-Wire Devices

The diagram below shows an example of wiring two-wire devices.

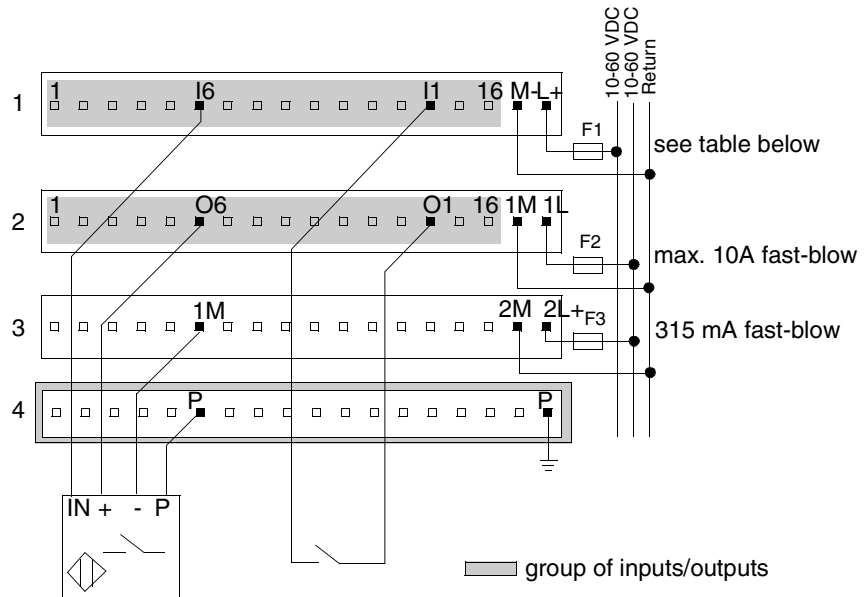


Fuse table for F1

Voltage	Fuse
12 VDC	630 mA fast-blow
24 VDC	315 mA fast-blow
48 VDC	200 mA fast-blow

### Sensor Activated by Output

The wiring diagram below shows an example of a sensor activated by an output. The diagram shows the sensors being supplied with voltage only when the outputs on pins 6 and 14, row 2, are high. The inputs from pins 6 and 14, row 1, can be high only when the associated outputs is high.

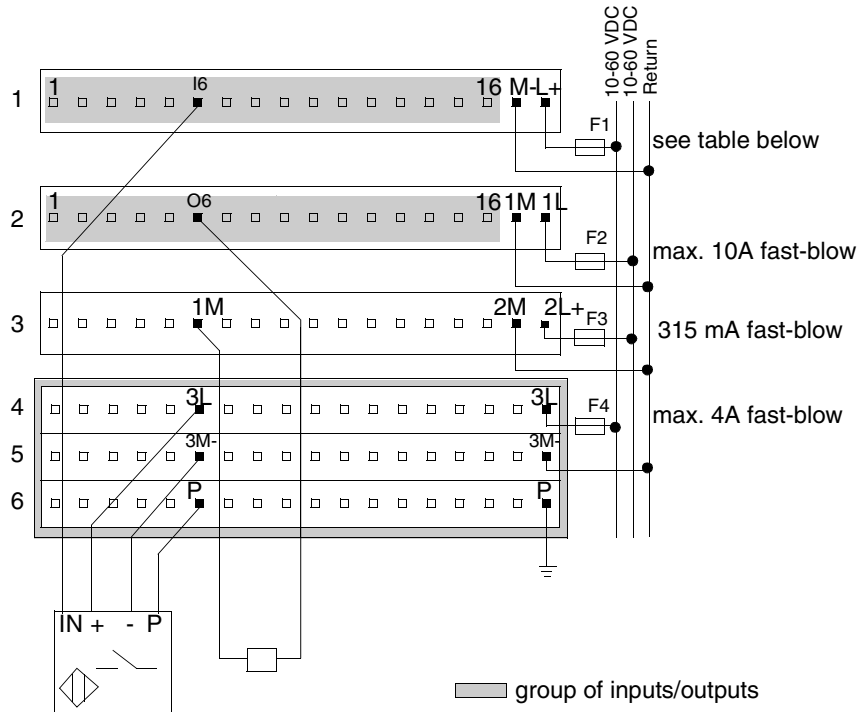


Fuse table for F1

Voltage	Fuse
12 VDC	630 mA fast-blow
24 VDC	315 mA fast-blow
48 VDC	200 mA fast-blow

