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Quantum with Unity Pro
Discrete and Analog I/O
Reference Manual

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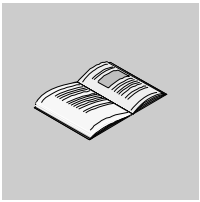
This package contains the following manuals:

- Quantum Hardware Reference Manual
- Quantum Discrete and Analog I/O Reference Manual
- Quantum Experts and Communication Reference Manual
- Grounding and Electromagnetic Compatibility of PLC Systems User Manual
- Quantum Series 800 I/O Reference Manual

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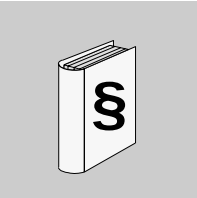
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Safety Information



Important Information

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.

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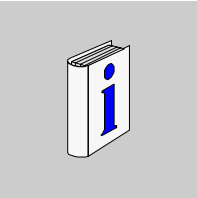
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About the Book



At a Glance

Document Scope

This documentation is a reference documentation for the discrete and analog I/O hardware of the Quantum automation system with Unity Pro.

This documentation is valid for Unity Pro from version 2.0.

Validity Note

The data and illustrations found in this documentation are not binding. We reserve the right to modify our products in line with our policy of continuous product development. The information in this document is subject to change without notice and should not be construed as a commitment by Schneider Electric.

Related Documents

Title of Documentation	Reference Number
Quantum Discrete and Analog I/O Reference Manual	Part of this package
Quantum Experts and Communication Reference Manual	Part of this package
Grounding and Electromagnetic Compatibility of PLC Systems User Manual	Part of this package
Quantum and Premium Communication Architecture Reference Manual	UNYUSE10410V20E
Quantum Hot Standby User Manual	UNYUSE10710V20E
Modicon Remote I/O Cable System Planning and Installation Guide	890USE10100
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140 EIA 921 00 Quantum AS-i-Bus Interface Module User Manual	UNYUSE10410V20E
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140 ESI 062 10 Quantum ASCII Interface Module User Manual	UNYUSE10410V20E
140 ERT 854 10 Quantum Time Stamp Module User Manual	UNYUSE10620V20E
140 DCF 077 00 Quantum Clock Module User Manual	UNYUSE10910V20E

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Title of Documentation	Reference Number
140 HLI 340 00 Quantum High Speed I/O Module with Interrrupt Function User Manual	UNYUSE10630V20E
140 EHC 105 00 High Speed Counter Module User Manual	UNYUSE10510V20E
140 MSB 101 00 / 140 MSC 101 00 Quantum Single Axis Motion Module User Manual	UNYUSE10520V20E
140 NOA 622 00 Quantum INTERBUS-Master Module User Manual	UNYUSE10410V20E
140 CRP 811 00 Quantum Profibus DP Module User Manual	UNYUSE10410V20E

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When controllers are used for applications with technical safety requirements, please follow the relevant instructions.

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General Information

I

At a Glance

Introduction

This part provides general information on the discrete and analog I/O modules.

What's in this Part?

This part contains the following chapters:

Chapter	Chapter Name	Page
1	Configuration of the module	25
2	Quantum Addressing Modes	29

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Configuration of the module

1

Overview

Purpose

This chapter provides information on the software configuration of the module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Mapping a Local Quantum I/O Station	26
Open the Parameter Configuration	27

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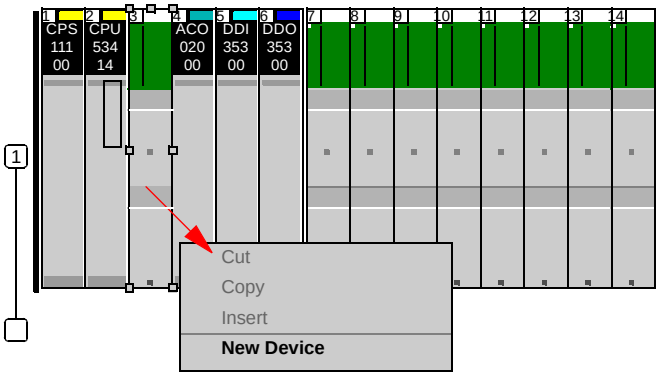
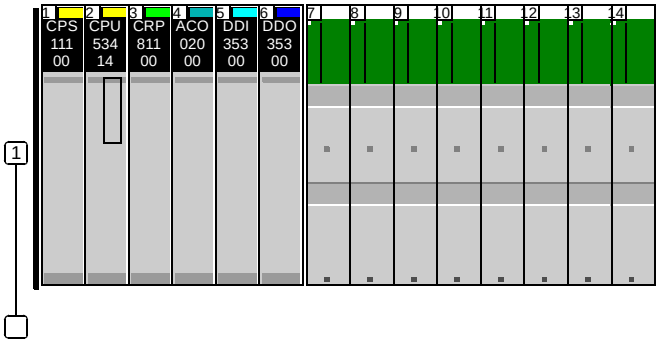
Mapping a Local Quantum I/O Station

Overview

Use the following dialog to map an existing local Quantum I/O station with a new module.

Inserting a module (local)

This table shows the steps required for inserting a module in a local station.

Step	Action
1	Call the Bus Editor
2	Mark a free slot in the local station (left mouse button)
3	Move the mouse pointer over the marked slot
4	Click on the right mouse button **Result:** A shortcut menu is opened 
5	Select **New Device** **Result:** A dialog window opens that displays all available modules
6	Select the desired module from the respective category in the Hardware catalog. **Result:** The new module is inserted in the empty slot on the local station. 

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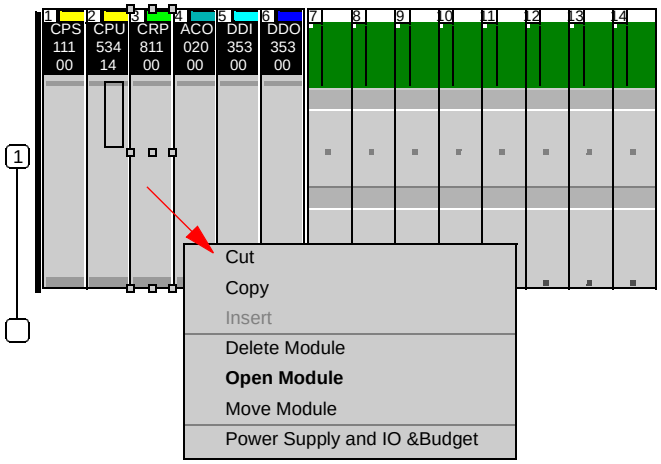
Open the Parameter Configuration

Overview

The following dialog box enables you to call the parameter configuration for a module.
An explanation of the individual parameters can be found in the respective module chapters.

Open the Parameter Configuration

This table shows the steps required to open the parameter configuration.

Step	Action
1	Call the Bus Editor
2	Select the module
3	Click on the right mouse button **Result:** A shortcut menu is opened 
4	Select **Open Module** **Result:** The module opens with the parameter configuration window

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Quantum Addressing Modes

2

Overview

Purpose

This chapter provides information on the three different modes Unity Pro allows to address the I/O data from a Quantum I/O module:

- Flat Addressing
- Topological Addressing
- IODDT Addressing

Note: The different addressing modes refer to the same physical location in the PLC memory for a given data point.

While Flat Addressing and Topological Addressing are available for all Quantum I/O modules, IODDTs are only provided for modules which deliver information additional to the I/O values (e.g. errors or warnings).

Also provided is information about the I/O modules status byte and about bit order.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Flat Addressing	30
Topological Addressing	31
IODDT Addressing	32
Quantum IODDTs	33
Addressing Example	35
Discrete I/O Bit Numbering	36
I/O Modules Status Byte	37
I/O Configuration for Discrete Input Modules	40
I/O Configuration for Discrete Output Modules	46
I/O Configuration for Discrete Input/Output Modules	53

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Flat Addressing

Flat Addressing

The Quantum modules follow a flat address mapping. Each module requires a determinate number of bits and/or words to work properly. This addressing mode is equivalent to the former used register addressing with the following assignments:

- 0x is now %M
- 1x is now %I
- 3x is now %IW
- 4x is now %MW

To access the I/O data of a module the address range entered in the configuration screen for the module is used.

Examples

The following examples show the relation between the register addressing and the IEC addressing used in Unity:

000001 is now %M1
100101 is now %I101
301024 is now %IW1024
400010 is now %MW10

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Topological Addressing

Topological Addressing

The topological addressing allows to access I/O data items using the topological location of the module within a system.
The following notation is used:

```
%<Exchangetype><Objecttype>[\b.e\]r.m.c[.rank]
```

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot, **c** = channel

Note: The [\b.e\] defaults to \1.1\ in a local rack and does not need to be specified. The rank is an index used to identify different properties of an object with the same data type (e.g. value, warning level, error level). The rank numbering is zero-based and the rank can be ommited in case of being zero.

For detailed information on I/O variables, please refer to direct addressing data instances in the *Unity Pro Reference Manual*.

Example

To read the input value (rank = 0) from channel 7 of an analog module located in slot 6 of a local rack:

```
%IW1.6.7[.0]
```

For the same module located in drop 3 of a RIO bus 2:

```
%IW\2.3\1.6.7[.0]
```

To read the 'out of range' (rank = 1) from channel 7 of an analog module located in slot 6 of a local rack:

```
%I1.6.7.1[.0]
```


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IODDT Addressing

IODDT Addressing

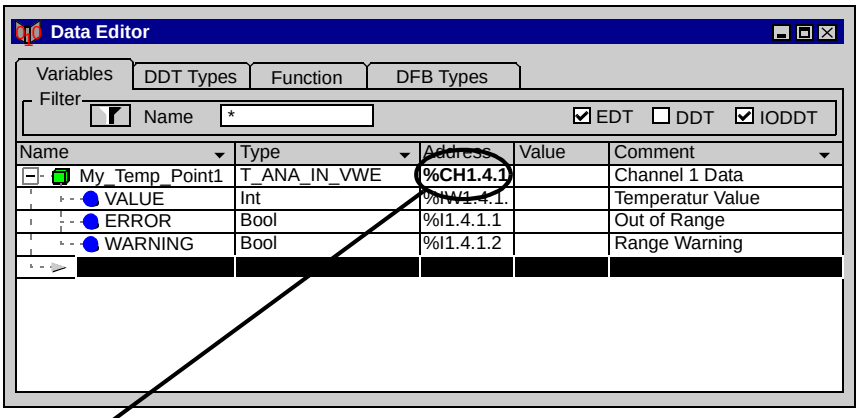
An IODDT allows all information (bits and registers) related to a channel to be handled through a user-defined variable. This variable is defined in the Unity Pro data editor by selecting the appropriate IODDT for the module as a data type and specifying the topological address of the module using the following syntax:

`%CH[\b.e\]r.m.c`

where:

- **b** = bus
- **e** = equipment (drop)
- **r** = rack
- **m** = module slot
- **c** = channel

Here is an example of an IODDT for an thermocouple input module in slot 4 of a local rack:



Note: Only %CH1.4.1 needs to be entered. The topological addresses related to this channel (%IW.. and `%I..`) are generated automatically.

Variables in the User Program

You can access all information related to channel 1 of the module using the following variables:

- `My_Temp_Point1.VALUE` for the measured value
- `My_Temp_Point1.ERROR` indicating an out-of-range condition
- `My_Temp_Point1.WARNING` indicating an over-range condition

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Quantum IODDTs

Introduction

Unity Pro provides a couple of IODDTs which are either generic and can be used for several I/O modules or belong to one specific module.

Note: Deviating from the general description of the data types in the Direct Addressing Data Instances chapter in the *Unity Pro Reference Manual*, in Quantum IODDTs for analog modules and expert modules the data type **Bool** is used for **%I** and **%Q**.

T_ANA_IN_VE

T_ANA_IN_VE is used with all channels of the following I/O modules:

- ACI 030 00
- AII 330 10
- ACI 040 00
- ACI 040 00

IODDT for analog input modules supporting **V**alue and **E**rror

Object	Symbol	Rank	Description
%IW	VALUE	0	Input value
%I	ERROR	1	Input error

T_ANA_IN_VWE

T_ANA_IN_VWE is used with all channels of the following I/O modules:

- ARI 030 10,
- AVI 030 00
- ATI 030 00
- AII 330 00

and

- Channels 3 and 4 of AMM 090 00

IODDT for analog input modules supporting **V**alue, **W**arning and **E**rror

Object	Symbol	Rank	Description
%IW	VALUE	0	Input value
%I	ERROR	1	Input error
%I	WARNING	2	Input warning

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T_ANA_BI_VWE

T_ANA_BI_VWE is used with the following I/O modules:

- Channels 1 and 2 of AMM 090 00

IODDT for bidirectional analog modules supporting **V**alue, **W**arning and **E**rror

Object	Symbol	Rank	Description
%IW	VALUE_IN	0	Input value
%QW	VALUE_OUT	0	Output value
%I	ERROR_IN	1	Input error
%I	WARNING	2	Input warning
%I	ERROR_OUT	3	Output error

T_CNT_105

T_CNT_105 is used with all channels of the following I/O modules:

- EHC 105

Specific IODDT for high speed counter module EHC 105

Object	Symbol	Rank	Description
%IW	VALUE_L	1	Input value: Low word
%IW	VALUE_H	2	Input value: High word
%I	ERROR	1	Error in Counter
%I	SP_FINAL	2	Final Set Point signal
%I	SP_FIRST	3	First Set Point signal
%I	SP_SECOND	4	Second Set Point signal
%QW	STOP_VALUE	1	For CNT_DIR="0", final set point value
%QW	INITIAL_VALUE	2	For CNT_R="1", initial set point value
%Q	LS	1	"1", Counter load/start (controlled by the rising edge)
%Q	RSTART	2	"1", Counter restart (controlled by the rising edge)
%Q	OUT_OFF	3	"1", Counter output switch-off
%Q	CNT_DIR	4	"0" Counter counts up "1" Counter counts down
%Q	OM1	5	Operating Mode bit 1
%Q	OM2	6	Operating Mode bit 2
%Q	OM3	7	Operating Mode bit 3
%Q	OM4	8	Operating Mode bit 4

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Addressing Example

Example for the 3 Addressing Modes

The following example compares the 3 possible addressing modes. An 8-channel thermocouple 140 ATI 030 00 module with the following configuration data is used:

- mounted in slot 5 of the CPU rack (local rack)
- starting input address is 201 (input word %IW201)
- end input address is 210 (input word %IW210)

To access the I/O data from the module you can use the following syntax:

Module data	Flat addressing	Topological addressing	IODDT addressing	Concept addressing
Channel 3 temperature	%IW203	%IW1.5.3	My_Temp.VALUE	300203
Channel 3 out of range	%IW209.5	%I1.5.3.1	My_Temp.ERROR	300209 Bit 5 to be extracted by user-logic
Channel 3 range warning	%IW209.13	%I1.5.3.2	My_Temp.WARNING	300209 Bit 13 to be extracted by user-logic
Module internal temperature	%IW210	%IW1.5.10	not accessible through IODDT	300210

Note: For the IODDT the data type `T_ANA_IN_VWE` is used and the variable `My_Temp` with the address `%CH1.5.10` was defined.

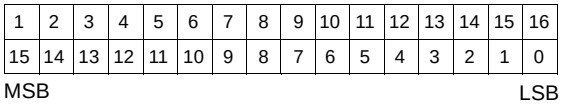
For comparison, the register addressing as used with Concept is added in the last column. As Concept does not support direct addressing of a bit in a word, the bit extraction has to be performed in the user program.

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Discrete I/O Bit Numbering

Introduction

The numbering of channels of an I/O module usually starts with 1 and counts up to the maximum number of supported channels. The software however starts numbering with a 0 for the least significant bit in a word (LSB). Additional the Quantum I/O modules have their lowest channel mapped to the most significant bit (MSB).
The following figure shows the mapping of I/O channels related to the bits in a word:.



Word Addressing versus Bit Addressing

Mainly discrete I/O modules can be configured to deliver their I/O data either in word format or in bit format. This can be selected during configuration by selecting either %IW (%MW) or %I (%M). If you need to access a single bit from an I/O module configured to use an I/O word, you can use the syntax %word.bit. The following table gives you the connection between I/O point number and the belonging I/O address in bit and word addressing.
The table shows an 32-point input module in the main rack, slot 4 configured with starting address %I1 or %IW1:

I/O channel	Bit address (flat addressing)	Bit address (topological addressing)	Bit address extracted from word (flat addressing)	Bit address extracted from word (topological addressing)
1	%I1	%I1.4.1[.0]	%IW1.15	%IW1.4.1.1.15
2	%I2	%I1.4.2[.0]	%IW1.14	%IW1.4.1.1.14
3	%I3	%I1.4.3[.0]	%IW1.13	%IW1.4.1.1.13
		• • •		
15	%I15	%I1.4.15[.0]	%IW1.1	%IW1.4.1.1.1
16	%I16	%I1.4.16[.0]	%IW1.0	%IW1.4.1.1.0
17	%I17	%I1.4.17[.0]	%IW2.15	%IW1.4.1.2.15
18	%I18	%I1.4.18[.0]	%IW2.14	%IW1.4.1.2.14
		• • •		
31	%I31	%I1.4.31[.0]	%IW2.1	%IW1.4.1.2.1
32	%I32	%I1.4.32[.0]	%IW2.0	%IW1.4.1.2.0

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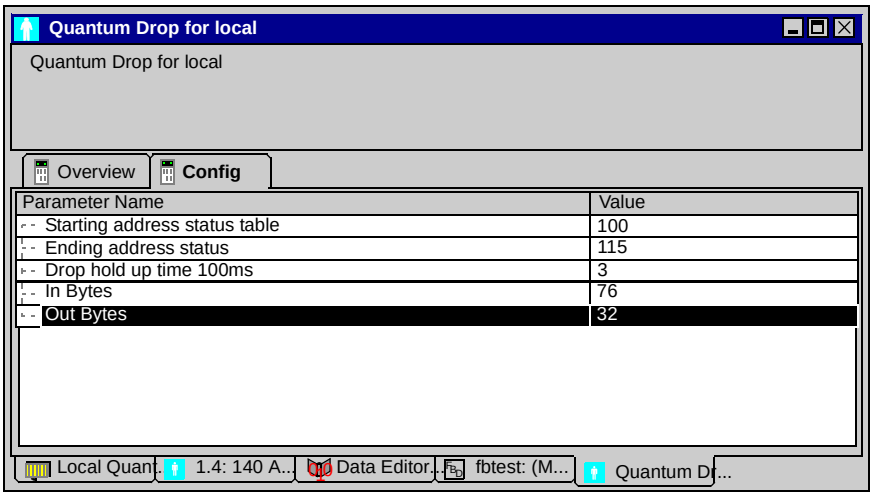
I/O Modules Status Byte

Addressing Module Status Data

In addition to possible channel related diagnostics data, a module related status byte may be used. The status information of all modules in a Drop is administered by a table of %IW words. The starting address of this table can be entered in the configuration screen for the Drop.
This information is not accessible through topological addressing.

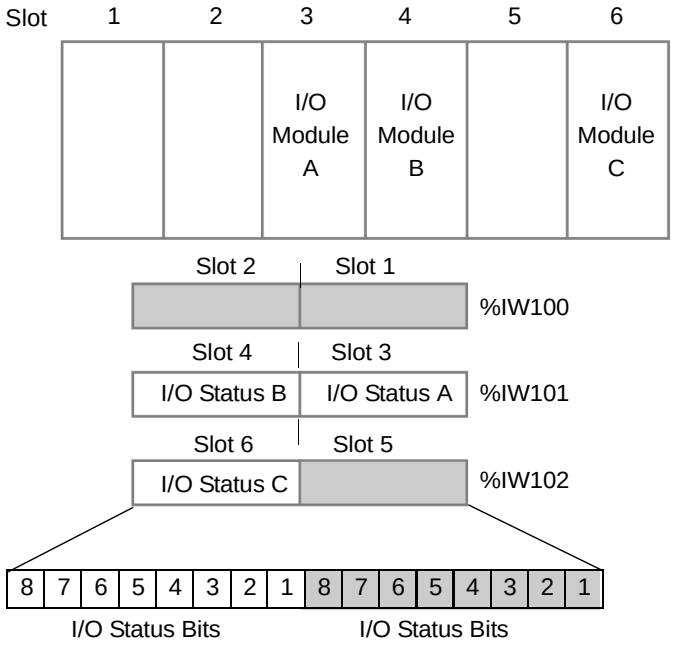
Note: The status information is only available if the module supports a status byte. For the meaning of the status byte check the module descriptions.

Example of a Drop configuration screen with the starting address of the status table set to 100:



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The following illustration shows how one word of the table conveys the status information for two modules:

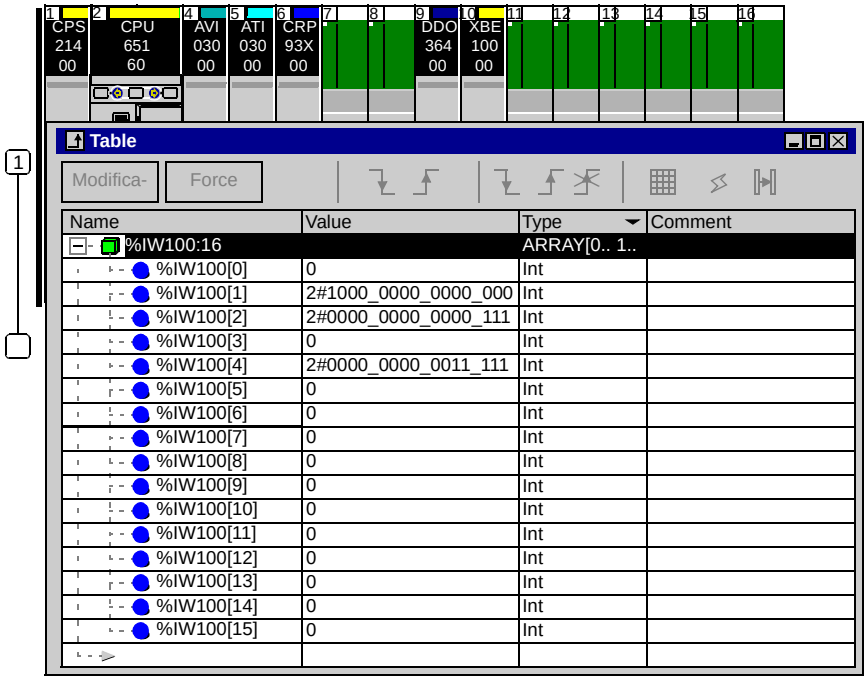


Example

The following example shows a rack and the corresponding I/O status bytes displayed in an animation table. The drop is configured to start at word %IW100 and allocates 16 words. This represents the local and expansion rack, and assumes they are 16 slot racks.
If a module does not have have a status byte associated with the module or the slot is empty, then the byte = 0.

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Rack configuration and Animation table:



Relation between Slot, Input Word and Status Byte. The byte related to the module is marked:

Slot	Input Word	Value	Module	Module
1	%IW[0]	0	Power Supply	no Status Byte
2		0	CPU	no Status Byte
3	%IW[1]	2#1000_0000_**0000_0000**	CPU	no Status Byte
4		2#**1000_0000**_0000_0000	AVI	At least one channel fault
5	%IW[2]	2#0000_0000_**0000_1111**	ATI	Fault on channels 1 ... 4
6		2#**0000_0000**_0000_1111	CRP	no Status Byte
7	%IW[3]	0	Empty	
8		0	Empty	
9	%IW[4]	2#0000_0000_**0011_1111**	DDO	Fault on all channels
10		2#**0000_0000**_0011_1111	XBE	no Status Byte
• • •				

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I/O Configuration for Discrete Input Modules

Overview

This section provides information on configuration of 8-, 16-, 24-, 32-, and 96-point input modules.

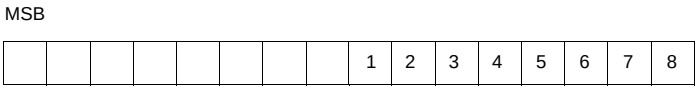
8-Point Input Modules

The 8-point input modules are:

- 140DII33000 (DC Input Intrinsically Safe)

Flat Addressing

The input modules listed above can be configured as either 8 contiguous %I references or as one %IW word. For a description of how to access the input points, please refer to *Discrete I/O Bit Numbering, p. 36*.



Topological Addressing

The following tables show the topological addresses for the 8-Point Input Modules. Topological addresses in Bit Mapping format:

Point	I/O Object	Comment
Input 1	%I[\b.e\]r.m.1	Value
Input 2	%I[\b.e\]r.m.2	Value
	• • •	
Input 7	%I[\b.e\]r.m.7	Value
Input 8	%I[\b.e\]r.m.8	Value

Topological addresses in Word Mapping format:

Point	I/O Object	Comment
Inputword 1	%IW[\b.e\]r.m.1.1	Value

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

I/O Map Status Byte

There is no I/O map status byte associated with these modules.

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16-Point Input Modules

The 16-point input modules are:

- 140DAI34000 (AC Input 24 Vac 16x1)
- 140DAI44000 (AC Input 48 Vac 16x1)
- 140DAI54000 (AC Input 115 Vac 16x1)
- 140DAI54300 (AC Input 115 Vac 8x2)
- 140DAI74000 (AC Input 230 Vac 16x1)
- 140DDI84100 (DC Input 10 ... 60 Vdc 8x2 Sink)
- 140HLI34000 (DC Input 24 Vdc 16 Sink/Source)

Flat Addressing

The input modules listed above can be configured as either 16 contiguous %I references or as one %IW word. For a description of how to access the input points, please refer to *Discrete I/O Bit Numbering, p. 36*.

MSB

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Topological Addressing

The following tables show the topological addresses for the 16-Point Input Modules. Topological addresses in Bit Mapping format:

Point	I/O Object	Comment
Input 1	%I[\b.e\]r.m.1	Value
Input 2	%I[\b.e\]r.m.2	Value
	• • •	
Input 15	%I[\b.e\]r.m.15	Value
Input 16	%I[\b.e\]r.m.16	Value

Topological addresses in Word Mapping format:

Point	I/O Object	Comment
Inputword 1	%IW[\b.e\]r.m.1.1	Value

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

I/O Map Status Byte

There is no I/O map status byte associated with these modules.

24-Point Input Module

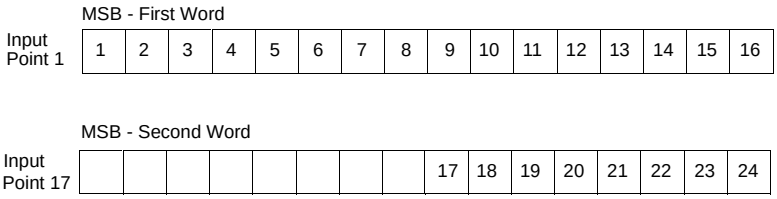
There is only one 24-point input module:

- 140DDI67300 (DC Input 125 VDC 3x8 Sink)

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Flat Addressing

The input module listed above can be configured as either 24 contiguous discrete input %I reference, or as 2 contiguous %IW input words in the following format. For a description of how to access the input points, please refer to *Discrete I/O Bit Numbering, p. 36*.



Topological Addressing

The following tables show the topological addresses for the 24-Point Input Modules. Topological addresses in Bit Mapping format:

Point	I/O Object	Comment
Input 1	%I[\b.e\]r.m.1	Value
Input 2	%I[\b.e\]r.m.2	Value
• • •		
Input 23	%I[\b.e\]r.m.23	Value
Input 24	%I[\b.e\]r.m.24	Value

Topological addresses in Word Mapping format:

Point	I/O Object	Comment
Inputword 1	%IW[\b.e\]r.m.1.1	Value
Inputword 2	%IW[\b.e\]r.m.1.2	Value

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

I/O Map Status Byte

There is no input I/O map status byte associated with this module.

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32-Point Input Modules

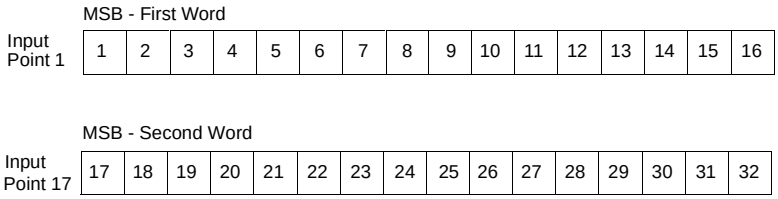
The 32-point input modules are as follows:

- 140DAI35300 (AC Input 24 Vac 4x8)
- 140DAI45300 (AC Input 48 Vac 4x8)
- 140DAI55300 (AC Input 115 Vac 4x8)
- 140DAI75300 (AC Input 230 Vac 4x8)
- 140DDI15310 (DC Input 5 V TTL 4x8 Source)
- 140DDI35300 (DC Input 24 Vdc 4x8 Sink)
- 140DDI35310 (DC Input 24 Vdc 4x8 Source)
- 140DDI85300 (DC Input 10 ... 60 Vdc 4x8 Sink)

For addressing information of the 140DSI353000, please refer to *Addressing, p. 303*.

Flat Addressing

The input modules listed above can be configured as either 32 contiguous discrete input %I references or as two contiguous %IW input words in the following format. For a description of how to access the input points, please refer to *Discrete I/O Bit Numbering, p. 36*.



Topological Addressing

The following tables show the topological addresses for the 32-Point Input Modules. Topological addresses in Bit Mapping format:

Point	I/O Object	Comment
Input 1	%I[\b.e\]r.m.1	Value
Input 2	%I[\b.e\]r.m.2	Value
• • •		
Input 31	%I[\b.e\]r.m.31	Value
Input 32	%I[\b.e\]r.m.32	Value

Topological addresses in Word Mapping format:

Point	I/O Object	Comment
Inputword 1	%IW[\b.e\]r.m.1.1	Value
Inputword 2	%IW[\b.e\]r.m.1.2	Value

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

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I/O Map Status Byte

There is no I/O map status byte associated with these modules.

96-Point Input modules

The following is the only 96 point input module:

- 140DDI36400 - DC input 6 x 16 sink

Flat Addressing

The following information pertains to the 140DDI36400 Input module. For a description of how to access the input points, please refer to *Discrete I/O Bit Numbering, p. 36*.

MSB - First Word

Input Point 1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

MSB - Second Word

Input Point 17	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

MSB - Third Word

Input Point 33	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48

MSB - Fourth Word

Input Point 49	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64

MSB - Fifth Word

Input Point 65	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80

MSB - Sixth Word

Input Point 81	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96

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Topological Addressing

The following tables show the topological addresses for the 96-Point Input Modules. Topological addresses in Bit Mapping format:

Point	I/O Object	Comment
Input 1	%I[\b.e\]r.m.1	Value
Input 2	%I[\b.e\]r.m.2	Value
• • •		
Input 95	%I[\b.e\]r.m.95	Value
Input 96	%I[\b.e\]r.m.96	Value

Topological addresses in Word Mapping format:

Point	I/O Object	Comment
Inputword 1	%IW[\b.e\]r.m.1.1	Value
Inputword 2	%IW[\b.e\]r.m.1.2	Value
Inputword 3	%IW[\b.e\]r.m.1.3	Value
Inputword 4	%IW[\b.e\]r.m.1.4	Value
Inputword 5	%IW[\b.e\]r.m.1.5	Value
Inputword 6	%IW[\b.e\]r.m.1.6	Value

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

I/O Map Status Byte

There is no I/O map status byte associated with this module.

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I/O Configuration for Discrete Output Modules

Overview

This section provides information on configuration of 8-, 12-, 16-, 32- and 96-point output modules.

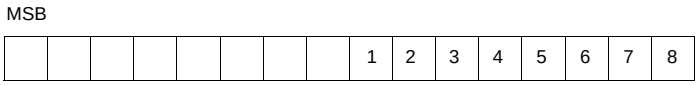
8-Point Output Modules

The following shows the 8-point output module:

- 140DRC83000 (Relay Ouput 8x1 Normally Open/Normally Closed)

Flat Addressing

The ouput modules listed above can be configured as either eight contiguous discrete %M output references or as one %MW output word. For a description of how to access the input points, please refer to *Discrete I/O Bit Numbering, p. 36*.



Topological Addressing

The following tables show the topological addresses for the 8-Point Output Modules. Topological addresses in Bit Mapping format:

Point	I/O Object	Comment
Output 1	%Q[\b.e\]r.m.1	Value
Output 2	%Q[\b.e\]r.m.2	Value
• • •		
Output 7	%Q[\b.e\]r.m.7	Value
Output 8	%Q[\b.e\]r.m.8	Value

Topological addresses in Word Mapping format:

Point	I/O Object	Comment
Outputword 1	%QW[\b.e\]R.S.1.1	Value

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

I/O Map Status Byte

There is no I/O Map status byte associated with these modules.

12-Point Output Module

The 12-point output module is:

- 140DDO88500

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Flat Addressing (Fault Inputs)

The Fault Inputs of the 140DDO88500 can be configured as either 16 contiguous %I references or as one %IW word. For a description of how to access the input points, please refer to *Discrete I/O Bit Numbering, p. 36*.

MSB

1	2	3	4	5	6	7	8	9	10	11	12				

Topological Addressing

The following tables show the topological addresses for the 12-Point Fault Inputs. Topological addresses in Bit Mapping format:

Point	I/O Object	Comment
Input 1	%I[\b.e\]r.m.1	Value
Input 2	%I[\b.e\]r.m.2	Value
• • •		
Input 11	%I[\b.e\]r.m.11	Value
Input 12	%I[\b.e\]r.m.12	Value

Topological addresses in Word Mapping format:

Point	I/O Object	Comment
Inputword 1	%IW[\b.e\]r.m.1.1	Value

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

Flat Addressing (Outputs)

The 140DDO88500 can be configured as one %MW output word in the following format. For a description of how to access the input points, please refer to *Discrete I/O Bit Numbering, p. 36*.

MSB

1	2	3	4	5	6	7	8	9	10	11	12				

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Topological Addressing

The following tables show the topological addresses for the 12-Point Output Modules.
Topological addresses in Bit Mapping format:

Point	I/O Object	Comment
Output 1	%Q[\b.e\]r.m.1	Value
Output 2	%Q[\b.e\]r.m.2	Value
• • •		
Output 11	%Q[\b.e\]r.m.11	Value
Output 12	%Q[\b.e\]r.m.12	Value

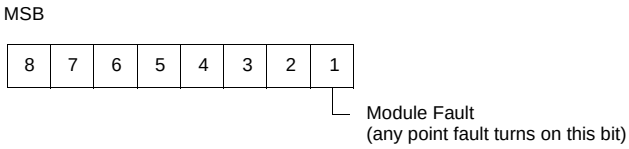
Topological addresses in Word Mapping format:

Point	I/O Object	Comment
Outputword 1	%QW[\b.e\]r.m.1.1	Value

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

I/O Map Status Byte (Outputs)

The least significant bit in the output I/O map status byte is used as follows. For a description of how to access the input points, please refer to *Discrete I/O Bit Numbering, p. 36*.



16-Point Output Modules

The 16-point output modules are as follows:

- 140DAO84000 (AC Output 24 ... 230 Vac 16x1)
- 140DAO84010 (AC Output 24 ... 115 Vac 16x1)
- 140DAO84210 (AC Output 100 ... 230 Vac 4x4)
- 140DAO84220 (AC Output 48 Vac 4x4)
- 140DDO84300 (DC Output 10 ... 60 VDC 2x8 Source)
- 140DRA84000 (Relay Output 16x1 Normally Open)

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Flat Addressing

The output modules listed above can be configured as either 16 contiguous discrete %M output references, or as one %MW output word in the following formats. For a description of how to access the input points, please refer to *Discrete I/O Bit Numbering, p. 36*.

MSB

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Topological Addressing

The following tables show the topological addresses for the 16-Point Output Modules.
Topological addresses in Bit Mapping format:

Point	I/O Object	Comment
Output 1	%Q[\b.e\]r.m.1	Value
Output 2	%Q[\b.e\]r.m.2	Value
• • •		
Output 15	%Q[\b.e\]r.m.15	Value
Output 16	%Q[\b.e\]r.m.16	Value

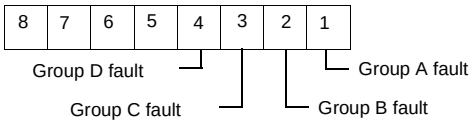
Topological addresses in Word Mapping format:

Point	I/O Object	Comment
Outputword 1	%QW[\b.e\]r.m.1.1	Value

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

I/O Map Status Byte

The I/O map status byte is used by the 140DAO84210 and 140DAO84220 output modules. The following figure shows I/O map status bytes use.



There is no I/O map status byte associated with the 140DAO84000, 140DAO84010, 140DDO84300, or 140DRA84000 module.

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32-Point Output Modules

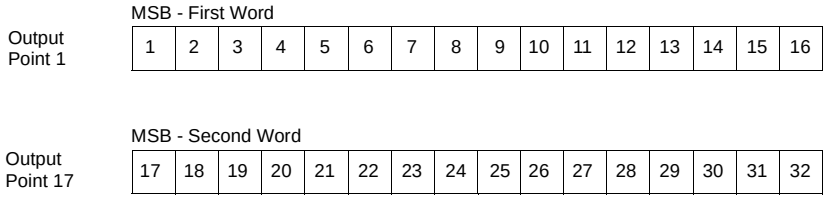
The following list shows the 32-point output modules:

- 140DAO85300 (AC Output 230 Vac 4x8 Sink)
- 140DDO15310 (DC Output 5 V TTL 4x8 Sink)
- 140DDO35300 (DC Output 24 Vdc 4x8 Source)
- 140DDO35301 (DC Output 24 Vdc 4x8 Source)
- 140DDO35310 (DC Output 24 Vdc True Low 4x8 Sink)

For addressing information of the 140DVO85300, please refer to *Addressing, p. 454*.

Flat Addressing

The output modules listed above can be configured as either 32 contiguous %M references, or as two %MW words in the following format. For a description of how to access the input points, please refer to *Discrete I/O Bit Numbering, p. 36*.



Topological Addressing

The following tables show the topological addresses for the 32-Point Output Modules.

Topological addresses in Bit Mapping format:

Point	I/O Object	Comment
Output 1	%Q[\b.e\]r.m.1	Value
Output 2	%Q[\b.e\]r.m.2	Value
• • •		
Output 31	%Q[\b.e\]r.m.31	Value
Output 32	%Q[\b.e\]r.m.32	Value

Topological addresses in Word Mapping format:

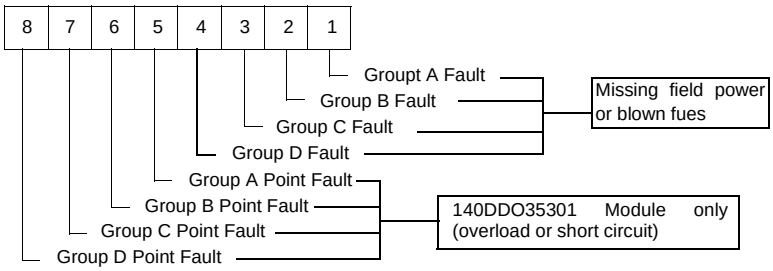
Point	I/O Object	Comment
Outputword 1	%QW[\b.e\]r.m.1.1	Value
Outputword 2	%QW[\b.e\]r.m.1.2	Value

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

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I/O Map Status Byte

The I/O map status byte is used by the modules as follows:



96-Point Output Module

The 96 point output module is:

- 140DDO36400 - DC out 24VDC 6x16 Source

Flat Addressing

The following figures show the words 1 through 6 format for the 140DDO36400 output module. For a description of how to access the input points, please refer to *Discrete I/O Bit Numbering, p. 36*.

MSB - First Word

Output Point 1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

MSB - Second Word

Output Point 17	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

MSB - Third Word

Output Point 33	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48

MSB - Fourth Word

Output Point 49	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64

MSB - Fifth Word

Output Point 65	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80

MSB - Sixth Word

Output Point 81	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96

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Topological Addressing

The following tables show the topological addresses for the 16-Point Output Modules.
Topological addresses in Bit Mapping format:

Point	I/O Object	Comment
Output 1	%Q[\b.e\]r.m.1	Value
Output 2	%Q[\b.e\]r.m.2	Value
• • •		
Output 95	%Q[\b.e\]r.m.95	Value
Output 96	%Q[\b.e\]r.m.96	Value

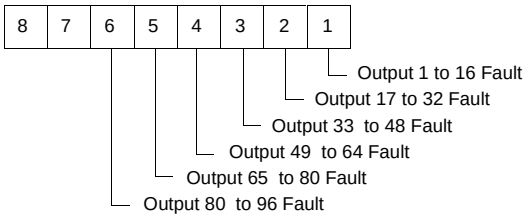
Topological addresses in Word Mapping format:

Point	I/O Object	Comment
Outputword 1	%QW[\b.e\]r.m.1.1	Value
Outputword 2	%QW[\b.e\]r.m.1.2	Value
Outputword 3	%QW[\b.e\]r.m.1.3	Value
Outputword 4	%QW[\b.e\]r.m.1.4	Value
Outputword 5	%QW[\b.e\]r.m.1.5	Value
Outputword 6	%QW[\b.e\]r.m.1.6	Value

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

I/O Map Status Byte

The I/O map status byte is used by the module as follows:



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I/O Configuration for Discrete Input/Output Modules

Overview

This section provides information on configuration of 4 In/4 Out and 16 In/8 Out modules.

4-Point Input/ 4-Point Output Module

The following shows the 4 In/4 Out module:

- 140DDM69000 (125 Vdc Input/High Power Output)

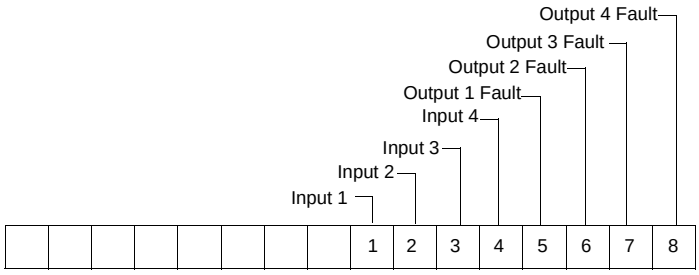
Flat Addressing

The 140DDM69000 input/output module can be configured as either eight contiguous %I references; or as one %IW word and either eight contiguous %M references or one %MW word.

	**CAUTION** **I/O Mapping** When I/O mapping module inputs using discrete %I references in remote drops, users should not split discrete words between drops. The lowest discrete reference for a drop should start on a word boundary. **Failure to follow this precaution can result in injury or equipment damage.**

I/O Map Register (Inputs)

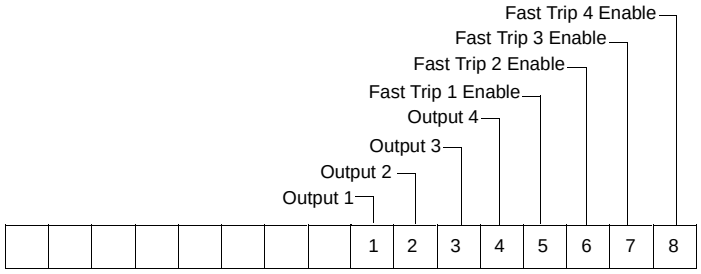
The following figure shows the %IW input word.



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I/O Map Assignment (Outputs)

The following figure shows the %MW output word.



In Fast Trip Mode, each output can be turned ON by the Command Bit (e.g., Output 1) or by the corresponding Input Bit plus the Fast Trip Enable Bit (e.g., last order Input 1 controls Output 1 directly).

Topological Addressing

The following tables show the topological addressing for the 140DDM69000 Input/ Output Module.
Topological addresses in Bit Mapping format:

Point	I/O Object	Comment
Input 1	%I[\b.e\]r.m.1	Value
Input 2	%I[\b.e\]r.m.2	Value
• • •		
Input 7	%I[\b.e\]r.m.7	Value
Input 8	%I[\b.e\]r.m.8	Value
Output 1	%Q[\b.e\]r.m.1	Value
Output 2	%Q[\b.e\]r.m.2	Value
• • •		
Output 7	%Q[\b.e\]r.m.7	Value
Output 8	%Q[\b.e\]r.m.8	Value

Topological addresses in Word Mapping format:

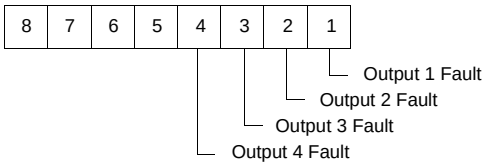
Point	I/O Object	Comment
Inputword 1	%IW[\b.e\]r.m.1.1	Value
Outputword 1	%QW[\b.e\]r.m.1.1	Value

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

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I/O Map Status Byte (Outputs)

The four least significant bits in the I/O map status are used as follows:



16-Point Input/8-Point Output Modules

The following information pertains to the 140DAM59000 (AC Input 115 Vac 2x8 / AC Output 115 Vac 2x4) and the 140DDM39000 (DC Input 24 Vdc 2x8 / DC Output 24 Vdc 2x4) modules.

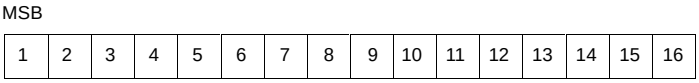
- 140DAM59000 (AC Input 115 Vac 2x8 / AC Output 115 Vac 2x4)
- 140DDM3900 (DC Input 24 Vdc 2X8 / DC Output 24 Vdc 2x4)

Flat Addressing

The modules listed above can be configured as either 16 contiguous %I references or as one %IW word and as one %MW word.

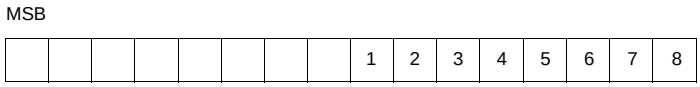
I/O Map Register (Inputs)

The following figure shows the %IW input word. For a description of how to access the input points, please refer to *Discrete I/O Bit Numbering, p. 36*.



I/O Map Assignment (Outputs)

The modules listed above can be configured as 8 %M references or as 1 %MW output word in the following format. For a description of how to access the input points, please refer to *Discrete I/O Bit Numbering, p. 36*.



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Topological Addressing

The following tables show the topological addresses for the 16/8-Point Input/Output Modules.
Topological addresses in Bit Mapping format:

Point	I/O Object	Comment
Input 1	%I[\b.e\]r.m.1	Value
Input 2	%I[\b.e\]r.m.2	Value
	• • •	
Input 15	%I[\b.e\]r.m.15	Value
Input 16	%I[\b.e\]r.m.16	Value
Output 1	%Q[\b.e\]r.m.1	Value
Output 2	%Q[\b.e\]r.m.2	Value
	• • •	
Output 7	%Q[\b.e\]r.m.7	Value
Output 8	%Q[\b.e\]r.m.8	Value

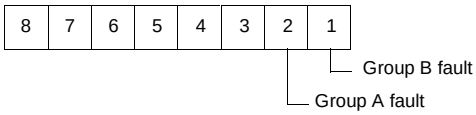
Topological addresses in Word Mapping format:

Point	I/O Object	Comment
Inputword 1	%IW[\b.e\]r.m.1.1	Value
Outputword 1	%QW[\b.e\]r.m.1.1	Value

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

I/O Map Status Byte (Outputs)

The two least significant bits in the output I/O map status byte are used as follows.



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Analog IN Modules

II

At a Glance

Introduction

The following part provides information on the Quantum Analog IN modules.

What's in this Part?

This part contains the following chapters:

Chapter	Chapter Name	Page
3	140 ACI 030 00: Analog Current / Voltage IN Module	59
4	140 ACI 040 00: Analog Mixed Current IN Module	69
5	140 ARI 030 10: Analog RTD IN Module	79
6	140 ATI 030 00: Analog TC IN Module	91
7	140 AVI 030 00: Analog Mixed Current/Voltage IN Module	103

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140 ACI 030 00: Analog Current / Voltage IN Module

3

Overview

Purpose

The following chapter provides information of the Quantum 140 ACI 030 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	60
Indicators	61
Wiring Diagram	62
Specifications	64
Addressing	66
Parameter Configuration	68

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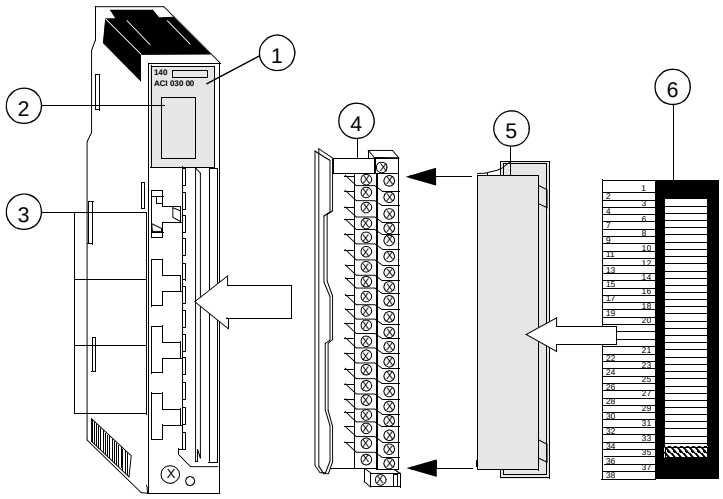
Presentation

Function

The Analog Input 8 Channel Unipolar module accepts mixed current and voltage inputs. Required jumpers between the input and sense terminals for current input measuring are included with the module.