**Four-Wire Sensor with a Two-Wire Actuator**

The diagram below shows a four-wire sensor with a two-wire actuator. The process of wiring a 3-wire sensor is very similar to the one below. Because 3-wire sensors do not require PE, a 2-row busbar could be used instead of the 3-row busbar shown.

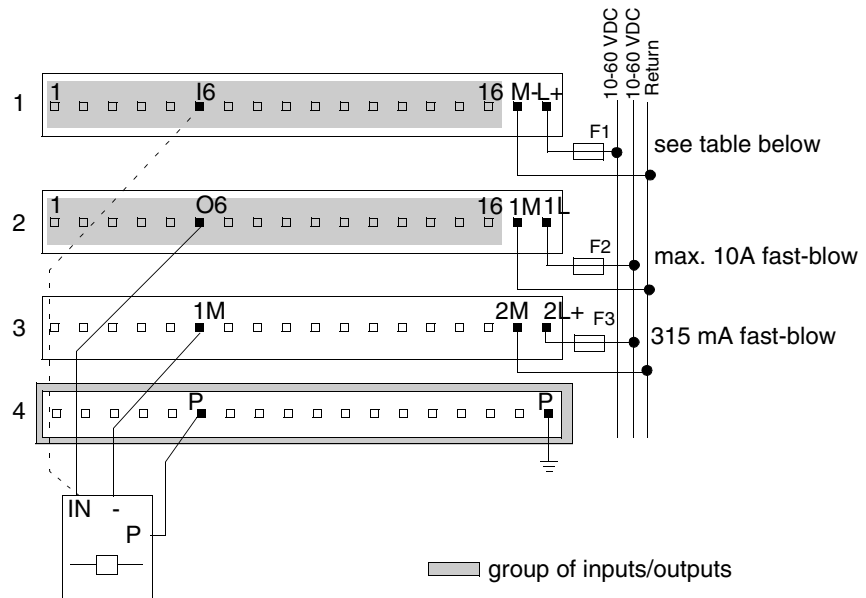


Fuse table for F1

Voltage	Fuse
12 VDC	630 mA fast-blow
24 VDC	315 mA fast-blow
48 VDC	200 mA fast-blow

## Broken Wire Detection

The diagram below shows a three-wire actuator with an optional wiring scheme for broken wire detection. The dotted line reads back whether or not current has reached the actuator. When the output on pin 6, row 2, is high, the input from pin 6, row 1, must also be high.

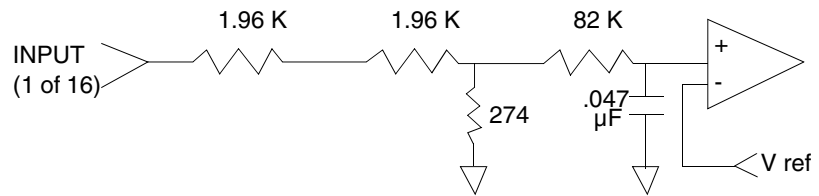


Fuse table for F1

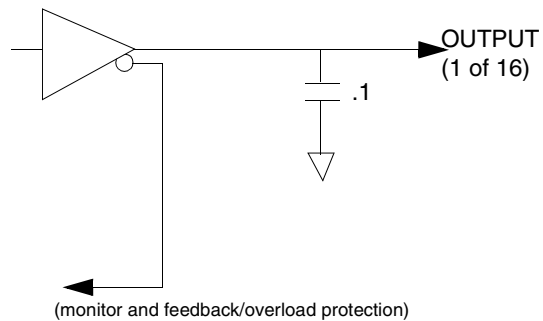
Voltage	Fuse
12 VDC	630 mA fast-blow
24 VDC	315 mA fast-blow
48 VDC	200 mA fast-blow

**Simplified Input Schematics**

The following diagram shows the field-side input circuitry.

**Simplified Output Schematics**

The following diagram shows the field-side output circuitry.





## I/O Mapping

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### Overview

The 170 ADM 850 10 TSX Momentum I/O base supports 16 discrete inputs and 16 discrete outputs. This section contains information about the mapping of the I/O data into input words and output words.

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### I/O Map

The I/O base may be mapped as one input word and as one output word, or as 16 discrete input points and as 16 discrete output points.

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### IEC vs. Ladder Logic

In order to correctly field wire the inputs/outputs and map the inputs/outputs data, you need to know which type of Momentum Adapter is mounted on the base. Adapters may be either IEC compliant or 984 Ladder Logic compliant.

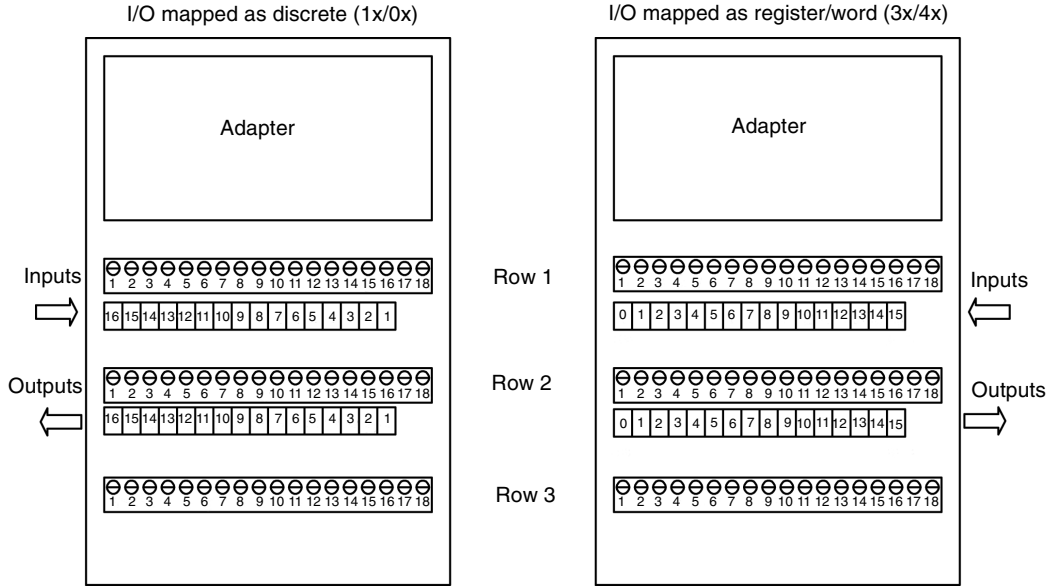
	<b>IEC Compliant</b>	<b>984 Compliant</b>
Momentum Processor Adapters	All	None
Momentum Communication Adapters	All, except 170 NEF 110 21 170 NEF 160 21 170 FNT 110 00 170 FNT 110 01	170 NEF 110 21 170 NEF 160 21 170 FNT 110 00 170 FNT 110 01