Illustration

The following figure shows the140 ACI 030 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

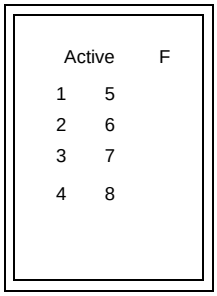
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 ACI 030 00 module.



Descriptions

The following table shows the LED descriptions for the 140 ACI 030 00 module.

LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
1 ... 8	Green	The indicated point or channel is turned ON.
1 ... 8	Red	There is a fault on the indicated point or channel.

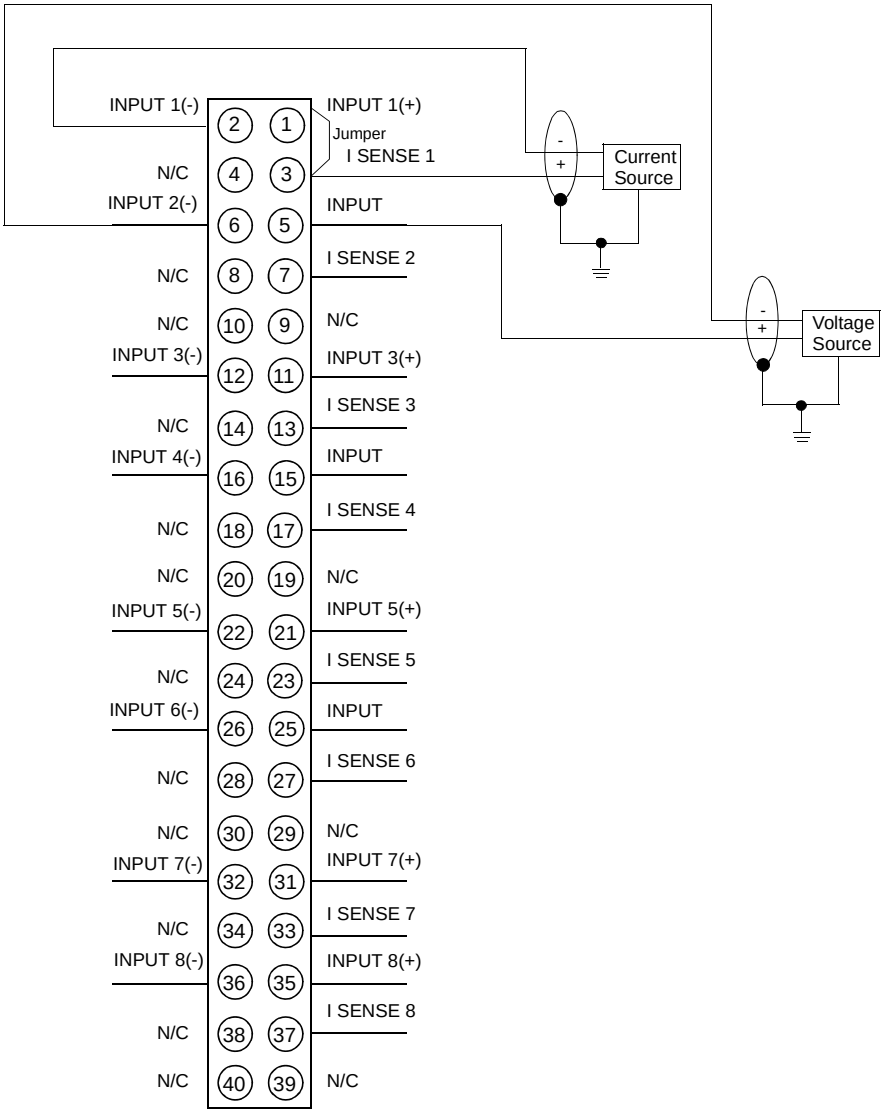
Note: This module produces a fault signal F if any one channel detects a broken wire condition in the 4 ... 20 mA range or under voltage (1 ... 5 V only).

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Wiring Diagram

Illustration

The following figure shows the wiring diagram for the 140 ACI 030 module.



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Notes on Wiring Diagram

- The current and voltage sources are supplied by the user (fusing is at the discretion of the user)
- Either a shielded or unshielded signal cable may be used. Shielded types should have a shield tied to earth ground near the signal source end.
- Unused inputs may cause the activation of the F LED. To avoid this occurrence, wire unused channels in voltage mode to a channel that is in use.
- N / C = Not Connected.

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	8 Channel IN Differential
External Power	Not required
Bus Current required (Module)	240 mA
Power Dissipation	2 W
I/O map	9 input words
Fault Detection	Broken wire (4 ... 20 mA mode) or under voltage range (1 ... 5 V)

Voltage / Input

Voltage / Input

Operating Voltage (Channel to Channel)	30 VDC (max.)
Absolute Voltage (max.)	50 VDC
Linear Mesuring Range	1 ... 5 VDC
Input Impedance	> 20 Mohms

Current / Input

Current / Input

Absolute Current (max.)	25 mA
Linear Measuring Range	4 ... 20 mA
Input Impedance	250 ohms + 0.003%

Resolution / Conversion

Resolution / Conversion

Resolution	12 bit
Absolute Accuracy Error @ 25 degrees C (voltage mode)	Typical: +/- 0.05% of full scale Maximum: +/- 0.1% of full scale
Linearity	+/- 0.04%
Accuracy drift with temperature	Typical: +/- 0.0025% of full scale / degrees C Maximum: +/- 0.005% of full scale / degrees C
Common Mode Rejection	-72 dB @ 60 Hz
Input Filter	Single pole low pass, -3 dB cutoff @ 15 Hz, +/- 20%
Update Time	5 ms for all channels

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Isolation

Isolation

Channel to Bus	1000 VDC 3000 Vpp for 1 minute

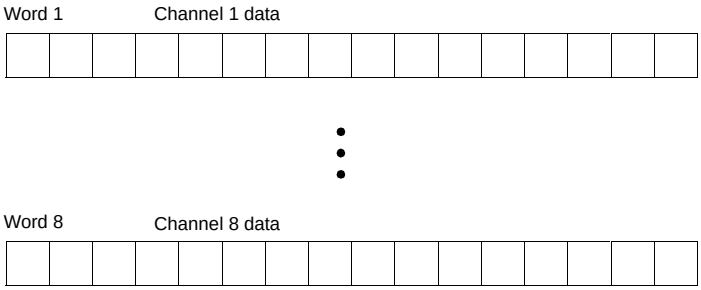
Note: Calibration is not required for this module.

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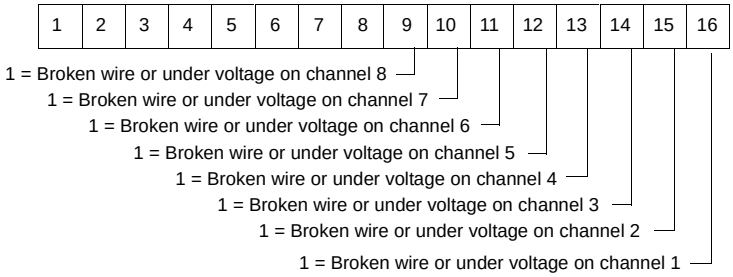
Addressing

Flat Addressing

This module requires nine contiguous, 16-bit words-eight for input data and one for channel status. The data words formats are as follows.



The following shows the word 9 register.



Topological Addressing

Topological addresses for the 140ACI03000 Input Module:

Point	I/O Object	Comment
Input 1	%IW[\b.e\]r.m.1	Value
	%I[\b.e\]r.m.1.1	Broken wire or under voltage
	• • •	
Input 8	%IW[\b.e\]r.m.8	Value
	%I[\b.e\]r.m.8.1	Broken wire or under voltage
Status Word	%IW[\b.e\]r.m.9	Status of input channels

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Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

IODDT

The 140ACI03000 Input Module uses the `T_ANA_IN_VE` IODDT:

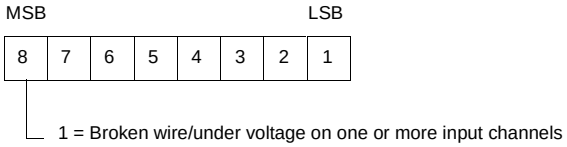
IODDT Name	Object	Data Type	Name
T_ANA_IN_VE	%CH[\b.e\]r.m.c	ANA_IN_VWE	userdefined
	%IWr.m.c.0	Int	.VALUE
	%Ir.m.c.1	Bool	.ERROR

Used abbreviations: **r** = rack, **m** = module slot, **c** = channel, **b** = bus, **e** = equipment (drop).
Bus and Drop default to 1 if not specified and can be left off.

Note: In Quantum IODDTs for analog modules and expert modules the data type **Bool** is used for **%I** and **%Q**.

I/O Map Status Byte

The I/O map status byte is used by the 140ACI03000 Input Module as follows.

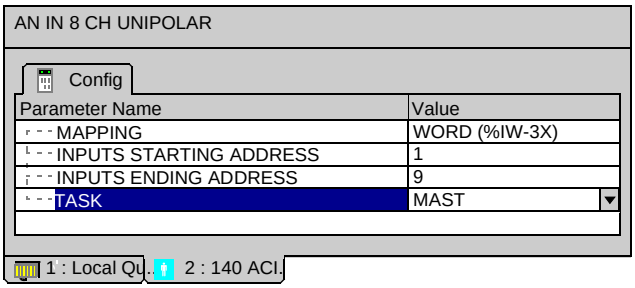


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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	WORD (%IW-3X)	-	
Inputs Starting Address	1	-	
Inputs Ending Address	9	-	includes a Statusword
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local

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140 ACI 040 00: Analog Mixed Current IN Module

4

Overview

Purpose

The following chapter provides information of the Quantum 140 ACI 040 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	70
Indicators	71
Wiring Diagram	72
Specifications	74
Addressing	76
Parameter Configuration	78

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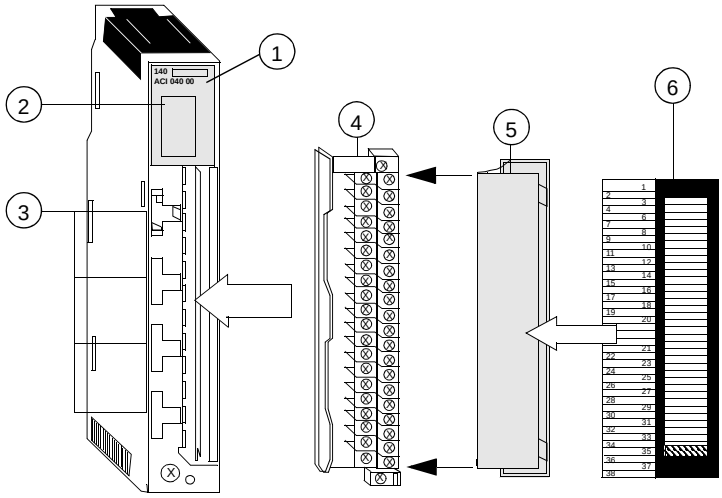
Presentation

Function

The 140 ACI 040 00 is a 16 channel analog input module which accepts mixed current inputs.

Illustration

The following figure shows the140 ACI 040 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

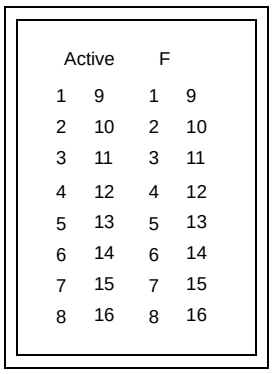
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 ACI 040 00 module.



Descriptions

The following table shows the LED descriptions for the 140 ACI 040 00 module.

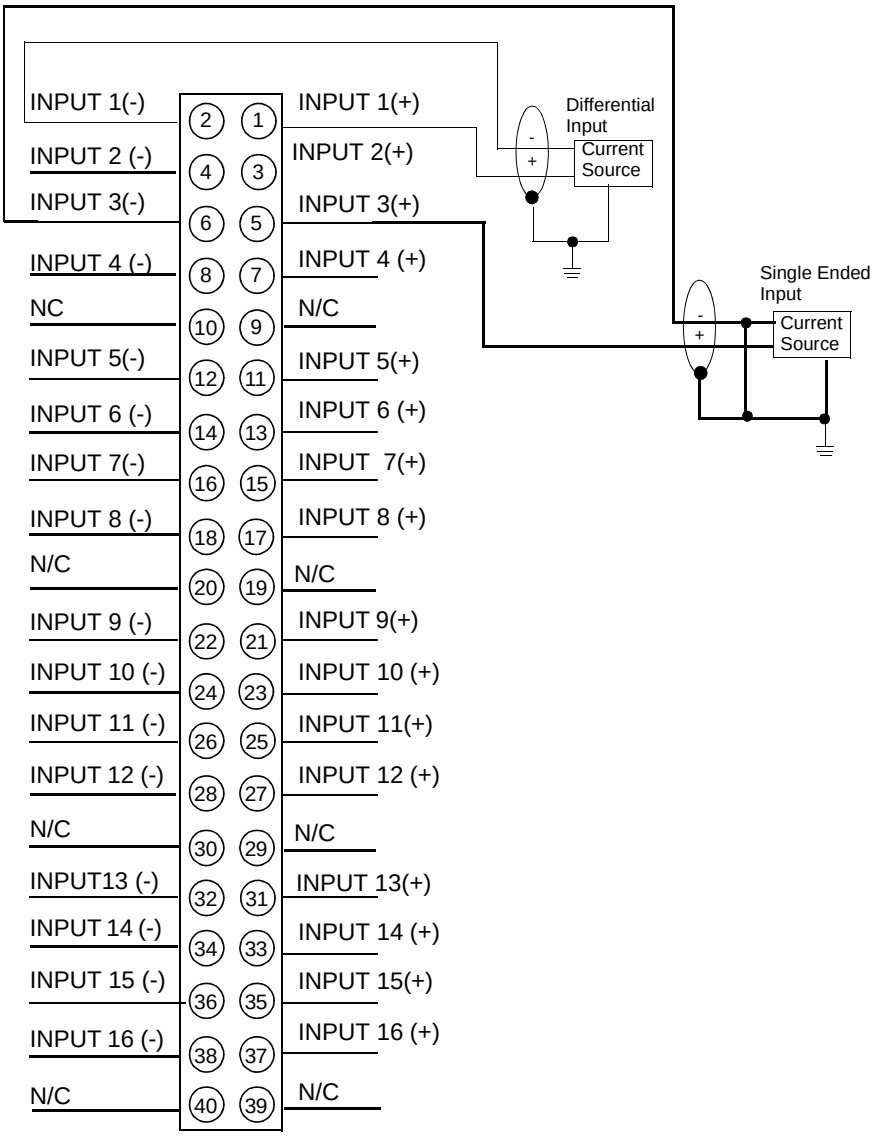
LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
1 ... 16	Green	The indicated point or channel is turned ON.
1 ... 16	Red	There is a fault on the indicated point or channel.

Note: This module produces a fault signal F if any one channel detects a broken wire condition in the 4 ... 20 mA range

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Wiring Diagram

Illustration Wiring diagram for the 140 ACI 040 00 Module.



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Notes on Wiring Diagram

- The current sources are supplied by the user (fusing is at the discretion of the user.)
- Either shielded or unshielded cables may be used. In noisy environments twisted shielded cable is recommended. Shielded cable should have a shield tied to earth ground near the signal source end.
- Unused inputs may cause the activation of the F LED. To avoid this occurrence the unused channels should be configured in the 0 ... 25 mA range.
- The maximum channel to channel working voltage cannot exceed 30 VDC.
- N/C = Not connected
- When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	16 Channel IN (Differential or externally tied single ended)
External Power	Not required
Operating Voltage (Channel to Channel)	30 VDC (max.)
Bus Current required (Module)	360 mA
Power Dissipation	5 W
I/O map	17 input words
Fault Detection	Broken wire (4 ... 20 mA mode)
Isolation (Field to Bus)	1780 VAC for 1 minute

Current / Input

Current / Input

Absolute Current (max.)	30 mA
Linear Measuring Range	0 ... 25 mA, 0 ... 25,000 counts 0 ... 20 mA, 0 ... 20,000 counts 4 ... 20 mA, 0 ...16,000 counts 4 ... 20 mA, 0 ... 4,095 counts
Input Impedance	250 ohms nominal

Resolution / Conversion

Resolution / Conversion

Resolution	0 ... 25,000 counts 0 ... 20,000 counts 0 ...16,000 counts 0 ... 4,095 counts
Absolute Accuracy Error @ 25 degrees C	+/- 0.125% of full scale
Linearity (0 to 60 degrees C)	+/- 12 microA max., 4 ... 20 mA +/- 6 microA max., 0 ... 25 mA +/- 6 microA max., 0 ... 20 mA +/- 6 microA max., 4 ... 20 mA
Accuracy drift with temperature	Typical: +/- 0.0025% of full scale / degrees C Maximum: +/- 0.005% of full scale / degrees C
Common Mode Rejection	-90 dB @ 60 Hz
Input Filter	Single pole low pass, -3 dB cutoff @ 34 Hz, +/- 25%
Update Time	15 ms for all channels

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Fuses

Fuses

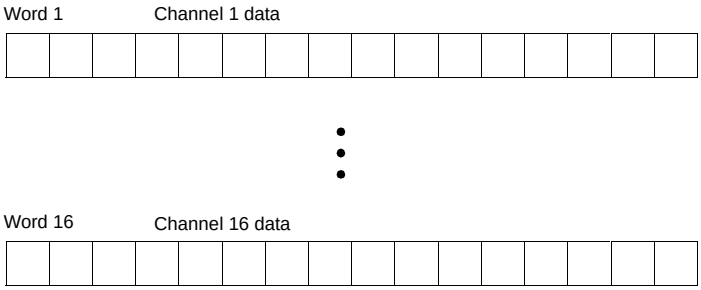
Internal	None
External	User discretion

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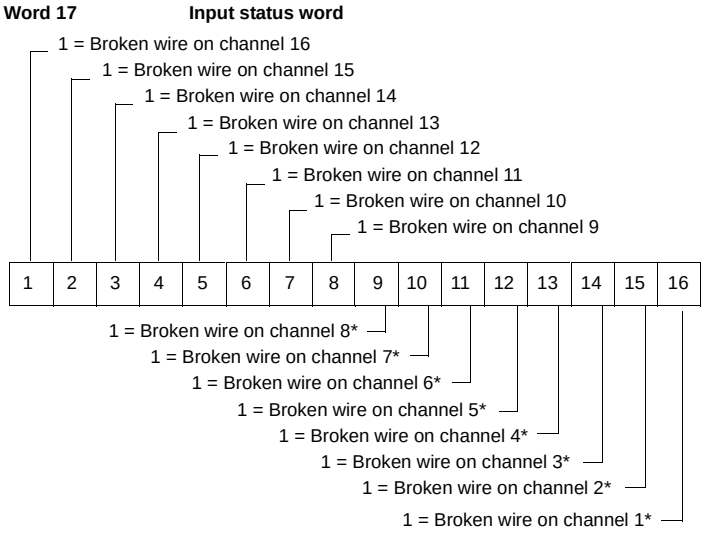
Addressing

Flat Addressing

This module requires 17 contiguous, 16-bit words—16 for input data and one for channel status. The data words formats are as follows.



The following shows the word 17.



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Topological Addressing

Topological addresses for the 140ACI04000 Input Module:

Point	I/O Object	Comment
Input 1	%IW[\b.e\]r.m.1	Value
	%I[\b.e\]r.m.1.1	Broken wire or under voltage
• • •		
Input 16	%IW[\b.e\]r.m.16	Value
	%I[\b.e\]r.m.16.1	Broken wire or under voltage
Status Word	%IW[\b.e\]r.m.17	Status of input channels

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

IODDT

The 140ACI04000 Input Module uses the `T_ANA_IN_VE` IODDT:

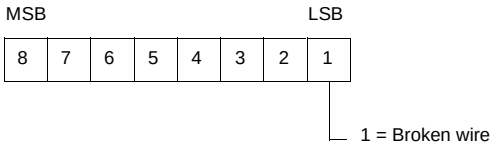
IODDT Name	Object	Data Type	Name
T_ANA_IN_VE	%CH[\b.e\]r.m.c	ANA_IN_VWE	userdefined
	%IWr.m.c.0	Int	.VALUE
	%Ir.m.c.1	Bool	.ERROR

Used abbreviations: **r** = rack, **m** = module slot, **c** = channel, **b** = bus, **e** = equipment (drop).
Bus and Drop default to 1 if not specified and can be left off.

Note: In Quantum IODDTs for analog modules and expert modules the data type **Bool** is used for **%I** and **%Q**.

I/O Map Status Byte

The I/O map status byte is used by the 140ACI04000 Input Module as follows.

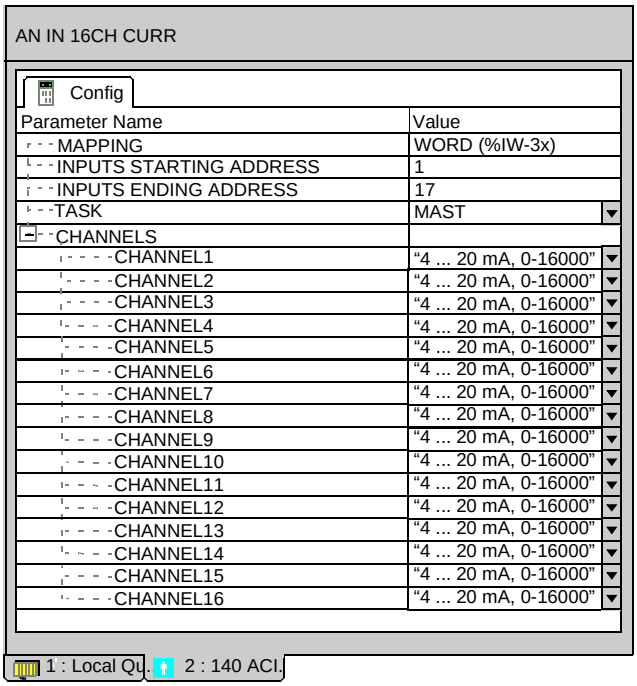


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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	WORD (%IW-3X)	-	
Inputs Starting Address	1	-	
Inputs Ending Address	17	-	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Channels			
Channel1-Channel16	"4 ... 20 mA, 0-16000"	"4 ... 20 mA, 0-4095" "0 ... 20 mA, 0-20000 "0 ... 25 mA, 0-25000	

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140 ARI 030 10: Analog RTD IN Module

5

Overview

Purpose

The following chapter provides information of the Quantum 140 ARI 030 10 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	80
Indicators	81
Wiring Diagram	82
140 ARI 030 10 Specifications	84
Addressing	86
Parameter Configuration	88

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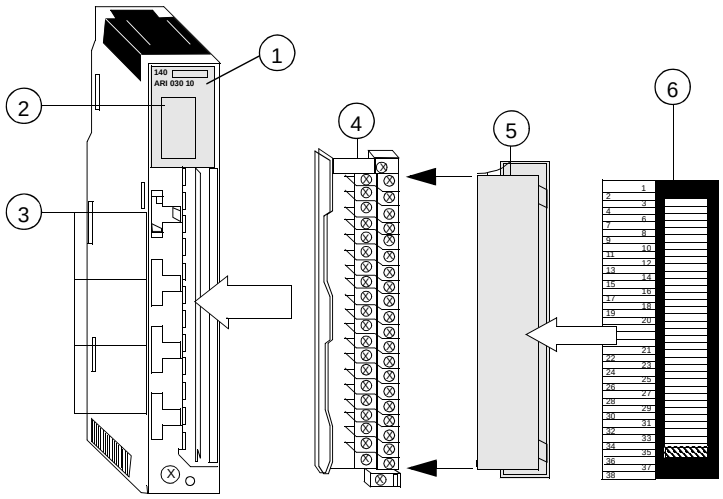
Presentation

Function

The Analog RTD Input 8 Channel module accepts input from up to eight 2-, 3-, and 4-wire RTD sensors, and provides temperature measurement data to the Quantum CPU.

Illustration

The following figure shows the 140 ARI 030 10 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

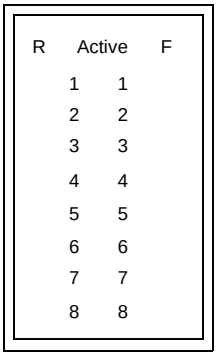
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 ARI 030 10 module.



Descriptions

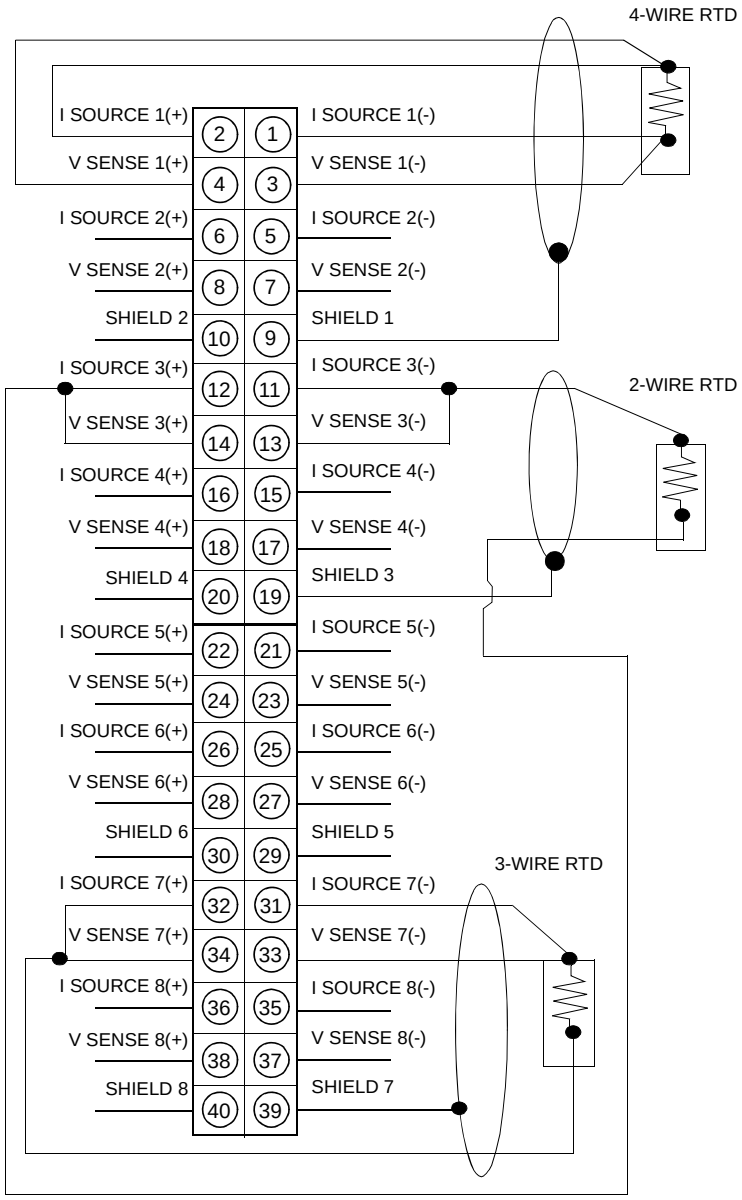
The following table shows the LED descriptions for the 140 ARI 030 10 module.

LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
R		Module has passed power up diagnostics
1 ... 8	Green	The indicated point or channel is turned ON.
1 ... 8	Red	There is a fault on the indicated point or channel. This includes broken wire and short circuit conditions.

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Wiring Diagram

Illustration The following figure shows the wiring diagram of the 140 ARI 030 10.



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Notes on Wiring Diagram

- The module is calibrated per IEC Publication 751 for platinum RTDs: 100 ohms @ 0 degrees C, TCR = 0.00385 ohms/degrees C
  DIN 43760 for nickel RTDs, American Platinum RTDs: 100 ohms @ 0 degrees C, TCR = 0.00392 ohms/degrees C.
- Terminals labeled shield are not connected internally. Shields should be grounded at the field device end.
- When using 2-wire configurations, the temperature equivalent of twice the lead resistance of one leg must be subtracted from the temperature reading.
- When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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140 ARI 030 10 Specifications

General Specifications

Module Type	8 Channel IN (RTD)
External Power	Not required
Bus Current required (Module)	200 mA
Power Dissipation	1 W
I/O map	10 input words
Input Impedance	> 10 MΩ
Fault Detection	Out of range or 8 red LEDs to indicate broken wire conditions.

RTD-Types / Range

IEC Platinum: PT 100, PT 200, PT 500, PT 1000	-200 ... +850 degrees C
American Platinum: PT 100, PT 200, PT 500, PT 1000	-100 ... +450 degrees C
Nickel: N 100, N 200, N 500, N 1000	-60 ... +180 degrees C

Measurement Current

PT 100, PT 200, N100, N200	2.5 mA
PT 500, PT 1000, N 500, N 1000	0.5 mA

Resolution / Conversion

Resolution	0.1 degree C
Absolute Accuracy Error	+/- 0.5% degrees C (25 degrees C) +/- 0.9% degrees C (0 ... 60 degrees C)
Linearity (0 to 60 degrees C)	+/- 0.01% of full scale (0 ... 60 degrees C)

Isolation

Channel to Channel	300 Vpp
Channel to Bus	1780 VAC @ 47 ... 63 Hz for 1 minute 2500 VDC

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Update Time (all channels)

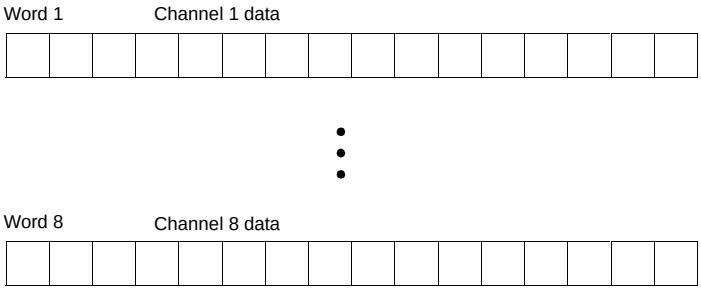
2-wire 4-wire	640 ms
3-wire	1.2 s

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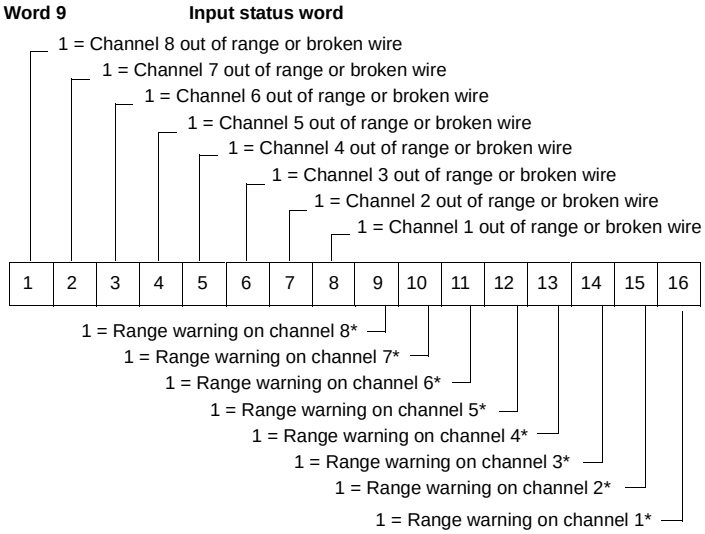
Addressing

Flat Addressing

This module requires nine contiguous, 16-bit words—eight for input data and one for channel status. The data words formats are as follows.



The following shows the word 9 register.



*A range warning is issued when a channel input exceeds the rated input value. An out-of-range bit is set when a channel input exceeds the rated input value by 2.34% or when a broken wire is sensed on the channel. The warning bit is cleared (if set) when the out-of-range bit is set.

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Topological Addressing

Topological addresses for the 140ARI03010 Input Module:

Point	I/O Object	Comment
Input 1	%IW[\b.e\]r.m.1	Value
	%I[\b.e\]r.m.1.1	Broken wire or Out of range
	%I[\b.e\]r.m.1.2	Range warning
• • •		
Input 8	%IW[\b.e\]r.m.8	Value
	%I[\b.e\]r.m.8.1	Broken wire or Out of range
	%I[\b.e\]r.m.8.2	Range warning
Status Word	%IW[\b.e\]r.m.9	Status of input channels

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

IODDT

The 140ARI03010 Input Module uses the `T_ANA_IN_VE` IODDT:

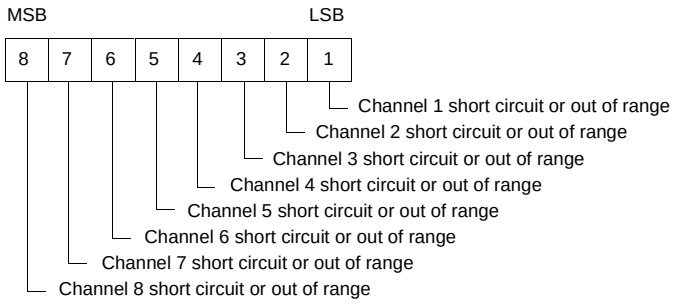
IODDT Name	Object	Data Type	Name
T_ANA_IN_VE	%CH[\b.e\]r.m.c	ANA_IN_VWE	userdefined
	%IWr.m.c.0	Int	.VALUE
	%Ir.m.c.1	Bool	.ERROR
	%Ir.m.c.2	Bool	.WARNING

Used abbreviations: **r** = rack, **m** = module slot, **c** = channel, **b** = bus, **e** = equipment (drop).
Bus and Drop default to 1 if not specified and can be left off.

Note: In Quantum IODDTs for analog modules and expert modules the data type **Bool** is used for **%I** and **%Q**.

I/O Map Status Byte

The I/O map status byte is used by the 140ARI03010 Input Module as follows.

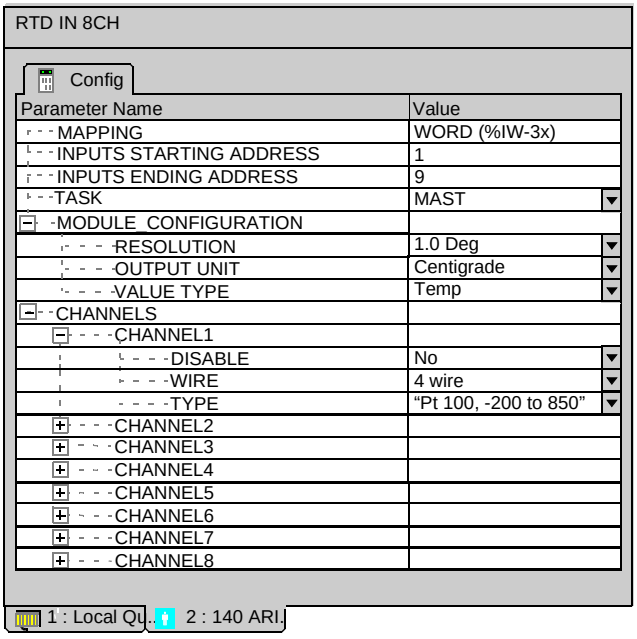


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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



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Name	Default Value	Options	Description
Mapping	WORD (%IW-3X)	-	
Inputs Starting Address	1	-	
Inputs Ending Address	9	-	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Module_Configuration			
Resolution	1.0 Deg	0.1 Deg	
Output Unit	Centigrade	Fahrenheit	
Value Type	Temp	Raw Value	
Channels Channel1			
Disable	No	Yes	
Wire	4 wire	2 wire 3 wire	
Type	"Pt 100, -200 to 850"	"Pt 200, -200 to 850" "Pt 500, -200 to 850" "Pt 1000, -200 to 850" "Ni 100, -200 to 850" "Ni 200, -200 to 850" "Ni 500, -200 to 850" "Ni 1000, -200 to 850" "R, 0 to 766,66 ohms" "R, 0 to 4000 ohms" "Apt 100, -100 to 450 ohms" "Apt 200, -100 to 450 ohms" "Apt 500, -100 to 450 ohms" "Apt 1000, -100 to 450 ohms"	
Channel2-Channel8			see Channel1

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140 ATI 030 00: Analog TC IN Module

6

Overview

Purpose

The following chapter provides information of the Quantum 140 ATI 030 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	92
Indicators	93
Wiring Diagram	94
Specifications	96
Addressing	98
Parameter Configuration	101

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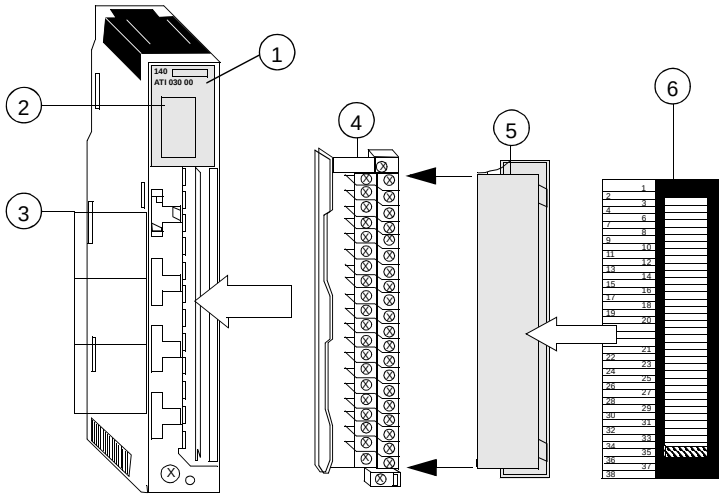
Presentation

Function

The140 ATI 030 00 is an eight-channel thermocouple input module.

Illustration

The following figure shows the 140 ATI 030 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

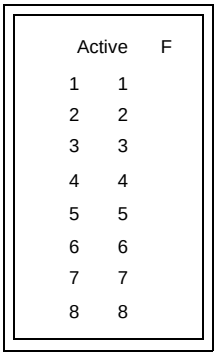
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 ATI 030 00 module.



Descriptions

The following table shows the LED descriptions for the 140 ATI 030 00 module.

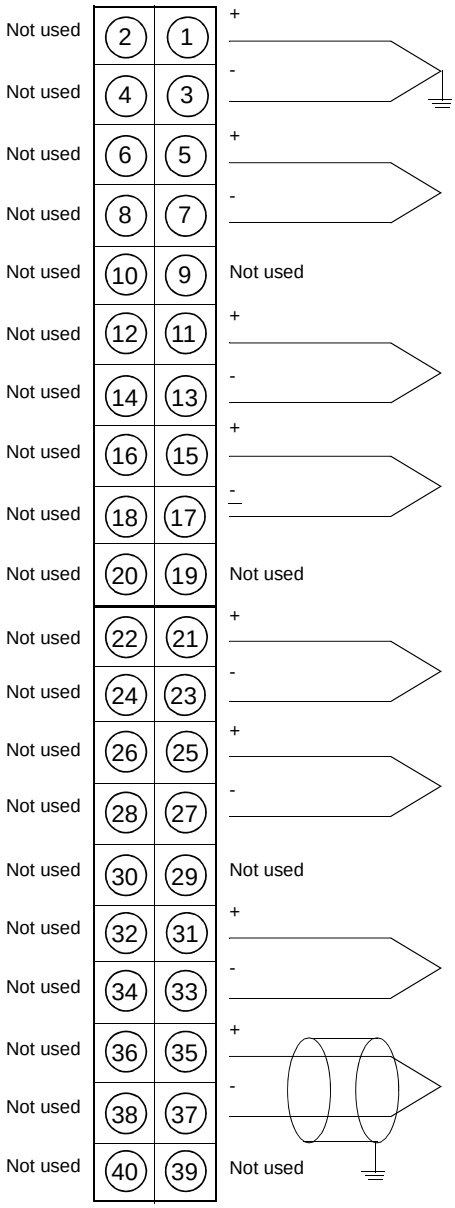
LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
1 ... 8	Green	The indicated point or channel is turned ON.
1 ... 8	Red	Indicated channel is out of range. Broken wire condition is detected

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Wiring Diagram

Illustration

The following figure shows the wiring diagram of the 140 ATI 030 00.



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Notes on Wiring Diagram

- Either shielded or unshielded TCs may be used. (The user should consider using shielded wire in a noisy environment.) Shielded types should have a shield tied to earth ground near the signal source end.
- Connections marked Not Used are not electrically connected within the module. These points are used as a thermal link to ambient air. They are not recommended as electrical tie points as this could affect the accuracy of cold junction compensation.
- When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	8 Channel IN TC
External Power	Not required
Operating Voltage (Channel to Channel)	220 VAC @ 47 ... 63 Hz or 300 VDC max.
Bus Current required (Module)	280 mA
Power Dissipation	1.5 W
I/O map	10 input words
Fault Detection	8 red LEDs to indicate out of range or broken wire conditons

Range

Range

TC Types:	Range (degrees C):
J	-210 ... +760
K	-270 ... +1370
E	-270 ... +1000
T	-270 ... +400
S	-50 ... +1665
R	-50 ... +1665
B	+130 ... +1820
Millivolt Ranges (Open circuit detect can be disabled on these ranges)	-100 mV ... +100 mV -25 mV ... +25 mV

Resistance / Filter

Resistance / Filter

TC Resistance / Max. Source Resistance	200 ohms for rated accuracy
Input Impedance	> 1 Mohms
Input Filter	Single low pass @ nominal 20 Hz plus notch filter at 50 / 60 Hz

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Noise Rejection / CJC

Noise Rejection / CJC

Normal Noise Rejection	120 dB min. @ 50 or 60 Hz
Cold Junction Compensation (CJC)	Internal CJC operates 0 ... 60 degrees C (errors are included in the accuracy specification). The connector door must be closed. Remote CJC can be implemented by connecting a TC (which monitors the external junction block temperature) to channel 1. Types J, K, and T are recommended for remote CJC.

Resolution

Resolution

TC Ranges	1 degree C (default) 0.1 degree C 1 degree F 0.1 degree F
Millivolt Ranges	100 mV range , 3.05 µV (16 bit) 25 mV range , 0.76 µV (16 bit)

Absolute Accuracy / Update Time

Absolute Accuracy / Update Time

TC Absolute Accuracy (see Note 1)	Types J, K, E, T (see Note 2): +/- 2 degrees C plus +/- 0.1% reading Types S, R, B (see Note 3): +/- 4 degrees C plus +/- 0.1% reading
Millivolt Absolute Accuracy @ 25 degrees C	+/- 20 microV +/- 0.1% of reading
Accuracy Drift with Temperature	0.15 µV / degrees C + 0.0015% of reading / degrees C max.
Update Time	1 s (all channels)

Isolation

Isolation

Channel to Bus	1780 VAC @ 47 ... 63 Hz or 2500 VDC for 1 minute

Notes on Specifications

- Absolute accuracy includes all errors from the internal CJC, TC – curvature, offset plus gain, for module temperature of 0 ... 60 degrees C. User supplied TC errors not included.
- For Type J and K, add 1.5 degrees C inaccuracy for temperatures below -100 degrees C.
- Type B cannot be used below 130 degrees C.
- All TC ranges have an open TC detect and upscale output. This results in a reading of 7FFFh or 32767 decimal when an open TC is detected.

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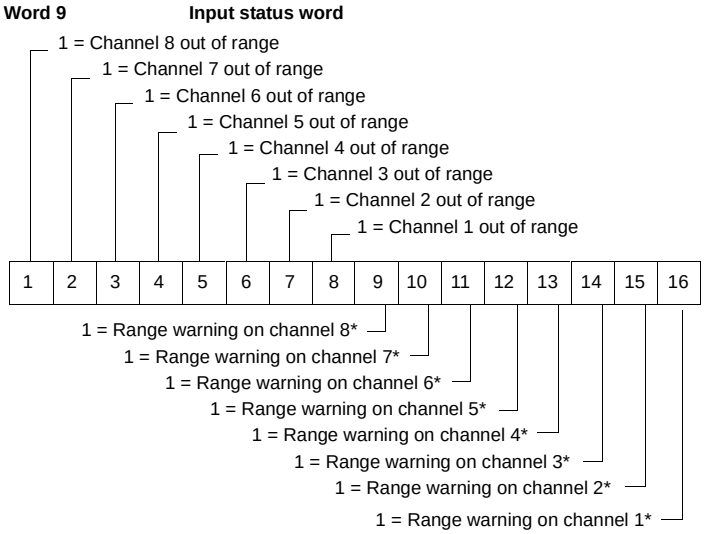
Addressing

Flat Addressing

This module requires ten contiguous, 16-bit words—eight for input data, one for channel status, and one for internal temperature of the module. The data words formats are as follows.



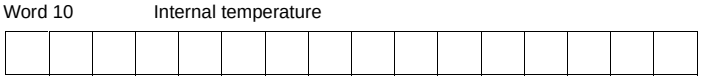
The following shows the word 9 register.



* A range warning is issued when a channel input exceeds the rated input value. An out-of-range bit is set when a channel input exceeds the rated input value by 2.4% or when a broken wire is sensed on the channel. The warning bit is cleared (if set) when the out-of-range bit is set.

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The following figure shows the word 10 register.



Topological Addressing

Topological addresses for the 140ATI03000 Input Module:

Point	I/O Object	Comment
Input 1	%IW[\b.e\]r.m.1	Value
	%I[\b.e\]r.m.1.1	Out of range
	%I[\b.e\]r.m.1.2	Range warning
• • •		
Input 8	%IW[\b.e\]r.m.8	Value
	%I[\b.e\]r.m.8.1	Out of range
	%I[\b.e\]r.m.8.2	Range warning
Status Word	%IW[\b.e\]r.m.9	Status of input channels
Internal Temperature	%IW[\b.e\]r.m.10	Internal module temperature

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

IODDT

The 140ATI03000 Input Module uses the `T_ANA_IN_VWE` IODDT:

IODDT Name	Object	Data Type	Name
T_ANA_IN_VWE	%CH[\b.e\]r.m.c	ANA_IN_VWE	userdefined
	%IWr.m.c.0	Int	.VALUE
	%Ir.m.c.1	Bool	.ERROR
	%Ir.m.c.2	Bool	.WARNING

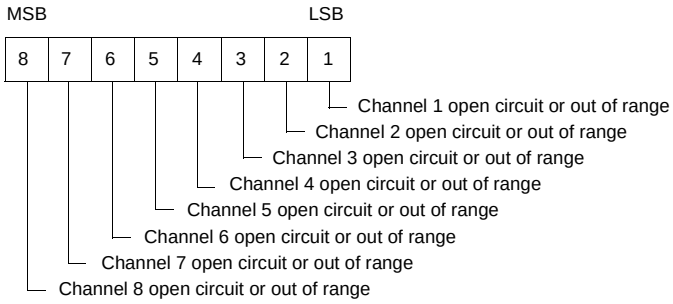
Used abbreviations: **r** = rack, **m** = module slot, **c** = channel, **b** = bus, **e** = equipment (drop).
Bus and Drop default to 1 if not specified and can be left off.

Note: In Quantum IODDTs for analog modules and expert modules the data type **Bool** is used for **%I** and **%Q**.

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I/O Map Status Byte

The I/O map status byte is used by the 140ATI03000 Input Module as follows.

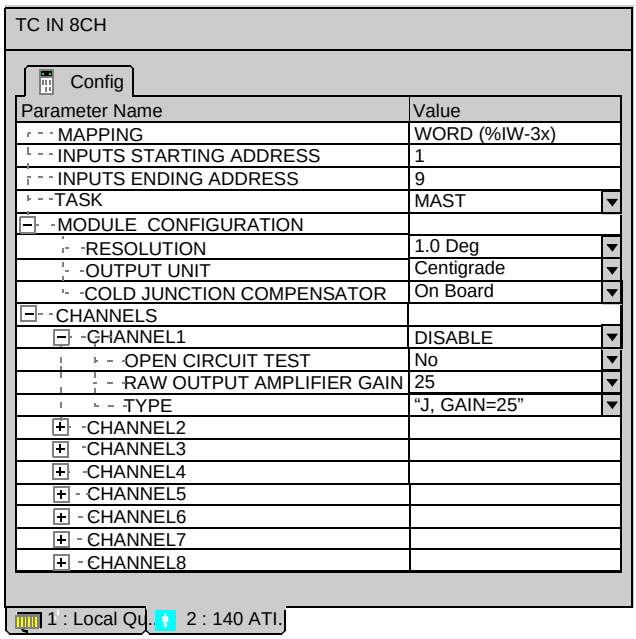


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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



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Name	Default Value	Options	Description
Mapping	WORD (%IW-3X)	-	
Inputs Starting Address	1	-	
Inputs Ending Address	9	-	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Module_Configuration			
Resolution	1.0 Deg	0.1 Deg	
Output Unit	Centigrade	Fahrenheit	
Cold Junction Compensator	On Board	Channel 1	
Channels			
Channel1	DISABLE	ENABLE	
Open Circuit Test	No	Yes	
Raw Output Amplifier Gain	25	100	
Type	"J, Gain=25"	"K, Gain=25" "E, Gain=25" "T, Gain=100" "S, Gain=100" "R, Gain=100"	
Channel2-Channel8			see Channel1

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140 AVI 030 00: Analog Mixed Current/Voltage IN Module

7

Overview

Purpose

The following chapter provides information of the Quantum 140 AVI 030 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	104
Indicators	105
Wiring Diagram	106
Specifications	108
Addressing	111
Parameter Configuration	113

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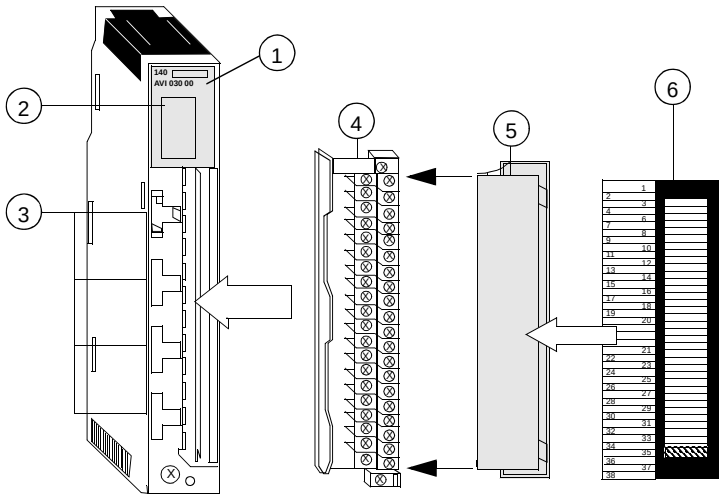
Presentation

Function

The Analog In 8 Channel Bipolar module accepts a mix of current and voltage inputs. Jumpers are required between the input and sense terminals for current inputs.