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**Data Mapping**

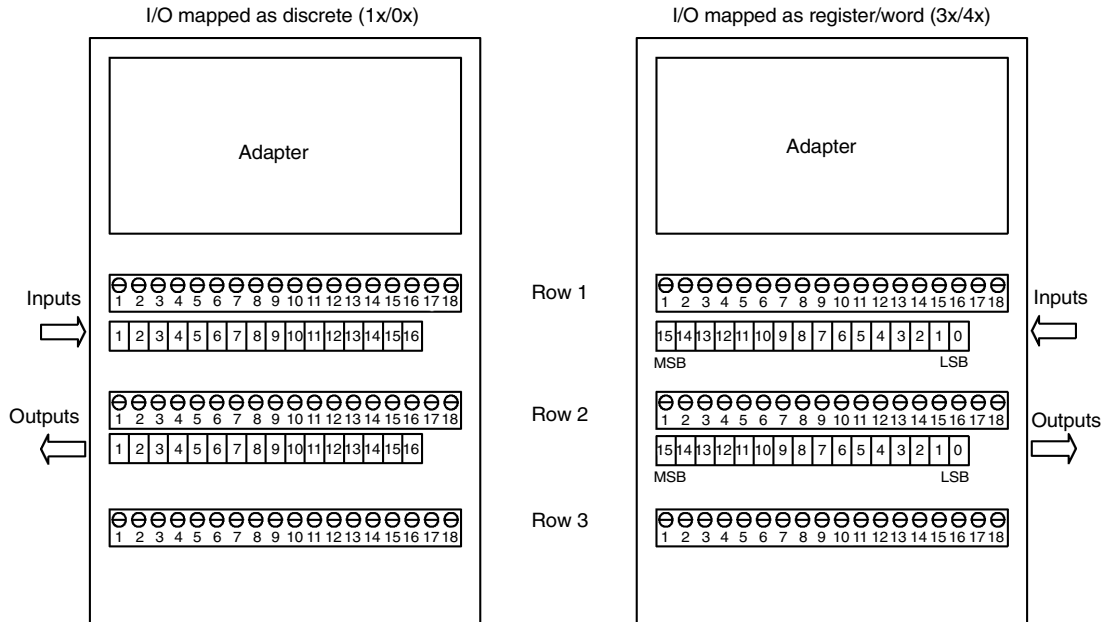
The figure below shows how data is mapped on the I/O base with an IEC Compliant adapter. When the I/O is mapped as discrete points (1x/0x), the MSB is assigned to Pin 1 and the LSB is assigned to Pin 16. When the I/O is mapped as a word or register (3x/4x), the MSB (bit 15) is assigned to Pin 16 and the LSB (bit 0) is assigned to Pin 1.

IEC Format



The figure below shows how data is mapped on the I/O base with a 984 Ladder Logic Compliant adapter. When the I/O is mapped as discrete points (1x/0x), the MSB is assigned to Pin 16 and the LSB is assigned to Pin 1. When the I/O is mapped as a word or register (3x/4x), the MSB (bit 15) is assigned to Pin 1 and the LSB (bit 0) is assigned to Pin 16.

984 Format





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# 170 ADO 830 30

## 6 Pt. Relay Out Module Base

# 2

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### Overview

#### Purpose

This chapter describes the ADO 830 30 Momentum I/O Base.

#### What's in this Chapter?

This chapter contains the following topics.

Topic	Page
Front Panel Components	22
Specifications	24
Internal Pin Connections	26
Field Wiring Guidelines	27
Wiring Diagrams	28
I/O Mapping	30

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## Front Panel Components

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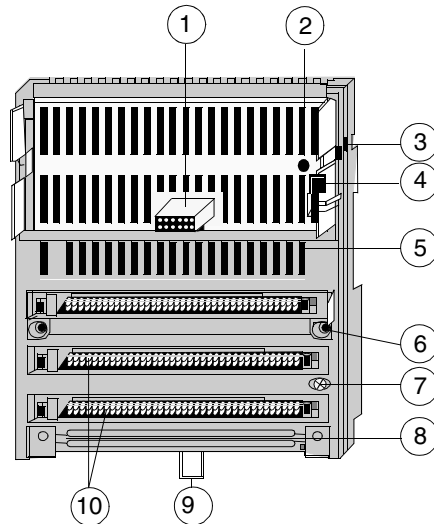
### Overview

This section contains an illustration of the front panel of the 170 ADM 830 30 Relay I/O base and a description of the LEDs.

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### Front Panel Illustration

The front panel of the I/O base is shown below.



### Components of the I/O Module

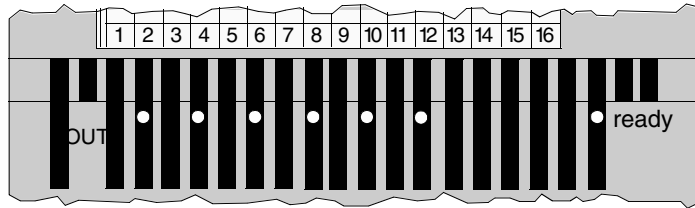
Label	Description
1	Internal interface (ATI) connector
2	Ground nut standoff
3	Locking tab for the adapter
4	Ground contact for the adapter
5	LED status display
6	Mounting holes for panel mount
7	Grounding screw
8	Grounding busbar mounting slot
9	Locking tab for DIN rail mount
10	Sockets for the terminal connectors

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**LED Illustration**

The LEDs are shown in the illustration below.



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**LED Descriptions**

The LEDs are described in the table below.

Indicator	Condition	Message
Ready	Green	Module is ready to communicate. Operating voltage for internal logic (5 V) is present.
	Off	Module not ready.
OUT 2,4,6,8,10,12	Green	Output status (an LED per output); Output point active, (logically ON): For Normally Closed (N/C) Relay wiring, the output relay opens. For Normally Open (N/O) Relay wiring, the output relay closes.
	Off	Output status (an LED per output); Output point inactive, (logically OFF): For Normally Closed (N/C) Relay wiring, the output relay is closed. For Normally Open (N/O) Relay wiring, the output relay is opened.

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## Specifications

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### Overview

This section contains specifications for the 170 ADO 830 30 I/O base.

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### General Specifications

#### General Specifications

Module type	6 relay outputs normally open /normally closed
Module Supply voltage	120 to 230 VAC
Module Supply current consumption	125 mA at 120 VAC; 65 mA at 230 VAC
I/O map	1 output word

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### Isolation

Output to output	1780 VAC RMS for 1 minute
Field to Logic	1780 VAC RMS for 1 minute 2500 VDC RMS for 1 minute
Field to Protective Earth	1780 VAC RMS for 1 minute
Field to communication adapter	Defined by Communication Adapter type

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### Fuses

Internal	none
External: operating voltage (L+)	315 mA fast-blow (Wickman1930315000)

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### EMC

Immunity	IEC 1131-2 Surge on auxiliary power supply AC 2 KV to PE, 1 KV to differential surge on auxiliary power supply DC 0.5 KV.
Emissions	EN 50081-2
Agency approvals	UL, CSA, CE, FM Class 1 Div.2 pending

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## Physical dimensions

Width	125 mm (4.9 in)
Depth (with no adapter)	40 mm (1.54 in)
Length	141.5 mm (5.5 in) with or without one busbar 159.5mm (6.3 in) two busbars 171.5 mm (6.75 in) three busbars
Weight	260 g (0.57lb)

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## Relay Outputs

Output type	Form "C" Relay, NO/NC contact
Relay Contact Material	Gold lash over silver alloy
Number of points	6
Number of groups	6
Points per group	1
Switched Output Voltage	
AC	20-250 VAC
DC	30-150 VDC
Maximum Load Current	
AC	5A @ 250 VAC @ 60 degrees C resistive load 2A Tungsten lamp load 3A @ power factor 0.4
DC	300mA resistive @ 60 degree C resistive load 100mA (L/R=10msec) 5A @ 5-30VDC @ 60 degrees C resistive load
Minimum Load Current	
AC	0.5mA
DC	0.5mA
Maximum Surge Current	20A each point (cap. load @ 10 ms.)
Maximum Switching Capability	1250 VAC (resistive load)
Maximum Module Current	21A at 60 degrees C 25A at 30 degrees C
Output Leakage Current	< 100 microamps
Fault sensing	None
Fault reporting	None
Error indication	None
Response Time	10 ms @ 60 Hz OFF to ON 20 ms @ 60 Hz ON to OFF
Maximum switching cycles	> 30 x 10 <sup>6</sup> (mechanical) >=1 x 10 <sup>5</sup> (inductive load with external protective circuitry)