Illustration

The following figure shows the 140 AVI 030 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

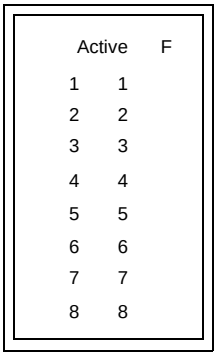
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 AVI 030 00 module.



Descriptions

The following table shows the LED descriptions for the 140 AVI 030 00 module.

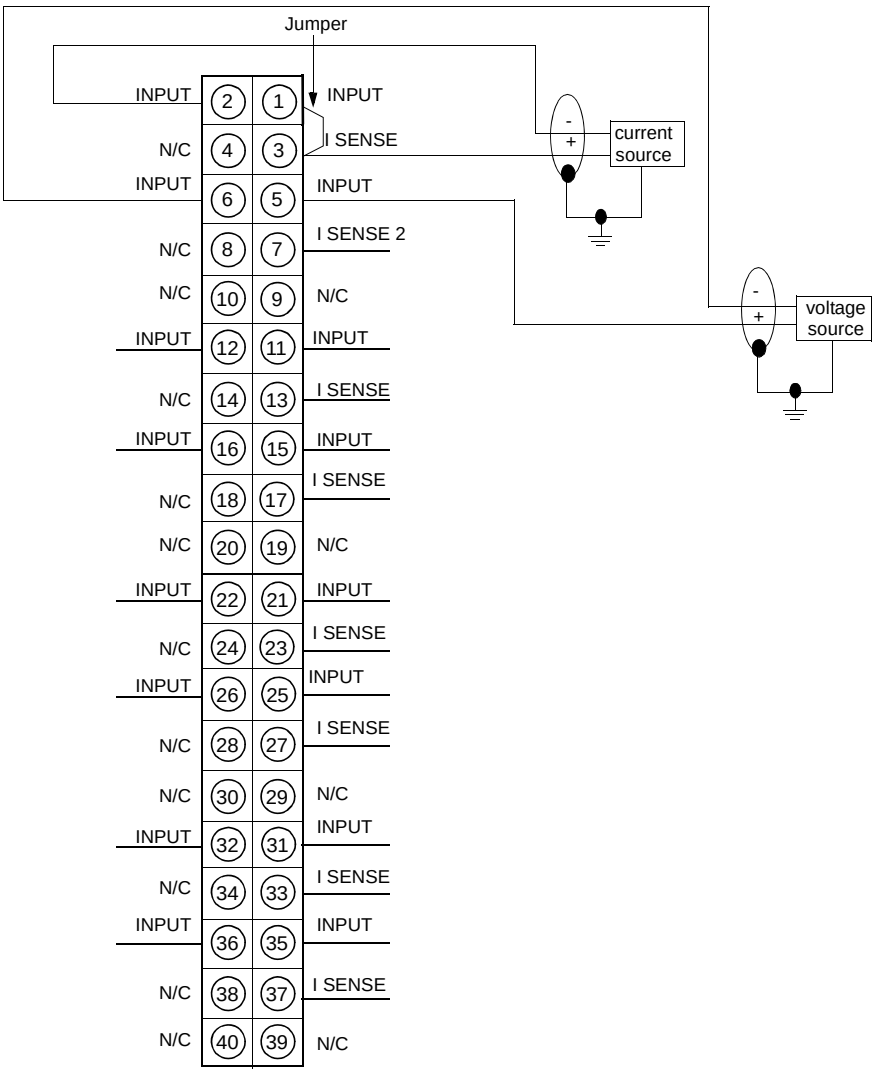
LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
1 ... 8	Green	The indicated point or channel is turned ON.
1 ... 8	Red	Indicated channel is out of range (1 ... 5 V) Broken wire condition is detected (4 ... 20 mA)

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Wiring Diagram

Illustration

The following figure shows the 140 AVI 030 00 wiring diagram.



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Notes on Wiring Diagram

- The current and voltage sources are supplied by the user (fusing is at the discretion of the user).
- Either a shielded or unshielded signal cable may be used. Shielded types should have a shield tied to earth ground near the signal source end.
- To prevent improper fault indications, unused inputs should have the + (plus) and - (minus) inputs tied together and be configured for a bipolar input range.
- N / C = Not Connected.
- When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	8 Channel IN Differential
External Power	Not required
Operating Voltage (Channel to Channel)	200 VDC 135 VAC rms max.
Bus Current required (Module)	280 mA
Power Disssipation	2.2 W
I/O map	9 input words
Fault Detection	Broken wire in 4 ... 20 mA mode, Out of range

Operating Ranges

Operating Ranges

Bipolar	+/- 10 VDC +/- 5 VDC +/- 20 mA
Unipolar	0 ...10 VDC 0 ... 5 VDC 0 ... 20 mA
Unipolar with Offset	1 ... 5 VDC 4 ... 20 mA

Note: The Operating Ranges are selectable on a per-channel base.

Voltage / Input

Voltage / Input

Absolute Voltage (max.)	50 VDC
Linear Mesuring Range	(Input range) x 1.024
Input Impedance	> 20 Mohms

Current / Input

Current / Input

Absolute Current (max.)	25 mA
Linear Measuring Range	Input range) x 1.024
Input Impedance	250 ohms + 0.03%

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Resolution / Conversion

Resolution / Conversion

16 bit	+/- 10 VDC, 0 ...10 VDC
15 bit	+/- 5 VDC, 0 ...5 VDC, +/- 20 mA, 0 ... 20 mA
14 bit	1 ... 5 VDC; 4 ... 20 mA
Absolute Accuracy Error @ 25 degrees C (voltage mode)	Typical: +/- 0.03% Maximum: +/- 0.05% of full scale
Accuracy Drift with Temperature	Typical: +/- 0.0015% of full scale / degrees C Maximum: +/- 0.004% of full scale / degrees C
Linearity	+/- 0.008%
Common Mode Rejection	> -80 dB @ 60 Hz
Input Filter	Single pole low pass, -3 dB @ 847 Hz, +/- 20%
Update Time	10 ms for all channels

Isolation

Isolation

Channel to Bus	500 VAC rms for 1 minute 750 VDC rms for 1 minute

Note: Calibration is not required for this module.

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Linear Measuring Ranges Table

The following table shows the linear measuring ranges for the 140 AVI 030 00 Analog Input Module.

Data Format	Input	Under Warning	Normal	Over Warning
16-bit Format	+/- 10 V	< 768	768 ... 64,768	> 64,768
	+/- 5 V, +/- 20 mA	< 16,768	16,768 ... 48,768	> 48,768
	0 ... 10 V		0 ... 64,000	> 64,000
	0 ... 5 V, 0 ... 20 mA		0 ... 32,000	> 32,000
	1 ... 5 V, 4 ... 20 mA	<6,400	6,400 ... 32,000	> 32,000
Voltmeter* Format	+/- 10 V	< -10,000	-10,000 ... 10,000	> 10,000
	+/-5 V, +/- 20 mA	< -5,000	-5,000 ... 5,000	> 5,000
	0 ... 10 V		0 ... 10,000	> 10,000
	0 ... 5 V, 0 ... 20 mA		0 ... 5,000	> 5,000
	1 ... 5 V, 4 ... 20 mA	< 1,000	1,000 ... 5,000	> 5,000
12-bit Format	+/- 10 V	0	0 ... 4,095	4,095
	+/- 5 V, +/- 20 mA	0	0 ... 4,095	4,095
	0 ... 10 V		0 ... 4,095	4,095
	0 ... 5 V, 0 ... 20 mA		0 ... 4,095	4,095
	1 ... 5 V, 4 ... 20 mA	0	0 ... 4,095	4,095

* The Voltmeter ranges are listed in Modsoft signed format.

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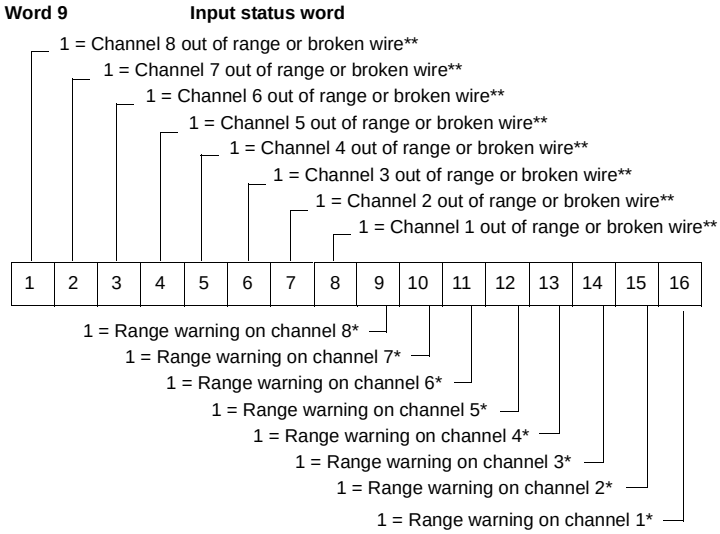
Addressing

Flat Addressing

This module requires nine contiguous, 16-bit words—eight for input data and one for channel status. The data words formats are as follows.



The following shows the word 9 register.



*A range warning is issued when a channel input exceeds the rated input value. Warning bit stay on after out of range bits are set.
**An out-of-range bit is set when a channel input exceeds the rated input value by 2.4% or when a broken wire (4 ... 20 mA or 1 ... 5 V mode) is sensed on the channel. Out of range bits are also set if inputs drop below 0.5 V (1 ... 5 V mode) or 2.08 mA (4 ...20 mA mode)

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Topological Addressing

Topological addresses for the 140AVI03000 Input Module:

Point	I/O Object	Comment
Input 1	%IW[\b.e\]r.m.1	Value
	%I[\b.e\]r.m.1.1	Out of range
	%I[\b.e\]r.m.1.2	Range warning
	• • •	
Input 8	%IW[\b.e\]r.m.8	Value
	%I[\b.e\]r.m.8.1	Out of range
	%I[\b.e\]r.m.8.2	Range warning
Status Word	%IW[\b.e\]r.m.9	Status of input channels

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

IODDT

The 140AVI03000 Input Module uses the `T_ANA_IN_VWE` IODDT:

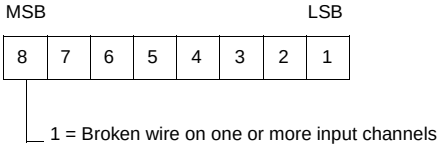
IODDT Name	Object	Data Type	Name
T_ANA_IN_VWE	%CH[\b.e\]r.m.c	ANA_IN_VWE	userdefined
	%IWr.m.c.0	Int	.VALUE
	%Ir.m.c.1	Bool	.ERROR
	%Ir.m.c.2	Bool	.WARNING

Used abbreviations: **r** = rack, **m** = module slot, **c** = channel, **b** = bus, **e** = equipment (drop).
Bus and Drop default to 1 if not specified and can be left off.

Note: In Quantum IODDTs for analog modules and expert modules the data type **Bool** is used for **%I** and **%Q**.

I/O Map Status Byte

The I/O map status byte is used by the 140AVI03000 Input Module as follows.

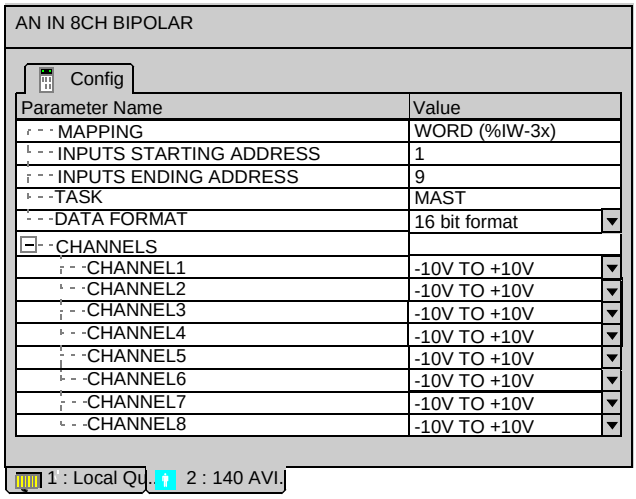


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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	WORD (%IW-3X)	-	
Inputs Starting Address	1	-	
Inputs Ending Address	9	-	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Data Format	16 bit format	Volt Meter 12 bit format	
Channels			
Channel1	-10 TO +10V	-10V TO +10V 0V TO +10V -5V TO +5V 0V TO +5V +1V TO +5V -20 mA TO +20mA	
Channel2-Channel8			see Channel1

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Analog OUT Modules

III

At a Glance

Introduction

The following part provides information on the Quantum Analog OUT modules.

What's in this Part?

This part contains the following chapters:

Chapter	Chapter Name	Page
8	140 ACO 020 00: Analog Current OUT Module	117
9	140 ACO 130 00: Analog Mixed Current OUT Module	127
10	140 AVO 020 00: Analog Mixed Voltage OUT Module	137

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140 ACO 020 00: Analog Current OUT Module

8

Overview

Purpose

The following chapter provides information of the Quantum 140 ACO 020 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	118
Indicators	119
Wiring Diagram	120
Specifications	122
Addressing	124
Parameter Configuration	125

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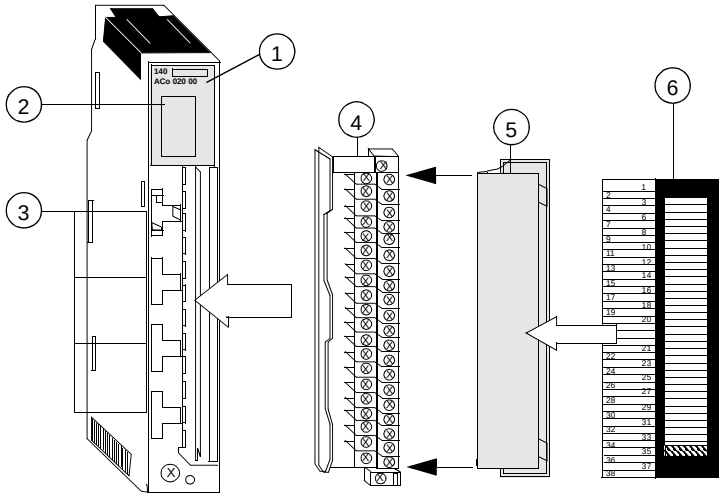
Presentation

Function

The Analog Output 4 Channel Current module controls and monitors current in 4 ... 20 mA loops.

Illustration

The following figure shows the 140 ACO 020 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

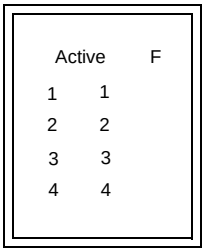
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 ACO 020 00 module.



Descriptions

The following table shows the LED descriptions for the 140 ACO 020 00 module.

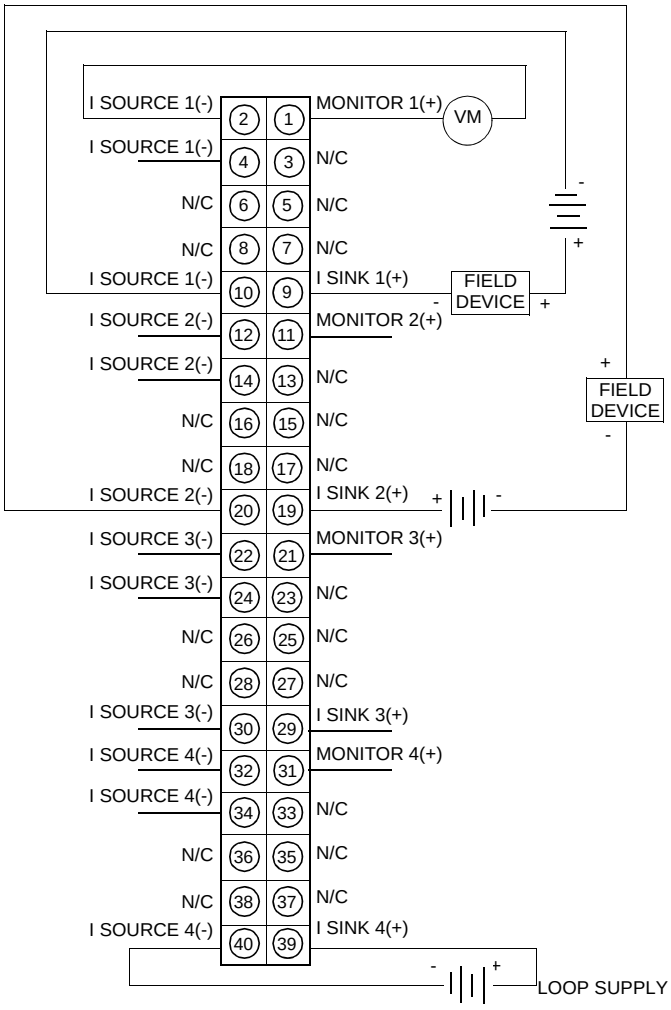
LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
1 ... 4	Green	Module outputs switched ON.
1 ... 4	Red	Broken wire on indicated channels.

Note: When the green channel status LEDs are OFF, the loop current is 0 mA .

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Wiring Diagram

Illustration The following figure shows the wiring diagram for the 140 ACO 020 00 module.



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WARNING

Possible injury to personnel or equipment.

Before removing the connector, ensure that it is safe to have field wiring in an open circuit condition.

Failure to follow this precaution can result in death, serious injury, or equipment damage.

Notes on Wiring Diagram

- Unused channels will indicate broken wire status unless wired to the loop supply, as shown on Channel 4. In this example, loop supply must be 30 V or less.
- VM is an optional voltmeter that can be connected to read voltage that is proportional to the current. Wiring to this terminal is limited to 1 meter maximum.
- The wiring example shows Channel 1 acting as a current sink and Channel 2 acting as a current source for their respective field devices.
- N / C = Not Connected.
- At power up, the channel outputs are all disabled (current = 0). Configuring any channel as disabled will cause all channels to be disabled when a communication loss occurs.
- When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	4 Channel OUT
External Power	Loop Voltage:12 ... 30 VDC, up to 60 VDC with an external loop resistor
Bus Current required (Module)	480 mA
Power Dissipation	5.3 W max.
I/O map	4 output words
Fault Detection	Open circuit in 4 ... 20 mA mode. Specific channel is identified when an open circuit is detected through the red channel LED.

Voltage

Voltage

Loop Voltage	12 ... 30 VDC, up to 60 VDC with an external loop resistor
Loop Resistance	R_{MIN} * = (V_{LOOP} - 30 VDC) / 0.02 A R_{MAX} = (V_{LOOP} - 7 VDC) / 0.02 A * No R_{MIN} is required for loop voltage less than 30 VDC
Internal Voltage Drop	7 VDC min., 30 VDC max. @ 20 mA

Resolution / Conversion

Resolution

Resolution	12 bit
Accuracy Error at 25 degrees C	+/- 0.20% of full scale
Accuracy Drift with Temperature	Typical: 0.004% of full scale / degrees C. Maximum: 0.007% of full scale / degrees C.
Linearity	+/- 1 LSB
Update Time	3 ms for all Channels (simultaneous update)
Settling time	900 µs to +/- 0.1 % of final value

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Isolation

Isolation

Channel to Bus	1780 VAC @ 47 ... 63 Hz or 2500 VDC for 1 minute
Channel to Channel	500 VAC @ 47 ... 63 Hz or 750 VDC for 1 minute

Fuses

Fuses

Internal	Not required
External	-

Note: When the green channel status LEDs are off, the loop current is 0 mA.

Voltmeter Monitor Specifications Table

The following table shows the voltmeter monitor specifications.

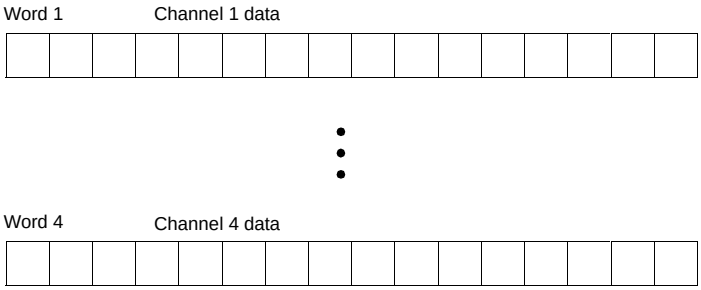
Range	1 ... 5 V (Main current loop must be active)
Scaling	V_{OUT} (Volts) = I_{LOOP} (mA) x 0.25
Output Impedance	300 ohms Typical
Wiring Length	1 m max.

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Addressing

Flat Addressing

This module requires four contiguous, 16-bit words (%MW) for output data. The data words formats are as follows.



Topological Addressing

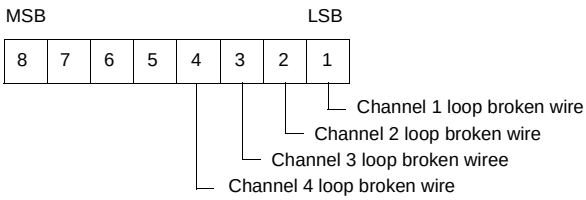
Topological addresses for the 140ACO02000 Output Module:

Point	I/O Object	Comment
Output 1	%QW[\b.e\]r.m.1	Value
Output 2	%QW[\b.e\]r.m.2	Value
Output 3	%QW[\b.e\]r.m.3	Value
Output 4	%QW[\b.e\]r.m.4	Value

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

I/O Map Status Byte

The I/O map status byte is used by the 140ACO02000 Output Module as follows.

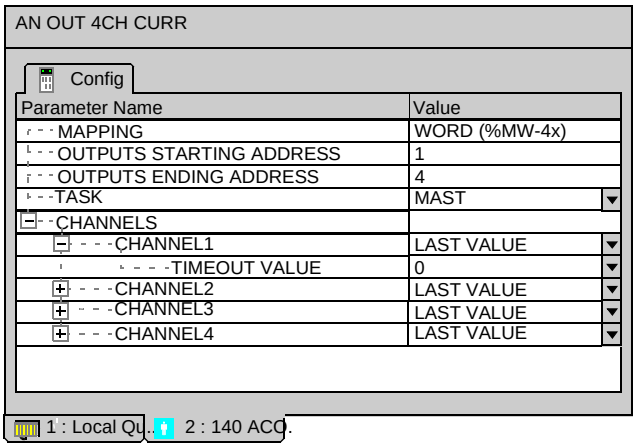


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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	WORD (%MW-4X)	-	
Outputs Starting Address	1	-	
Outputs Ending Address	4	-	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Channels			
Channel1	LAST VALUE	DISABLED USER DEFINED	
Timeout Value	0	0-65535	only enabled if Channel=USER DEFINED
Channel2-Channel4			see Channel1

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140 ACO 130 00: Analog Mixed Current OUT Module

9

Overview

Purpose

The following chapter provides information of the Quantum 140 ACO 130 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	128
Indicators	129
Wiring Diagram	130
Specifications	132
Addressing	134
Parameter Configuration	135

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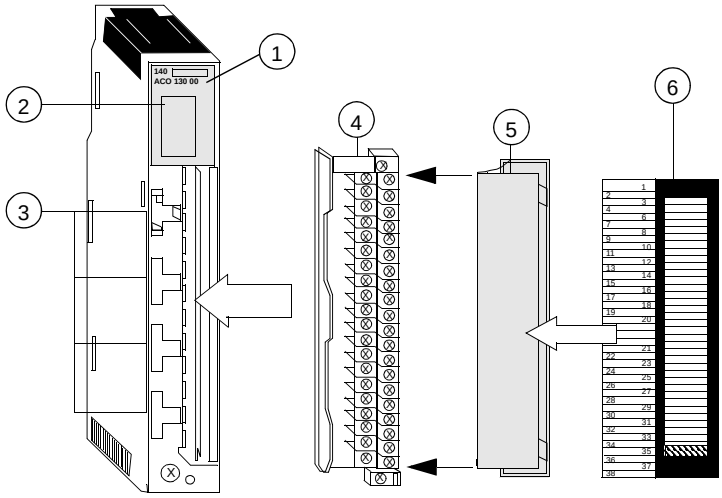
Presentation

Function

The 140 ACO 130 00 is an eight channel analog output module used to control and monitor current in 4 ... 20 mA, 0 ... 20 mA, and 0 ... 25 mA loops.

Illustration

The following figure shows the 140 ACO 130 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

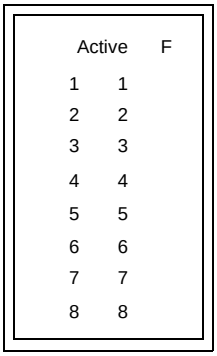
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 ACO 130 00 module.



Descriptions

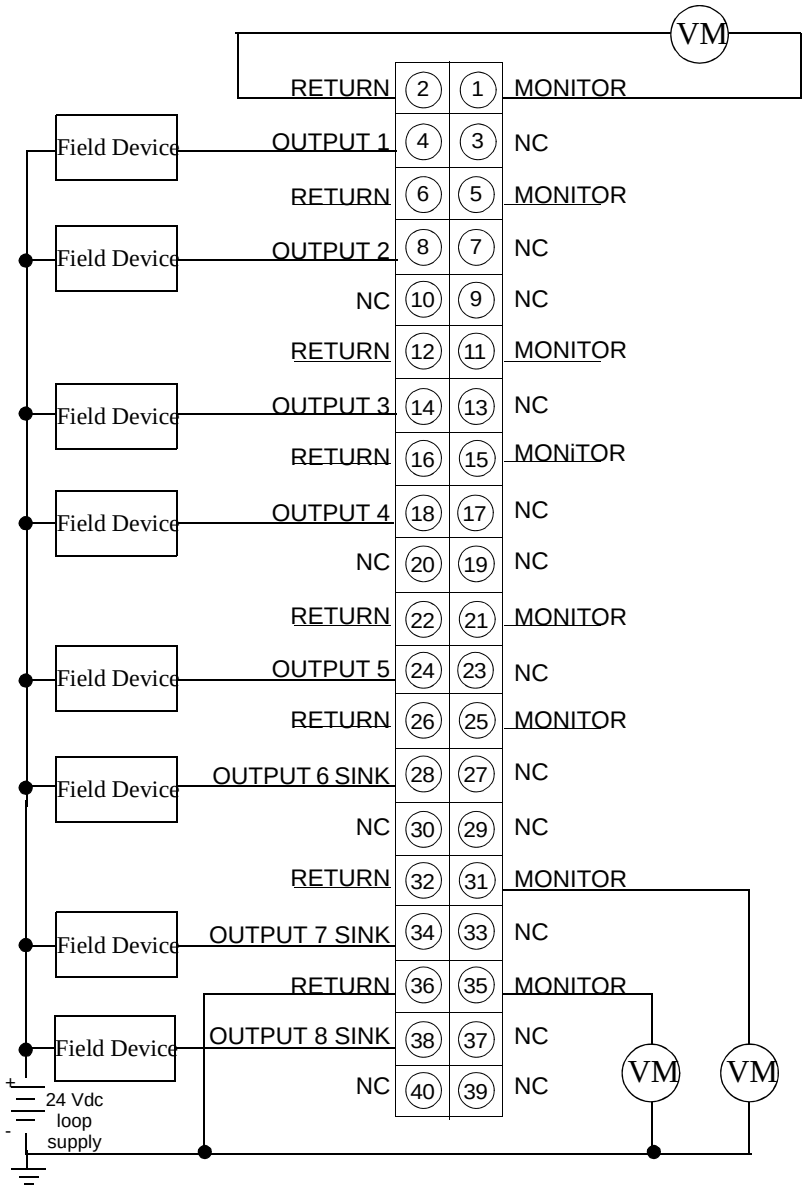
The following table shows the LED descriptions for the 140 ACO 130 00 module.

LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
1 ... 8	Green	Module outputs switched ON.
1 ... 8	Red	Broken wire on indicated channels.

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Wiring Diagram

Illustration 140 ACO 130 Wiring Diagram



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Notes on Wiring Diagram

- At power up all channel outputs have zero current (0 mA).
- VM is an optional voltmeter that can be connected to read voltage that is proportional to the current. Wiring to this terminal is limited to 1 meter maximum.
- Either shielded or unshielded cables may be used. In noisy environments twisted shielded cable is recommended. Shielded cable should have a shield tied to earth ground near the signal source end.
- Unused inputs may cause the activation of the F (fault) LED. To avoid this occurrence the unused channels should be configured in the 0 ... 25 mA range.
- All terminals labeled ‘RETURN" are common inside the module.
- N/C = Not connected
- When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	8 Channel OUT
External Power	Loop Voltage: 6 ... 30 VDC max.
Bus Current required (Module)	550 mA
Power Dissipation	5.0 W max.
I/O map	8 output words
Fault Detection	Open circuit in 4 ... 20 mA mode. The faulty channel is detected through the red channel LED and is also reported back to the controller in the I/O Map status byte

Voltage

Voltage

Loop Voltage	6 ... 30 VDC max.
Internal Voltage Drop	6 VDC min., 30 VDC max. @ 25 mA

Range / Resolution

Range / Resolution

0 ... 25 mA	0 ... 25,000 counts
0 ... 20 mA	0 ... 20,000 counts
4 ... 20 mA	0 ... 16,000 counts
4 ... 25 mA	0 ... 4,095 counts

Accuracy

Accuracy

Accuracy Error @ 25 degrees C	+/- 0.20% of full scale
Accuracy Drift with Temperature	Typical: 0.004% of full scale / degrees C. Maximum: 0.007% of full scale / degrees C.

Linearity

Linearity

0 ... 25 mA 0 ... 20 mA 4 ... 20 mA	+/- 4 µA
4 ... 25 mA	+/- 12 µA

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Times

Times

Update Time	5 ms for all Channels
Settling Time Full Scale	1.6 ms to 5% of the final value
Step Change	3.2 ms to 5% of the final value

Isolation

Isolation

Field to Bus	1780 VAC for 1 minute
Channel to Channel	None

Fuses

Fuses

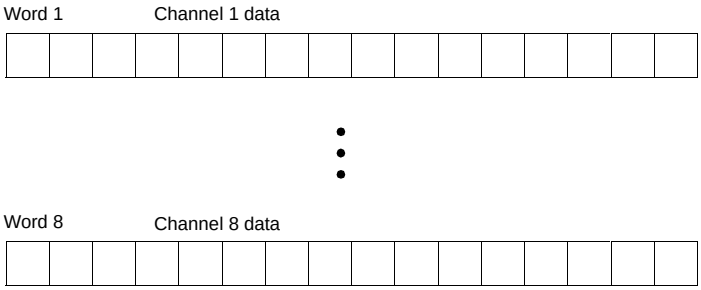
Internal	None
External	None

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Addressing

Flat Addressing

This module requires eight contiguous, 16-bit words (%MW) for output data. The data words formats are as follows.



Topological Addressing

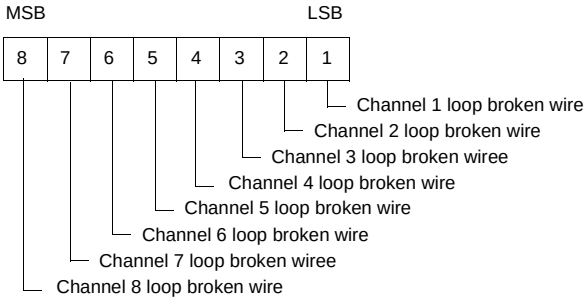
Topological addresses for the 140ACO13000 Output Module:

Point	I/O Object	Comment
Output 1	%QW[\b.e\]r.m.1	Value
Output 2	%QW[\b.e\]r.m.2	Value
	• • •	
Output 7	%QW[\b.e\]r.m.7	Value
Output 8	%QW[\b.e\]r.m.8	Value

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

I/O Map Status Byte

The I/O map status byte is used by the 140ACO13000 Output Module as follows.

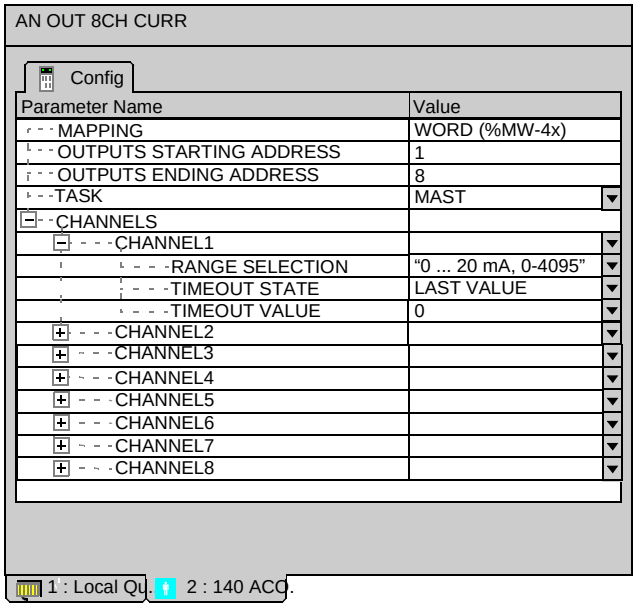


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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	WORD (%MW-4X)	-	
Outputs Starting Address	1	-	
Outputs Ending Address	8	-	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Channels Channel1			
Range Selection	"4 ... 20 mA, 0-4095"	"4 ... 20 mA, 0-16000" "0 ... 20 mA, 0-20000" "0 ... 25 mA, 0-25000"	
Timeout State	LAST VALUE	MINIMUM OUTPUT USER DEFINED	
Timeout Value	0	0-65535	only enabled Timeout State=USER DEFINED
Channel2-Channel8			see Channel1

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140 AVO 020 00: Analog Mixed Voltage OUT Module

10

Overview

Purpose

The following chapter provides information of the Quantum 140 AVO 020 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	138
Indicators	139
Wiring Diagram	140
Specifications	142
Addressing	144
Parameter Configuration	145

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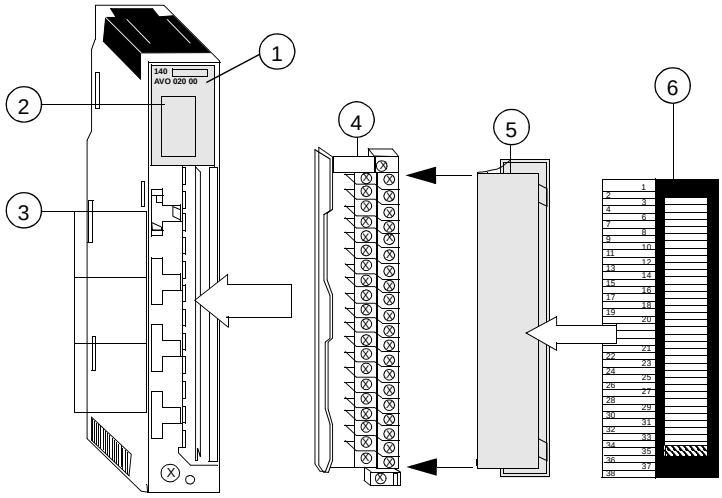
Presentation

Function

The Analog Out 4 Channel module accepts outputs voltages in mixed modes and levels. These are selected using jumpers on the field-wiring connector.

Illustration

The following figure shows the 140 AVO 020 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

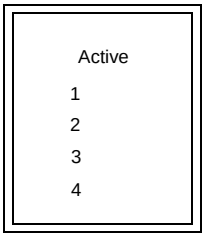
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 AVO 020 00 module.



Descriptions

During normal operation, the front panel Active and 1 ... 4 green LEDs are ON. If bus communication to the module stops for any reason, the Active LED will go off and output values are set depending on panel software configuration.

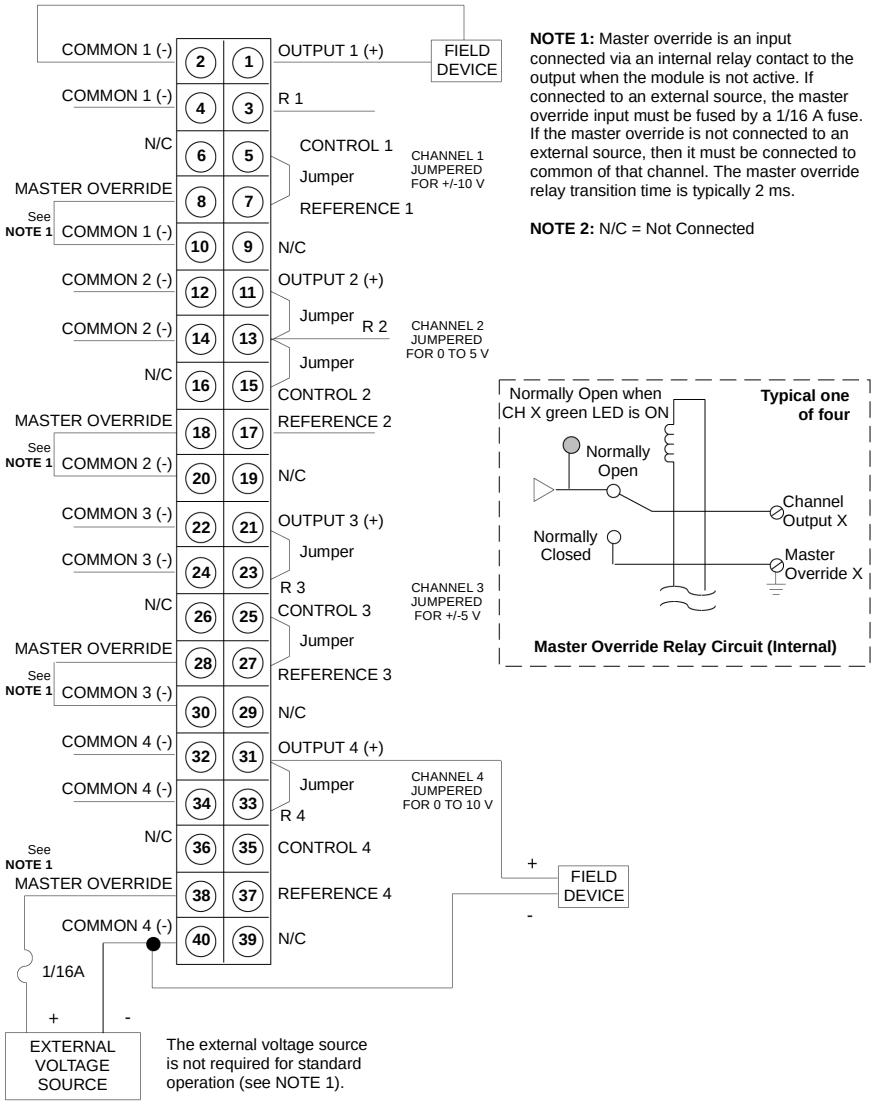
- When LEDs 1 ... 4 are ON, the channel output levels will be as predetermined and held by the module.
- When LEDs 1 ... 4 are OFF, the master override levels are output on each channel.

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Wiring Diagram

Illustration

The following figure shows the wiring diagram for the 140 AVO 020 00 module.



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	**WARNING** **Possible injury to personnel or equipment.** Before removing the connector, ensure that it is safe to have field wiring in an open circuit condition. **Failure to follow this precaution can result in death, serious injury, or equipment damage.**

	**WARNING** **Malfunction of equipment** Master override must be connected to an external source through 1/16 A in line fuse, or strapped to common to avoid erroneous outputs in this module. **Failure to follow this precaution can result in death, serious injury, or equipment damage.**

Note: The output levels of this module are either those generated within the module based on data inputs from the system, or from the master override inputs on the field-wiring terminal strip.

If module power is lost or the module fails, the master override levels will be output. The master override inputs must be from an external supply with a source impedance of < 200 ohms or tied to system common. These inputs for channels that are in use should not be allowed to float and may be unique for each.

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	4 Channel OUT
External Power	Not required
Bus Current required (Module)	700 mA
Power Dissipation	4.5 W max.
I/O map	4 output words
Fault Detection	None
Wiring length	400 m max.

Output Ranges*

Output Ranges*

Voltages (Bipolar)	+/- 10 VDC (Min. load resistance = 1 kohms) +/- 5 VDC (Min. load resistance = 500 ohms)
Voltages (Unipolar)	0 ...10 VDC (Min. load resistance = 1 kohms) 0 ... 5 VDC (Min. load resistance = 500 ohms)
Output Current	+/- 10 mA max. (any range) Outputs are shortcut proof
Source Resistance	0.1 ohms

Note: *The range is determined by Jumpers (see wiring diagram)

Resolution / Accuracy

Resolution / Accuracy

Resolution	12 bit
Accuracy Error @ 25 degrees C	+/- 0.15% of full scale
Linearity	+/- 1 LSB

Accuracy Drift with Temperature

Accuracy Drift with Temperature

Unipolar Ranges	Typical: 0.003% of full scale / degrees C Maximum: 0.005% of full scale / degrees C
Bipolar Ranges	Typical: 0.004% of full scale / degrees C Maximum: 0.007% of full scale / degrees C

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Times

Times

Max. Settling Time	700 µs to +/- 0.1% of the final value
Update Time	3 ms for all channels

Isolation

Isolation

Channel to Bus	1780 VAC rms for 1 minute
Channel to Channel	500 VAC rms for 1 minute

Fuses

Fuses

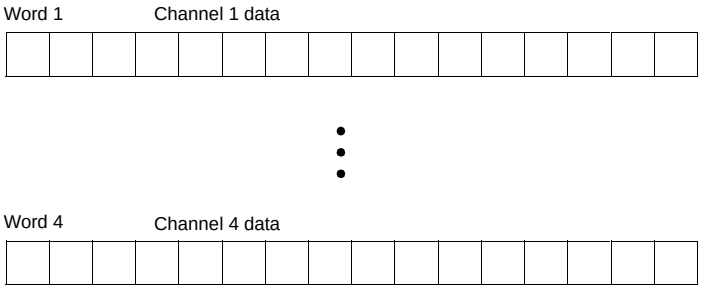
Internal	Not required
External	An external fuse is required on the master override signal when it is connected to an external source. The required fuse is 1/16 A or 0.063 A fuse: Fuse Type: 3 AG Fast acting 1/16 A, 250 V Fuse Holder: 3 AG Fuse type The external fuse is not required if master override is connected to common

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Addressing

Flat Addressing

This module requires four contiguous, 16-bit words (%MW) for output data. The data words formats are as follows.



Topological Addressing

Topological addresses for the 140AVO02000 Output Module:

Point	I/O Object	Comment
Output 1	%QW[\b.e\]r.m.1	Value
Output 2	%QW[\b.e\]r.m.2	Value
Output 3	%QW[\b.e\]r.m.3	Value
Output 4	%QW[\b.e\]r.m.4	Value

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

I/O Map Status Byte

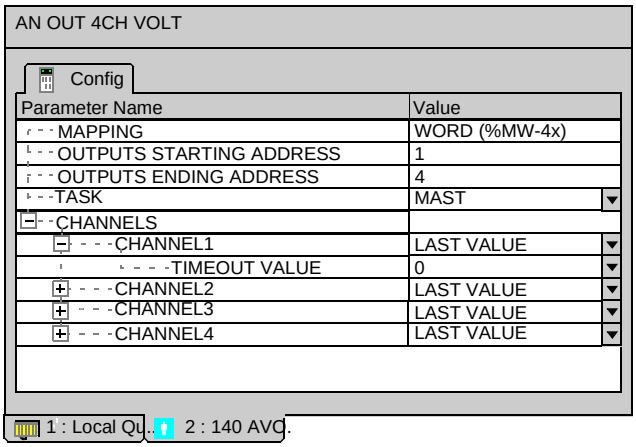
There is no I/O map status byte used by the 140AVO02000 Output Module.

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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	WORD (%MW-4X)	-	
Outputs Starting Address	1	-	
Outputs Ending Address	4	-	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Channels			
Channel1	LAST VALUE	DISABLED USER DEFINED	
Timeout Value	0	0-65535	only enabled if Channel=USER DEFINED
Channel2-Channel4	LAST VALUE	DISABLED USER DEFINED	

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Analog IN / OUT Modules

IV

At a Glance

Introduction

The following part provides information on the Quantum Analog IN / OUT modules.

What's in this Part?

This part contains the following chapters:

Chapter	Chapter Name	Page
11	140 AMM 090 00: Analog Mixed Current/Voltage IN / OUT Module	149

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140 AMM 090 00: Analog Mixed Current/Voltage IN / OUT Module

11

Overview

Purpose

The following chapter provides information of the Quantum 140 AMM 090 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	150
Indicators	151
Wiring Diagram	152
Specifications	154
Addressing	157
Parameter Configuration	160

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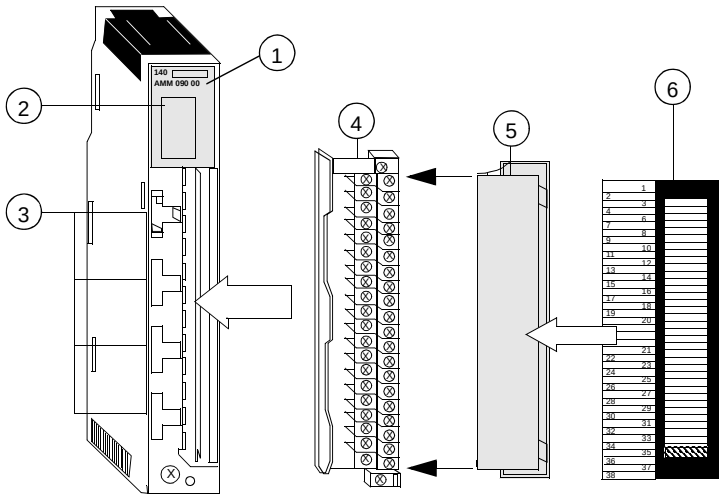
Presentation

Function

The Analog In/Out 4/2 bi-directional module combines four analog inputs which accept a mix of current and voltage, with two isolated analog outputs that control and monitor current in 4 ... 20 mA loops.

Illustration

The following figure shows the 140 AMM 090 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

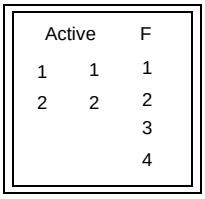
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 AMM 090 00 module.



Descriptions

The following table shows the LED descriptions for the 140 AMM 090 00 module.

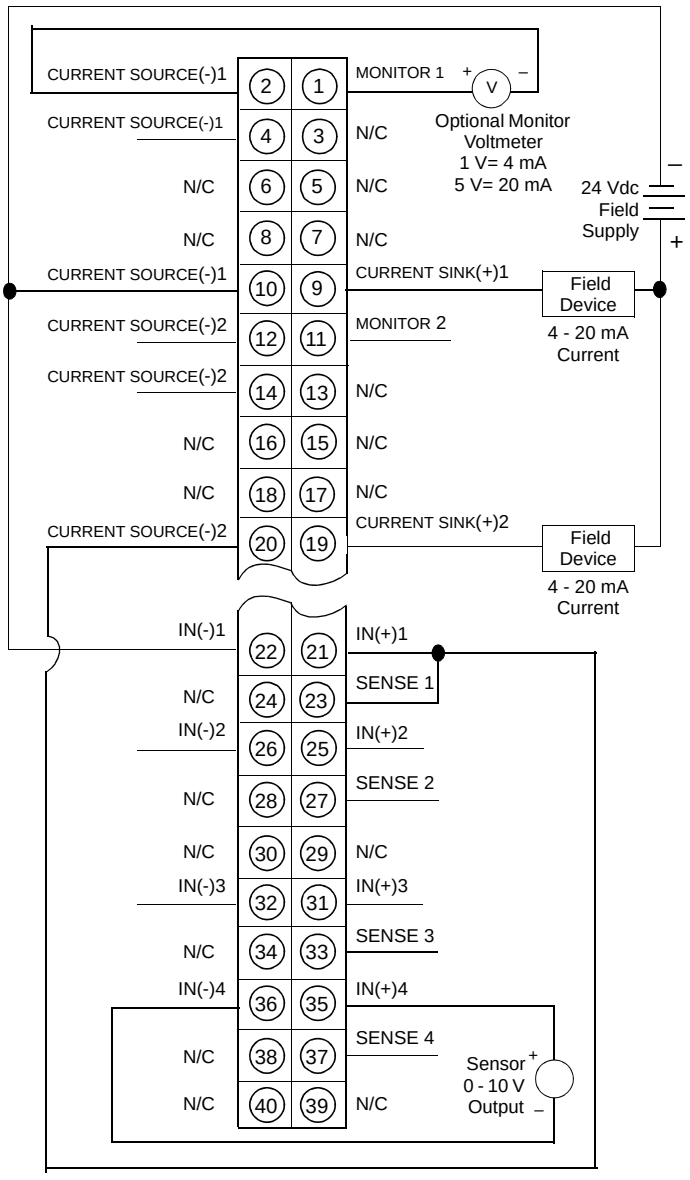
LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	No power applied to the output group(s) or input out of range
1 ... 2	Green (left column)	Module outputs switched ON.
1 ... 2	Red (middle column)	Broken wire on indicated output channels.
1 ... 4	Red (right column)	Indicates input status: under/over range

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Wiring Diagram

Illustration

The following figure shows the wiring diagram for the 140 AMM 090 00 analog input/output module.



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The following information pertains to the wiring diagram above.
Output Section 2 Channels

Typical Wiring Outputs	
Channel 1	The output shows a connection to an external field device and optional monitor.
Channel 2	The output shows a connection to an external field device and the input of channel 1.

Input Section 4 Channels

Typical Wiring Inputs	
Channel 1	Channel 1 shows 4 - 20 mA current input controlled by output section Channel 2.
Channel 2	The input shows a connection to a voltage output sensor.

Note: Pins 1 ... 20 are outputs.
Pins 21 ... 40 are inputs.
N / C = Not Connected
Jumpers are required between IN (+) and SENSE terminals for all current input ranges.

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.



CAUTION

Possible Equipment Failure

When configured for voltage inputs (no jumper installed between In(+) and sense terminals), in the occurrence of field wire breakage, readings will be non-zero and unpredictable.

Failure to follow this precaution can result in injury or equipment damage.

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Specifications

General Specifications

General Specifications

Module Type	4 Channel IN 2 Channel OUT (isolated)
External Power	Loop Voltage:... 30 VDC, up to 60 VDC with an external resistor
Bus Current required (Module)	350 mA
Fault Detection	Open circuit in 4 ... 20 mA range, or over range, or under range in bipolar modes only.

Operating Ranges

Operating Ranges

Bipolar	+/- 10 VDC +/- 5 VDC +/- 20 mA
Unipolar	0 ...10 VDC 0 ... 5 VDC 0 ... 20 mA
Unipolar with Offset	1 ... 5 VDC 4 ... 20 mA

Voltage / Input

Voltage / Input

Operating Voltage (Channel to Channel)	+/- 40 VDC (max.)
Absolute Voltage (max.)	+/- 50 VDC
Linear Mesuring Range	2.4% over and under range
Input Impedance in Range	> 10 Mohms
Input Impedance over Range	< 0.5 Mohms

Current / Input

Current / Input

Absolute Current (max.)	+/- 25 mA
Linear Measuring Range	2.4% over and -9.6% under range.
Input Impedance	250 ohms

When configured for current inputs (jumper installed between IN(+) and SENSE terminals), a broken field wire results in a zero current reading.
If 4 ... 20 mA is selected, fault LEDs and warning/out of range are displayed.

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Resolution / Conversion

Resolution / Conversion

16 bit	+/- 10 VDC, 0 ...10 VDC
15 bit	+/- 5 VDC, 0 ...5 VDC, +/- 20 mA, 0 ... 20 mA
14 bit	1 ... 5 VDC; 4 ... 20 mA
Absolute Accuracy Error @ 25 degrees C (voltage mode)	Typical: +/- 0.03% Maximum: +/- 0.05% of full scale
Linearity	Monotonic +/- 1 LSB
Offset 0 ... 60 degrees C	+/- 0.0014% of full scale max.
Gain Shift 0 ... 60 degrees C	+/- 0.002% of full scale max.
Common Mode Rejection	Better than 80 dB @ 50 or 60 Hz
Input Filter	Single pole low pass, -3 dB @ 21 Hz, +/- 20%
Update Time	320 ms for 4 channels

Isolation

Isolation

Channel to Bus	500 VAC rms for 1 minute 750 VDC rms for 1 minute
Channel to Channel	500 VAC rms for 1 minute 750 VDC rms for 1 minute

Fuses

Fuses

Internal	Not required
External	User discretion

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Output Specifications

Output Specifications

Loop Voltage	... 30 VDC, up to 60 VDC with an external resistor
Loop Resistance	R_{MIN} * = (V_{LOOP} - 30 VDC) / 0.020 A R_{MAX} = (V_{LOOP} - 7 VDC) / 0.020 A * No R_{MIN} is required for loop voltage less than 30 VDC
Internal Voltage Drop	7 VDC min., 30 VDC max. @ 20 mA
Fault Detection	Open circuit in 4 ... 20 mA range, or over range, or under range in bipolar modes only.

Resolution / Conversion

Resolution / Conversion

Resolution	12 bit
Accuracy Error at 25 degrees C	+/- 0.20% of full scale
Accuracy Error @ 0 ...60 degrees C (voltage mode)	Typical: +/- 0.004% of full scale Maximum: +/- 0.07% of full scale
Linearity	Monotonic +/- 1 LSB
Update Time	15 ms for 2 Channels
Settling time	900 micro sec to +/- 0.1 % of final value
Fault Detection	Open circuit indicator light and status byte

A range warning is issued when a channel input is outside the rated input value. Warning bits stay on after out of range bits are set. An out-of-range bit is set when a channel input exceeds the rated input value by 2.4%. Out of range bits are also set if inputs drop below 0.5V (1 ... 5V mode) or 2.08 mA (4 ... 20 mA mode)

Isolation

Isolation

Channel to Bus	500 VAC rms for 1 minute 750 VDC rms for 1 minute
Channel to Channel	500 VAC rms for 1 minute 750 VDC rms for 1 minute

Voltmeter Monitor Specifications Table

The following table shows the specifications for the voltmeter monitor for the analog input/output module.

Range	1 ... 5 V (Loop current must be active)
Scaling	I_{OUT} (mA) x 0.250 = V_{OUT} (volts)
Output Impedance	300 ohms typical
Maximum Wire Length	1 meter

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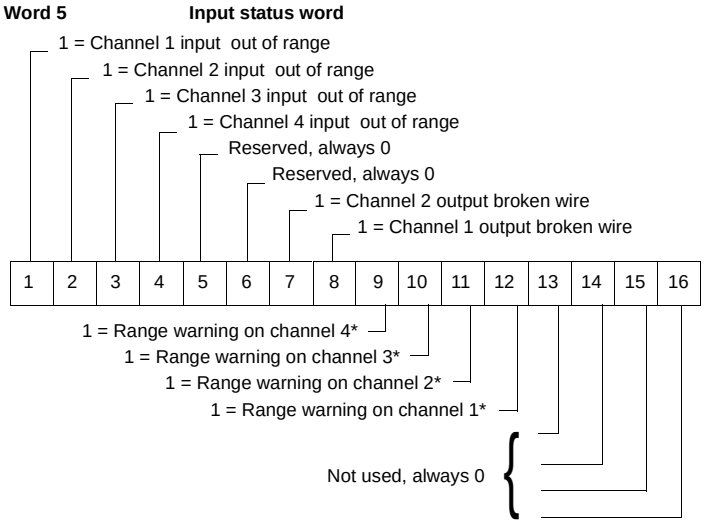
Addressing

Flat Addressing

This module requires five contiguous, 16-bit input words (%IW)—four for input data, one for channel status, and 2 contiguous, 16-bit output words (%QW)— for output data. The data words formats are as follows.
The following shows the input words 1 ... 4:



The following shows the input word 5:



*A range warning is issued when a channel input exceeds the rated input value. An out-of-range bit is set when a channel input exceeds the rated input value by 2.4% or when a broken wire (4 ... 20 mA mode) is sensed on the channel.

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The following shows the output words 1 and 2:



Topological Addressing

Topological addresses for the 140AMM09000 Input/Output Module:

Point	I/O Object	Comment
Input 1	%IW[\b.e\]r.m.1	Value
	%I[\b.e\]r.m.1.1	Out of range
	%I[\b.e\]r.m.1.2	Range warning
• • •		
Input 4	%IW[\b.e\]r.m.4	Value
	%I[\b.e\]r.m.4.1	Out of range
	%I[\b.e\]r.m.4.2	Range warning
Status Word	%IW[\b.e\]r.m.5	Status of in/out channels
Output 1	%QW[\b.e\]r.m.1	Value
	%I[\b.e\]r.m.1.3	Broken wire
Output 2	%QW[\b.e\]r.m.2	Value
	%I[\b.e\]r.m.2.3	Broken wire

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

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IODDT

The 140AMM09000 Input/Output Module uses the `T_ANA_BI_VWE` IODDT for the first 2 input and output channels and the `T_ANA_IN_VWE` for the input channels 3 and 4:

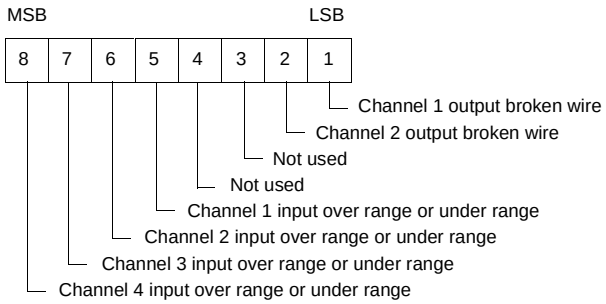
IODDT Name	Object	Data Type	Name
T_ANA_BI_VWE	%CH[\b.e\]r.m.c	ANA_IN_VWE	userdefined
	%IWr.m.c.0	Int	.VALUE_IN
	%IQr.m.c.0	Int	.VALUE_OUT
	%Ir.m.c.1	Bool	.ERROR_IN
	%Ir.m.c.2	Bool	.WARNING_IN
	%Ir.m.c.3	Bool	.ERROR_OUT
T_ANA_IN_VWE	%CH[\b.e\]r.m.c	ANA_IN_VWE	userdefined
	%IWr.m.c.0	Int	.VALUE
	%Ir.m.c.1	Bool	.ERROR
	%Ir.m.c.2	Bool	.WARNING

Used abbreviations: **r** = rack, **m** = module slot, **c** = channel, **b** = bus, **e** = equipment (drop).
Bus and Drop default to 1 if not specified and can be left off.

Note: In Quantum IODDTs for analog modules and expert modules the data type **Bool** is used for **%I** and **%Q**.

I/O Map Status Byte

The I/O map status byte is used by the 140AMM09000 Input Module as follows.

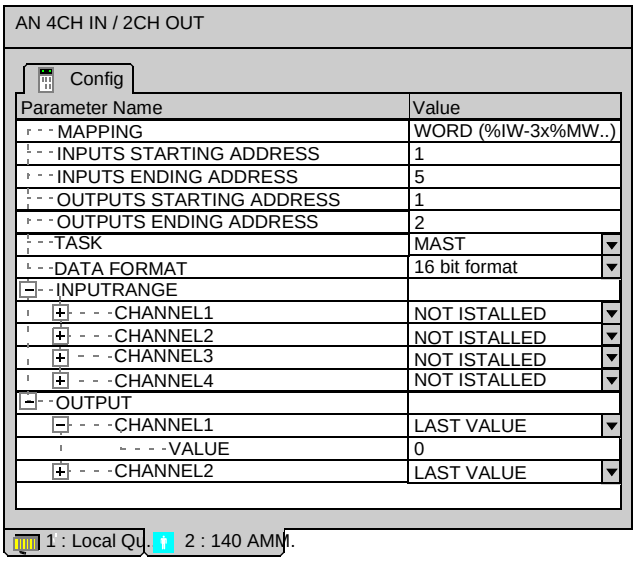


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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



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Name	Default Value	Options	Description
Mapping	WORD (%IW-3X%MW-4X)	-	
Inputs Starting Address	1	-	
Inputs Ending Address	4	-	
Outputs Starting Address	1	-	
Outputs Ending Address	2	-	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Data Format	16 bit format	Volt meter 12 bit format	
Input Range			
Channel1	NOT INSTALLED	-10V TO +10V 0V TO 10V -5V TO +5V 0V TO +5V +1V TO +5V -20 mA TO +20 mA	
Channel2-Channel4			see Channel1
Output			
Channel1	LAST VALUE	DISABLED USER DEFINED	
Value	0	0-65535	only enabled if Channel=USER DEFINED
Channel2			see Channel1

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Discrete IN Modules

V

At a Glance

Introduction

The following part provides information on the Quantum Discrete IN modules.

What's in this Part?

This part contains the following chapters:

Chapter	Chapter Name	Page
12	General Information	165
13	140 DDI 153 10: 5 VDC 4x8 TTL Source IN Module	167
14	140 DDI 353 00: 24 VDC 4x8 Sink IN Module	175
15	140 DDI 353 10: 24 VDC 4x8 Source IN Module	183
16	140 DDI 364 00: 24 VDC 6x16 Telefast IN Module	191
17	140 DDI 673 00: 125 VDC 3x8 Sink IN Module	199
18	140 DDI 841 00: 10 ... 60 VDC 8x2 Sink IN Module	209
19	140 DDI 853 00: 10 ... 60 VDC 4x8 Sink IN Module	217
20	140 DAI 340 00: 24 VAC 16x1 IN Module	225
21	140 DAI 353 00: 24 VAC 4x8 IN Module	233
22	140 DAI 440 00: 48 VAC 16x1 IN Module	241
23	140 DAI 453 00: 48 VAC 4x8 IN Module	249
24	140 DAI 540 00: 115 VAC 16x1 IN Module	257
25	140 DAI 543 00: 115 VAC 2x8 IN Module	265
26	140 DAI 553 00: 115 VAC 4x8 IN Module	273
27	140 DAI 740 00: 230 VAC 16x1 IN Module	281
28	140 DAI 753 00: 230 VAC 4x8 IN Module	289
29	140 DSI 353 00: 24 VDC 2x16 Supervised IN Module	297

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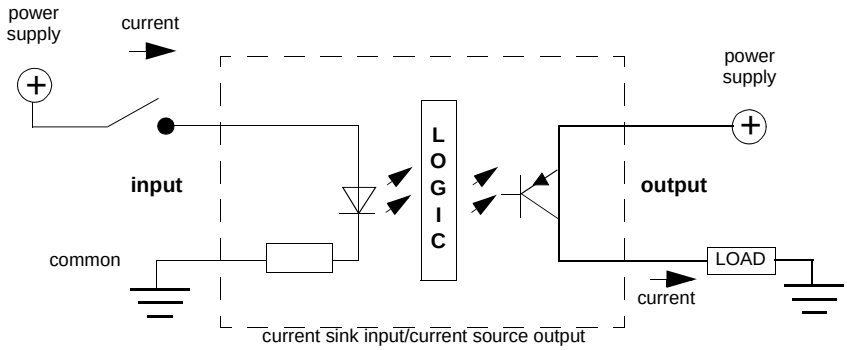
General Information

12

Discrete I/O Logic Circuits

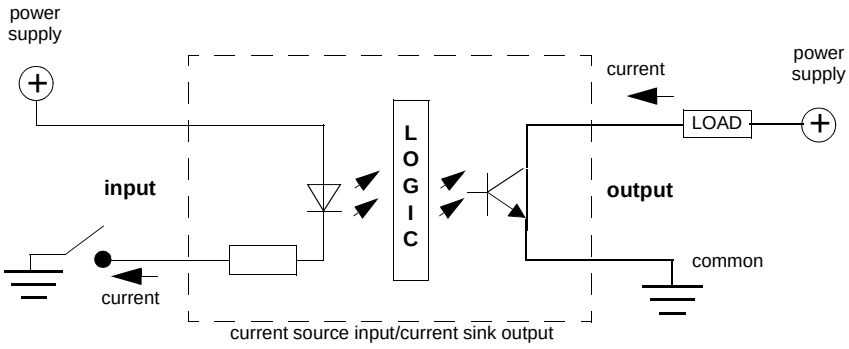
Discrete I/O True High Figure

The following is the true high/current sink input/current source output schematic.



Discrete I/O True Low Figure

The following is the true low/current source input/current sink output schematic.



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Current Sinking	This describes a physical implementation of the I/O hardware, which when in the *true* state, sinks current from the external load.
Current Sourcing	This describes a physical implementation of the I/O hardware, which when in the *true* state, sources current to the external load.

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140 DDI 153 10: 5 VDC 4x8 TTL Source IN Module

13

Overview

Purpose

The following chapter provides information of the Quantum 140 DDI 153 10 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	168
Indicators	169
Wiring Diagram	170
Specifications	172
Parameter Configuration	174

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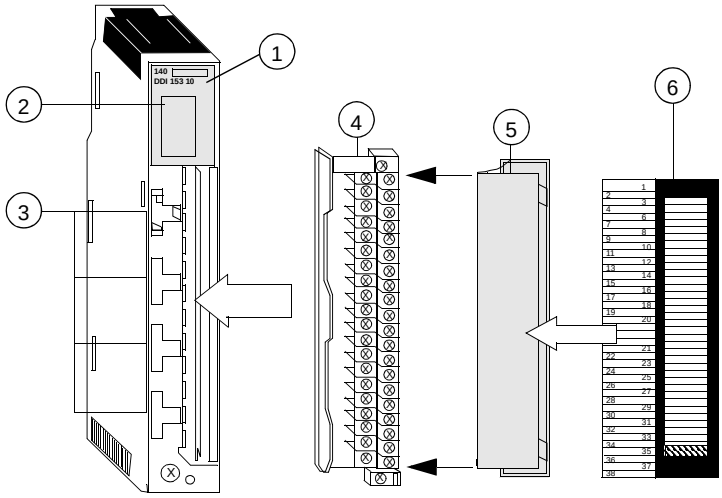
Presentation

Function

The DC Input 5 V TTL 4x8 Source module accepts 5 VDC inputs, and is for use with sink output devices and compatible with LS, S, TTL, and CMOS logic.

Illustration

The following figure shows the 140 DDI 153 10 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

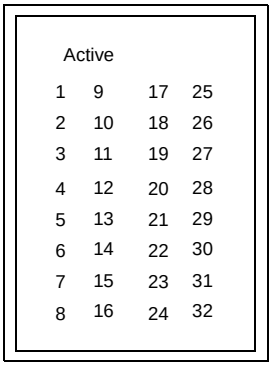
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DDI 153 10 module.



Descriptions

The following table shows the LED descriptions for the 140 DDI 153 10 modul.

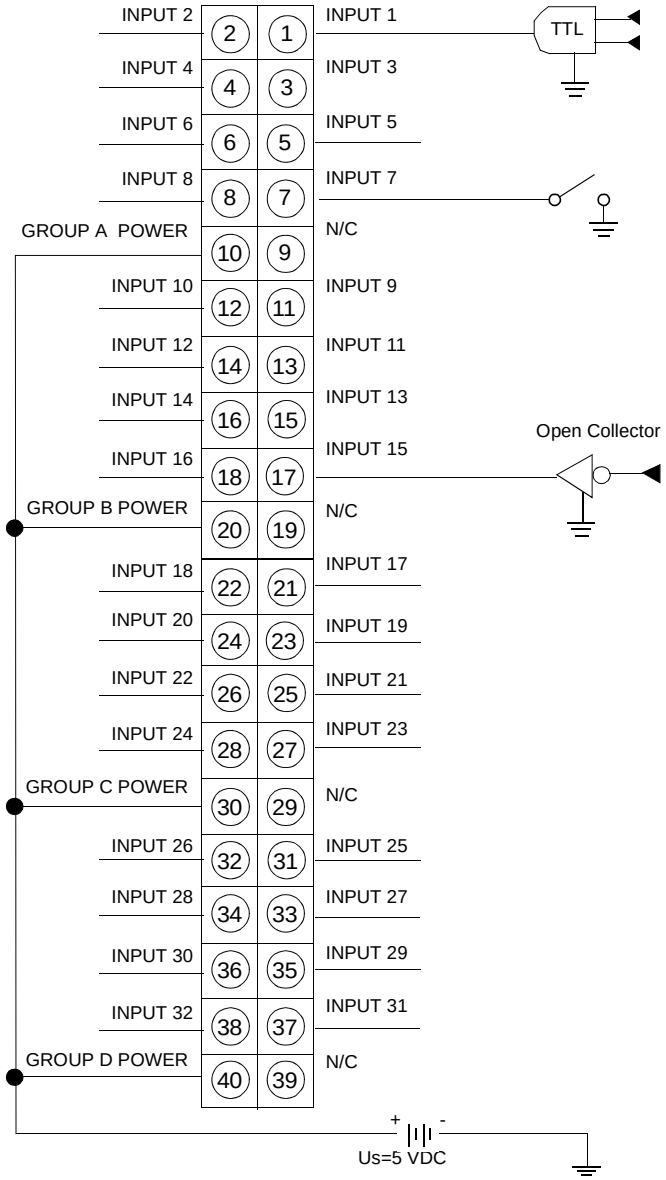
LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
1 ... 32	Green	The indicated point or channel is turned ON.

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Wiring Diagram

Illustration

The following figure shows the 140 DDI 153 10 wiring diagram.



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Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	32 IN (4 groups x 8 points)
Logic	True Low
External Power (Us)	4.5 ... 5.5 VDC
Bus Current required (Module)	170 mA
Power Dissipation	5 W
I/O map	2 input words
Fault Detection	None

Isolation

Isolation

Group to Group	500 VAC rms for 1 minute
Group to Bus	1780 VAC rms for 1 minute

Input Rating

Input Rating

ON Level voltage	0.8 VDC maximum
ON Level current	4.0 mA @ Us = 5.5 V and Uin = 0 V
OFF Level voltage	4 VDC (min) @ Us = 5.5 V 3 VDC (min) @ Us = 4.5 V
OFF Leakage	200 µA @ Us = 5.5 V and Uin = 4 VDC
Internal Pullup Resistor	7.5 kohm
Input Protection	Resistor limited

Absolute Maximum Inputs

Absolute Maximum Inputs

Continuous	5.5 VDC
1.3 ms	15 VDC decaying pulse

Response

Response

OFF - ON	250 µs (max)
ON - OFF	500 µs (max)

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Fuses

Fuses

Internal	Not required
External	User discretion

Logic States Table

The following tables shows the logic states for the DDI 153 10 module.

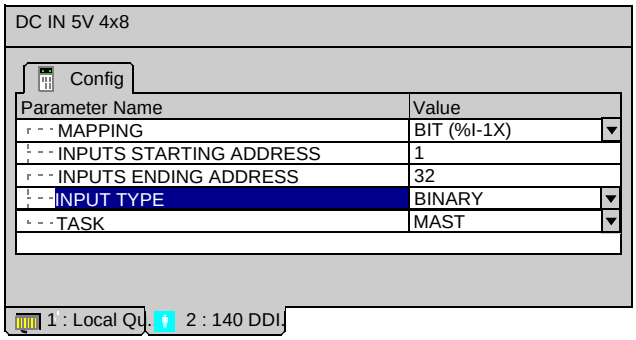
Input Voltage	Input State	LED
≤ 0.8 VDC	ON	ON
≥ 4.0 VDC @ 5.5 Us ≥ 3.0 VDC @ 4.5 Us	OFF	OFF
No Connection	OFF	OFF

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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	BIT (%I-1x)	WORD (%IW-3X)	
Inputs Starting Address	1	1	
Inputs Ending Address	32	2	
Input Type	BINARY	BCD	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local

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140 DDI 353 00: 24 VDC 4x8 Sink IN Module

14

Overview

Purpose

The following chapter provides information of the Quantum 140 DDI 353 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	176
Indicators	177
Wiring Diagram	178
Specifications	180
Parameter Configuration	182

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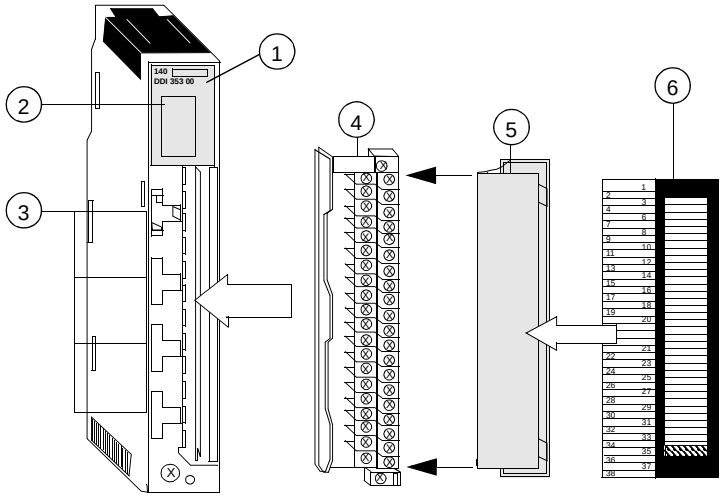
Presentation

Function

The DC Input 24 VDC 4x8 Sink module accepts 24 VDC inputs and is for use with source output devices.

Illustration

The following figure shows the 140 DDI 353 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

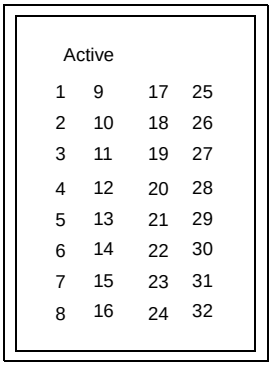
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DDI 353 00 module.



Descriptions

The following table shows the LED descriptions for the 140 DDI 353 00 module.

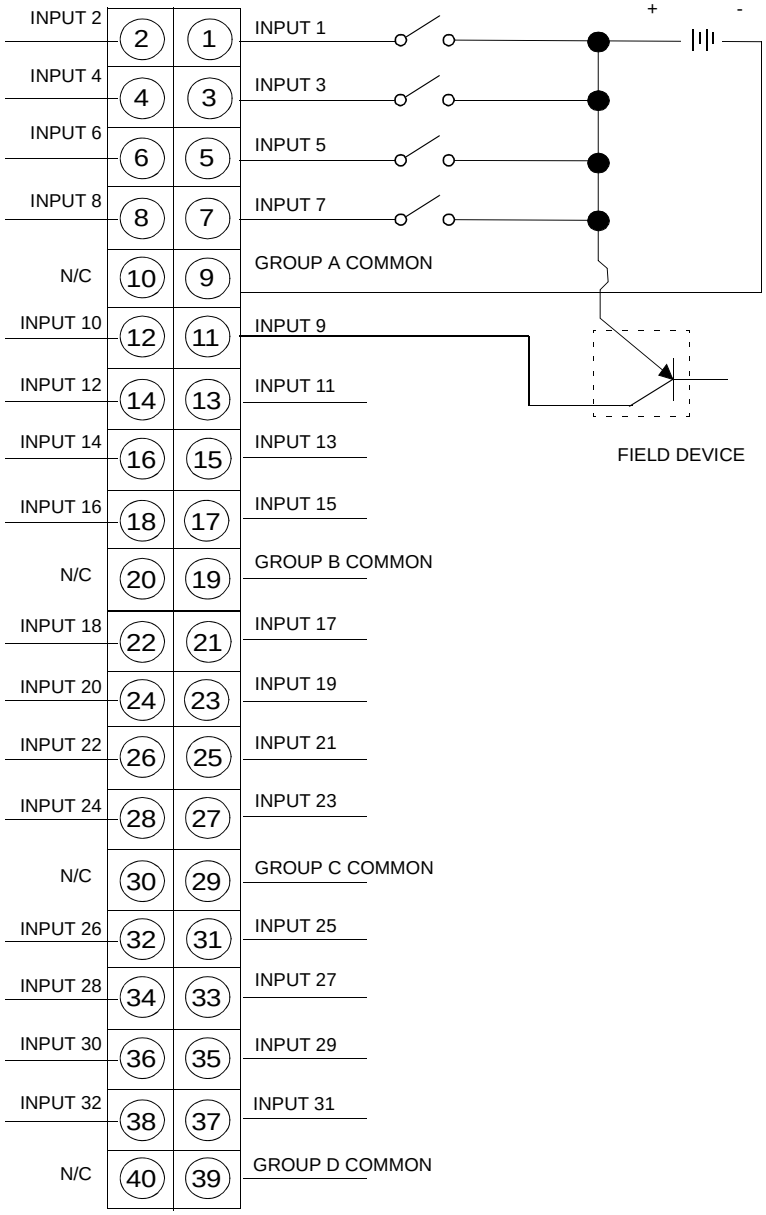
LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
1 ... 32	Green	The indicated point or channel is turned ON.

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Wiring Diagram

Illustration

The following figure shows the 140 DDI 353 00 wiring diagram.



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Note: N / C = Not Connected

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	32 IN (4 groups x 8 points)
Logic	True High
External Power	Not required for this module
Power Dissipation	1.7 W + 0.36 W x the number of points ON
Bus Current Required	330 mA
I/O map	2 input words
Fault Detection	None

Isolation

Isolation

Group to Group	500 VAC rms for 1 minute
Group to Bus	1780 VAC rms for 1 minute

Fuses

Fuses

Internal	Not required
External	User discretion

Input Rating

Input Rating

ON Level voltage	+15 ... +30 VDC
OFF Level voltage	-3 ... +5 VDC
ON Level current	2.0 mA (min.)
OFF Level current	0.5 mA (max.)
Internal Resistance	2.5 kohms
Input Protection	Resistor Limited

Absolute Maximum Inputs

Absolute Maximum Inputs

Continuous	30 VDC
1.3 ms	56 VDC decaying pulse

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Response

Response

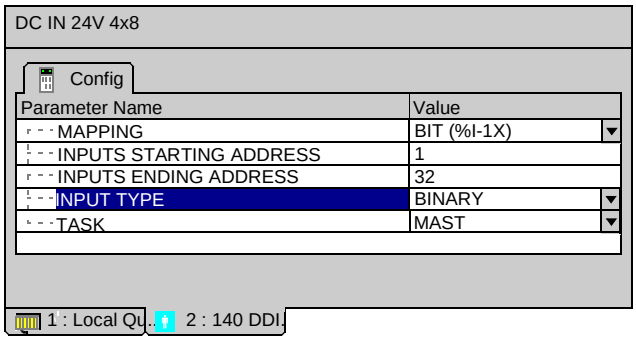
OFF - ON	1 ms (max.)
ON - OFF	1 ms (max.)

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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	BIT (%I-1x)	WORD (%IW-3X)	
Inputs Starting Address	1	1	
Inputs Ending Address	32	2	
Input Type	BINARY	BCD	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local

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140 DDI 353 10: 24 VDC 4x8 Source IN Module

15

Overview

Purpose

The following chapter provides information of the Quantum 140 DDI 353 10 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	184
Indicators	185
Wiring Diagram	186
Specifications	188
Parameter Configuration	190

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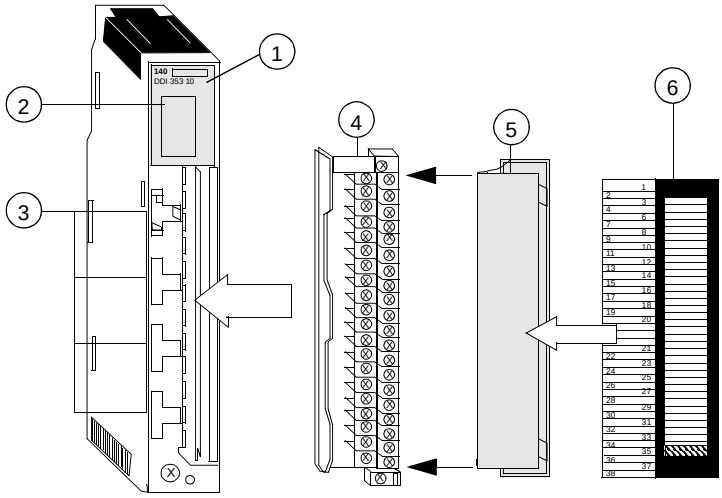
Presentation

Function

The 24 VDC 4x8 True Low Input module accepts 24 VDC inputs and is for use with sink output devices.

Illustration

The following figure shows the 140 DDI 353 10 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

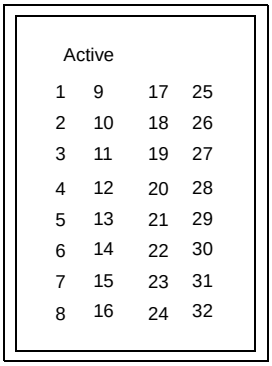
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DDI 353 10 module.



Descriptions

The following table shows the LED descriptions for the 140 DDI 353 10 module.

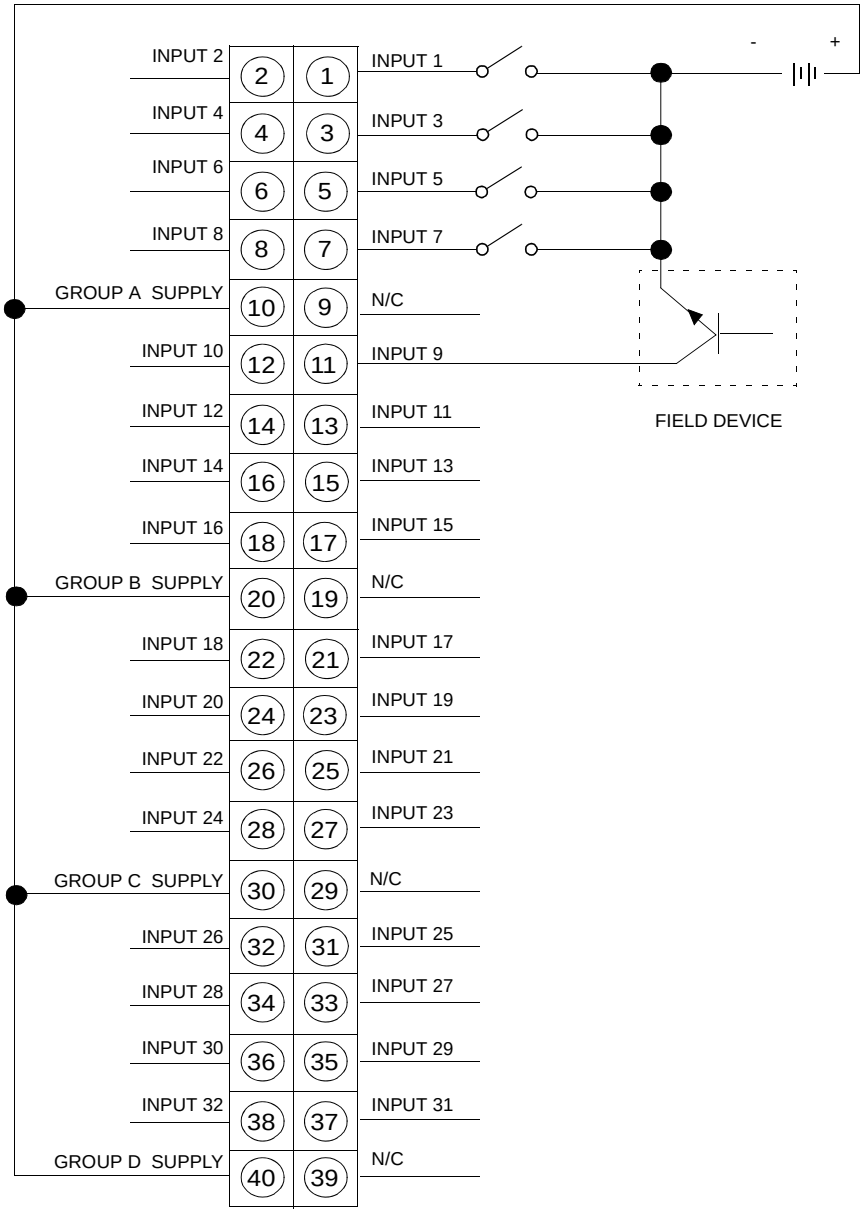
LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
1 ... 32	Green	The indicated point or channel is turned ON.

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Wiring Diagram

Illustration

The following figure shows the 140 DDI 353 10 wiring diagram.



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Note: N / C = Not Connected

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	32 IN (4 groups x 8 points)
Logic	True Low
External Power	19.2 ... 30 VDC
Power Dissipation	1.5 W + 0.26 W x the number of points ON
Bus Current required	330 mA max.
I/O map	2 input words
Fault Detection	None

Isolation

Isolation

Group to Group	500 VAC rms for 1 minute
Group to Bus	1780 VAC rms for 1 minute

Input Rating

Input Rating

ON Level voltage	-15 ... -30 VDC (reference from group supply)
OFF Level voltage	0 ... -5 VDC (reference from group supply)
ON Level current	2.0 mA min; 14 mA max
OFF Level current	0.5 mA max
Internal Resistance	2.4 kohm
Input Protection	Resistor Limited

Absolute Maximum Inputs

Absolute Maximum Inputs

Continuous	30 VDC
1.3 ms	50 VDC decaying pulse

Response

Response

OFF - ON	1 ms (max)
ON - OFF	1 ms (max)

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Fuses

Fuses

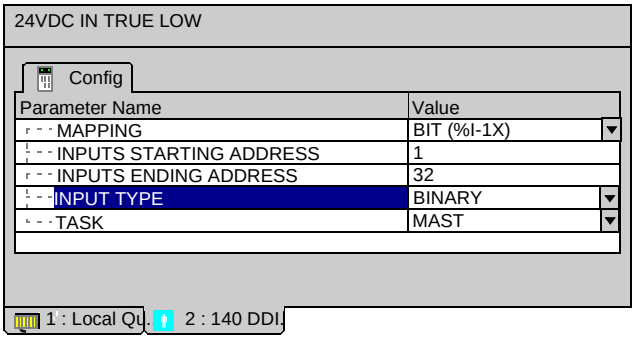
Internal	None
External	User discretion

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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	BIT (%I-1x)	WORD (%IW-3X)	
Inputs Starting Address	1	1	
Inputs Ending Address	32	2	
Input Type	BINARY	BCD	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local

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140 DDI 364 00: 24 VDC 6x16 Telefast IN Module

16

Overview

Purpose

The following chapter provides information of the Quantum 140 DDI 364 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	192
Indicators	195
Color Codes	196
Specifications	197
Parameter Configuration	198

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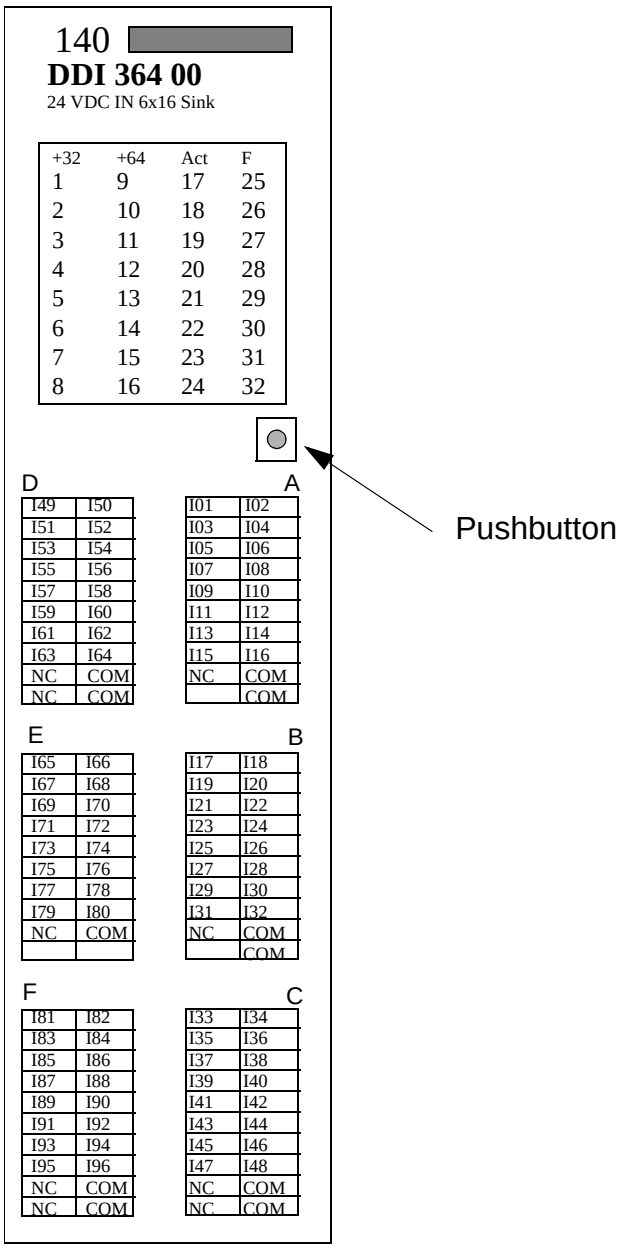
Presentation

Function The 140 DDI 364 00 sink module accepts 24 VDC inputs.

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Illustration

The front view of the 140 DDI 364 00 input module including terminal assignment numbers:



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Recommended Cables

The following table shows recommended cables, description, and their length in meters.

Cable Part Number	Description	Length (M)
TSXCDP301	(1) HE 10 - flying leads	3
TSXCDP501	(1) HE 10 - flying leads	5
TSXCDP102	(2) HE 10 - ribbon cable	1
TSXCDP202	(2) HE 10 - ribbon cable	2
TSXCDP302	(2) HE 10 - ribbon cable	3
TSXCDP053	(2) HE 10 - round cable	0.5
TSXCDP103	(2) HE 10 - round cable	1
TSXCDP203	(2) HE 10 - round cable	2
TSXCDP303	(2) HE 10 - round cable	3
TSXCDP503	(2) HE 10 - round cable	5

Compatible Connection Sub-Bases

The following tables shows the compatible connections sub-bases.

Channels	Type
8	ABE-7H08Rxx[1]
8	ABE-7H08S21[1]
16	ABE-7H16Rxx/H16Cxx
16	ABE-7H16S21
16	ABE-7H16R23
16	ABE-7H16S43
[1]With the splitter sub-base ABE-7ACC02	

Compatible Input Adapter Sub-Base

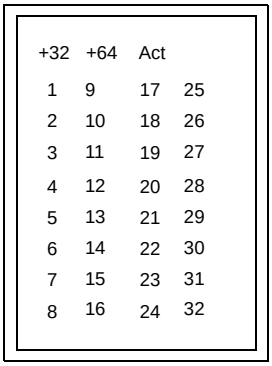
16 Channels, ABE-7S16E2xx/7P16F3xx

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Indicators

Illustration

The following table shows the LED indicators for the 140 DDI 364 00 module.



Descriptions

The following table shows the LED descriptions for the 140 DDI 364 00 module.

LEDs	Color	Indication when ON
Act	Green	Bus communication is present.
+32	Green	Points 33 to 64 displayed on LED matrix.
+64	Green	Points 65 to 96 displayed on LED matrix.

Pushbutton

Use the pushbutton to select input points to be displayed as per the following table:

LED	**+32**	**+64**
Out 1 to 32	Off	Off
Out 33 to 64	On	Off
Out 65 to 96	Off	On

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Color Codes

Color Codes for Input groups

Table indicating cable color coding for all input groups:

1	white	2	brown
3	green	4	yellow
5	gray	6	pink
7	blue	8	red
9	black	10	purple
11	gray/pink	12	red/blue
13	white/green	14	brown/green
15	white/yellow	16	yellow/brown
17	white/gray	18	gray/brown
19	white/pink	20	pink/brown

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Specifications

General Specifications

General Specifications

Module Type	96 IN (6 groups x 16 points)
Power Dissipation	1.35 W + 0.13 W x the number of points ON
Bus Current required	270 mA (max.)
I/O map	6 input words

Isolation

Isolation

Group to Group	500 VAC rms for 1 minute
Group to Bus	-

Input Rating

Input Rating

ON Level voltage	+15 VDC
OFF Level voltage	+5 VDC
ON Level current	2.5 mA (min.)
OFF Level current	0.7 mA
Internal Resistance	6.7 kohm
Input Protection	Resistor Limited

Absolute Maximum Inputs

Absolute Maximum Inputs

Continuous	30 VDC
1.0 ms	50 VDC

Response

Response

OFF - ON	2.0 ms (max.)
ON - OFF	3.0 ms (max.)

Fuses

Fuses

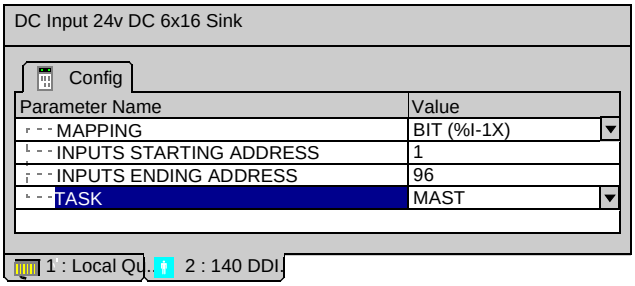
Internal	-
External	User discretion

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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	BIT (%I-1x)	WORD (%IW-3X)	
Inputs Starting Address	1	1	
Inputs Ending Address	96	6	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local

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140 DDI 673 00: 125 VDC 3x8 Sink IN Module

17

Overview

Purpose

The following chapter provides information of the Quantum 140 DDI 673 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	200
Indicators	201
Wiring Diagram	202
Specifications	204
Parameter Configuration	207

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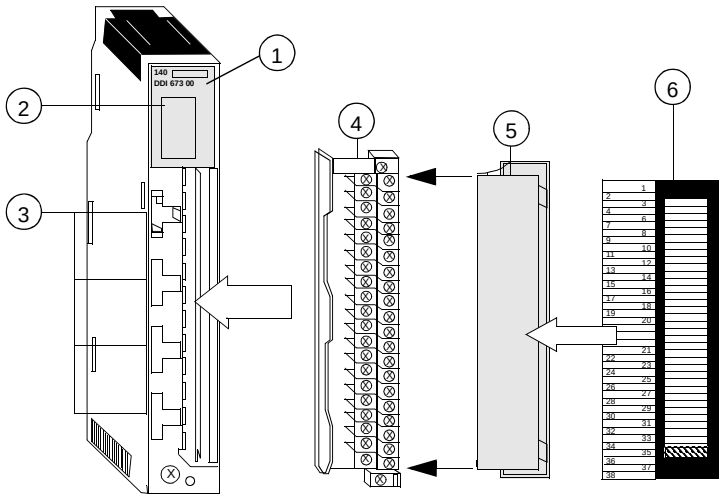
Presentation

Function

The DC Input 125 VDC 3x8 Sink module accepts 125 VDC inputs and is for use with source output devices. The module has software-selectable response time to provide additional input filtering.

Illustration

The following figure shows the 140 DDI 673 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

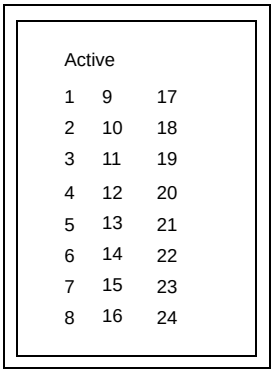
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DDI 673 00 module.



Descriptions

The following table shows the LED descriptions for the 140 DDI 673 00 module.

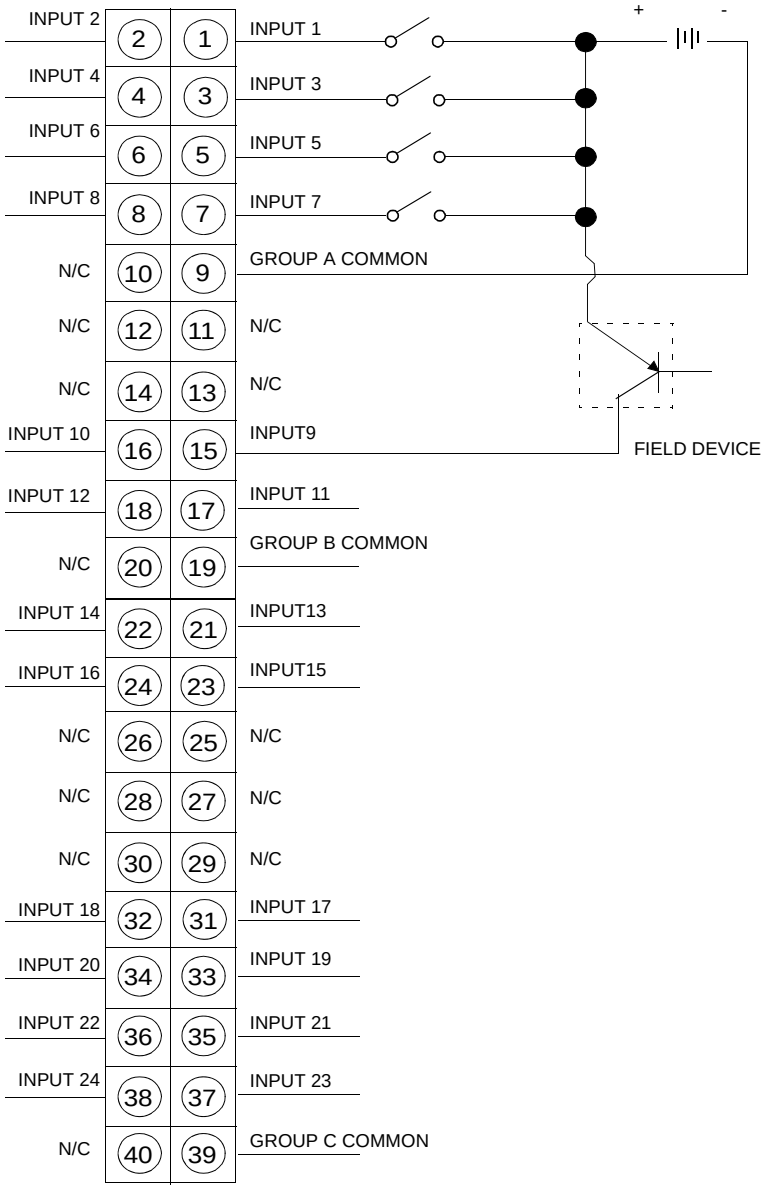
LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
1 ... 24	Green	The indicated point or channel is turned ON.