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## Internal Pin Connections

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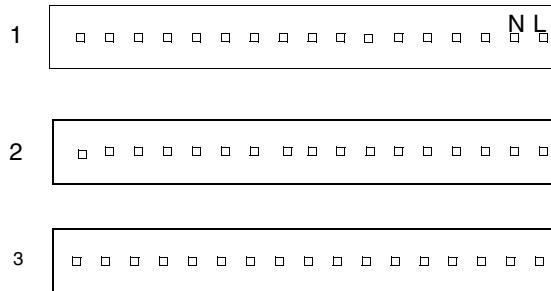
### Overview

This section contains an illustration of the I/O base.

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### Illustration

There are no internal connections between terminals on the I/O base.



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## Field Wiring Guidelines

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### Overview

This section contains wiring guidelines and precautions.

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### Terminal Connector

With respect to the terminal connector, the guidelines are as follows:

- Screw type, 17 pin, field connectors are included with this module and do not have to be ordered separately.
  - Note that pin 1 has been removed and the connector begins at pin 2.
  - 18 pin connectors that are used on other Momentum I/O Bases, cannot be used with this module.
- 

### Busbar May Be Required

Depending on the type of field devices you are using, you may need a 1-row busbar. The following busbars are available from Schneider Automation.


Type	Part Number
Screw-in	170 XTS 006 01
Spring-clip	170 XTS 007 01

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### Mapping Terminal Blocks

The following table shows mapping terminal blocks and optional busbars.

Row	Terminal	Function
1	2,4,6,8,10,12	Relay Output 1 through 6 (normally open)
	17	module neutral
	18	120 to 230 VAC module power
2	2,4,6,8,10,12	Relay Output 1 through 6 (normally closed)
3	2,4,6,8,10,12	Relay Output Common 1 through 6
4	1 ... 18	Protective earth (PE)

<b>CAUTION</b>	
	<b>POTENTIAL FOR SHORT CIRCUITS AND/OR POWER-UP SPIKES</b>
	Provide external fuses on the operating voltage to protect the module. Appropriate fuse values are shown in the wiring illustration. An unprotected module may be subject to short circuits and/or power-up spikes.
	<b>Failure to follow this precaution can result in injury or equipment damage.</b>

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### Protective Circuit Required

When contacted switches are used on the input lines or when lines to the peripherals are very long, the outputs of inductive loads require protective circuitry with a clamping/suppressor diode. Install the protective circuit parallel to the operating coil.

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## Wiring Diagrams

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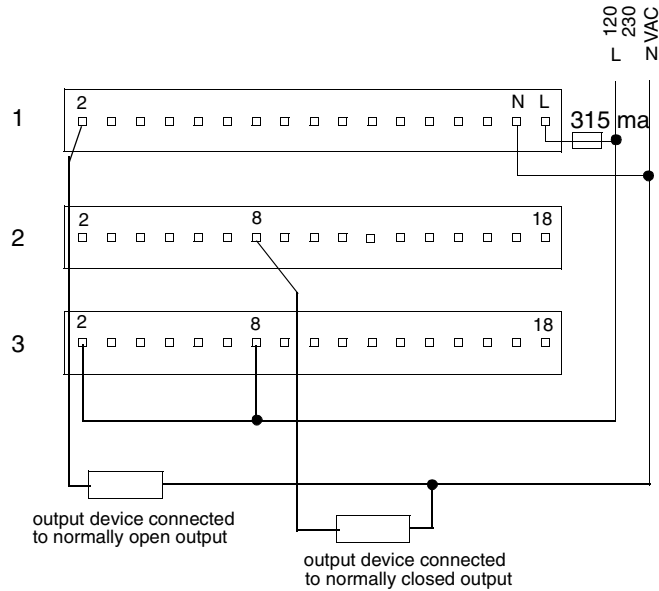
### Overview

This section provides a diagram to assist you in wiring a 2-wire actuator.