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Wiring Diagram

Illustration

The following figure shows the DDI 673 00 wiring diagram.



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Note: N / C = Not Connected

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	24 IN (3 groups x 8 points)
Logic	True High
External Power	Not required for this module
Power Dissipation	1.0 W + 0.62 W x the number of points ON
Bus Current required	200 mA (max.)
I/O map	2 input words
Fault Detection	None

Isolation

Isolation

Group to Group	1780 VAC rms for 1 minute
Group to Bus	2500 VAC rms for 1 minute

Input Rating

Input Rating

ON Level voltage	+88 ... +150 VDC
OFF Level voltage	0 ... +36 VDC
ON Level current	2.0 mA (min.)
OFF Level current	0.5 mA (max.)
Internal Resistance	OFF State: 73.8 kohms (nominal) ON State: 31.6 kohms (nominal)
Input Protection	Resistor Limited
Absolute Voltage (max.)	Continuous: 156 VDC including ripple

Response

Response

OFF - ON	0.7 ms (Default filter) 1.5 ms (Non default filter)
ON - OFF	0.7 ms (Default filter) 1.5 ms (Non default filter)

Fuses

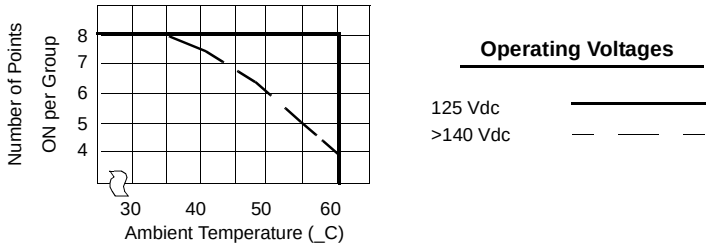
Fuses

Internal	None
External	User discretion

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Operating Curve Figure

The following figure shows the 140 DDI 673 00 operating curve.



Note: The following information baselines minimum version levels that will support this module.

Minimum Version Levels

The following table shows the minimum version level for the module products.

Products	Minimum Version Level (see label illustration below	User Action Required
CPUs and NOMs	< V02.20	Executive upgrade to > V02.10
	≥ V02.20	None
RIOs	< V02.00	Module upgrade
	≥ V02.00 and < V02.20	Executive upgrade to > V01.10
	> V02.20	None
DIOs	< V02.10	Module upgrade
	≥ V02.10	None

CAUTION

Software compatibility

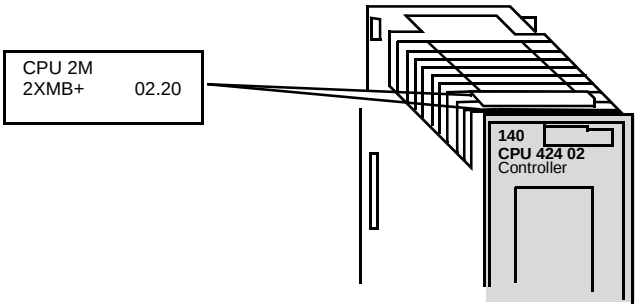
When using a DIO drop and the CPU and the NOM executive software is not per the compatibility chart, channels 17 ... 24 of this module will be seen as zeroes in the controller when configured as discretes.

Failure to follow this precaution can result in injury or equipment damage.

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Version Label Figure

The following figure shows the version label.



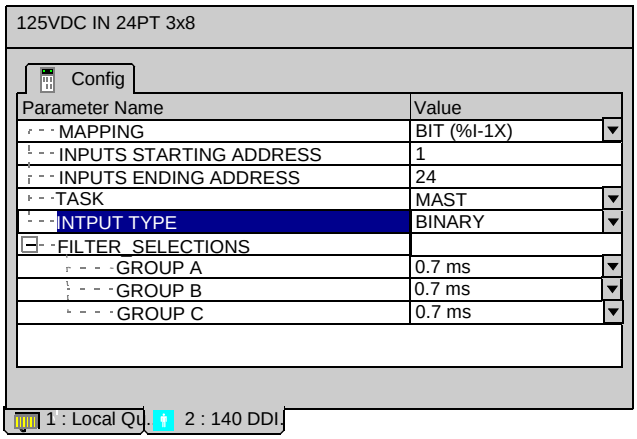
Note: The version label is found on the top front of the module.

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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	BIT (%I-1x)	WORD (%IW-3X)	
Intputs Starting Address	1	1	
Intputs Ending Address	24	2	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
FILTER_SELECTION			
Input Type	BINARY	BCD	
Group A	0.7 ms	1.5 ms	
Group B, Group C			see Group A

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140 DDI 841 00: 10 ... 60 VDC 8x2 Sink IN Module

18

Overview

Purpose

The following chapter provides information of the Quantum 140 DDI 841 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	210
Indicators	211
Wiring Diagram	212
Specifications	214
Parameter Configuration	216

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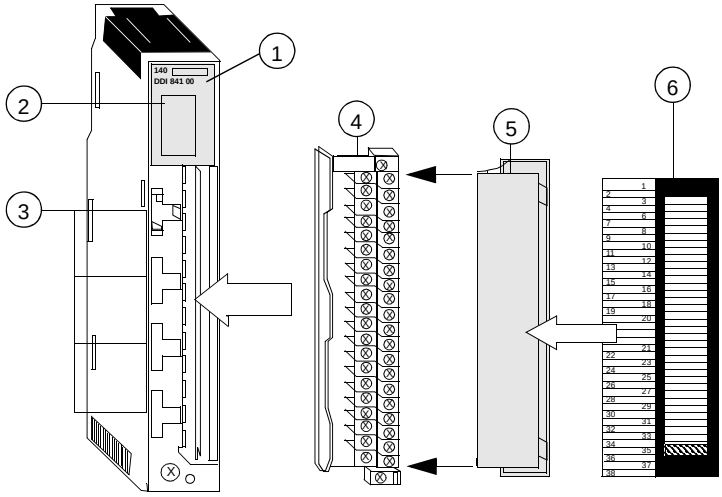
Presentation

Function

The DC Input 10 ... 60 VDC 8x2 Sink module accepts 10 ... 60 VDC inputs and is for use with source output devices. ON-OFF levels are dependent on the reference voltage selected. Different reference voltages may be used for different groups.

Illustration

The following figure shows the 140 DDI 841 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

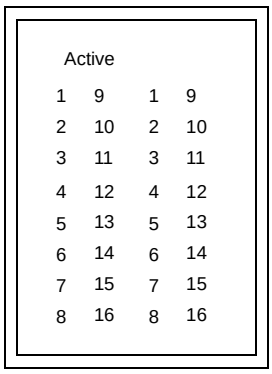
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DDI 841 00 module.



Descriptions

The following table shows the LED descriptions for the 140 DDI 841 00 module.

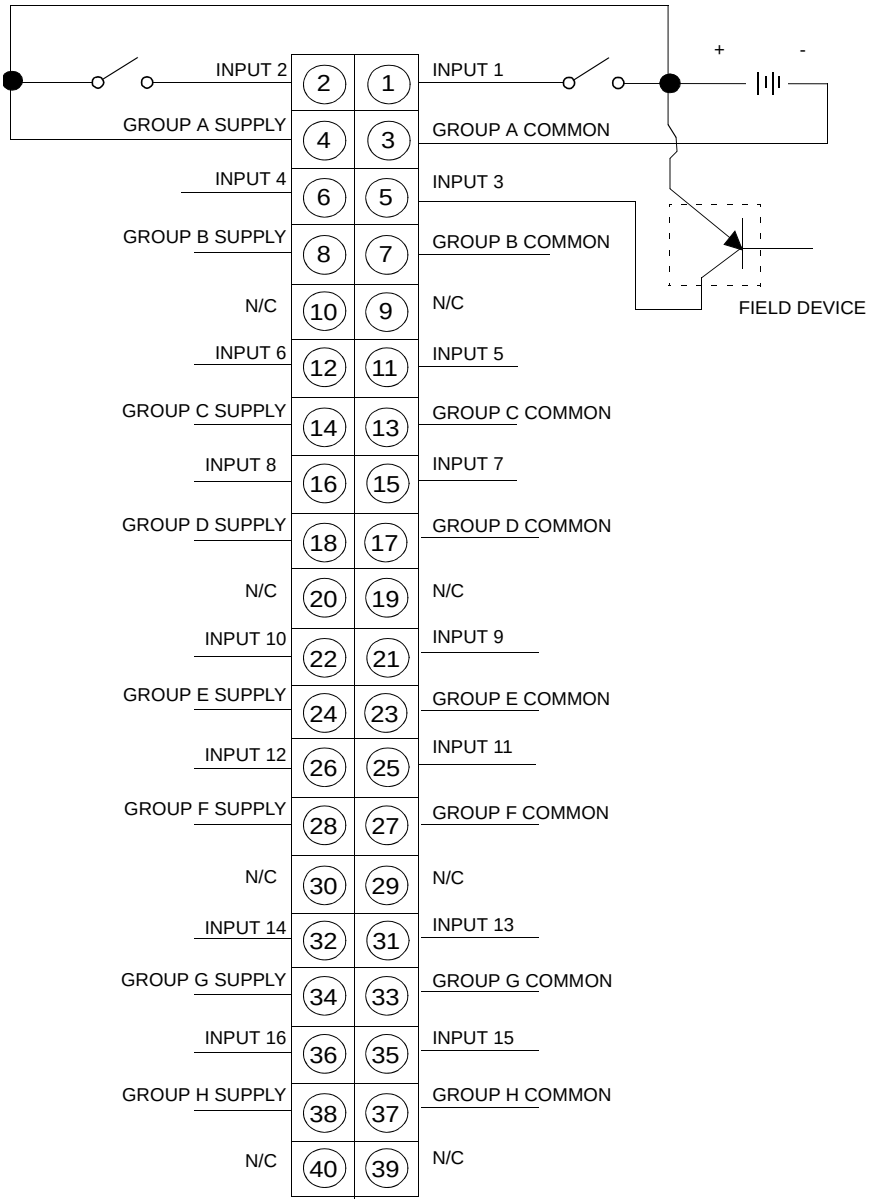
LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
1 ... 16	Green	The indicated point or channel is turned ON.
1 ... 16	Red	There is a fault on the indicated point or channel.

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Wiring Diagram

Illustration

The following figure shows the 140 DDI 841 00 wiring diagram.



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Note: N / C = Not Connected

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	16 IN (8 groups x 2 points)
Logic	True High
External Power	10 ... 60 VDC (group supply)
Power Dissipation	1.0 W + 0.25 W x the number of points ON
Bus Current required	200 mA
I/O map	1 input word

Group Supply / Tolerance

Group Supply / Tolerance

Group supply / Tolerance	ON* State	OFF* State
12 VDC / +/-5%	9 ... 12	0 ... 1.8 IEC 57 Class2
24 VDC / -15% ... +20%	11 ... 24	0 ... 5 IEC 65A Typ2
48 VDC / -15% ... +20%	34 ... 48	0 ... 10 IEC 65A Typ2
60 VDC / -15% ... +20%	45 ... 60	0 ... 9 IEC 57 Class1 *ON / OFF state ranges are specified at nominal reference voltages.

Isolation

Isolation

Group to Group	700 VAC rms for 1 minute
Group to Bus	2500 VAC rms for 1 minute

Fuses

Fuses

Internal	None
External	User discretion

Input Rating

Input Rating

Absolute Maximum Input	75 VDC
Input Protection	Resistor Limited

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ON State Current

ON State Current

@ 12 VDC	5 ... 10 mA
@ 24 VDC	6 ... 30 mA
@ 48 VDC	2 ... 15 mA
@ 60 VDC	1 ... 5 mA

Response / Switching Frequency

Response / Switching Frequency

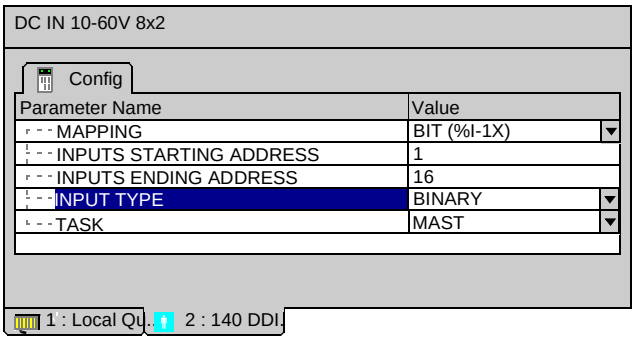
OFF - ON	4 ms
ON - OFF	4 ms
Switching Frequency	< 100 Hz

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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	BIT (%I-1x)	WORD (%IW-3X)	
Inputs Starting Address	1	1	
Inputs Ending Address	16	1	
Input Type	BINARY	BCD	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local

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140 DDI 853 00: 10 ... 60 VDC 4x8 Sink IN Module

19

Overview

Purpose

The following chapter provides information of the Quantum 140 DDI 853 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	218
Indicators	219
Wiring Diagram	220
Specifications	222
Parameter Configuration	224

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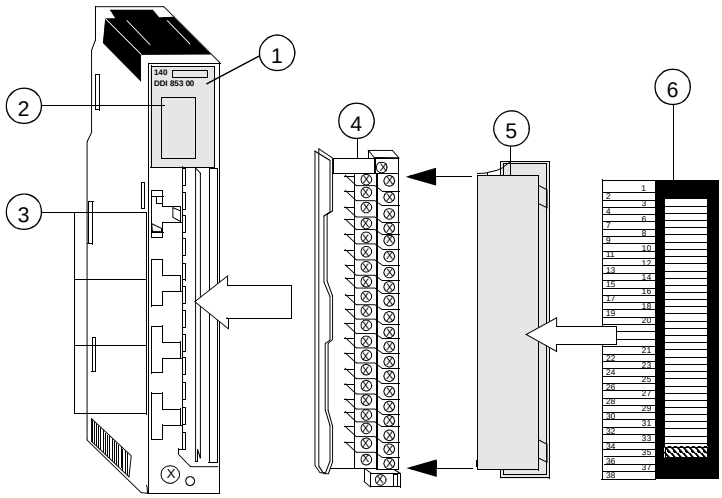
Presentation

Function

The DC Input 10 ... 60 VDC 4x8 Sink module accepts 10 ... 60 VDC inputs and is for use with source output devices. ON-OFF levels are dependent on the reference voltage selected. Different reference voltages may be used for different groups.

Illustration

The following figure shows the 140 DDI 853 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

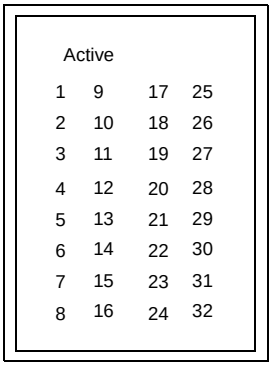
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DDI 853 00 module.



Descriptions

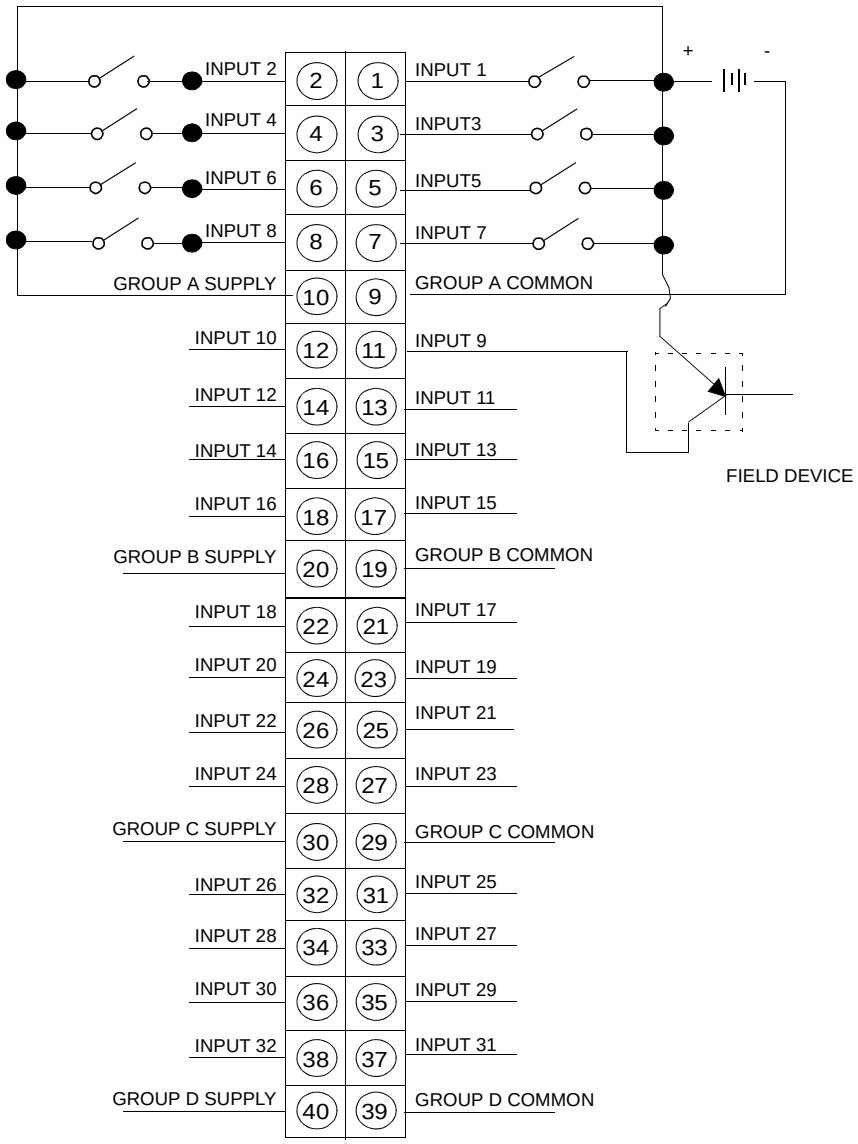
The following table shows the LED descriptions for the 140 DDI 853 00 module.

LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
1 ... 32	Green	The indicated point or channel is turned ON.

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Wiring Diagram

Illustration The following figure shows the 140 DDI 853 00 wiring diagram.



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Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	32 IN (4 groups x 8 points)
Logic	True High
External Power	10 ... 60 VDC (group supply)
Power Dissipation	1.0 W + 0.25 W x the number of points ON
Bus Current required	300 mA
I/O map	2 input words
Fault Detection	None

Group supply / Tolerance

Group supply / Tolerance

Group supply / Tolerance	ON* State	OFF* State
12 VDC / +/-5%	9 ... 12	0 ... 1.8 IEC 57 Class2
24 VDC / -15% ... +20%	11 ... 24	0 ... 5 IEC 65A Typ2
48 VDC / -15% ... +20%	34 ... 48	0 ... 10 IEC 65A Typ2
60 VDC / -15% ... +20%	45 ... 60	0 ... 12.5 IEC 57 Class1 *ON / OFF state ranges are specified at nominal reference voltages.

Isolation

Isolation

Group to Group	700 VAC rms for 1 minute
Group to Bus	2500 VAC rms for 1 minute

Input Rating

Input Rating

Absolute Maximum Input	75 VDC
Input Protection	Resistor Limited

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ON State Current

ON State Current

@ 12 VDC	5 ... 10 mA
@ 24 VDC	6 ... 30 mA
@ 48 VDC	2 ... 15 mA
@ 60 VDC	1 ... 5 mA

Response / Switching Frequency

Response / Switching Frequency

OFF - ON	4 ms
ON - OFF	4 ms
Switching Frequency	< 100 Hz max.

Fuses

Fuses

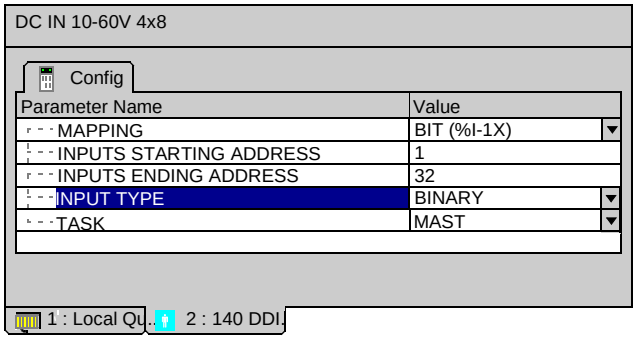
Internal	None
External	User discretion

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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	BIT (%I-1x)	WORD (%IW-3X)	
Inputs Starting Address	1	1	
Inputs Ending Address	32	2	
Input Type	BINARY	BCD	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local

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140 DAI 340 00: 24 VAC 16x1 IN Module

20

Overview

Purpose

The following chapter provides information of the Quantum 140 DAI 340 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	226
Indicators	227
Wiring Diagram	228
Specifications	230
Parameter Configuration	232

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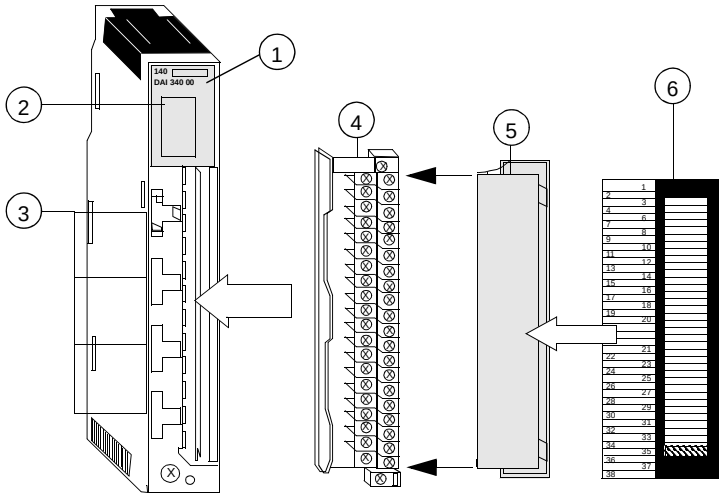
Presentation

Function

The AC Input 24 VAC 16x1 module accepts 24 VAC inputs.

Illustration

The following figure shows the 140 DAI 340 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

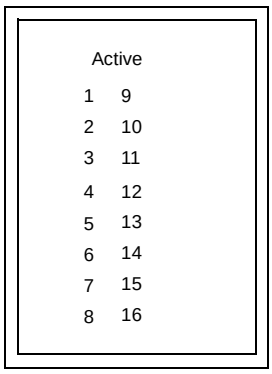
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DAI 340 00 module.



Descriptions

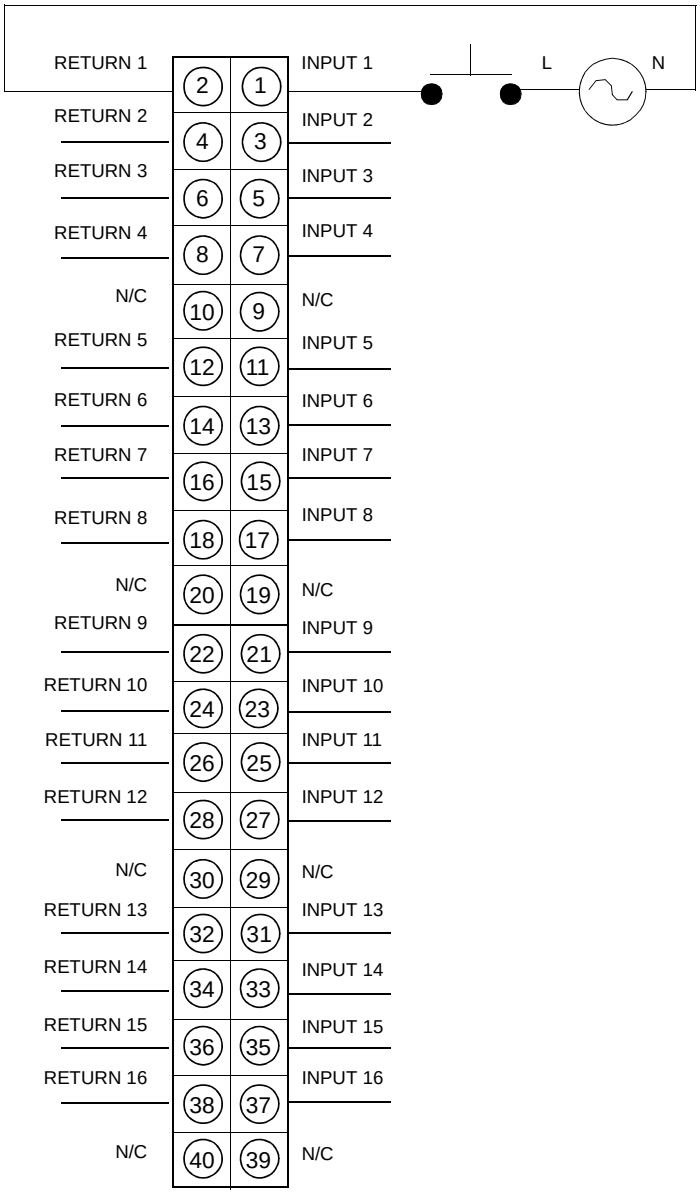
The following table shows the LED descriptions for the 140 DAI 340 00 module.

LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
1 ... 16	Green	The indicated point or channel is turned ON.

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Wiring Diagram

Illustration The following figure shows the 140 DAI 340 00 wiring diagram.



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Note: This module is not polarity sensitive.
N / C = Not Connected.

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	16 IN (16 groups x 1 point) individually isolated
External Power	Not required for this module
Power Dissipation	5.5 W (max.)
Bus Current required	180 mA
I/O map	1 input word
Fault Detection	None

Operating Voltage and Input Current*

Operating Voltage and Input Current*

50 Hz	ON: 14 ... 30 VAC (11.1 mA max.) OFF: 0 ... 5 VAC
60 Hz	ON: 12 ... 30 VAC (13.2 mA max.) OFF: 0 ... 5 VAC * Do not use outside the 47 ... 63 Hz range
Maximum Allowable Leakage Current from an External Device to be recognized as an OFF Condition.	1.9 mA

Typical Input Impedance

Typical Imput Impedance

50 Hz	3.1 kohms capacitive
60 Hz	2.6 kohms

Isolation

Isolation

Input to Input	1780 VAC for 1 minute
Input to Bus	1780 VAC for 1 minute

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Absolute Maximum Input

Absolute Maximum Input

Continuous	30 VAC
10 s	32 VAC
1 Cycle	50 VAC

Response

Response

OFF - ON	Min: 4.9 ms. Max: 0.75 line cycle.
ON - OFF	Min: 7.3 ms. Max: 12.3 ms.

Fuses

Fuses

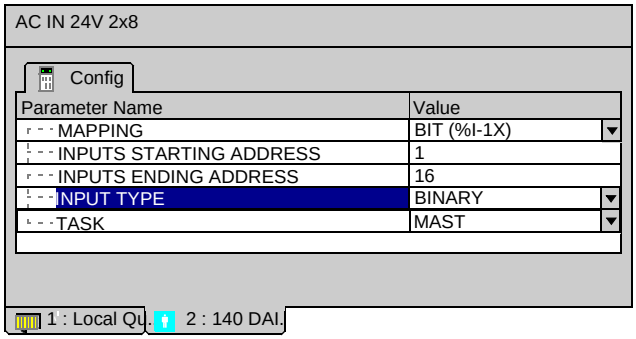
Internal	None
External	User discretion

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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	BIT (%I-1x)	WORD (%IW-3X)	
Inputs Starting Address	1	1	
Inputs Ending Address	16	1	
Input Type	BINARY	BCD	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local

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140 DAI 353 00: 24 VAC 4x8 IN Module

21

Overview

Purpose

The following chapter provides information of the Quantum 140 DAI 353 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	234
Indicators	235
Wiring Diagram	236
Specifications	238
Parameter Configuration	240

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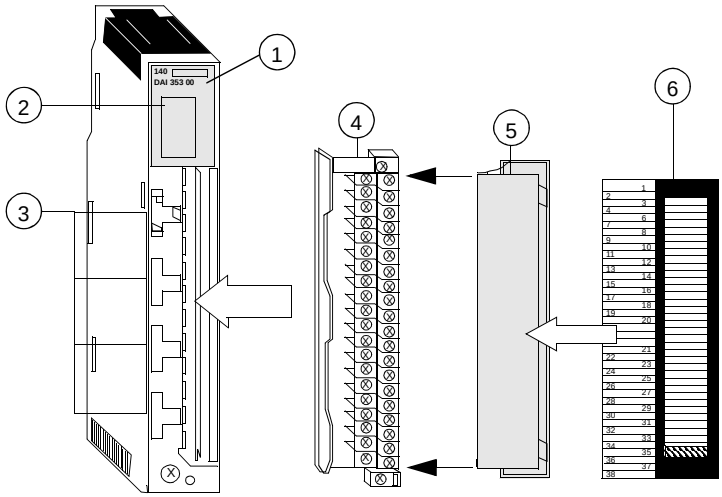
Presentation

Function

The AC Input 24 VAC 4x8 module accepts 24 VAC inputs.

Illustration

The following figure shows the 140 DAI 353 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

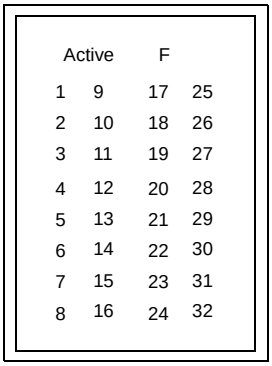
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DAI 353 00 module.



Descriptions

The following table shows the LED descriptions for the 140 DAI 353 00 module.

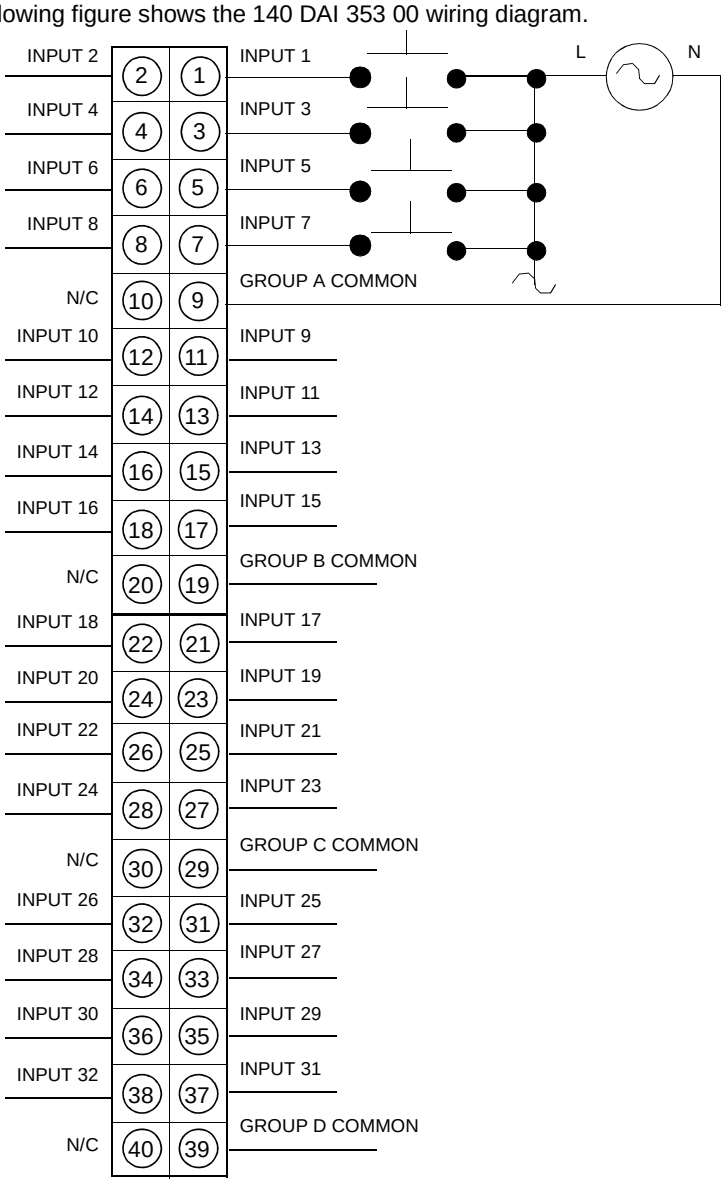
LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
1 ... 32	Green	The indicated point or channel is turned ON.

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Wiring Diagram

Illustration

The following figure shows the 140 DAI 353 00 wiring diagram.



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Note: This module is not polarity sensitive.
N / C = Not Connected.

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	32 IN (4 groups x 8 points)
External Power	Not required for this module
Power Dissipation	10.9 W (max.)
Bus Current required	250 mA
I/O map	2 input words
Fault Detection	None

Operating Voltage and Input Current*

Operating Voltage and Input Current*

50 Hz	ON: 14 ... 30 VAC (11.1 mA max) OFF: 0 ... 5 VAC
60 Hz	ON: 12 ... 30 VAC (13.2 mA max) OFF: 0 ... 5 VAC * Do not use outside the 47 ... 63 Hz range
Maximum Allowable Leakage Current from an External Device to be recognized as an OFF Condition.	1.9 mA

Typical Input Impedance

Typical Imput Impedance

50 Hz	3.1 kohms capacitive
60 Hz	2.6 kohms capacitive

Isolation

Isolation

Group to Group	1780 VAC for 1 minute
Input to Bus	1780 VAC for 1 minute

Fuses

Fuses

Internal	None
External	User discretion

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Absolute Maximum Input

Absolute Maximum Input

Continuous	30 VAC
10 s	32 VAC
1 Cycle	50 VAC

Response

Response

OFF - ON	Min: 4.9 ms. Max: 0.75 line cycle.
ON - OFF	Min: 7.3 ms. Max: 12.3 ms.

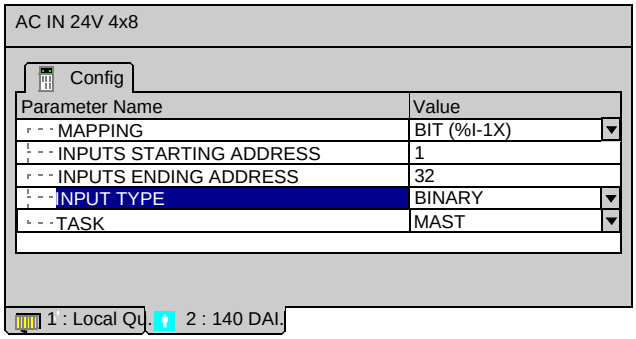
Note: Input signals must be sinusoidal with less than 6% THD and 63 Hz maximum frequency.

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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	BIT (%I-1x)	WORD (%IW-3X)	
Inputs Starting Address	1	1	
Inputs Ending Address	32	2	
Input Type	BINARY	BCD	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local

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140 DAI 440 00: 48 VAC 16x1 IN Module

22

Overview

Purpose

The following chapter provides information of the Quantum 140 DAI 440 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	242
Indicators	243
Wiring Diagram	244
Specifications	246
Parameter Configuration	248

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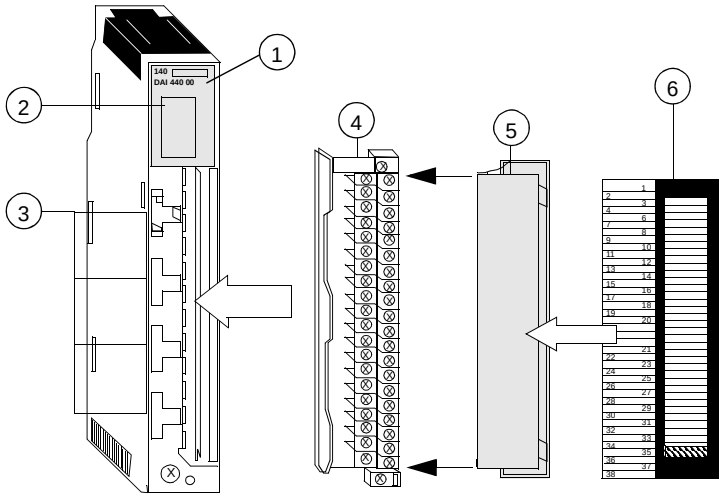
Presentation

Function

The AC Input 48 VAC 16x1 module accepts 48 VAC inputs.

Illustration

The following figure shows the 140 DAI 440 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

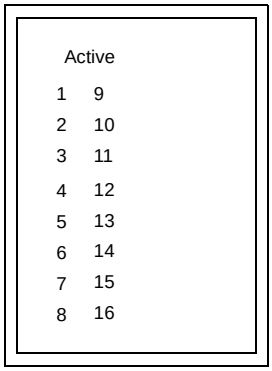
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DAI 440 00 module.



Descriptions

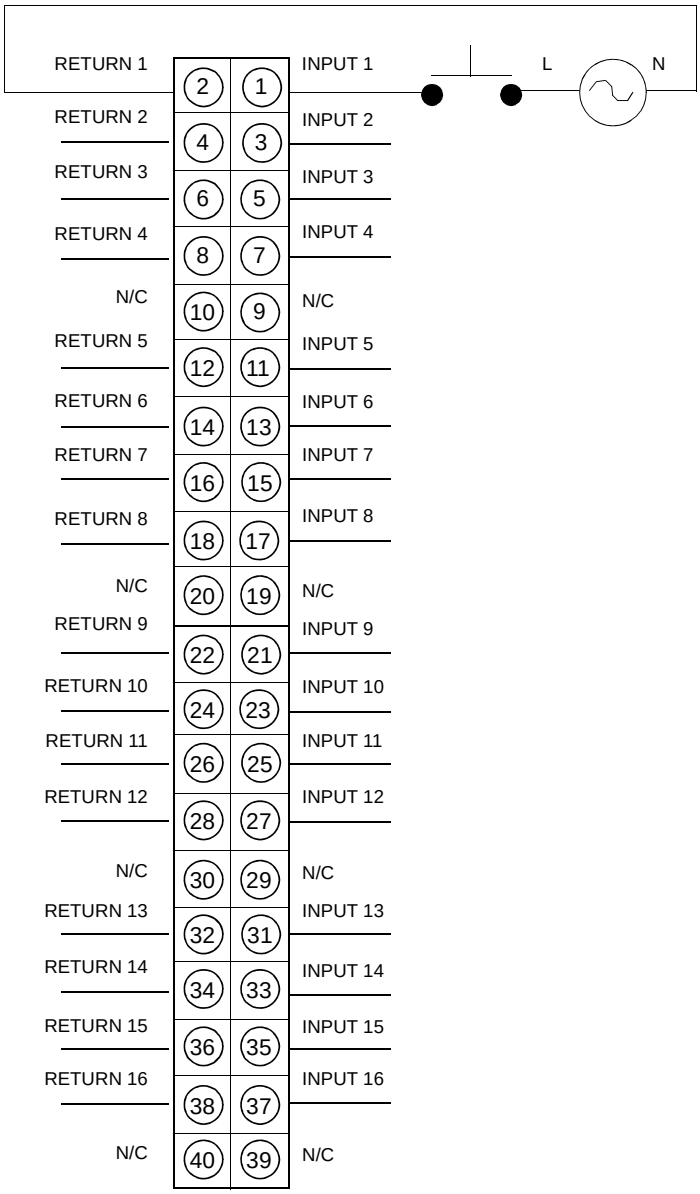
The following table shows the LED descriptions for the 140 DAI 440 00 module.

LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
1 ... 16	Green	The indicated point or channel is turned ON.

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Wiring Diagram

Illustration The following figure shows the 140 DAI 440 00 wiring diagram.



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Note: This module is not polarity sensitive.
N / C = Not Connected

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	16 individually isolated
External Power	Not required for this module
Power Dissipation	5.5 W (max.)
Bus Current required	180 mA
I/O map	1 input word
Fault Detection	None

Operating Voltage and Input Current*

Operating Voltage and Input Current*

50 Hz	ON: 34 ... 56 VAC (9.8 mA max) OFF: 0 ... 10 VAC
60 Hz	ON: 29 ... 56 VAC (11.7 mA max) OFF: 0 ... 10 VAC * Do not use outside the 47 ... 63 Hz range
Maximum Allowable Leakage Current from an External Device to be recognized as an OFF Condition.	1.7 mA

Typical Input Impedance

Typical Imput Impedance

50 Hz	6.8 kohms capacitive
60 Hz	5.6 kohms capacitive

Isolation

Isolation

Group to Group	1780 VAC for 1 minute
Input to Bus	1780 VAC for 1 minute

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Absolute Maximum Input

Absolute Maximum Input

Continuous	56 VAC
10 s	63 VAC
1 Cycle	100 VAC

Response

Response

OFF - ON	Min: 4.9 ms. Max: 0.75 line cycle.
ON - OFF	Min: 7.3 ms. Max: 12.3 ms.

Fuses

Fuses

Internal	None
External	User discretion

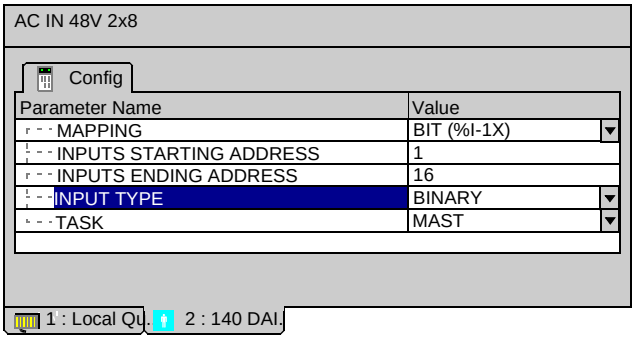
Note: Input signals must be sinusoidal with less than 6% THD and 63 Hz maximum frequency.

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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	BIT (%I-1x)	WORD (%IW-3X)	
Inputs Starting Address	1	1	
Inputs Ending Address	16	1	
Input Type	BINARY	BCD	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local

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140 DAI 453 00: 48 VAC 4x8 IN Module

23

Overview

Purpose

The following chapter provides information of the Quantum 140 DAI 453 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	250
Indicators	251
Wiring Diagram	252
Specifications	254
Parameter Configuration	256

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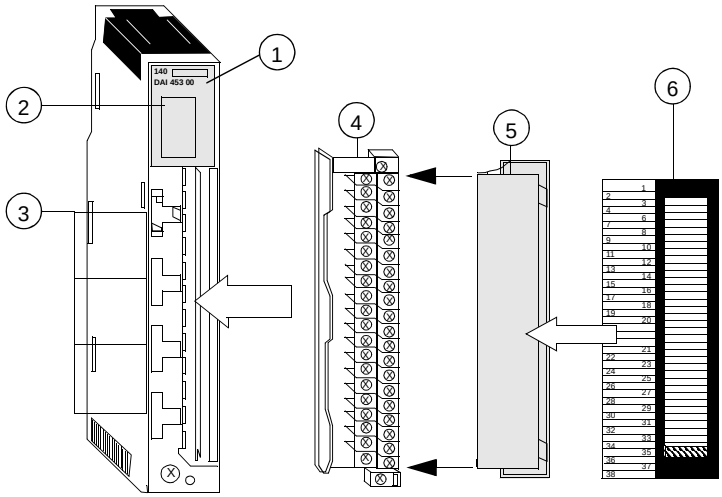
Presentation

Function

The AC Input 48 VAC 4x8 module accepts 48 VAC inputs.

Illustration

The following figure shows the 140 DAI 453 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

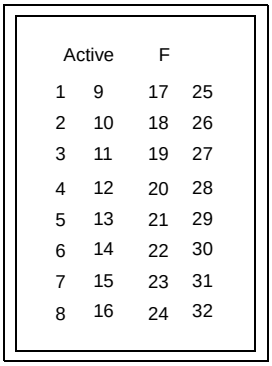
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DAI 453 00 module.



Descriptions

The following table shows the LED descriptions for the 140 DAI 453 00 module.

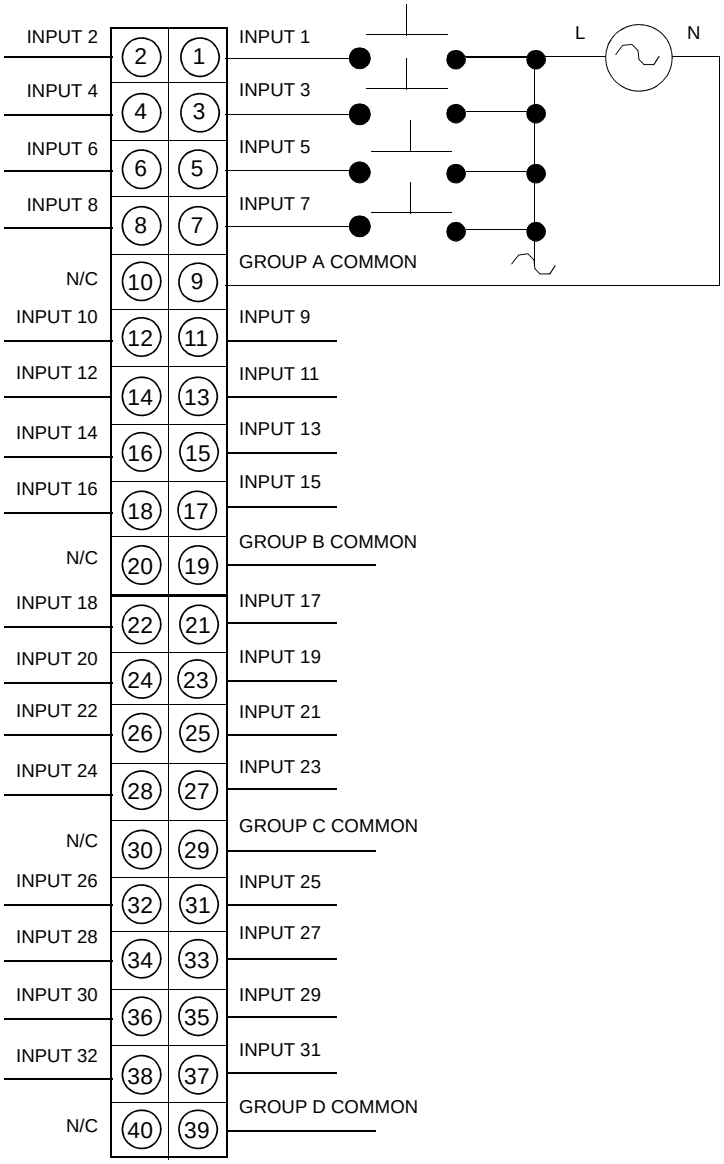
LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
1 ... 32	Green	The indicated point or channel is turned ON.

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Wiring Diagram

Illustration

The following figure shows the 140 DAI 453 00 wiring diagram.



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Note: This module is not polarity sensitive.
N / C = Not Connected.

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	32 IN (4 groups x 8 points)
External Power	Not required for this module
Power Dissipation	10.9 W (max.)
Bus Current required	250 mA
I/O map	2 input words
Fault Detection	None

Operating Voltage and Input Current*

Operating Voltage and Input Current*

50 Hz	ON: 34 ... 56 VAC (9.8 mA max) OFF: 0 ... 10 VAC
60 Hz	ON: 29 ... 56 VAC (11.7 mA max) OFF: 0 ... 10 VAC * Do not use outside the 47 ... 63 Hz range
Maximum Allowable Leakage Current from an External Device to be recognized as an OFF Condition.	1.7 mA

Typical Input Impedance

Typical Imput Impedance

50 Hz	6.8 kohms capacitive
60 Hz	5.6 kohms capacitive

Isolation

Isolation

Group to Group	1780 VAC for 1 minute
Input to Bus	1780 VAC for 1 minute

Absolute Maximum Input

Absolute Maximum Input

Continuous	56 VAC
10 s	63 VAC
1 Cycle	100 VAC

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Response

Response

OFF - ON	Min: 4.9 ms. Max: 0.75 line cycle.
ON - OFF	Min: 7.3 ms. Max: 12.3 ms.

Fuses

Fuses

Internal	None
External	User discretion

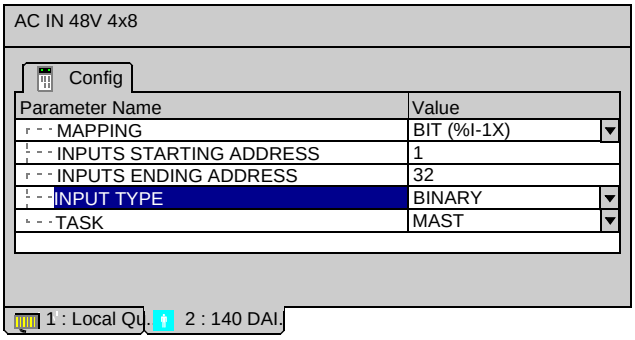
Note: Input signals must be sinusoidal with less than 6% THD and 63 Hz maximum frequency.

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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	BIT (%I-1x)	WORD (%IW-3X)	
Inputs Starting Address	1	1	
Inputs Ending Address	32	2	
Input Type	BINARY	BCD	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local

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140 DAI 540 00: 115 VAC 16x1 IN Module

24

Overview

Purpose

The following chapter provides information of the Quantum 140 DAI 540 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	258
Indicators	259
Wiring Diagram	260
Specifications	262
Parameter Configuration	264

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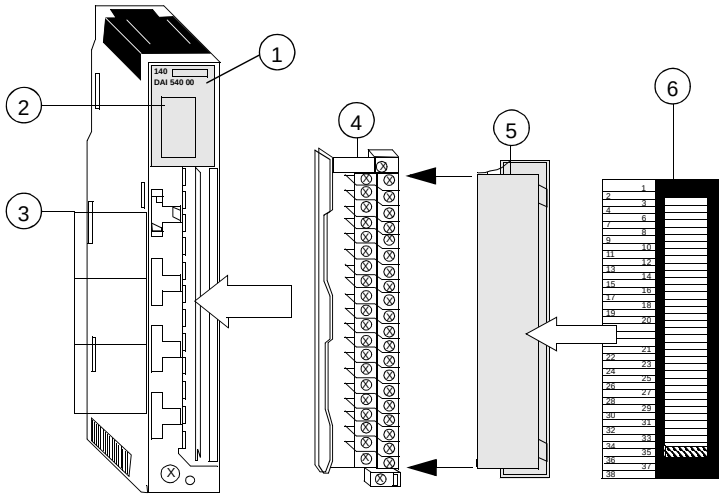
Presentation

Function

The AC Input 115 VAC 16x1 module accepts 115 VAC inputs.

Illustration

The following figure shows the 140 DAI 540 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

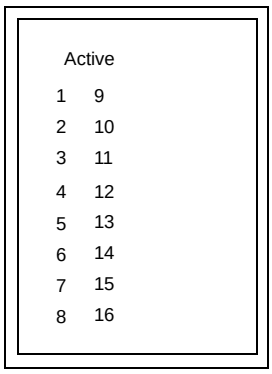
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DAI 540 00 module.



Descriptions

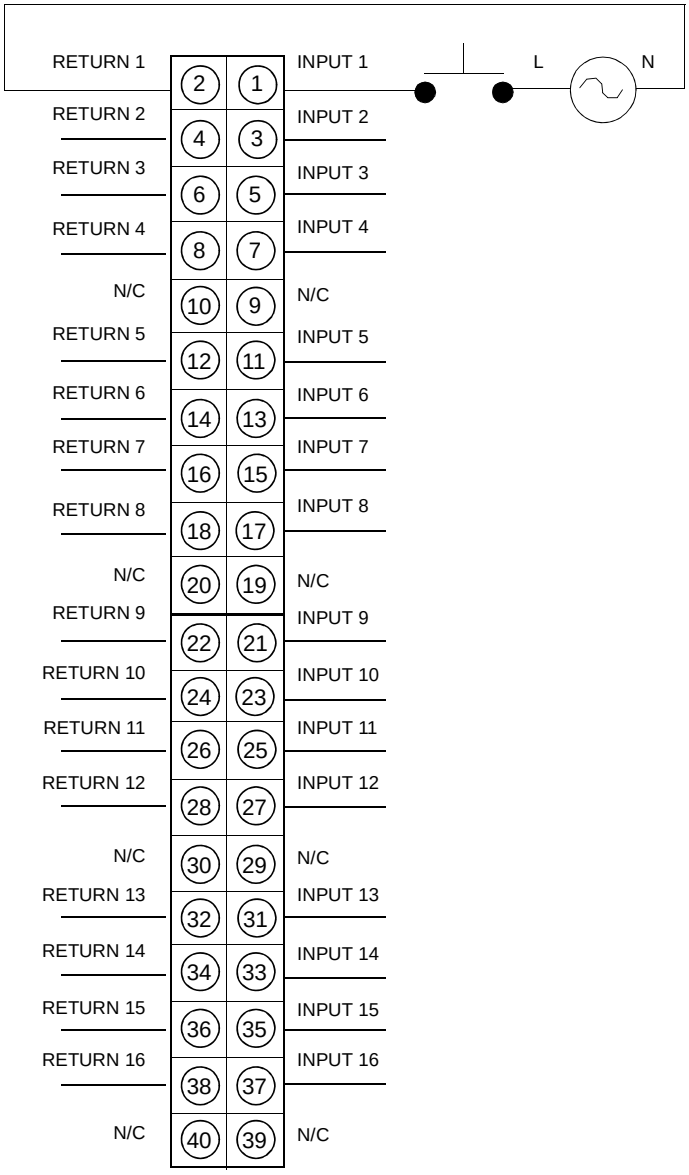
The following table shows the LED descriptions for the 140 DAI 540 00 module.

LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
1 ... 16	Green	The indicated point or channel is turned ON.

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Wiring Diagram

Illustration The following figure shows the 140 DAI 540 00 wiring diagram.



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Note: This module is not polarity sensitive.
N / C = Not Connected.

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.



CAUTION

Voltage Compatibility

All inputs in a group must be from the same phase of line input voltage.

Failure to follow this precaution can result in injury or equipment damage.

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Specifications

General Specifications

General Specifications

Module Type	16 IN (16 groups x 1 point)
External Power	Not required for this module
Power Dissipation	5.5 W (max.)
Bus Current required	180 mA
I/O map	1 input word
Fault Detection	None

Operating Voltage and Input Current*

Operating Voltage and Input Current*

50 Hz	ON: 85 ... 132 VAC (11.1 mA max) OFF: 0 ... 20 VAC
60 Hz	ON: 79 ... 132 VAC (13.2 mA max) OFF: 0 ... 20 VAC * Do not use outside the 47 ... 63 Hz range
Maximum Allowable Leakage Current from an External Device to be recognized as an OFF Condition.	2.1 mA

Typical Input Impedance

Typical Imput Impedance

50 Hz	14.4 kohms capacitive
60 Hz	12 kohms capacitive

Isolation

Isolation

Input to Input	1780 VAC for 1 minute
Input to Bus	1780 VAC for 1 minute

Absolute Maximum Input

Absolute Maximum Input

Continuous	132 VAC
10 s	156 VAC
1 Cycle	200 VAC

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Response

Response

OFF - ON	Min: 4.9 ms. Max: 0.75 line cycle.
ON - OFF	Min: 7.3 ms. Max: 12.3 ms.

Fuses

Fuses

Internal	None
External	User discretion

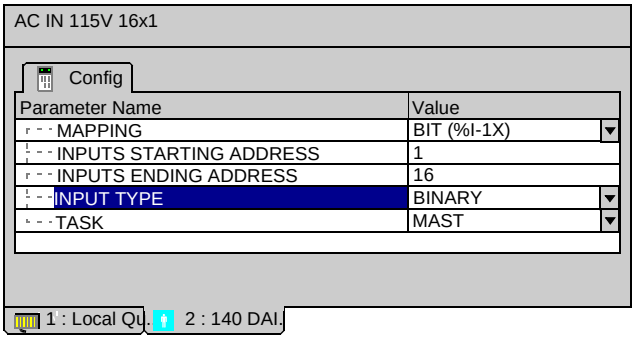
Note: Input signals must be sinusoidal with less than 6% THD and 63 Hz maximum frequency.

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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	BIT (%I-1x)	WORD (%IW-3X)	
Inputs Starting Address	1	1	
Inputs Ending Address	16	1	
Input Type	BINARY	BCD	
Task (Grayed if module in other than local)	MAST	FAST AUX1 AUX2 AUX3	fixed to MAST if module in other than local

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140 DAI 543 00: 115 VAC 2x8 IN Module

25

Overview

Purpose

The following chapter provides information of the Quantum 140 DAI 543 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	266
Indicators	267
Wiring Diagram	268
Specifications	270
Parameter Configuration	272

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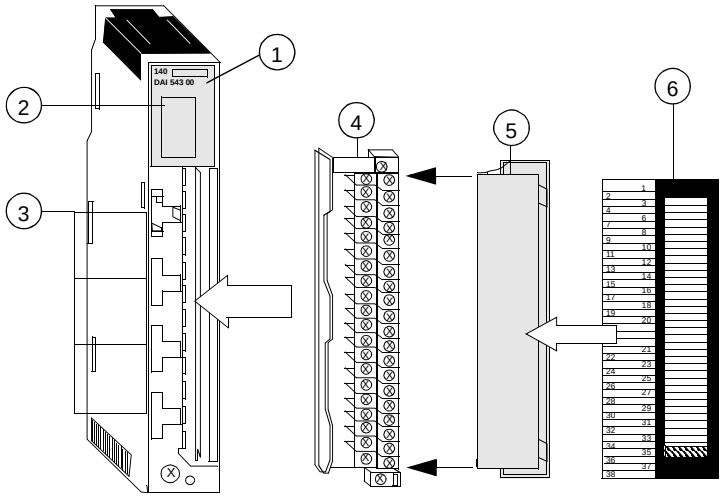
Presentation

Function

The AC Input 115 VAC 2x8 module accepts 115 VAC inputs.

Illustration

The following figure shows the 140 DAI 543 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

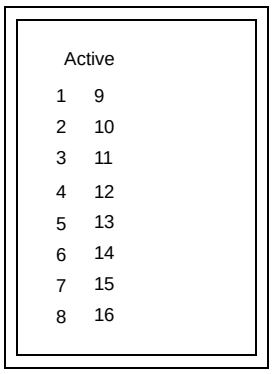
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DAI 543 00 module.



Descriptions

The following table shows the LED descriptions for the 140 DAI 543 00 module.

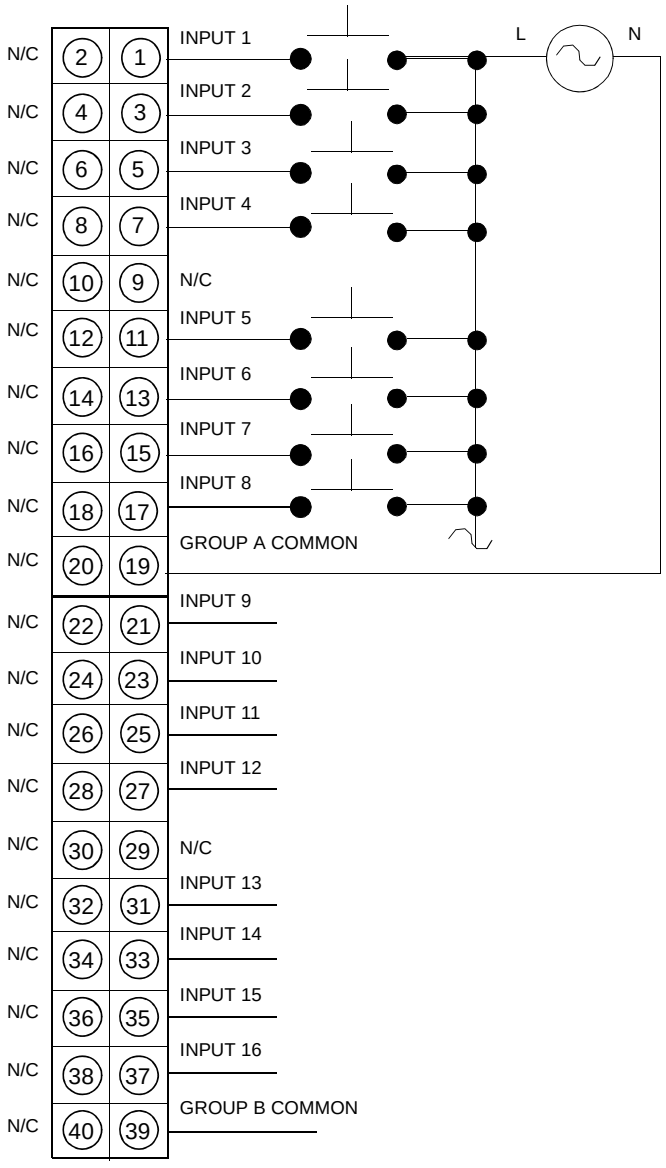
LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
1 ... 16	Green	The indicated point or channel is turned ON.

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Wiring Diagram

Illustration

The following figure shows the 140 DAI 543 00 wiring diagram.



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Note: All inputs in a group must be from the same phase of line-input voltage. This module is not polarity sensitive.
N / C = Not Connected.

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	16 IN (2 groups x 8 points)
External Power	Not required for this module
Power Dissipation	5.5 W (max)
Bus Current required	180 mA
I/O map	1 input word
Fault Detection	None

Operating Voltage and Input Current*

Operating Voltage and Input Current*

50 Hz	ON: 85 ... 132 VAC (11.1 mA max) OFF: 0 ... 20 VAC
60 Hz	ON: 79 ... 132 VAC (13.2 mA max) OFF: 0 ... 20 VAC * Do not use outside the 47 ... 63 Hz range
Maximum Allowable Leakage Current from an External Device to be recognized as an OFF Condition.	2.1 mA

Typical Input Impedance

Typical Imput Impedance

50 Hz	14.4 kohms capacitive
60 Hz	12 kohms capacitive

Isolation

Isolation

Group to Group	1780 VAC for 1 minute
Input to Bus	1780 VAC for 1 minute

Absolute Maximum Input

Absolute Maximum Input

Continuous	132 VAC
10 s	156 VAC
1 Cycle	200 VAC
1.3 ms	276 VAC

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Response

Response

OFF - ON	Min: 4.9 ms. Max: 0.75 line cycle.
ON - OFF	Min: 7.3 ms. Max: 12.3 ms.

Fuses

Fuses

Internal	None
External	User discretion

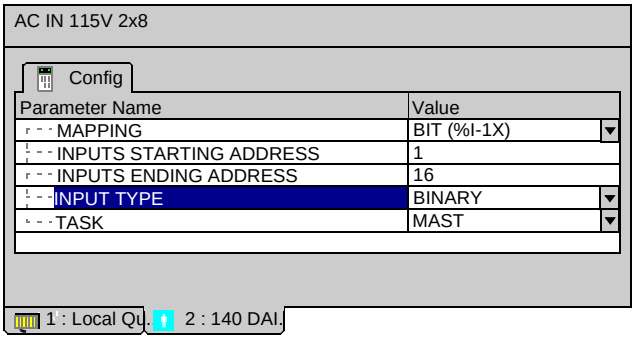
Note: Input signals must be sinusoidal with less than 6% THD and 63 Hz maximum frequency.

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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	BIT (%I-1x)	WORD (%IW-3X)	
Inputs Starting Address	1	1	
Inputs Ending Address	16	1	
Input Type	BINARY	BCD	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local

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140 DAI 553 00: 115 VAC 4x8 IN Module

26

Overview

Purpose

The following chapter provides information of the Quantum 140 DAI 553 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	274
Indicators	275
Wiring Diagram	276
Specifications	278
Parameter Configuration	280

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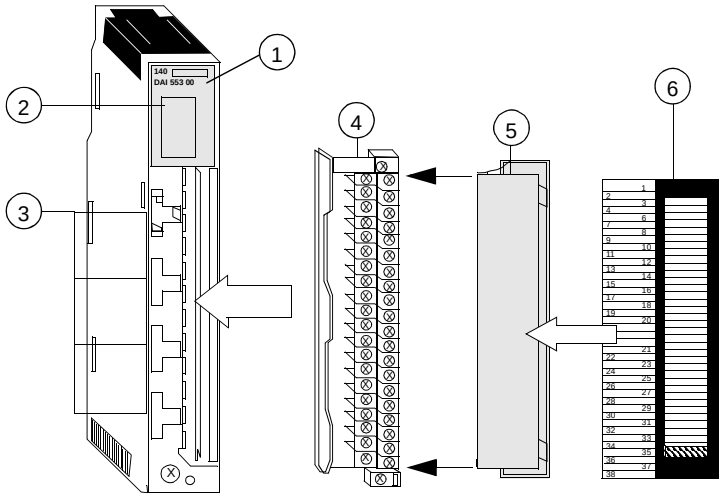
Presentation

Function

The AC Input 115 VAC 4x8 module accepts 115 VAC inputs.

Illustration

The following figure shows the 140 DAI 553 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

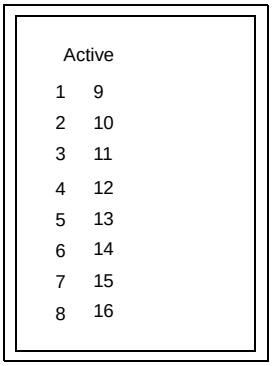
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DAI 553 00 module.



Descriptions

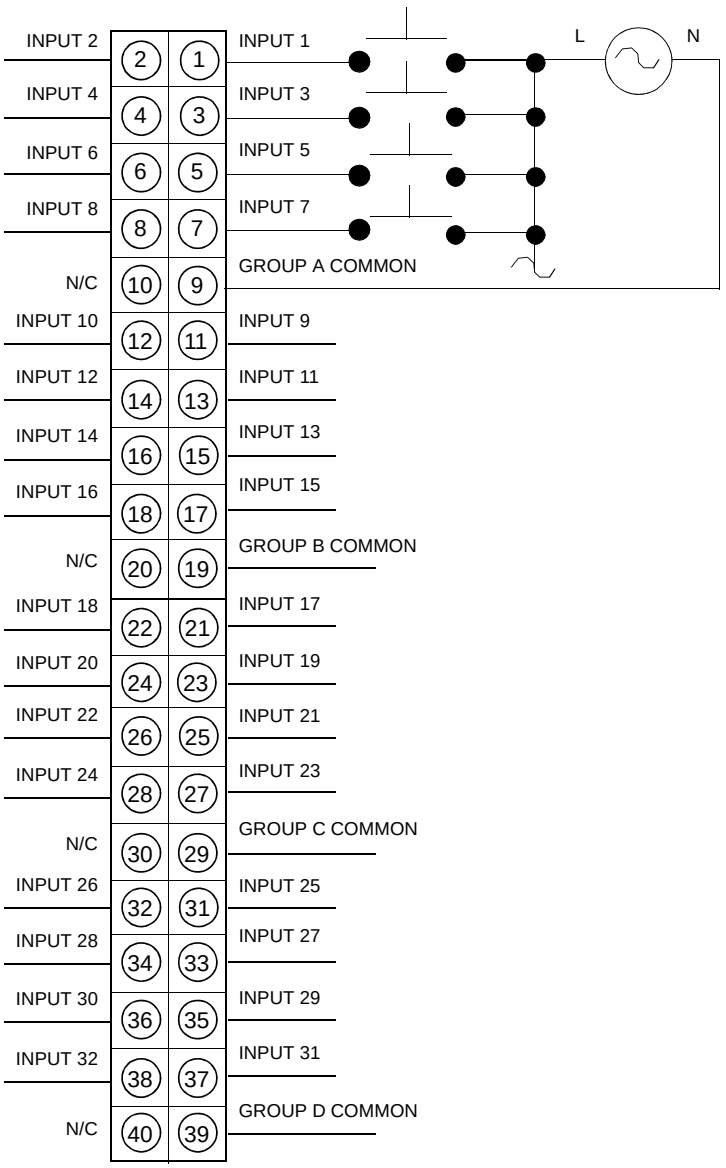
The following table shows the LED descriptions for the 140 DAI 553 00 module.

LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
1 ... 32	Green	The indicated point or channel is turned ON.

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Wiring Diagram

Illustration The following figure shows the 140 DAI 553 00 wiring diagram.



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Note: All inputs in a group must be from the same phase of line-input voltage. This module is not polarity sensitive.
N / C = Not Connected.

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.



CAUTION

Voltage Compatibility

All inputs in a group must be from the same phase of line input voltage.

Failure to follow this precaution can result in injury or equipment damage.

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Specifications

General Specifications

General Specifications

Module Type	32 IN (4 groups x 8 points)
External Power	Not required for this module
Power Dissipation	10.9 W (max)
Bus Current required	250 mA
I/O map	2 input words
Fault Detection	None

Operating Voltage and Input Current*

Operating Voltage and Input Current*

50 Hz	ON: 85 ... 132 VAC (11.1 mA max) OFF: 0 ... 20 VAC
60 Hz	ON: 79 ... 132 VAC (13.2 mA max) OFF: 0 ... 20 VAC * Do not use outside the 47 ... 63 Hz range
Maximum Allowable Leakage Current from an External Device to be recognized as an OFF Condition.	2.1 mA

Typical Input Impedance

Typical Imput Impedance

50 Hz	14.4 kohms capacitive
60 Hz	12 kohms capacitive

Isolation

Isolation

Group to Group	1780 VAC for 1 minute
Input to Bus	1780 VAC for 1 minute

Absolute Maximum Input

Absolute Maximum Input

Continuous	132 VAC
10 s	156 VAC
1 Cycle	200 VAC

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Response

Response

OFF - ON	Min: 4.9 ms. Max: 0.75 line cycle.
ON - OFF	Min: 7.3 ms. Max: 12.3 ms.

Fuses

Fuses

Internal	None
External	User discretion

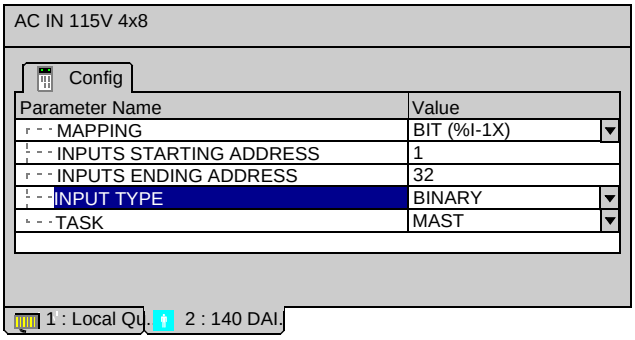
Note: Input signals must be sinusoidal with less than 6% THD and 63 Hz maximum frequency.

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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	BIT (%I-1x)	WORD (%IW-3X)	
Inputs Starting Address	1	1	
Inputs Ending Address	32	2	
Input Type	BINARY	BCD	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local

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140 DAI 740 00: 230 VAC 16x1 IN Module

27

Overview

Purpose

The following chapter provides information of the Quantum 140 DAI 740 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	282
Indicators	283
Wiring Diagram	284
Specifications	286
Parameter Configuration	288

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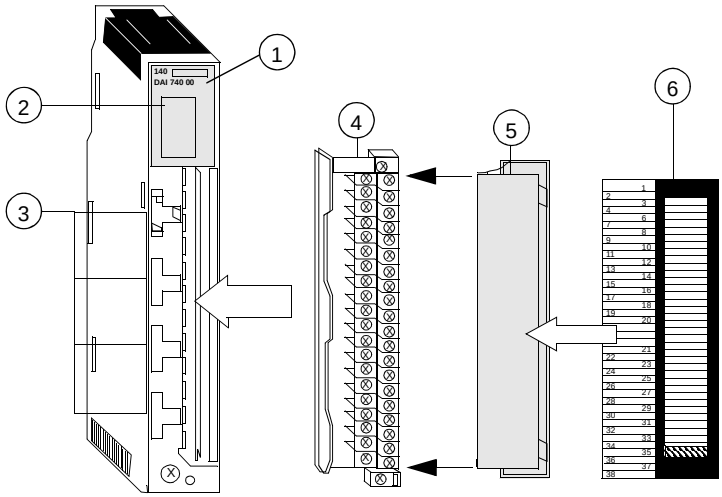
Presentation

Function

The AC Input 230 VAC 16x1 module accepts 230 VAC inputs.

Illustration

The following figure shows the 140 DAI 740 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

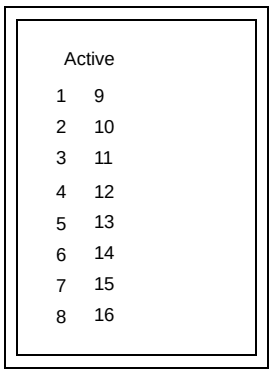
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DAI 740 00 module.



Descriptions

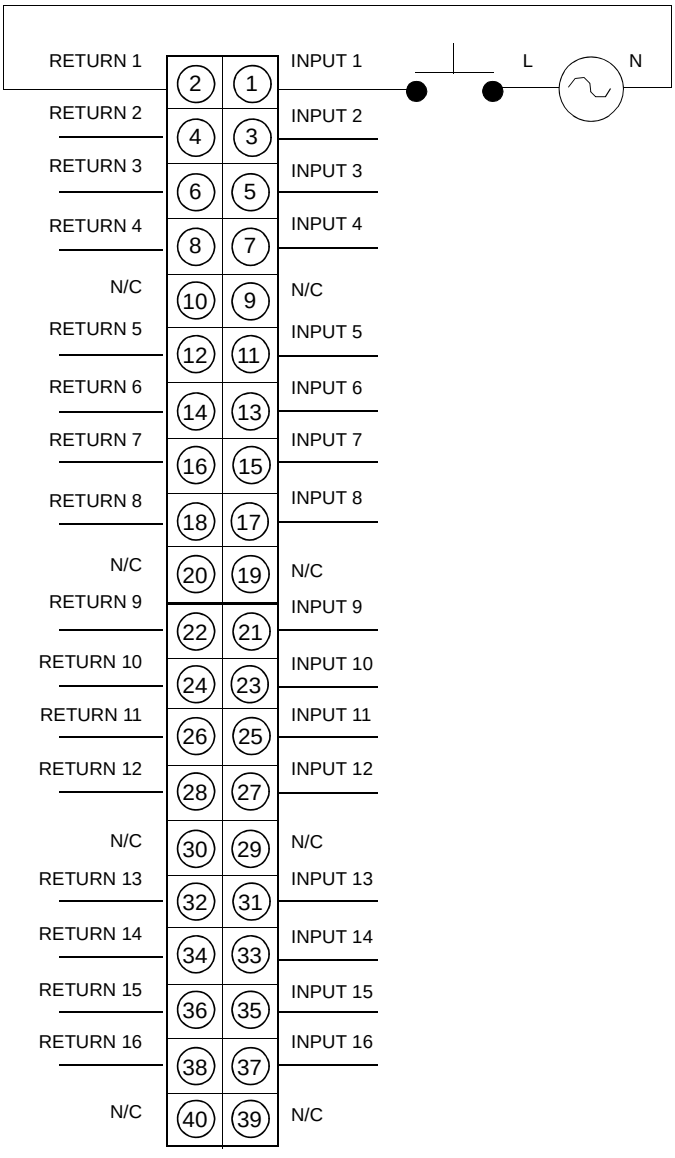
The following table shows the LED descriptions for the 140 DAI 740 00 module.

LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
1 ... 16	Green	The indicated point or channel is turned ON.

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Wiring Diagram

Illustration The following figure shows the 140 DAI 740 00 wiring diagram.



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Note: This module is not polarity sensitive.
N / C = Not Connected.

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	16 IN (2 groups x 8 points) individually isolated
External Power	Not required for this module
Power Dissipation	5.5 W (max)
Bus Current required	180 mA
I/O map	1 input word
Fault Detection	None

Operating Voltage and Input Current*

Operating Voltage and Input Current*

50 Hz	ON: 175 ... 264 VAC (9.7 mA max) OFF: 0 ... 40 VAC
60 Hz	ON: 165 ... 264 VAC (11.5 mA max) OFF: 0 ... 40 VAC * Do not use outside the 47 ... 63 Hz range
Maximum Allowable Leakage Current from an External Device to be recognized as an OFF Condition.	2.6 mA

Typical Input Impedance

Typical Imput Impedance

50 Hz	31.8 kohms capacitive
60 Hz	26.5 kohms capacitive

Isolation

Isolation

Input to Input	1780 VAC for 1 minute
Input to Bus	1780 VAC for 1 minute

Absolute Maximum Input

Absolute Maximum Input

Continuous	264 VAC
10 s	300 VAC
1 Cycle	400 VAC

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Response

Response

OFF - ON	Min: 4.9 ms. Max: 0.75 line cycle.
ON - OFF	Min: 7.3 ms. Max: 12.3 ms.

Fuses

Fuses

Internal	None
External	User discretion

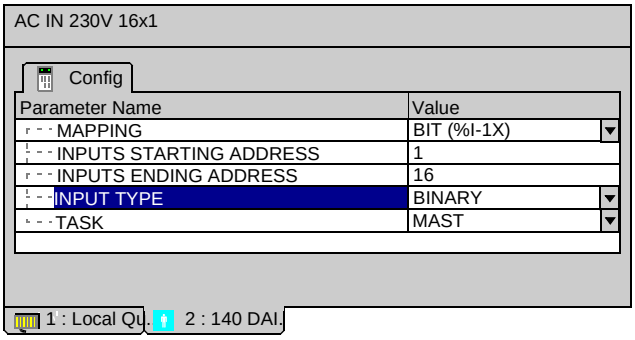
Note: Input signals must be sinusoidal with less than 6% THD and 63 Hz maximum frequency.

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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	BIT (%I-1x)	WORD (%IW-3X)	
Inputs Starting Address	1	1	
Inputs Ending Address	16	1	
Input Type	BINARY	BCD	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local

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140 DAI 753 00: 230 VAC 4x8 IN Module

28

Overview

Purpose

The following chapter provides information of the Quantum 140 DAI 753 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	290
Indicators	291
Wiring Diagram	292
Specifications	294
Parameter Configuration	296

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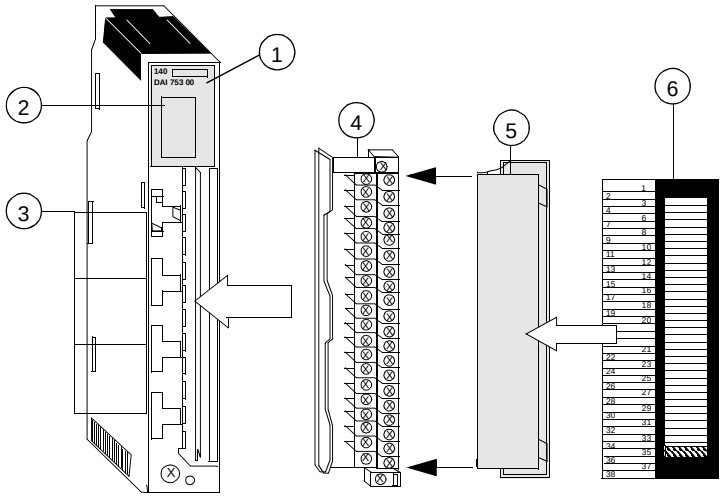
Presentation

Function

The AC Input 230 VAC 4x8 module accepts 230 VAC inputs.

Illustration

The following figure shows the 140 DAI 753 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

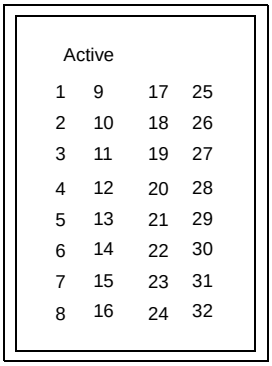
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DAI 753 00 module.



Descriptions

The following table shows the LED descriptions for the 140 DAI 753 00 module.

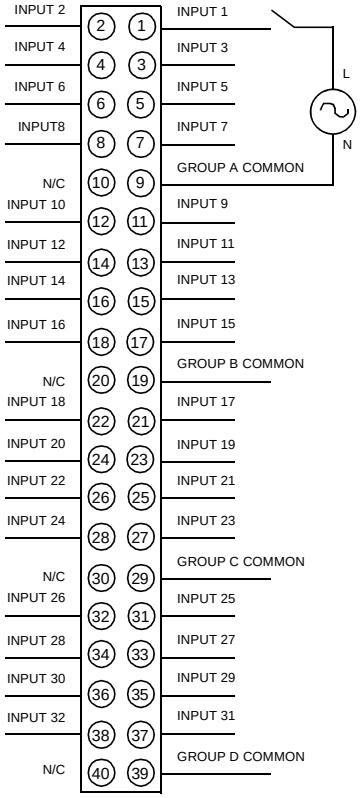
LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
1 ... 32	Green	The indicated point or channel is turned ON.

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Wiring Diagram

Illustration

The following figure shows the 140 DAI 753 00 wiring diagram.



Note: N / C = Not Connected.

CAUTION

Voltage Compatibility

All inputs in a group must be from the same phase of line input voltage.

Failure to follow this precaution can result in injury or equipment damage.

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Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	32 IN (4 groups x 8 points) individually isolated
External Power	Not required for this module
Power Dissipation	9 W (max)
Bus Current required	250 mA
I/O map	1 input word
Fault Detection	None

Operating Voltage and Input Current*

Operating Voltage and Input Current*

50 Hz	ON: 175 ... 264 VAC (9.7 mA max) OFF: 0 ... 40 VAC
60 Hz	ON: 165 ... 264 VAC (11.5 mA max) OFF: 0 ... 40 VAC * Do not use outside the 47 ... 63 Hz range
Maximum Allowable Leakage Current from an External Device to be recognized as an OFF Condition.	2.6 mA

Typical Input Impedance

Typical Imput Impedance

50 Hz	32 kohms capacitive
60 Hz	27 kohms capacitive

Isolation

Isolation

Input to Input	1780 VAC for 1 minute
Input to Bus	1780 VAC for 1 minute

Absolute Maximum Input

Absolute Maximum Input

Continuous	264 VAC
10 s	300 VAC
1 Cycle	400 VAC

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Response

Response

OFF - ON	Min: 4.9 ms. Max: 0.75 line cycle.
ON - OFF	Min: 7.3 ms. Max: 12.3 ms.

Fuses

Fuses

Internal	None
External	User discretion

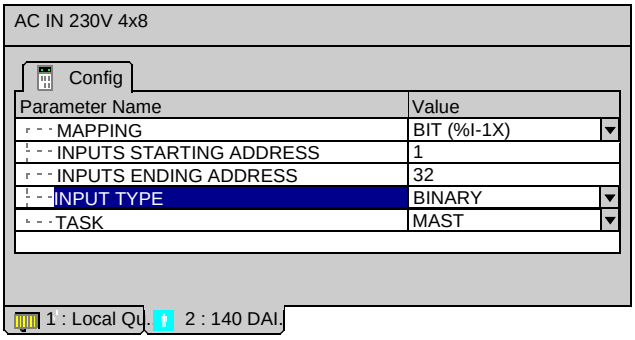
Note: Input signals must be sinusoidal with less than 6% THD and 63 Hz maximum frequency.

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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	BIT (%I-1x)	WORD (%IW-3X)	
Inputs Starting Address	1	1	
Inputs Ending Address	32	2	
Input Type	BINARY	BCD	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local

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140 DSI 353 00: 24 VDC 2x16 Supervised IN Module

29

Overview

Purpose

The following chapter provides information of the Quantum 140 DSI 353 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	298
Indicators	299
Wiring Diagram	300
Specifications	302
Addressing	303
Parameter Configuration	305

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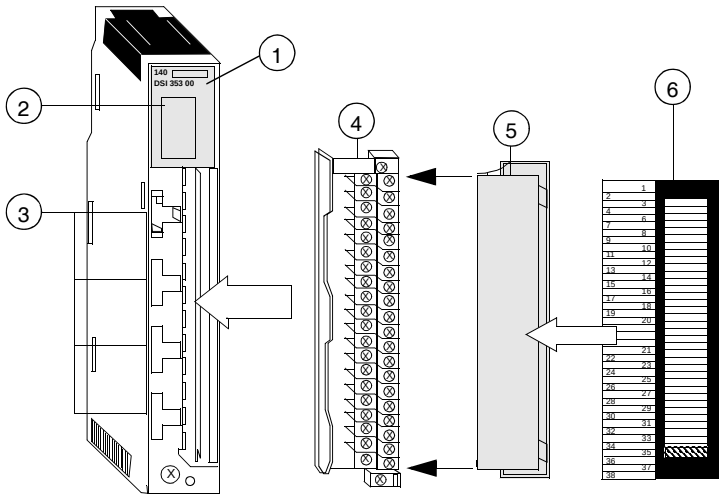
Presentation

Function

The 140 DSI 353 00 module is used with source output devices. It accepts 24 VDC inputs. It has 32 input points (four groups of 8), and has broken wire detection for each unit.

Illustration

The following figure shows the 140 DSI 353 00 module and its components.



1 Model Number, Module Description, Color Code
2 LED Display
3 Fuse Cutouts
4 Field Wiring Terminal Strip
5 Removable Door
6 Customer Identification Label (Fold label and place it inside door)

Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

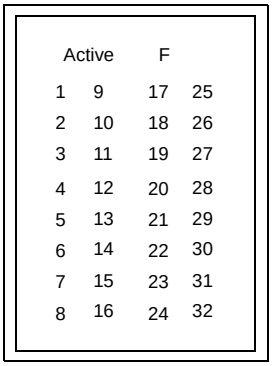
Note: In the DIO rack with 140 CRA 211 x0 module, 140 DSI 353 00 module must not be used.

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Indicators

Illustration

The following table shows the LED indicators for the 140 DSI 353 00 module.



Descriptions

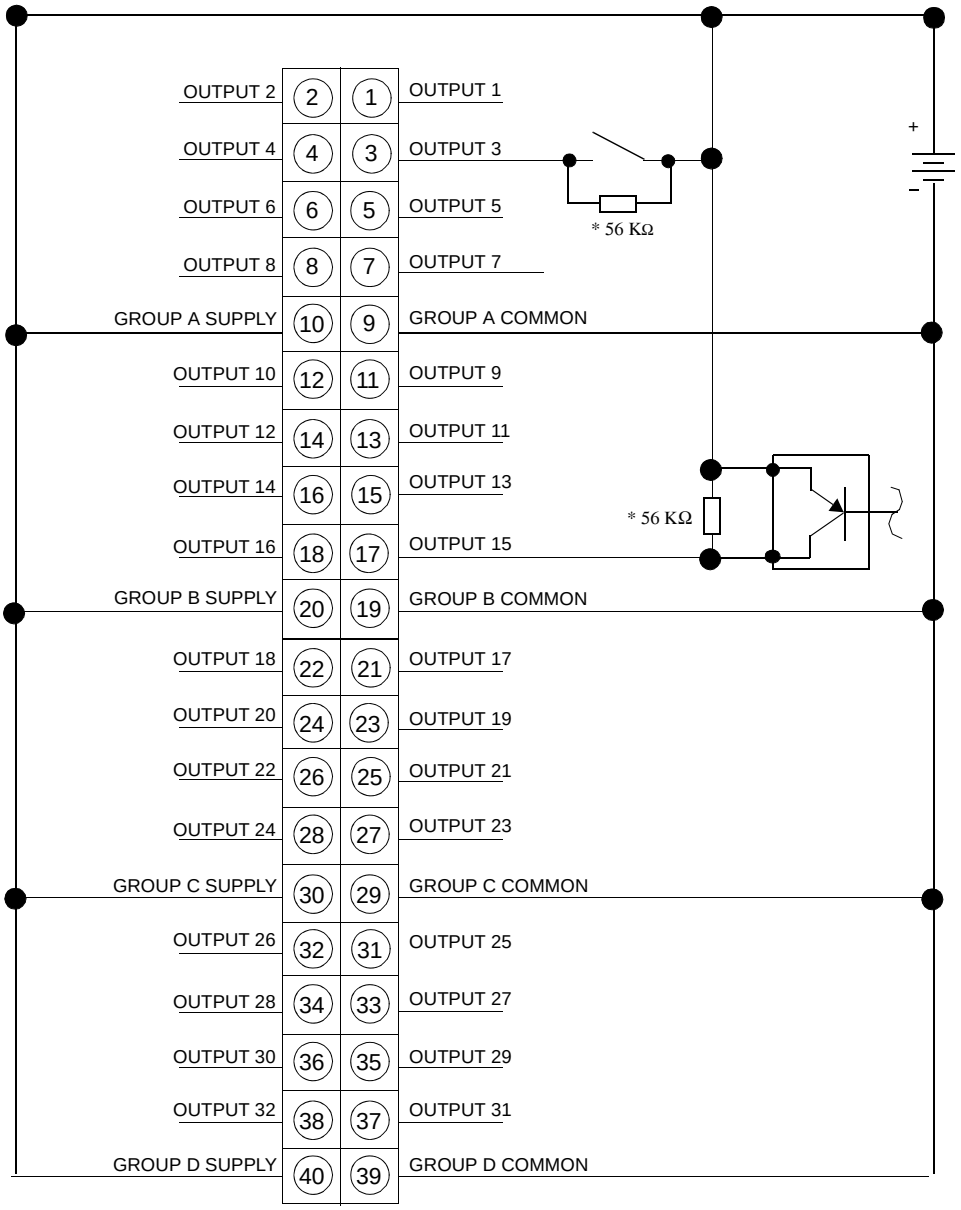
The following table shows the LED descriptions for the 140 DSI 353 00 module.

LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
1 ... 32	Green	The indicated point or channel is turned ON.

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Wiring Diagram

Wiring Diagram Wiring diagram for the 140 DSI 353 00 Module:



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* Recommended resistor value for 24V DC

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	32 IN (2 groups x 16 points)
External Power	+20 ... +30 VDC / 20 mA each group
Power Dissipation	7 W (all points on)
Bus Current required (Module)	250 mA

Operating Voltage and Current

Operating Voltage and Current

ON level current	2.5 mA (min.)
OFF level voltage	+5 VDC
OFF level current	min. 0.3 mA ... 1.2 mA

Response

Response

OFF - ON	2.2 ms
ON - OFF	3.3 ms

Isolation

Isolation

Group to Group	500 VAC rms for 1 minute
Group to Bus	1780 VAC rms for 1 minute

Open Circuit Monitoring

Open Circuit Monitoring

Broken wire detection	OFF Current < 0.15 mA
Shunt resistor	56 kohms recommended

Fuses

Fuses

Internal	None
External	User discretion

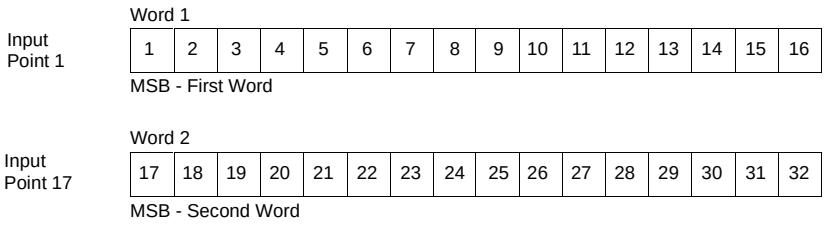
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Addressing

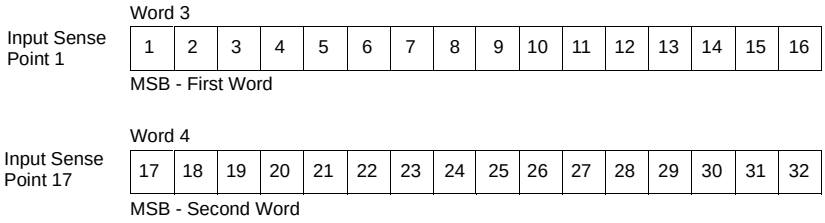
Flat Addressing

This module requires 64 contiguous, input references (%I) - 32 for input data and 32 for broken wire signal or 4 contiguous input words (%IW) 2 for input data and 2 for broken wire signal. The data words formats are as follows.

Input Words (Data):



Input Words (Sense):



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Topological Addressing

Topological addresses in Bit Mapping format:

Point	I/O Object	Comment
Input 1	%I[\b.e\]r.m.1.1	Value
Input 2	%I[\b.e\]r.m.2.1	Value
	• • •	
Input 31	%I[\b.e\]r.m.31.1	Value
Input 32	%I[\b.e\]r.m.32.1	Value
Broken Wire 1	%I[\b.e\]r.m.1.2	Value
Broken Wire 2	%I[\b.e\]r.m..2.2	Value
	• • •	
Broken Wire 31	%I[\b.e\]r.m.31.2	Value
Broken Wire 32	%I[\b.e\]r.m.32.2	Value

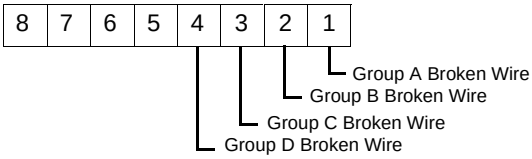
Topological addresses in Word Mapping format:

Point	I/O Object	Comment
Inputword 1	%IW[\b.e\]r.m.1.1	Value
Inputword 2	%IW[\b.e\]r.m.1.2	Value
Inputword 3	%IW[\b.e\]r.m.1.3	Broken Wire Flag
Inputword 4	%IW[\b.e\]r.m.1.4	Broken Wire Flag

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

I/O Map Status Byte

The eight bits in the I/O map status byte are used as follows:

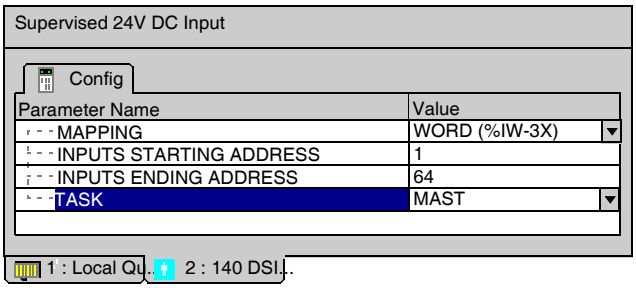


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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	BIT (%I-1x)	WORD (%IW-3X)	
Inputs Starting Address	1	1	
Inputs Ending Address	64	4	
Task (Grayed if module in other than local)	Mast	Fast	fixed to Mast if module in other than local

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Discrete OUT Modules

VI

At a Glance

Introduction

The following part provides information on the Quantum Discrete OUT modules.

What's in this Part?

This part contains the following chapters:

Chapter	Chapter Name	Page
30	General Information	309
31	140 DDO 153 10: 5 VDC 4x8 TTL Sink OUT Module	311
32	140 DDO 353 00: 24 VDC 4x8 Source OUT Module	319
33	140 DDO 353 01: 24 VDC 4x8 Source OUT Module	329
34	140 DDO 353 10: 24 VDC 4x8 Sink OUT Module	339
35	140 DDO 364 00: 24 VDC 6x16 Telefast OUT Module	349
36	140 DDO 843 00: 10 ... 60 VDC 2x8 Source OUT Module	359
37	140 DDO 885 00: 24 ... 125 VDC 2x6 Source OUT Module	367
38	140 DAO 840 00: 24 ... 230 VAC 16x1 OUT Module	379
39	140 DAO 840 10: 24 ... 115 VAC 16x1 OUT Module	389
40	140 DAO 842 10: 100 ... 230 VAC 4x4 OUT Module	399
41	140 DAO 842 20: 24 ... 48 VAC 4x4 OUT Module	409
42	140 DAO 853 00: 230 VAC 4x8 Source OUT Module	419
43	140 DRA 840 00: Relay 16x1 Normally Open OUT Module	429
44	140 DRC 830 00: Relay 8x1 Normally Open / Normally Closed OUT Module	437
45	140 DVO 853 00: 10 ... 30 VDC 32x1 Verified OUT Module	447

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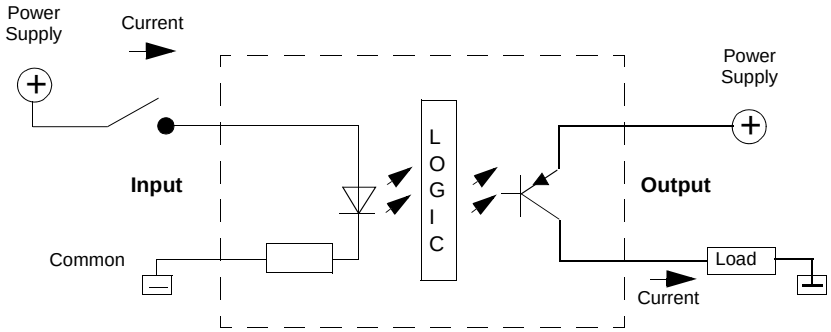
General Information

30

Discrete I/O Logic Circuits

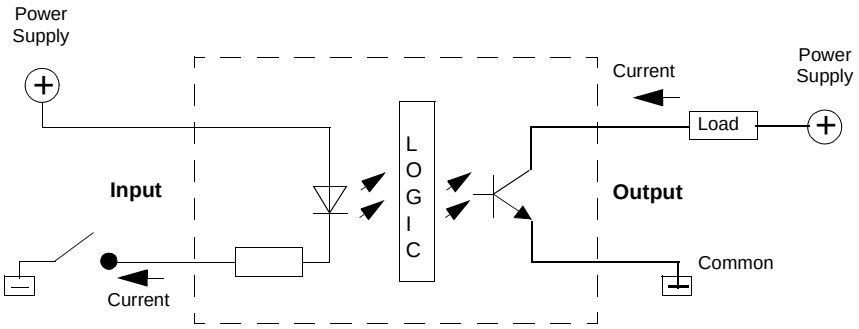
Discrete I/O True High Figure

The following figure shows true high/current sink input/current source output schematic.



Discrete I/O True Low Figure

The following figure shows true low/current source input/current sink output schematic.



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Current Sinking	This describes a physical implementation of the I/O hardware, which when in the true state, sinks current from the external load.
Current Sourcing	This describes a physical implementation of the I/O hardware, which when in the true state, sources current to the external load.