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### 2-Wire Actuator

The diagram below shows field wiring for 2-wire 120 VAC actuators using a normally open and normally closed relay output.

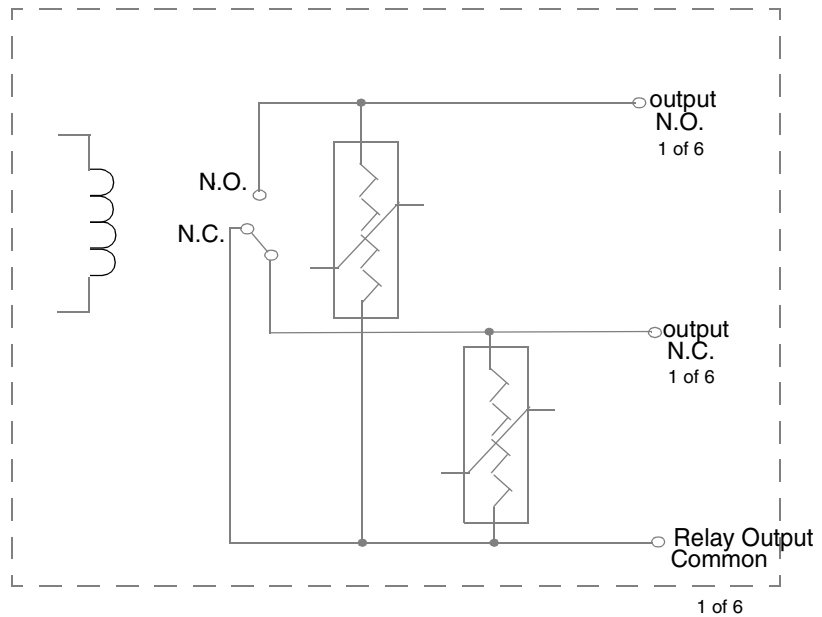


**Note:** The 6 relay outputs are individually isolated. This allows for the use of separate power sources for each output if individual isolation is required.

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**Simplified  
Output  
Schematics**

The following diagram shows the relay output circuitry.



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## I/O Mapping

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### Overview

The 170 ADO 830 30 TSX Momentum I/O base supports 6 relay outputs. This section contains information about the mapping of the I/O data into one output word.

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### I/O Map

The I/O base may be mapped as one output word, or as 16 discrete output points.

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### IEC vs. Ladder Logic

In order to correctly field wire the outputs and map the output data, you need to know which type of Momentum Adapter is mounted on the base.

<p><b>Note:</b> Pin 1 of the module has been eliminated and the relay begins with pin 2. The field connectors come with the relay module and do not need to be ordered separately.</p>
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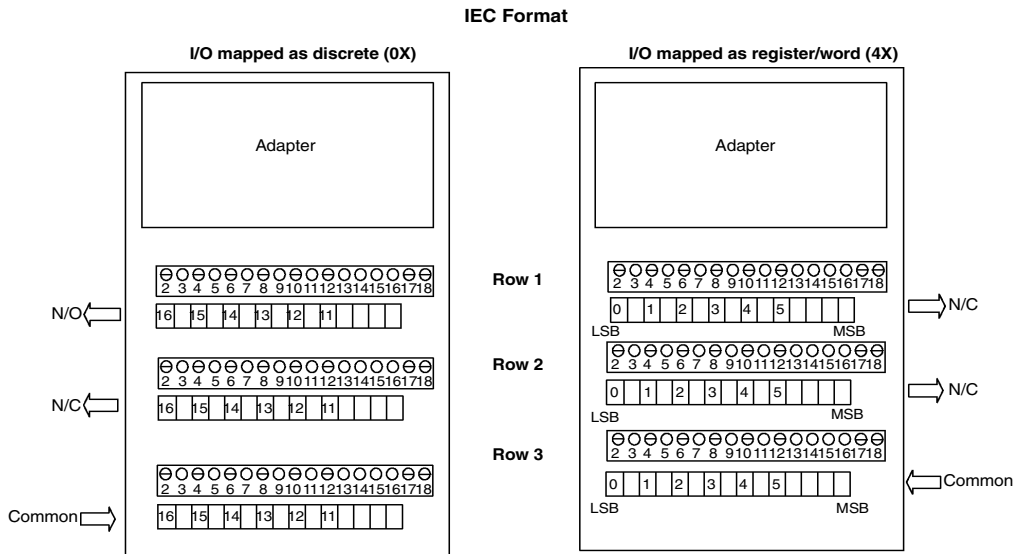
Adapters may be either IEC compliant or 984 Ladder Logic compliant.