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140 DDO 153 10: 5 VDC 4x8 TTL Sink OUT Module

31

Overview

Purpose

The following chapter provides information of the Quantum 140 DDO 153 10 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	312
Indicators	313
Wiring Diagram	314
Specifications	316
Maintenance	317
140 DDO 153 10 Parameter Configuration	318

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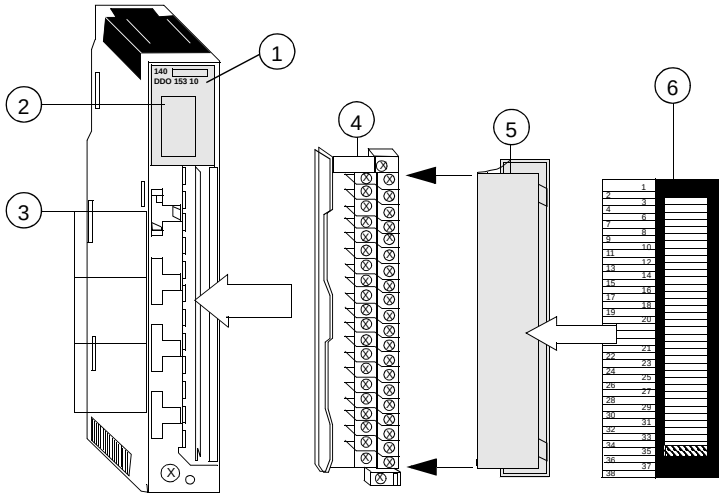
Presentation

Function

The DC Output 5 V TTL 4x8 Sink module switches 5 VDC loads and is for use with source devices and is compatible with LS, S, TTL, and CMOS logic.

Illustration

The following figure shows the 140 DDO 153 10 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

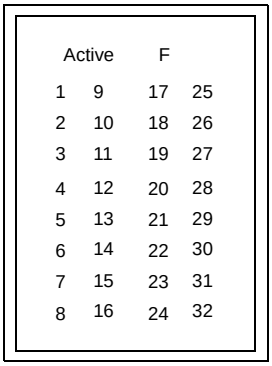
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DDO 153 10 module.



Descriptions

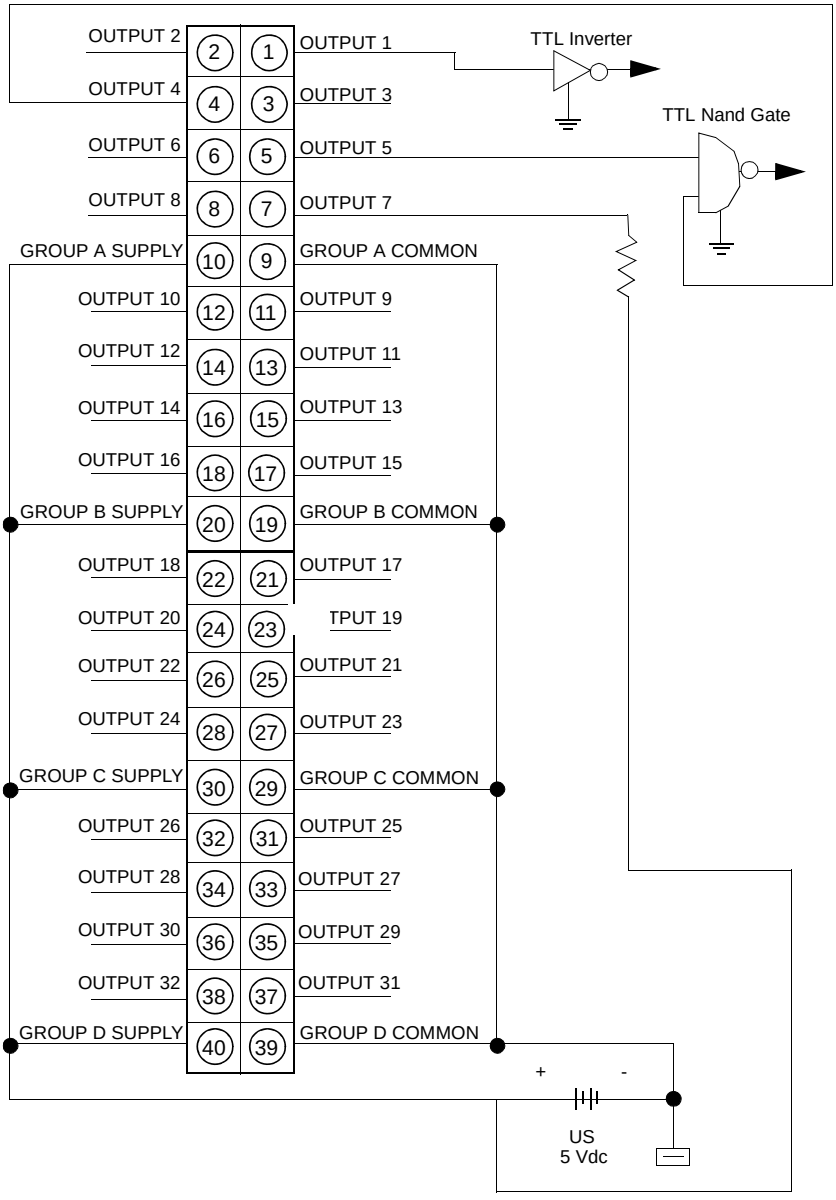
The following table shows the LED descriptions for the 140 DDO 153 10 module.

LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
1 ... 32	Green	The indicated point or channel is turned ON.

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Wiring Diagram

Illustration The following figure shows the 140 DDO 153 10 wiring diagram.



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Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	32 OUT (4 groups x 8 points)
Logic	True Low
External Power (Us)	4.5 ... 5.5 VDC continuous
Absolute Voltage (Us)	15 VDC for 1.3 ms decaying pulse
Power Dissipation	4 W
Supply Current	400 mA + Load Current per Point
Bus Current required (Module)	350 mA
I/O map	2 output word
Fault Detection	Output: Blown fuse detect, loss of field power.

Input Rating

Input Rating

ON level voltage	0.2 VDC (max.) @ 75 mA sinking
OFF level voltage	Vout = Us - 1.25 V @ 1 mA source Vout = 3.2 V (min.) @ 1 mA, Us = 4.5 V
Internal Pullup Resistor	440 ohm

Maximum Load Current / Surge Current

Maximum Load Current / Surge Current

Each Point	75 mA (sinking)
Each Group	600 mA
Per Module	2.4 A
Surge Current (max.)	Each Point: 75 mA @ 500 ms duration (no more than 6 per minute)

Isolation / Protection

Isolation / Protection

Group to Group	500 VAC rms for 1 minute
Group to Bus	1780 VAC rms for 1 minute
Output Protection	Transient Voltage Suppression (internal)

Response

Response

OFF - ON	250 µs (max) - (resistive load)
ON - OFF	250 µs (max) - (resistive load)

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Maintenance

Fuses

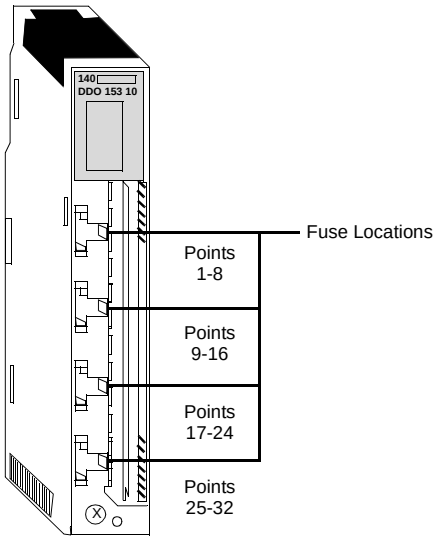
Fuses

Internal	1 A fuse for each group. (Part # 043508953) or equivalent). For the location of the fuses see figure below.
External	None

	**CAUTION** **Possible danger to equipment or personnel.** Turn off power to the module and remove the field wiring terminal strip to gain access to fuses. **Failure to follow this precaution can result in injury or equipment damage.**

Illustration

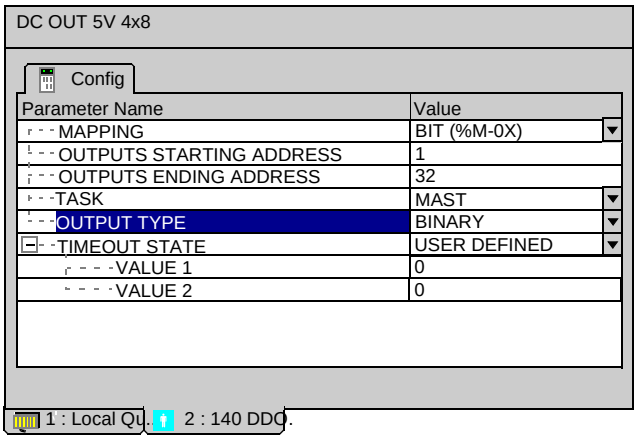
The following figure shows the locations of the fuses for the 140 DDO 153 10 module.



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140 DDO 153 10 Parameter Configuration

Parameter Configuration Window



Parameter and Default Values

Name	Default Value	Options	Description
Mapping	BIT (%M-0x)	WORD (%MW-4X)	
Output Starting Address	1	1	
Output Ending Address	32	2	
Output Type	BINARY	BCD	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Timeout State	USERDEFINED	Hold Last Value	
Value 1, Value 2	0	0-65535	only if Timeout State=USERDEFINED

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140 DDO 353 00: 24 VDC 4x8 Source OUT Module

32

Overview

Purpose

The following chapter provides information of the Quantum 140 DDO 353 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	320
Indicators	321
Wiring Diagram	322
Specifications	324
Maintenance	326
140 DDO 353 00 Parameter Configuration	327

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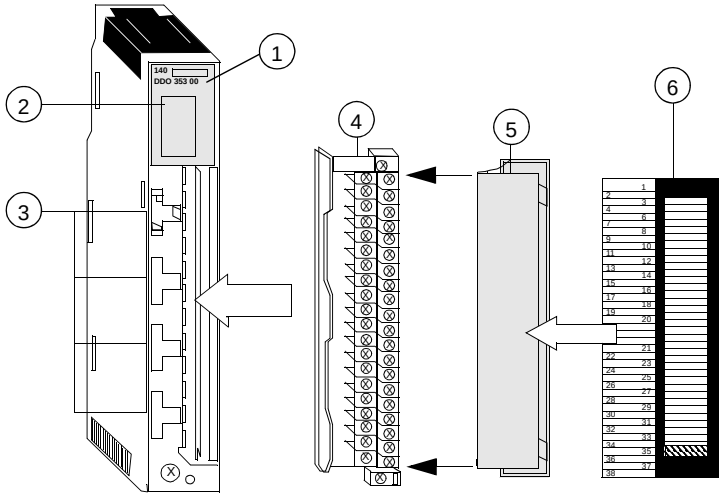
Presentation

Function

The DC Output 24 VDC 4x8 Source module switches 24 VDC powered loads and is for use with sink devices.

Illustration

The following figure shows the 140 DDO 353 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

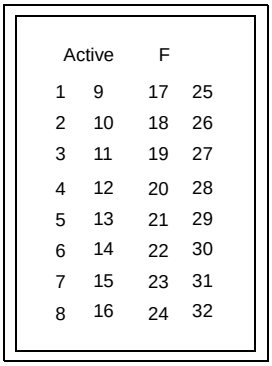
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DDO 353 00 module.



Descriptions

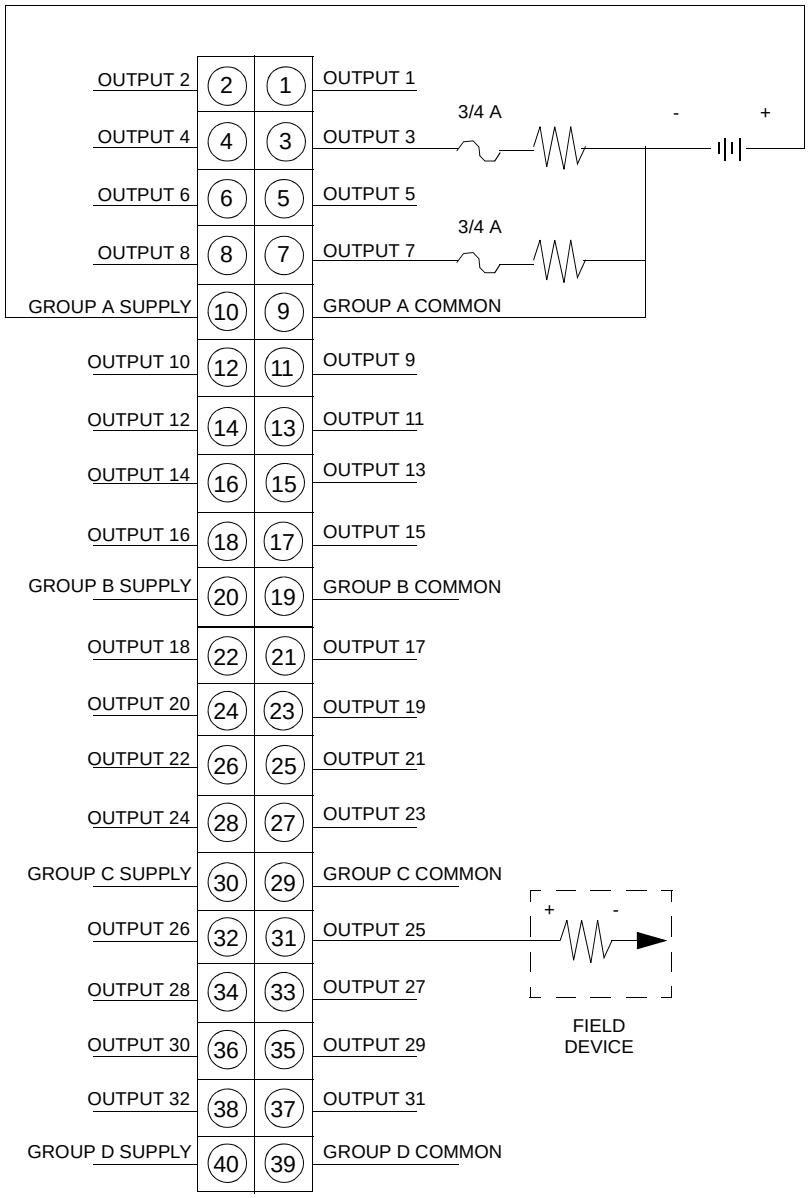
The following table shows the LED descriptions for the 140 DDO 353 00 module.

LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
1 ... 32	Green	The indicated point or channel is turned ON.

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Wiring Diagram

Illustration The following figure shows the 140 DDO 353 00 wiring diagram.



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	**CAUTION** **Possible Equipment Failure** Each group is protected with a 5 A fuse to protect the module from catastrophic failure. The group fuse will not be guaranteed to protect each output switch for all possible overload conditions. It is recommended that each point be protected with a 3/4 A, 250 V fuse (Part # 57-0078-000). **Failure to follow this precaution can result in injury or equipment damage.**

	**CAUTION** **Electrical shock hazard** Turn off power to the module and remove the field wiring terminal strip to gain access to fuses. **Failure to follow this precaution can result in injury or equipment damage.**

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	32 OUT (4 groups x 8 points)
Logic	True High
External Power	19.2 ... 30 VDC
Power Dissipation	1.75 W + 0.4 V x Total module load Current
Bus Current required (Module)	330 mA
I/O map	2 output word
Fault Detection	Output: Blown fuse detect, loss of field power.

Voltage

Voltage

Operating Voltage (max.)	19.2 ... 30 VDC
Absolute Voltage (max.)	56 VDC for 1 ms decaying pulse
ON State Drop / Point	0.4 VDC @ 0.5 A

Maximum Load Current / Surge Current

Maximum Load Current / Surge Current

Each Point	0.5 A
Each Group	4 A
Per Module	16 A
Surge Current (max.)	Each Point: 5 mA @ 500 ms duration (no more than 6 per minute)
OFF State Leakage / Point	0.4 mA @ 30 VDC

Isolation / Protection

Isolation / Protection

Group to Group	500 VAC rms for 1 minute
Group to Bus	1780 VAC rms for 1 minute
Output Protection	Transient Voltage Suppression (internal)

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Response (Resistive Loads)

Response (Resistive Loads)

OFF - ON	1 ms (max.)
ON - OFF	1 ms (max.)

Load Inductance / Capacitance (max.)

Load Inductance / Capacitance (max.)

Load Inductance (max.)	0.5 Henry @ 4 Hz switch frequency, or: $L = \frac{0.5}{I^2 F}$ where: L = Load inductance (henry), I = Load current (A), F = Switching Frequency (Hz)
Load Capacitance (max.)	50 µF

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Maintenance

Fuses

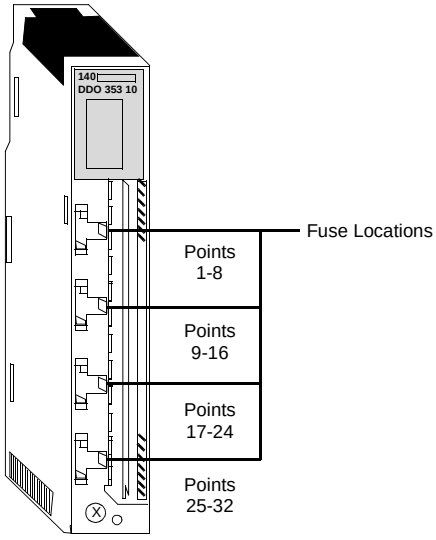
Fuses

Internal	5 A fuse for each group. (Part # 043502405) or equivalent). For the location of the fuses see figure below.
External	Each group is protected with a 5A fuse to protect the module from catastrophic failure. The group fuse is not guaranteed to protect each output switch for all possible overload conditions. It is recommended that each point be protected with a 3/4 A, 250 V fuse (Part # 57-0078-000).

	**CAUTION** **Possible danger to equipment or personnel.** Turn off power to the module and remove the field wiring terminal strip to gain access to fuses. **Failure to follow this precaution can result in injury or equipment damage.**

Illustration

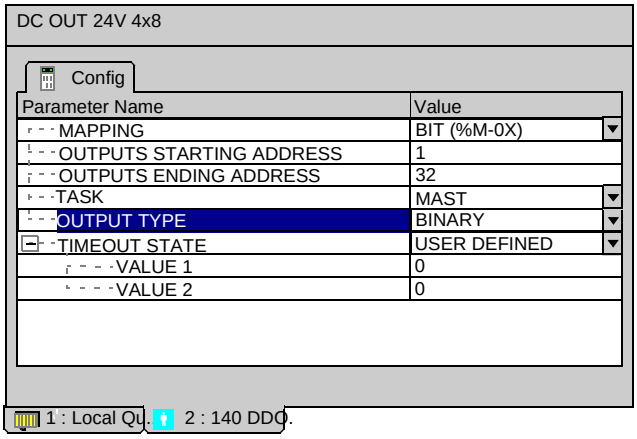
The following figure shows the fuse locations for the 140 DDO 353 00 module.



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140 DDO 353 00 Parameter Configuration

Parameter Configuration Window



Parameter and Default Values

Name	Default Value	Options	Description
Mapping	BIT (%M-0x)	WORD (%MW-4X)	
Output Starting Address	1	1	
Output Ending Address	32	2	
Output Type	BINARY	BCD	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Timeout State	USERDEFINED	HOLD LAST VALUE	
Value 1, Value 2	0	0-65535	only if Timeout State=USERDEFINED

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140 DDO 353 01: 24 VDC 4x8 Source OUT Module

33

Overview

Purpose

The following chapter provides information of the Quantum 140 DDO 353 01 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	330
Indicators	331
Wiring Diagram	332
Specifications	334
Maintenance	336
140 DDO 353 01 Parameter Configuration	337

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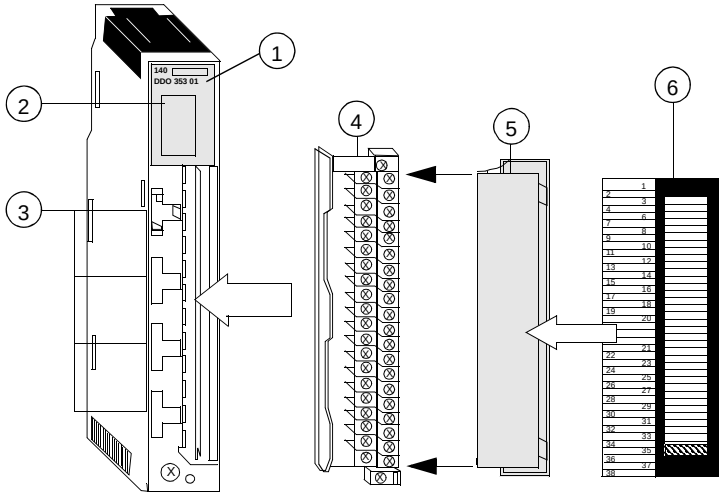
Presentation

Function

The 140 DDO 353 01 source module switches 24 VDC powered loads, and is short circuit and overload resistant.

Illustration

The following figure shows the 140 DDO 353 01 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

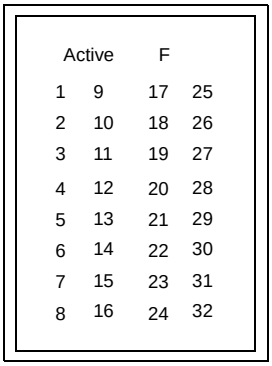
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DDO 353 01 module.



Descriptions

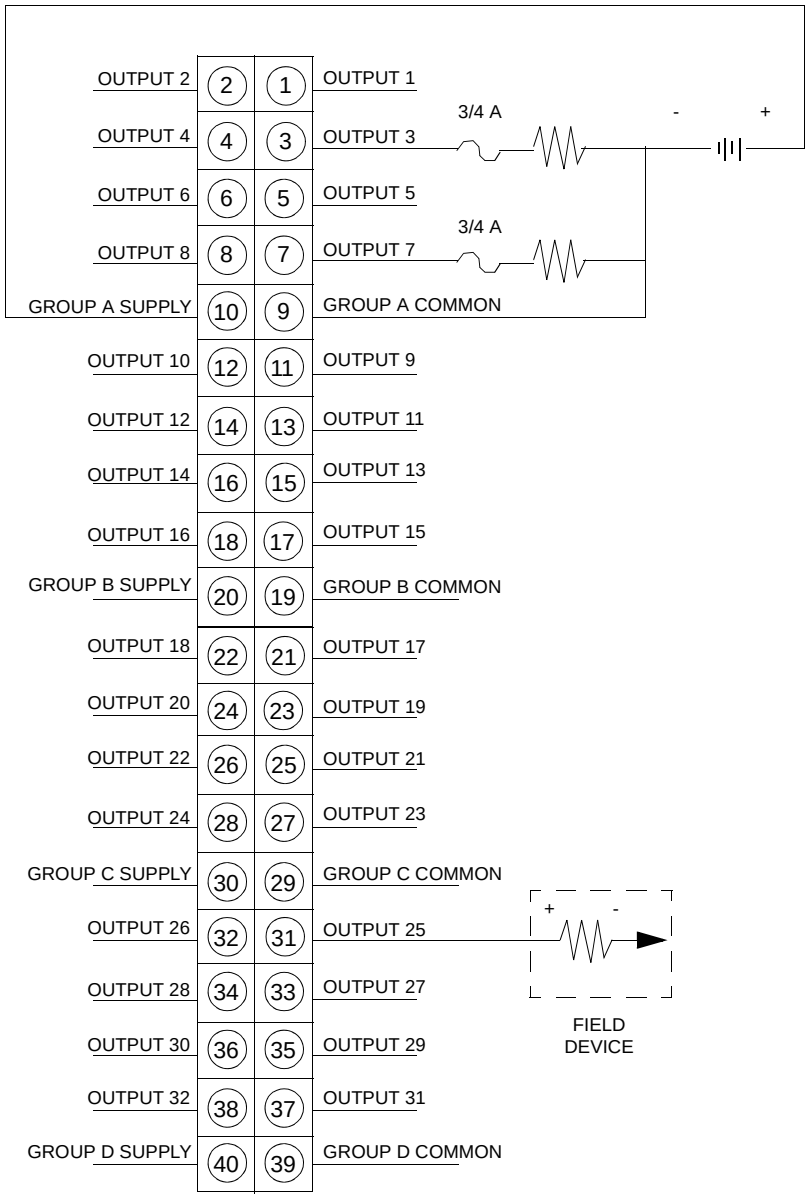
The following table shows the LED descriptions for the 140 DDO 353 01 module.

LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
1 ... 32	Green	The indicated point or channel is turned ON.

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Wiring Diagram

Illustration The following figure shows the 140 DDO 353 01 wiring diagram.



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	**CAUTION** **Possible Equipment Failure** Each group is protected with a 5 A fuse to protect the module from catastrophic failure. **Failure to follow this precaution can result in injury or equipment damage.**

	**CAUTION** **Electrical shock hazard** Disconnect the supply voltage to the module and remove the field wiring terminal strip to gain access to fuses. **Failure to follow this precaution can result in injury or equipment damage.**

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	32 OUT (4 groups x 8 points)
External Power	19.2 ... 30 VDC
Power Dissipation	5 W (all points ON)
Bus Current required (Module)	250 mA (max.)
I/O map	2 output word
Fault Detection	Group indication: loss of field power.

Voltage

Voltage

Operating Voltage (max.)	19.2 ... 30 VDC
ON State Drop / Point	0.5 VDC @ 0.5 A

Maximum Load Current / Surge Current

Maximum Load Current / Surge Current

Each Point	0.5 A
Each Group	4 A
Per Module	16 A
Surge Current (max.)	2 A each point (internally limited)
OFF State Leakage / Point	< 0.1 mA @ 24 VDC

Isolation / Protection

Isolation / Protection

Group to Group	500 VAC rms for 1 minute
Output to Bus	500 VAC rms for 1 minute
Output Protection (internal)	Thermal overload and short circuit.

Response (Resistive Loads)

Response (Resistive Loads)

OFF - ON	< 0.1 ms
ON - OFF	< 0.1 ms

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Load Inductance / Capacitance (max.)

Load Inductance / Capacitance (max.)

Load Inductance (max.)	0.5 Henry @ 4 Hz switch frequency, or: $L = \frac{0.5}{I^2 F}$ where: L = Load inductance (henry) I = Load current (A) F = Switching Frequency (Hz)
Load Capacitance (max.)	50 µF

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Maintenance

Fuses

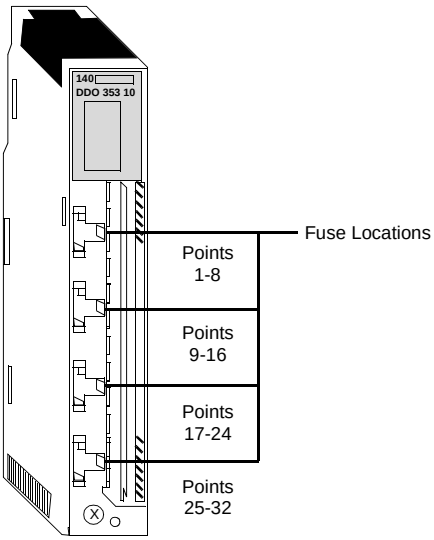
Fuses

Internal	5 A fuse for each group. (Part # 043502405) or equivalent). For the location of the fuses see figure below.
External	User discretion

	**CAUTION** **Possible danger to equipment or personnel.** Disconnect the supply voltage to the module and remove the field wiring terminal strip to gain access to fuses. **Failure to follow this precaution can result in injury or equipment damage.**

Illustration

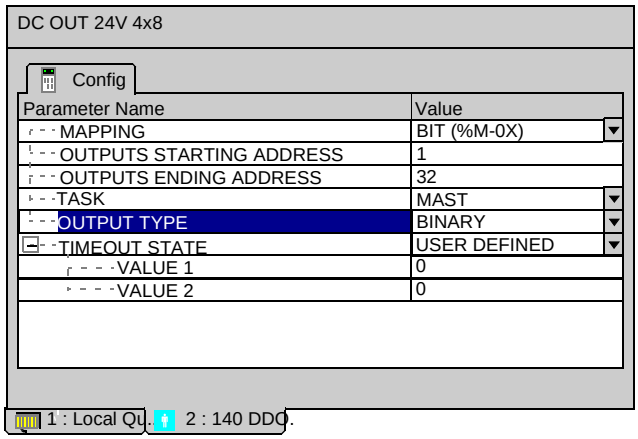
The following figure shows the fuse locations for the 140 DDO 353 00 module.



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140 DDO 353 01 Parameter Configuration

Parameter Configuration Window



Parameter and Default Values

Name	Default Value	Options	Description
Mapping	BIT (%M-0x)	WORD (%MW-4X)	
Output Starting Address	1	1	
Output Ending Address	32	2	
Output Type	BINARY	BCD	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Timeout State	USERDEFINED	HOLD LAST VALUE	
Value 1, Value 2	0	0-65535	only if Timeout State=USERDEFINED

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140 DDO 353 10: 24 VDC 4x8 Sink OUT Module

34

Overview

Purpose

The following chapter provides information of the Quantum 140 DDO 353 10 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	340
Indicators	341
Wiring Diagram	342
Specifications	344
Maintenance	346
140 DDO 353 10 Parameter Configuration	347

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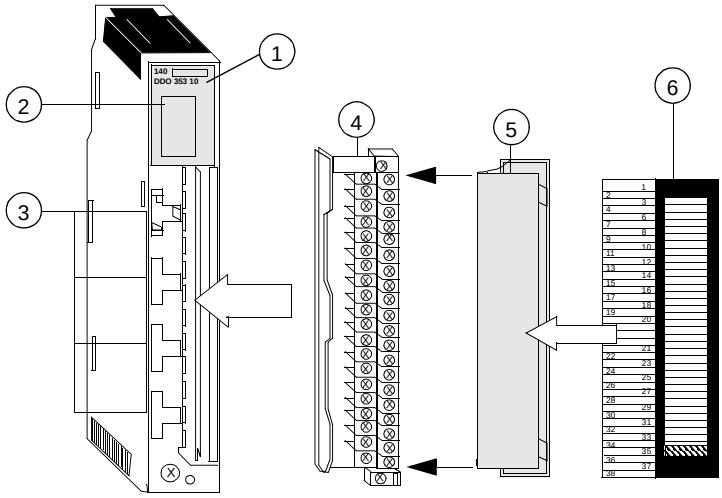
Presentation

Function

The 24 VDC True Low 4x8 Output module switches 24 VDC loads capable of driving displays, logic, and other loads up to 500 mA sinking, in the ON state.

Illustration

The following figure shows the 140 DDO 353 10 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

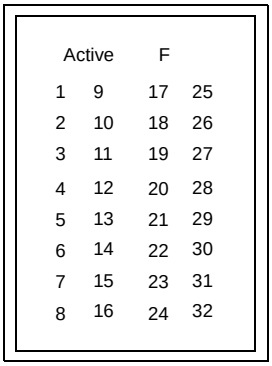
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DDO 353 10 module.



Descriptions

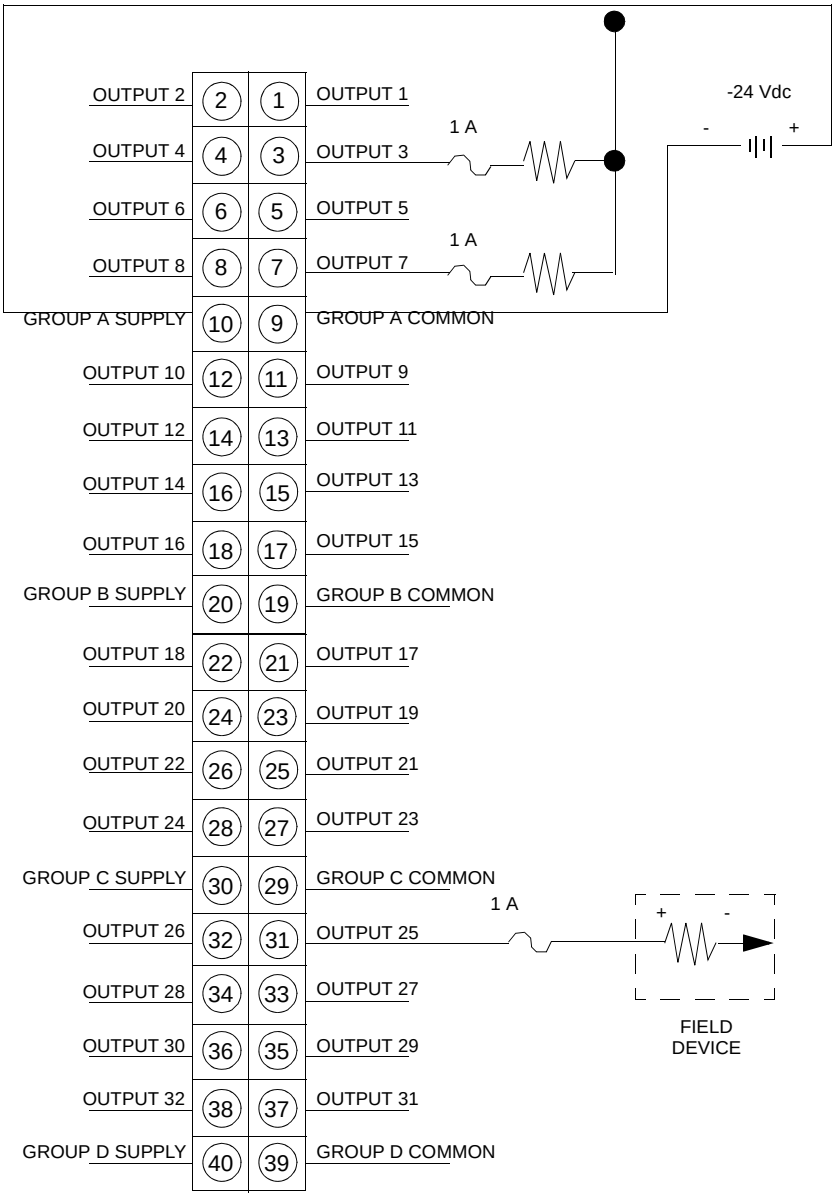
The following table shows the LED descriptions for the 140 DDO 353 10 module.

LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
1 ... 32	Green	The indicated point or channel is turned ON.

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Wiring Diagram

Illustration The following figure shows the 140 DDO 353 10 wiring diagram.



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	**CAUTION** **Possible Equipment Failure** Each group is protected with a 5 A fuse to protect the module from catastrophic failure. The group fuse will not be guaranteed to protect each output switch for all possible overload conditions. It is recommended that each point be fused with a 3/4 A, 250 V fuse Part # 57-0078-000. **Failure to follow this precaution can result in injury or equipment damage.**

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	32 OUT (4 groups x 8 points)
Logic	True Low
External Power	19.2 ... 30 VDC
Power Dissipation	2.0 W + (0.4 V x Total load Current)
Bus Current required (Module)	330 mA (max.)
I/O map	2 output word
Fault Detection	Blown fuse detect, loss of field power.

Voltage

Voltage

Operating Voltage (max.)	19.2 ... 30 VDC
1.0 ms	50 VDC decaying pulse
ON State Drop / Point	0.4 VDC @ 0.5 A

Maximum Load Current / Surge Current

Maximum Load Current / Surge Current

Each Point	0.5 A
Each Group	4 A
Per Module	16 A
Surge Current (max.)	5 A @ 1 ms duration (no more than 6 per miute)
OFF State Leakage / Point	0.4 mA @ 30 VDC

Isolation / Protection

Isolation / Protection

Group to Group	500 VAC rms for 1 minute
Output to Bus	1780 VAC rms for 1 minute
Output Protection (internal)	Transient voltage suppression: 36 V

Response (Resistive Loads)

Response (Resistive Loads)

OFF - ON	1 ms (max.)
ON - OFF	1 ms (max.)

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Load Inductance / Capacitance (max.)

Load Inductance / Capacitance (max.)

Load Inductance (max.)	0.5 Henry @ 4 Hz switch frequency, or: $L = \frac{0.5}{I^2 F}$ where: L = Load inductance (henry) I = Load current (A) F = Switching Frequency (Hz)
Load Capacitance (max.)	50 µF
Tungsten Load (max.)	12 W @ 24 V

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Maintenance

Fuses

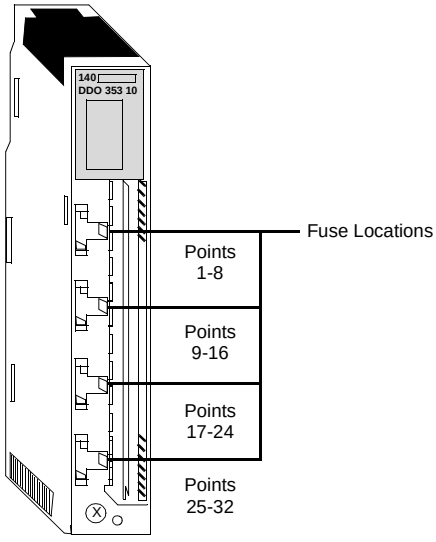
Fuses

Internal	Each group is protected with a 5 A fuse to protect the module from catastrophic failure. The group fuse is not guaranteed to protect each output switch for all possible overload conditions. It is recommended that each point be protected with a 3/4 A, 250 V fuse, Part # 57-0078-000.
External	User discretion

	**CAUTION** **Possible danger to equipment or personnel.** Disconnect the supply voltage to the module and remove the field wiring terminal strip to gain access to fuses. **Failure to follow this precaution can result in injury or equipment damage.**

Fuses Location Figure

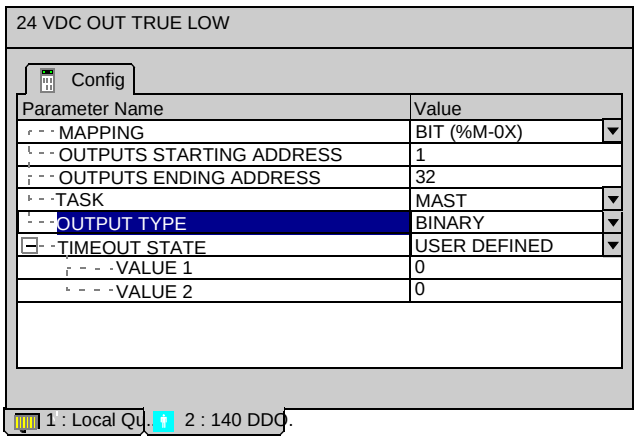
The following figure shows the locations of the fuses for the DDO 353 10 module.



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140 DDO 353 10 Parameter Configuration

Parameter Configuration Window



Parameter and Default Values

Name	Default Value	Options	Description
Mapping	BIT (%M-0x)	WORD (%MW-4X)	
Output Starting Address	1	1	
Output Ending Address	32	2	
Output Type	BINARY	BCD	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to Mast if module in other than local
Timeout State	USERDEFINED	HOLD LAST VALUE	
Value 1, Value 2	0	0-65535	only enabled if Timeout State=Userdefined

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140 DDO 364 00: 24 VDC 6x16 Telefast OUT Module

35

Overview

Purpose

The following chapter provides information of the Quantum 140 DDO 364 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	350
Indicators	353
140 DDO 364 00 Cable Color Codes	354
Specifications	355
140 DDO 364 00 Parameter Configuration	357

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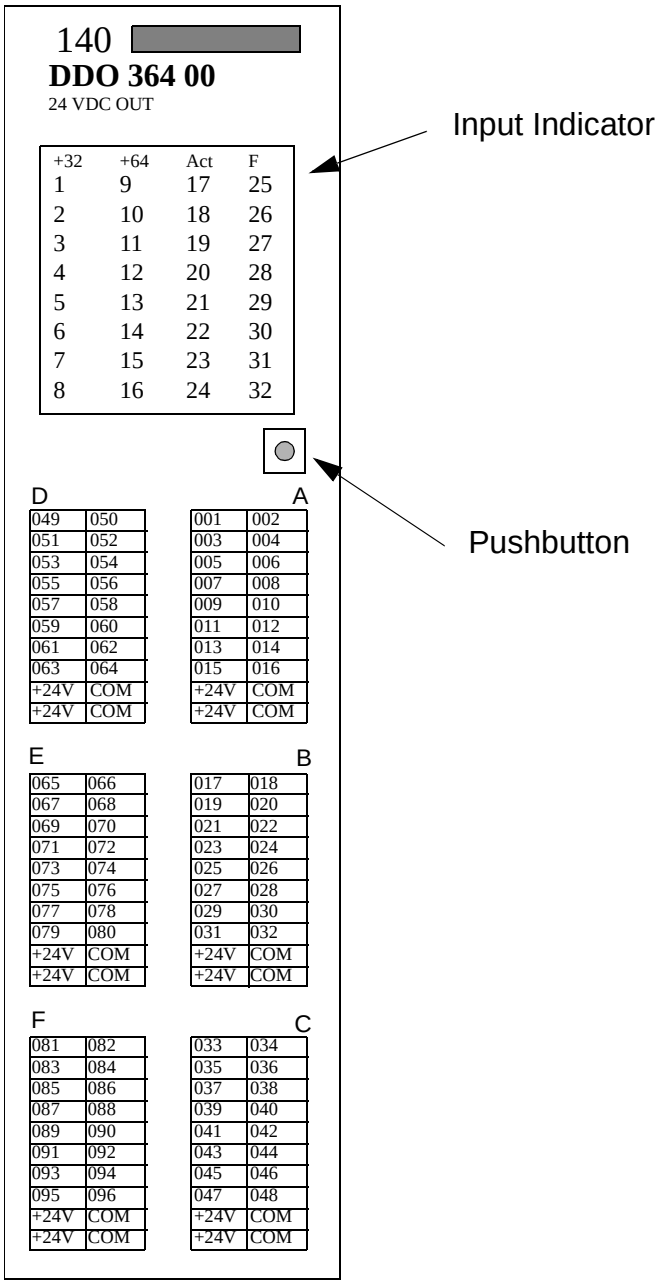
Presentation

Function

The 140 DDO 364 00 module switches 24 VDC powered loads. Outputs are thermally protected.

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Illustration The front view of the 140 DDO 364 00 output module



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Recommended Cables

The following table shows recommended cables, description, and their length in meters.

Cable Part Number	Description	Length (M)
TSXCDP301	(1) HE 10 - flying leads	3
TSXCDP501	(1) HE 10 - flying leads	5
TSXCDP053	(2) HE 10 - round cable	0.5
TSXCDP103	(2) HE 10 - round cable	1
TSXCDP203	(2) HE 10 - round cable	2
TSXCDP303	(2) HE 10 - round cable	3
TSXCDP503	(2) HE 10 - round cable	5

Compatible Output Adapter Sub-Bases

The following tables shows the compatible output adapter sub-bases..

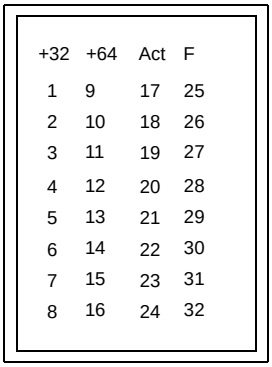
Channels	Type
8	ABE-7S08S2xx[1]
8	ABE-7R08Sxxx/7P08T330[1]
16	ABE-7R16Sxxx
16	ABE-7R16Txxx/7P16Txxx
[1]With the splitter sub-base ABE-7ACC02	

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Indicators

Illustration

The following table shows the LED indicators for the 140 DDO 364 00 module.



Descriptions

The following table shows the LED descriptions for the 140 DDO 364 00 module.

LEDs	Color	Indication when ON
Act	Green	Bus communication is present.
F	Red	Group power missing or point faulted.
+32	Green	Points 33 to 64 displayed on LED matrix.
+64	Green	Points 65 to 96 displayed on LED matrix.

Pushbutton

Use the pushbutton to select output points to be displayed as per the following table:

LED	**+32**	**+64**
Out 1 to 32	Off	Off
Out 33 to 64	On	Off
Out 65 to 96	Off	On

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140 DDO 364 00 Cable Color Codes

Cable Color Codes for all Groups

1. White	2. Brown
3. Green	4. Yellow
5. Gray	6. Pink
7. Blue	8. Red
9. Black	10. Purple
11. Gray/pink	12 Red/blue
13. White/green	14. Brown/green
15. White/yellow	16. Yellow/brown
17. White/gray	18. Gray/brown
19. White/pink	20. Pink/brown

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Specifications

General Specifications

General Specifications

Module Type	96 OUT (6 groups x 16 points)
External Power	19.2 ... 30 VDC 19.2 A max. (depends on load)
Power Dissipation	7.0 W
Bus Current required (Module)	250 mA (max.)
I/O map	6 output word
Fault Detection	Group indication about loss of field power, faulted point (short circuit or overload

Voltage

Voltage

Operating Voltage (max.)	19.2 ... 30 VDC
ON State Drop / Point	0.5 VDC @ 0.5 A

Maximum Load Current / Surge Current

Maximum Load Current / Surge Current

Each Point	0.5 A
Each Group	3.2 A
Per Module	19.2 A
Surge Current (max.)	2 A each point (internally limited)
OFF State Leakage / Point	< 1 mA @ 24 VDC

Isolation / Protection

Isolation / Protection

Output to Bus	500 VAC rms for 1 minute
Output Protection (internal)	Thermal overload and short circuit

Response (Resistive Loads)

Response (Resistive Loads)

OFF - ON	< 1 ms
ON - OFF	< 1 ms

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Load Inductance / Capacitance (max.)

Load Inductance / Capacitance (max.)

Load Inductance (max.)	0.5 Henry @ 4 Hz switch frequency, or: $L = \frac{0.5}{I^2 F}$ where: L = Load inductance (henry) I = Load current (A) F = Switching Frequency (Hz)
Load Capacitance (max.)	50 µF

Fuses

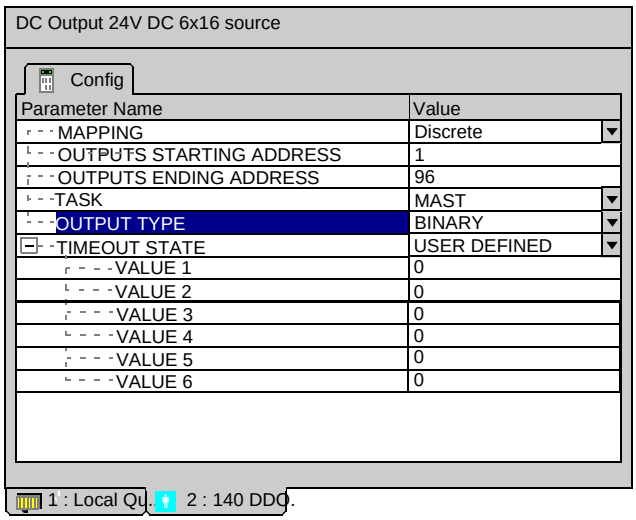
Fuses

Internal	-
External	User discretion for field power

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140 DDO 364 00 Parameter Configuration

Parameter Configuration Window



Parameter and Default Values

Name	Default Value	Options	Description
Mapping	Discrete	WORD (%QW-4X)	
Outputs Starting Address	1	1	
Outputs Ending Address	96	6	
Output Type	BINARY	BCD	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Timeout State	USER DEFINED	HOLD LAST VALUE	
Value 1, Value 2,...	0	0-65535	only enabled if Timeout State=USER DEFINED

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140 DDO 843 00: 10 ... 60 VDC 2x8 Source OUT Module

36

Overview

Purpose

The following chapter provides information of the Quantum 140 DDO 843 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	360
Indicators	361
Wiring Diagram	362
Specifications	363
Maintenance	364
140 DDO 843 00 Parameter Configuration	365

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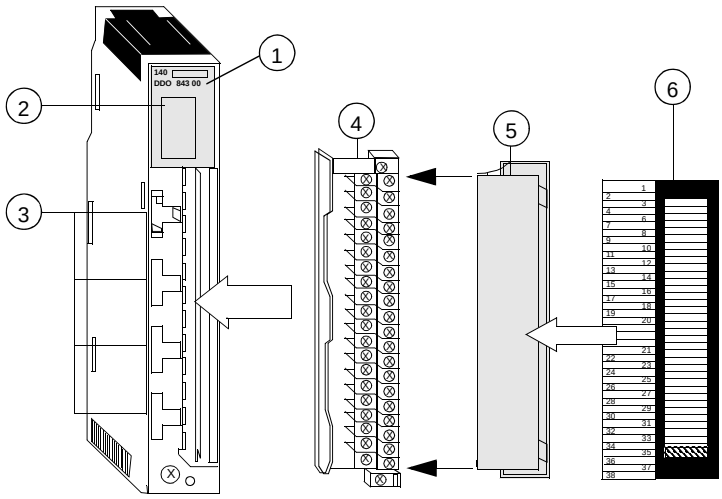
Presentation

Function

The DC Output 10 ... 60 VDC 2x8 Source module switches 10 ... 60 VDC powered loads and is for use with sink devices. External power supplies may be mixed between groups.

Illustration

The following figure shows the 140 DDO 843 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

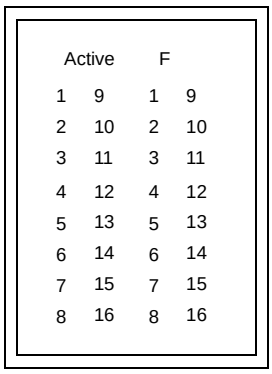
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DDO 843 00 module.