	IEC Compliant	984 Compliant
Momentum Processor Adapters	All	None
Momentum Communication Adapters	All, except 170 NEF 110 21 170 NEF 160 21 170 FNT 110 00 170 FNT 110 01	170 NEF 110 21 170 NEF 160 21 170 FNT 110 00 170 FNT 110 01

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## Data Mapping

The figure below shows how data is mapped on the I/O base with an IEC Compliant adapter. When the I/O is mapped as discrete points (0x), the MSB is assigned to Pin 2. When I/O is mapped as a word or register (4x), the LSB (bit 0) is assigned to Pin 2.



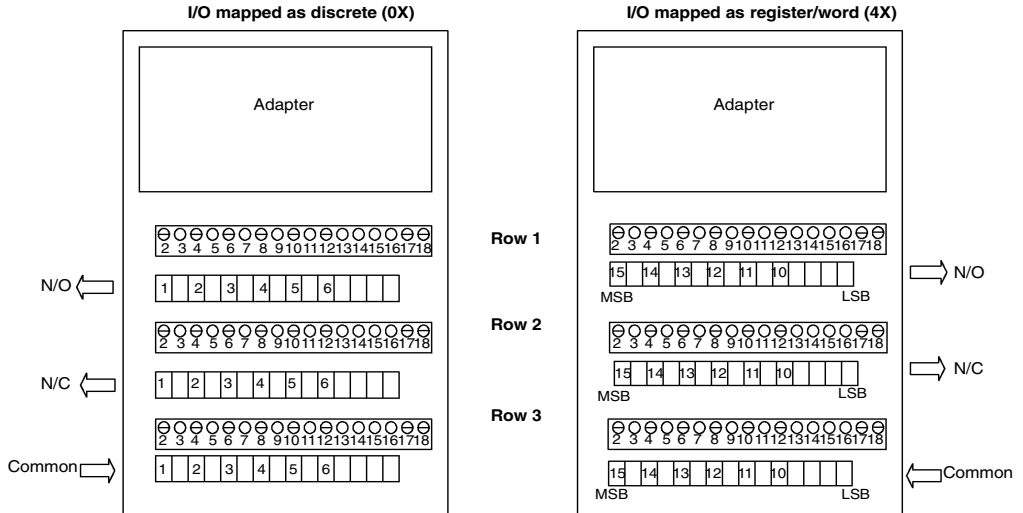
**Note:** The terminal connectors have the following features:

- Screw type, 17 pin, field connectors that are included with this module and do not have to be purchased separately.
- Pin 1 has been removed and the connector begins at pin 2.
- 18 pin connectors that are used on other Momentum I/O Bases, cannot be used with this module.
- Connector part number: 170XTS01000 (contains 3 connectors).

## Data Mapping

The figure below shows how data is mapped on the I/O base with a 984 Ladder Logic Compliant adapter. When the I/O is mapped as discrete points (0x), the LSB is assigned to Pin 2. When I/O is mapped as a word or register (4x), the MSB (bit 15) is assigned to Pin 2.

### 984 Format



#### Note: The terminal connectors have the following features:

- Screw type, 17 pin, field connectors that are included with this module and do not have to be purchased separately.
- Pin 1 has been removed and the connector begins at pin 2.
- 18 pin connectors that are used on other Momentum I/O Bases, cannot be used with this module.
- Connector part number : 170XTS01000 (contains 3 connectors).