Descriptions

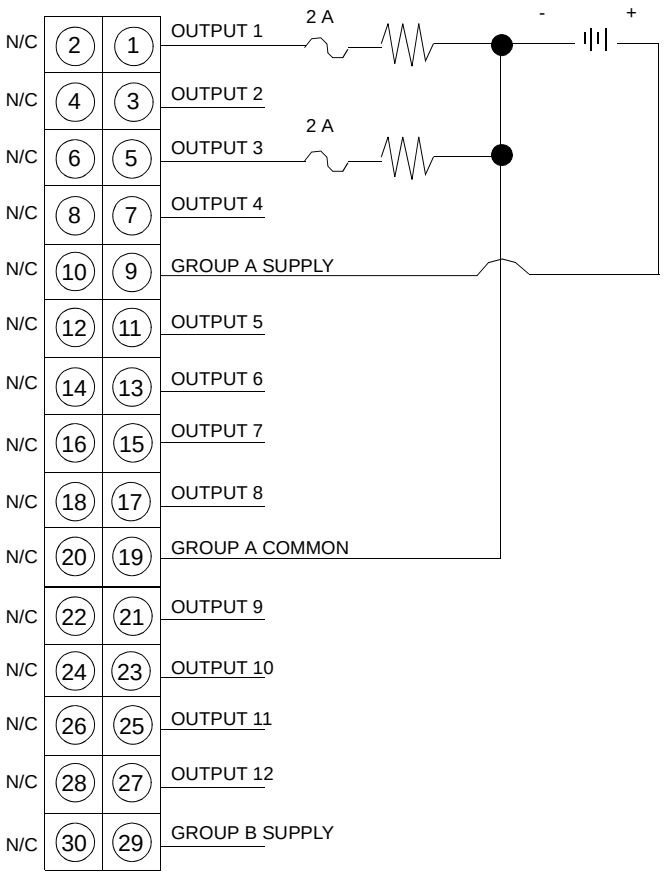
The following table shows the LED descriptions for the 140 DDO 843 00 module.

LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
1 ... 16	Green	The indicated point or channel is turned ON.
1 ... 16	Red	There is a fault on the indicated point or channel.

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Wiring Diagram

Illustration The following figure shows the 140 DDO 843 00 wiring diagram.



Note: N / C = Not Connected

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	16 OUT (2 groups x 8 points)
Logic	True High
External Power	10 ... 60 VDC
Power Dissipation	1.0 W + 1 V x Total module load Current
Bus Current required (Module)	160 mA (max.)
I/O map	1 output word

Voltage

Voltage

Operating Voltage (max.)	10.2 ... 72 VDC
Absolute Maximum Voltage	72 VDC (continuous)
ON State Drop / Point	1 VDC @ 2 A

Maximum Load Current / Surge Current

Maximum Load Current / Surge Current

Each Point	2 A
Each Group	6 A
Per Module	12 A
Surge Current (max.)	7.5 A @ 50 ms duration (no more than 20 per minute) each point
OFF State Leakage / Point	1 mA @ 60 VDC

Isolation / Protection

Isolation / Protection

Group to Group	700 VAC rms for 1 minute
Group to Bus	2500 VAC rms for 1 minute
Output Protection (internal)	Over voltage (suppression diode)

Response (Resistive Loads)

Response (Resistive Loads)

OFF - ON	1 ms
ON - OFF	1 ms

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Maintenance

Fuses

Fuses

Internal	8A fuse time-lag for each group (Part # 042701994 or equivalent).
External	Each group is protected with an 8 A fuse to protect the module from catastrophic failure. The group fuse is not guaranteed to protect each output switch for all possible overload conditions. It is recommended that each point be fused with a 2 A fuse: Modicon Fuse #: 57-0060-00



CAUTION

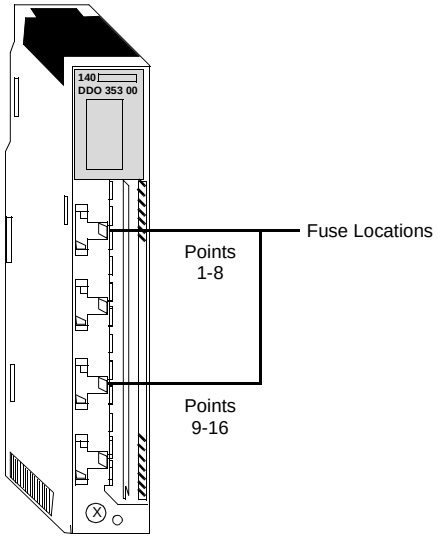
Possible danger to equipment or personnel.

Turn off power to the module and remove the field wiring terminal strip to gain access to fuses.

Failure to follow this precaution can result in injury or equipment damage.

Illustration

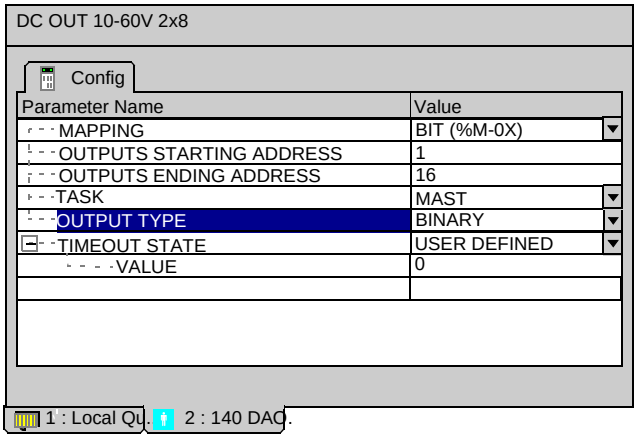
The following figure shows fuse locations for the 140 DDO 843 00 module.



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140 DDO 843 00 Parameter Configuration

Parameter Configuration Window



Parameter and Default Values

Name	Default Value	Options	Description
Mapping	BIT (%M-0x)	WORD (%MW-4X)	
Outputs Starting Address	1	1	
Outputs Ending Address	16	1	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Output Type	BINARY	BCD	
Timeout State	USER DEFINED	HOLD LAST VALUE	
Value	0	0-65535	only enabled if Timeout State=USER DEFINED

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140 DDO 885 00: 24 ... 125 VDC 2x6 Source OUT Module

37

Overview

Purpose

The following chapter provides information of the Quantum 140 DDO 885 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	368
Indicators	369
Wiring Diagram	370
Specifications	372
Maintenance	375
140 DDO 885 00 Parameter Configuration	376

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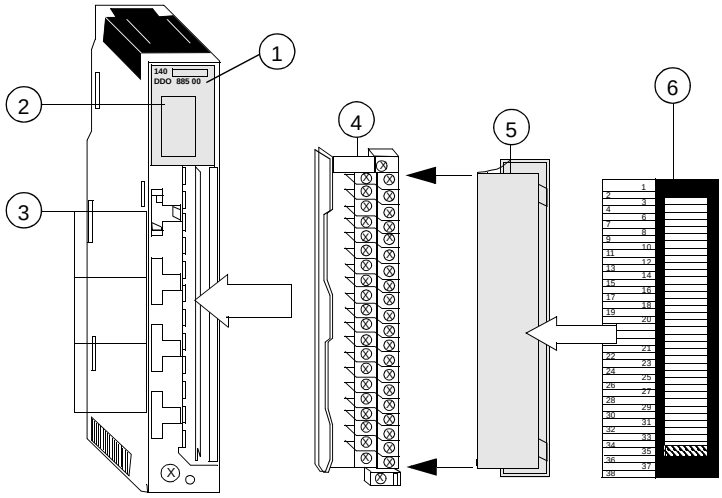
Presentation

Function

The DC Output 24 ... 125 VDC 2x6 Source module switches 24 ... 125 VDC powered loads and is for use with sink devices.

Illustration

The following figure shows the 140 DDO 885 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

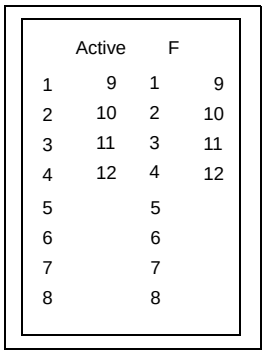
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DDO 885 00 module with fault indication.



Descriptions

The following table shows the LED descriptions for the 140 DDO 885 00 module

LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	An over current condition on any point has been detected.
1 ... 12	Green	The indicated point or channel is turned ON.
1 ... 12	Red	The indicated output point has an over current condition.

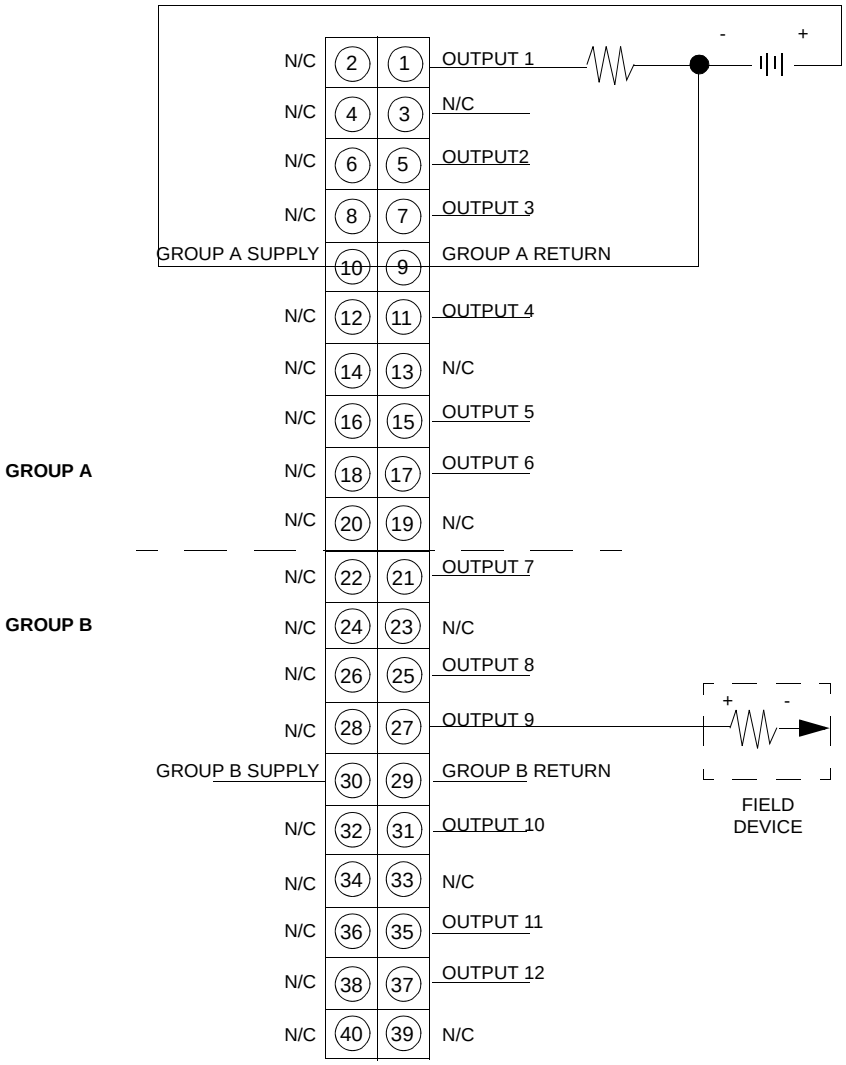
Note: To clear a fault, the point must be commanded OFF in user logic.

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Wiring Diagram

Illustration

The following figure shows the 140 DDO 885 00 wiring diagram.



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	**CAUTION** **Reverse Polarity Possibility** This module is not protected against reverse polarity. If you want to protect against polarity miswiring, an external diode in series with each group supply line is recommended. This diode must be able to support the group load current. **Failure to follow this precaution can result in injury or equipment damage.**

Note: N / C = Not Connected.

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	12 OUT (2 groups x 6 points)
External Power	None
Power Dissipation	1.0 W + 0.77 W x points ON
Bus Current required	6 points ON: 375 mA 12 points ON: 650 mA
I/O map	1 input word 1 output word
Fault Detection	Over Current (see note below)

Voltage

Voltage

Operating Voltage (max.)	19.2 ... 156.2 VDC including ripple
ON State Drop / Point	0.75 VDC @ 0.5 A

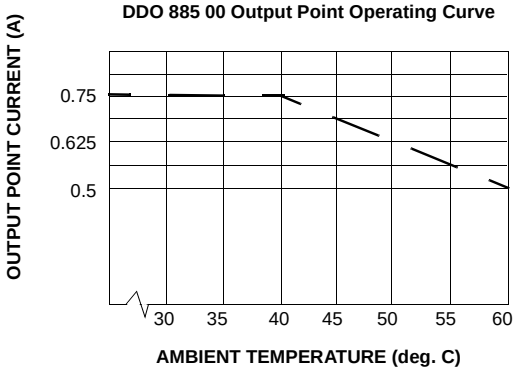
Maximum Load Current / Surge Current

Maximum Load Current / Surge Current

Each Point	0.75 A < 40 degrees C (see the operating curve)
Each Group	3 A, 0 ... 60 degrees C
Per Module	6 A, 0 ... 60 degrees C
Surge Current (max.)	4 A @1 ms duration (no more than 6 per minute)
OFF State Leakage / Point	0.5 mA @ 150 VDC

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The following figure shows the 140 DDO 885 00 Output Point Operating Curve.



NOTE: Each group: 3 A, 0 ... 60 degrees C. Per module: 6 A, 0 ... 60 degrees C

Maximum Tungsten

Maximum Tungsten

@ 130 VDC	46 W per point
@ 115 VDC	41 W per point
@ 24 VDC	8 W per point

Inductance and Switching Frequency

Inductance and Switching Frequency

Inductance	Internal Diode protected, no limit on Inductance
Switching Frequency	50 Hz (max.)

Isolation / Protection

Isolation / Protection

Field to Bus	2500 VAC rms for 1 minute
Group to Group	1200 VAC rms for 1 minute
Output Protection (internal)	Group varistor and individual point over Current sense

Response (Resistive Loads)

Response (Resistive Loads)

OFF - ON	1 ms
ON - OFF	1 ms

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Note: Each output point is protected by an over current sense circuit. When an over current condition is detected, the point is turned OFF, its LED fault indicator is turned ON, and the appropriate bit is set in the module fault register.
The output point will be turned OFF after a short is detected. A fault greater than 9.4 A will guarantee that the point will be turned OFF and will latch the output point in the OFF state. To clear a fault, the point must be commanded OFF in user logic.

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Maintenance

Fuses

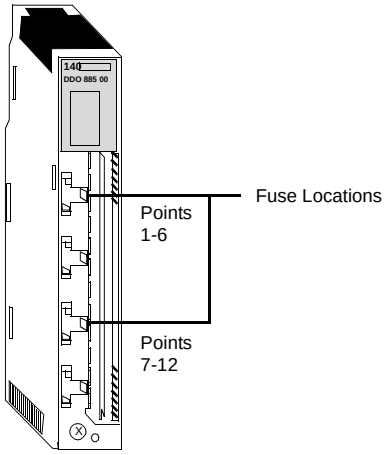
Fuses

Internal	4 A (Part # 043511382 or equivalent). See figure below for the location of the fuses.
External	Not required for this module.

	**CAUTION** **Possible danger to equipment or personnel.** Turn off power to the module and remove the field wiring terminal strip to gain access to fuses. **Failure to follow this precaution can result in injury or equipment damage.**

Illustration

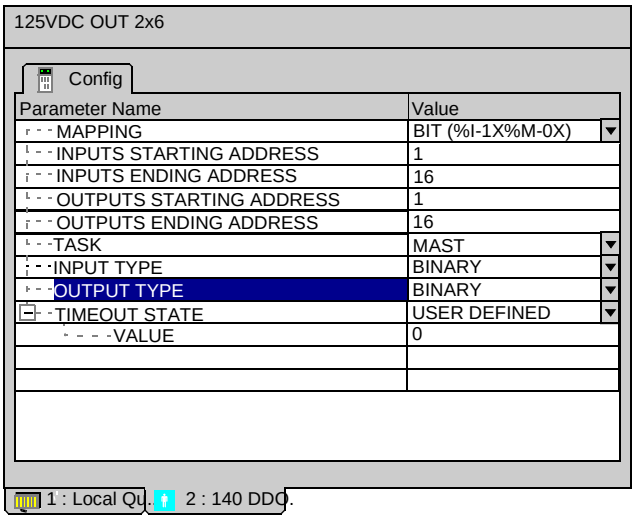
The following figure shows the fuse locations for the 140 DDO 885 00 module.



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140 DDO 885 00 Parameter Configuration

Parameter Configuration Window



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Parameter and Default Values

Name	Default Value	Options	Description
Mapping	BIT (%I-1X%M-0X)	WORD (%IW-3X%MW-4X)	
Inputs Starting Address	1	1	
Inputs Ending Address	16	1	
Outputs Starting Address	1	1	
Outputs Ending Address	16	1	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Input Type	BINARY	BCD	
Output Type	BINARY	BCD	
Timeout State	USER DEFINED	HOLD LAST VALUE	
Value	0	0-65535	only enabled if Timeout State=USER DEFINED

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140 DAO 840 00: 24 ... 230 VAC 16x1 OUT Module

38

Overview

Purpose

The following chapter provides information of the Quantum 140 DAO 840 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	380
Indicators	381
Wiring Diagram	382
Specifications	384
140 DAO 840 00 Parameter Configuration	387

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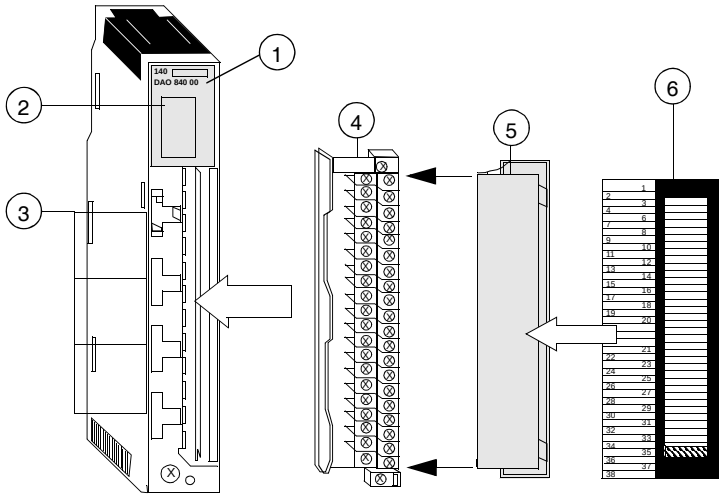
Presentation

Function

The AC Output 24 ... 230 VAC 16x1 module switches 24 ... 230 VAC powered loads.

Illustration

The following figure shows the 140 DAO 840 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

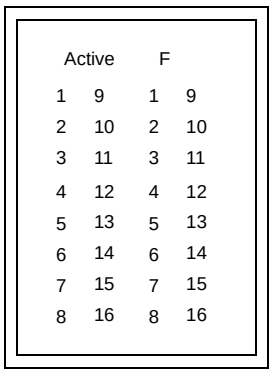
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DAO 840 00 module.



Descriptions

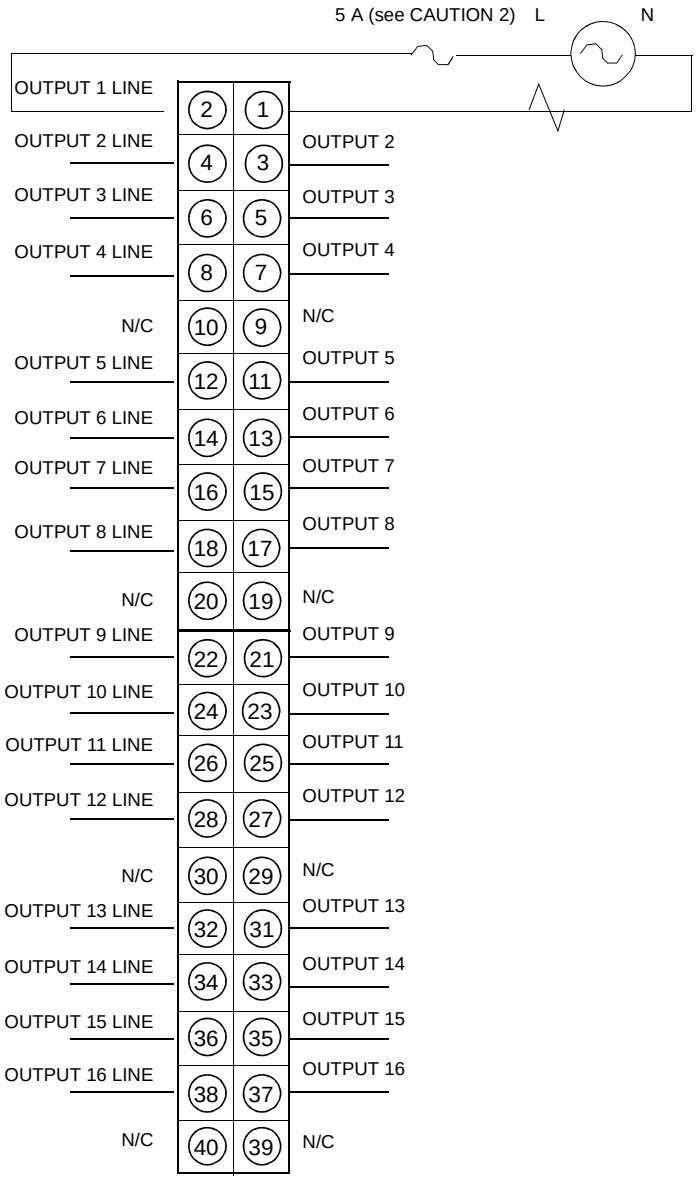
The following table shows the LED descriptions for the 140 DAO 840 00 module.

LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
1 ... 16	Green	The indicated point or channel is turned ON.
1 ... 16	Red	There is a fault on the indicated point or channel.

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Wiring Diagram

Illustration The following figure shows the 140 DAO 840 00 wiring diagram.



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1. This module is not polarity sensitive.
2. N / C = Not Connected.
3. Voltages up to 133V may be different phases on adjacent output points.
4. Voltages over 133V of different phases must have an output point separation between them. For example: Output 1 and 2 - Phase A, Skip Output 3, Output 4 - Phase B
5. When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

	**CAUTION**
	Electrical Shock hazard Turn off power to the module and remove the field wiring terminal strip to gain access to fuses. **Failure to follow this precaution can result in injury or equipment damage.**

	**CAUTION**
	Safety precaution to avoid equipment damage Each output point must be fused with an external fuse. The recommended fuse is a 5 A fuse (Part # 043502405) or any other fuse with an I2T rating of less than 87. **Failure to follow this precaution can result in injury or equipment damage.**

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Specifications

General Specifications

General Specifications

Module Type	16 OUT isolated
External Power	Not required for this module
Power Dissipation	1.85 W + 1.1 V x Total module load Currents
Bus Current required (Module)	350 mA
I/O map	1 output words

Absolute Maximum Input

Absolute Maximum Input

10 s	300 VAC
1 Cycle	400 VAC

Voltage

Voltage

Operating Voltage (max.)	20 ... 253 VAC
ON State Drop / Point	1.5 VAC

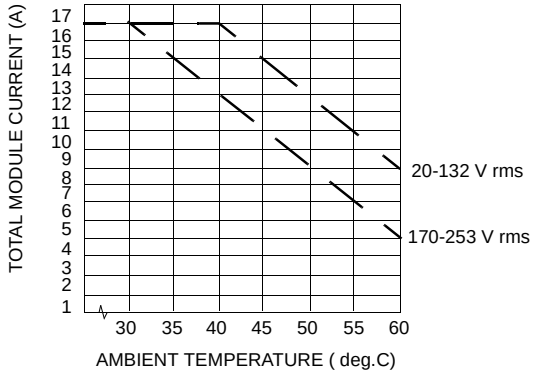
Maximum Load Current

Maximum Load Current

Each Point	4.0 A continuous, 20 ... 132 VAC rms 3.0 A continuous, 170 ... 253 VAC rms
Any four contiguous Points	4.0 A max. continuous for the sum of the four points.
Per Module	16 A continuous (see chart below)

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The following figure shows the 140 DAO 840 00 operating curve.



*The specifications stated are pending UL/CSA approval. This module was originally approved at 2 A each point; and 12 A, 0 ... 50° C (115 VAC) and 0 ... 50° C (230 VAC) per module.

Frequency and Minimum Load Current

Frequency and Minimum Load Current

Frequency	47 ... 63 Hz
Minimum Load Current	5 mA

OFF State Leakage / Point (max.)

OFF State Leakage / Point (max.)

OFF State Leakage / Point (max.)	2.5 mA @ 230 VAC 2 mA @ 115 VAC 1 mA @ 48 VAC 1 mA @ 24 VAC

Surge Current (max. rms)

Surge Current (max. rms)

One Cycle	30 A per point
Two Cycles	20 A per point
Three Cycles	10 A per point
Applied DV/DT	400 V / µs

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Isolation / Protection

Isolation / Protection

Output to Output	1500 VAC rms for 1 minute
Output to Bus	1780 VAC rms for 1 minute
Output Protection (internal)	RC snubber suppression

Response

Response

OFF - ON	0.5 of one line cycle max.
ON - OFF	0.5 of one line cycle max.

Fuses

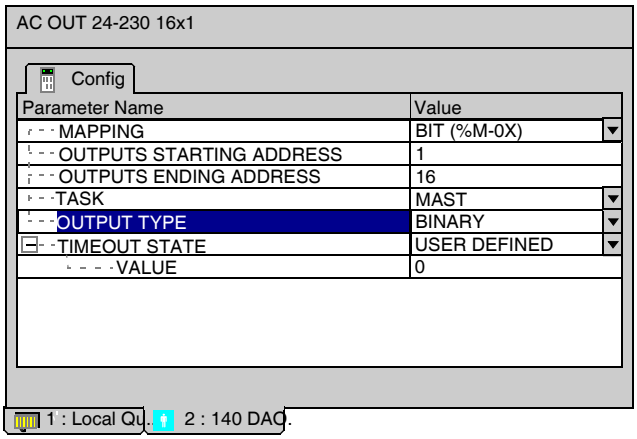
Fuses

Internal	None
External	Each output point must be fused with an external fuse . The recommended fuse is a 5 A fuse (Part # 043502405 or equivalent) or any of he fuse with an I2T rating of less than 87.

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140 DAO 840 00 Parameter Configuration

Parameter Configuration Window



Parameter and Default Values

Name	Default Value	Options	Description
Mapping	BIT (%M-0x)	WORD (%MW-4X)	
Output Starting Address	1	1	
Output Ending Address	16	1	
Output Type	BINARY	BCD	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Timeout State	USERDEFINED	HOLD LAST VALUE	
Value	0	0-65535	only enabled if Timeout State=USERDEFINED

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140 DAO 840 10: 24 ... 115 VAC 16x1 OUT Module

39

Overview

Purpose

The following chapter provides information of the Quantum 140 DAO 840 10 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	390
Indicators	391
Wiring Diagram	392
Specifications	394
140 DAO 840 10 Parameter Configuration	397

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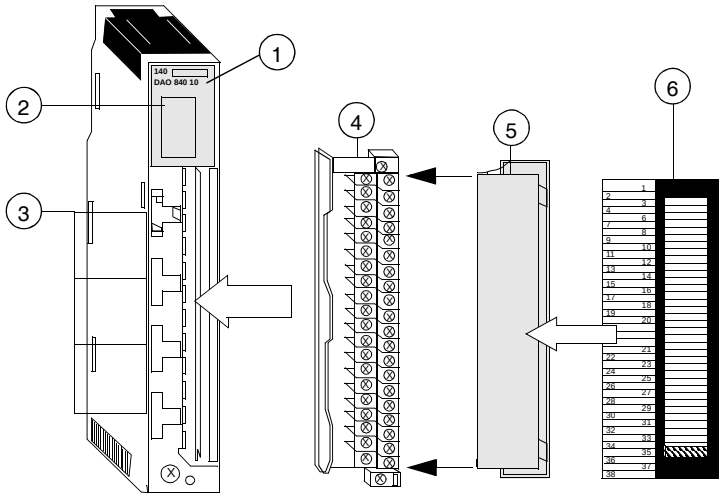
Presentation

Function

The AC Output 24 ... 115 VAC 16x1 module switches 24 ... 115 VAC powered loads.

Illustration

The following figure shows the 140 DAO 840 10 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

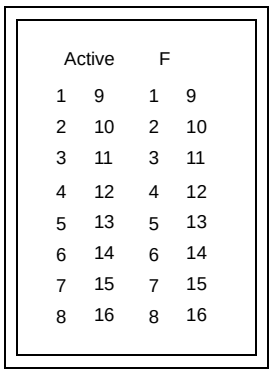
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DAO 840 10 module.



Descriptions

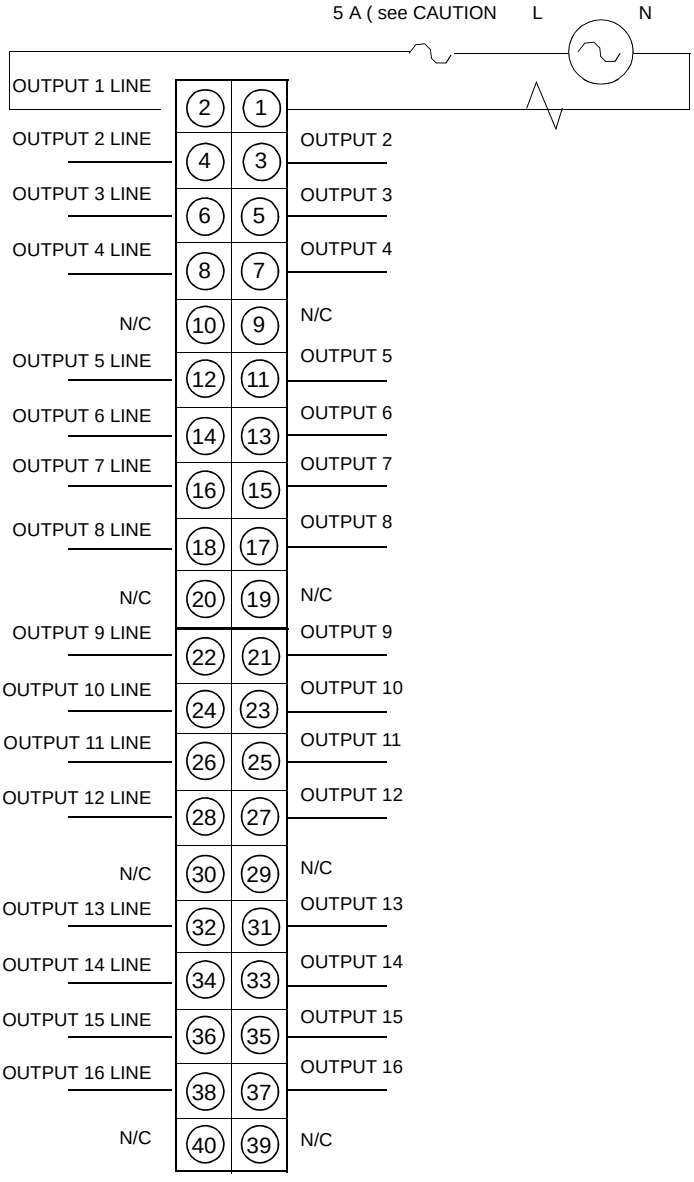
The following table shows the LED descriptions for the 140 DAO 840 10 module.

LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
1 ... 16	Green	The indicated point or channel is turned ON.
1 ... 16	Red	There is a fault on the indicated point or channel.

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Wiring Diagram

Illustration The following figure shows the 140 DAO 840 10 wiring diagram.



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	**CAUTION** **Electrical Shock hazard** Each output point must be fused with an external fuse. The recommended fuse is a 5 A fuse (Part # 043502405), or any other fuse with an I^2T rating of less than 87. **Failure to follow this precaution can result in injury or equipment damage.**

	**CAUTION** **Safety precaution to avoid equipment damage** Each output point must be fused with an external fuse. The recommended fuse is a 5 A fuse (Part # 043502405), or any other fuse with an I2T rating of less than 87. **Failure to follow this precaution can result in injury or equipment damage.**

Note: This module is not polarity sensitive.
N / C = Not Connected

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	16 OUT isolated
External Power	Not required for this module
Power Dissipation	1.85 W + 1.1 V x Total module load Currents
Bus Current required (Module)	350 mA
I/O map	1 output word

Absolute Maximum Input

Absolute Maximum Input

10 s	156 VAC
1 Cycle	200 VAC

Voltage

Voltage

Operating Voltage (max.)	20 ... 132 VAC
ON State Drop / Point	1.5 VAC

Maximum Load Current

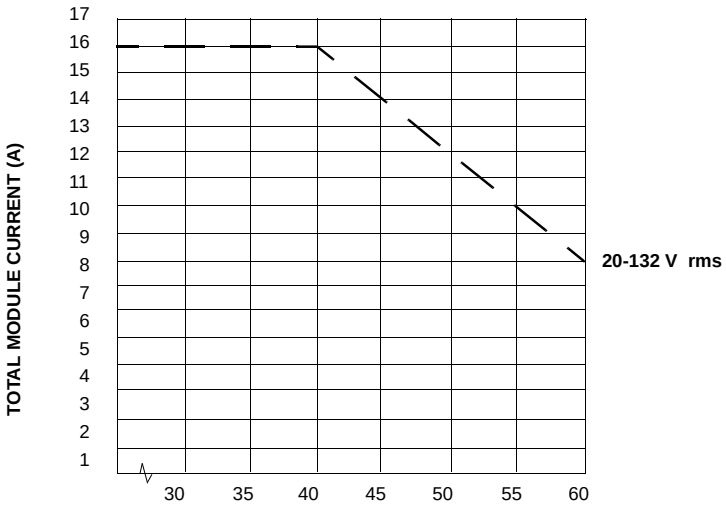
Maximum Load Current

Each Point	4.0 A continuous, 20 ... 132 VAC rms
Any four contiguous Points	4.0 A max. continuous for the sum of the four points.
Per Module	16 A continuous (see the chart below)

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The following figure shows the 140 DAO 840 10 operating curve.

DAO 840 10 Operating Curve*



Frequency and Minimum Load Current

Frequency	47 ... 63 Hz
Minimum Load Current	5 mA

OFF State Leakage / Point (max.)

OFF State Leakage / Point (max.)

OFF State Leakage / Point (max.)	2.5 mA @ 230 VAC 2 mA @ 115 VAC 1 mA @ 48 VAC 1 mA @ 24 VAC

Surge Current (max. rms)

Surge Current (max. rms)

One Cycle	30 A per point
Two Cycles	20 A per point
Three Cycles	10 A per point
Applied dV/dT	400 V / µs

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Isolation / Protection

Isolation / Protection

Output to Output	1500 VAC rms for 1 minute
Output to Bus	1780 VAC rms for 1 minute
Output Protection (internal)	RC snubber suppression

Response

Response

OFF - ON	0.5 of one line cycle max.
ON - OFF	0.5 of one line cycle max.

Fuses

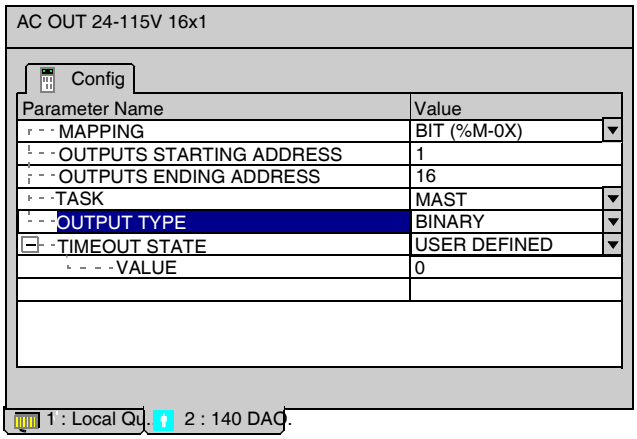
Fuses

Internal	None
External	Each output point must be fused with an external fuse . The recommended fuse is a 5 A fuse (Part # 043502405 or equivalent) or any of he fuse with an I2T rating of less than 87.

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140 DAO 840 10 Parameter Configuration

Parameter Configuration Window



Parameter and Default Values

Name	Default Value	Options	Description
Mapping	BIT (%M-0x)	WORD (%MW-4X)	
Output Starting Address	1	1	
Output Ending Address	16	1	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Output Type	BINARY	BCD	
Timeout State	USER DEFINED	HOLD LAST VALUE	
Value	0	0-65535	only enabled if Timeout State=USER DEFINED

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140 DAO 842 10: 100 ... 230 VAC 4x4 OUT Module

40

Overview

Purpose

The following chapter provides information of the Quantum 140 DAO 842 10 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	400
Indicators	401
Wiring Diagram	402
Specifications	404
Maintenance	407
140 DAO 842 10 Parameter Configuration	408

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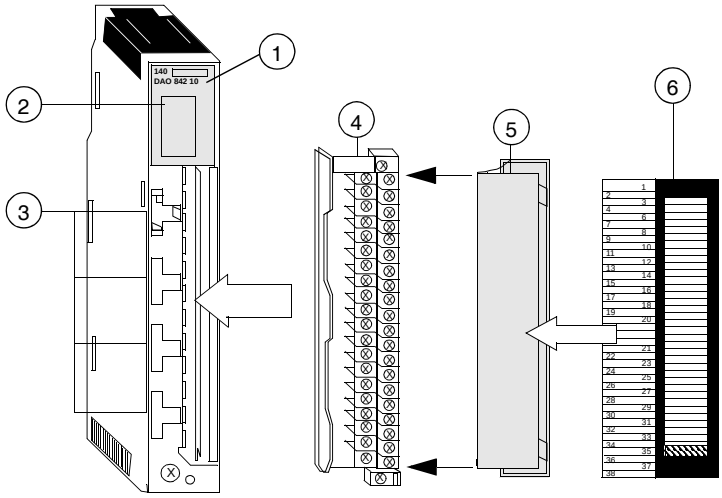
Presentation

Function

The AC Output 100 ... 230 VAC 4x4 module switches 100 ... 230 VAC powered loads.

Illustration

The following figure shows the 140 DAO 842 10 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

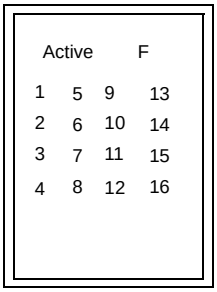
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DAO 842 10 module.



Descriptions

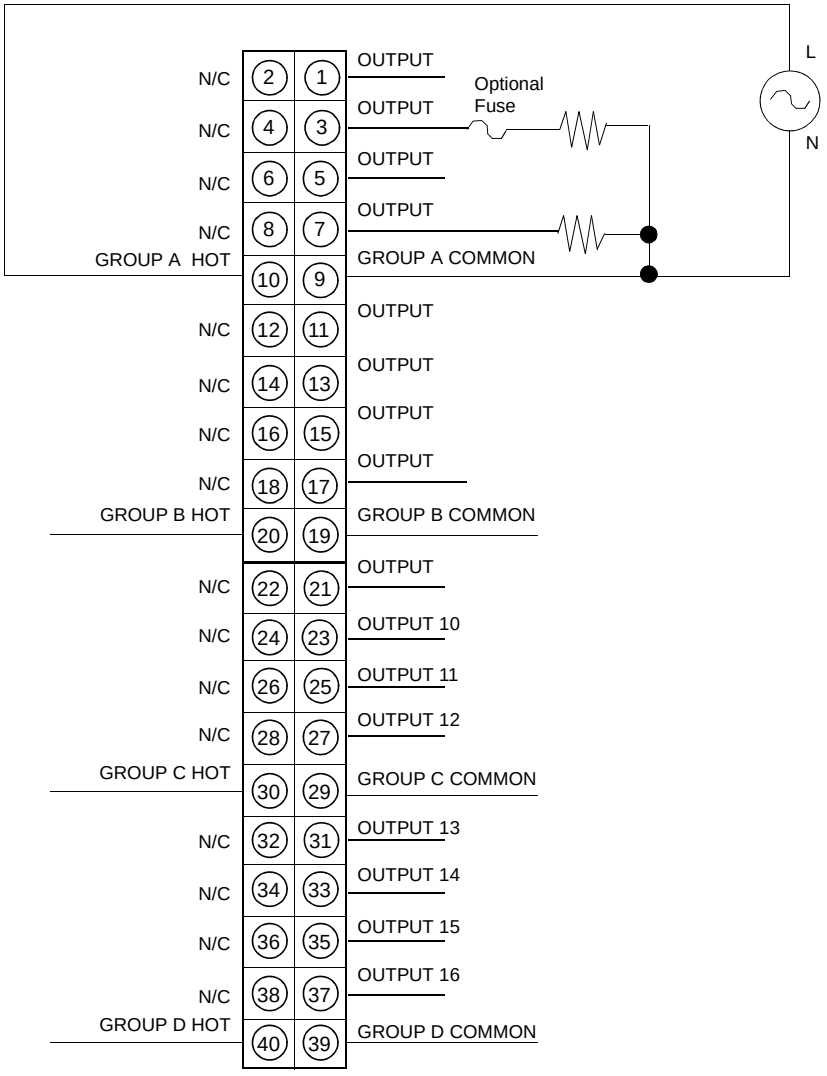
The following table shows the LED descriptions for the 140 DAO 842 10 module.

LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
1 ... 16	Green	The indicated point or channel is turned ON.
1 ... 4 5 ... 8 9 ... 12 13 ... 16	Red	The indicated group has a blown fuse or no field power.

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Wiring Diagram

Illustration The following figure shows the wiring diagram for the 140 DAO 842 10 module.



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	**CAUTION** **Power Compatibility** The AC power energizing each group must be from a common, single-phase AC power source. **Failure to follow this precaution can result in injury or equipment damage.**

	**CAUTION** **Wiring Compatibility** If an external switch is wired to control an inductive load in parallel with the module output, then an external varistor (Harris V390ZA05 or equivalent) must be wired in parallel with the switch. **Failure to follow this precaution can result in injury or equipment damage.**

Note: 1. This module is not polarity sensitive.
N / C = Not Connected

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	16 OUT (4 groups x 4 points)
External Power	85 ... 253 VAC
Power Dissipation	1.85 W + 1.1 V x Total module load Currents
Bus Current required (Module)	350 mA
I/O map	1 output words
Fault Detection	Blown fuse detect, loss of field power

Absolute Maximum Input

Absolute Maximum Input

10 s	300 VAC
1 Cycle	400 VAC

Voltage

Voltage

Operating Voltage (max.)	85 ... 253 VAC
ON State Drop / Point	1.5 VAC

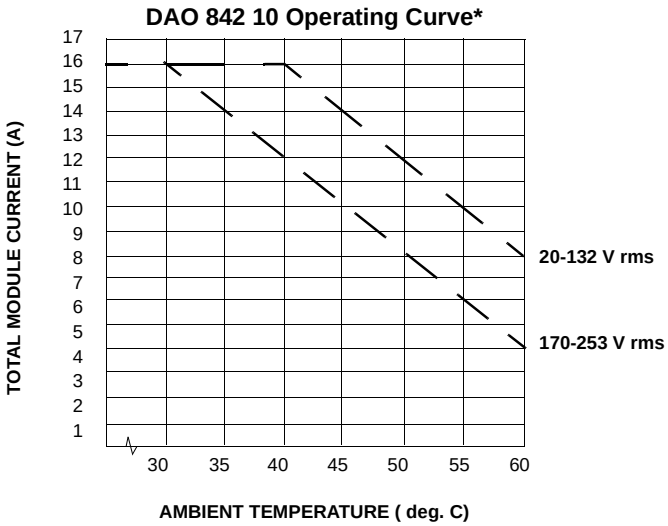
Maximum Load Current

Maximum Load Current

Each Point	4.0 A continuous, 85 ... 132 VAC rms 3.0 A continuous, 170 ... 253 VAC rms
Each Group	4.0 A continuous
Per Module	16 A continuous (see the chart below)

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The following figure shows the 140 DAO 842 10 Operating Curve.



*The specifications stated are pending UL/CSA approval. This module was originally approved at 2 A each point; and 12 A, 0 ... 50° C (115 VAC) and 0 ... 50° C (230 VAC) per module.

Frequency and Minimum Load Current

Frequency	47 ... 63 Hz
Minimum Load Current	5 mA

OFF State Leakage / Point (max.)

OFF State Leakage / Point (max.)

OFF State Leakage / Point (max.)	2.5 mA @ 230 VAC 2 mA @ 115 VAC

Surge Current (max. rms)

Surge Current (max. rms)

One Cycle	30 A per point, 45 A per group
Two Cycles	20 A per point, 30 A per group
Three Cycles	10 A per point, 25 A per group
Applied dV/dT	400 V / µs

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Isolation / Protection

Isolation / Protection

Group to Group	1000 VAC rms for 1 minute, galvanically isolated
Output to Bus	1780 VAC rms for 1 minute
Output Protection (internal)	RC snubber suppression

Response

Response

OFF - ON	0.5 of one line cycle max.
ON - OFF	0.5 of one line cycle max.

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Maintenance

Fuses

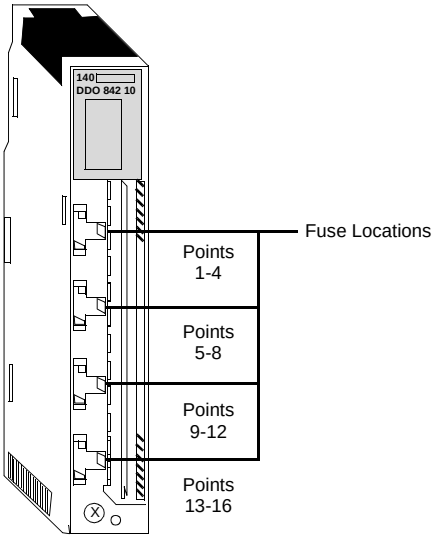
Fuses

Internal	None
External	Each output point must be fused with an external fuse. The recommended fuse is a 5 A fuse (Part # 043502405 or equivalent) or any other fuse with an I^2T rating of less than 87.

	**WARNING** **Possible injury to personnel or equipment** First turn off the power to the module to remove the field wiring terminal strip to gain access to the fuses. **Failure to follow this precaution can result in death, serious injury, or equipment damage.**

Illustration

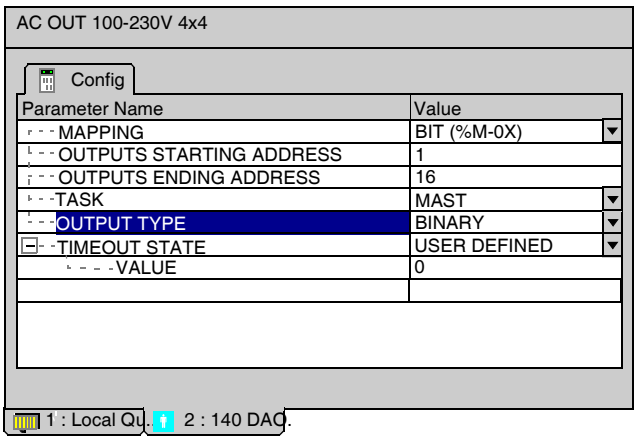
The following figure shows the fuse locations for the DAO 842 10 module.



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140 DAO 842 10 Parameter Configuration

Parameter Configuration Window



Parameter and Default Values

Name	Default Value	Options	Description
Mapping	BIT (%M-0x)	WORD (%MW-4X)	
Outputs Starting Address	1	1	
Outputs Ending Address	16	1	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Output Type	BINARY	BCD	
Timeout State	USER DEFINED	HOLD LAST VALUE	
Value	0	0-65535	only enabled if Timeout State=USER DEFINED

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140 DAO 842 20: 24 ... 48 VAC 4x4 OUT Module

41

Overview

Purpose

The following chapter provides information of the Quantum 140 DAO 842 20 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	410
Indicators	411
Wiring Diagram	412
Specifications	414
Maintenance	417
140 DAO 842 20 Parameter Configuration	418

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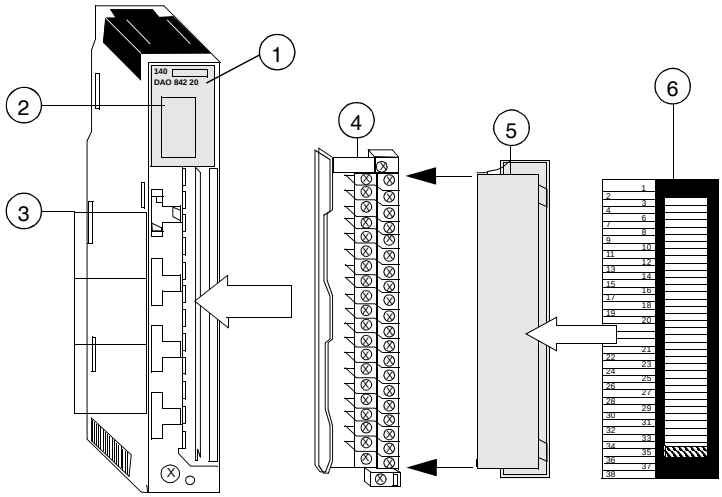
Presentation

Function

The AC Output 24 ... 48 VAC 4x4 module switches 24 ... 48 VAC powered loads.

Illustration

The following figure shows the 140 DAO 842 20 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

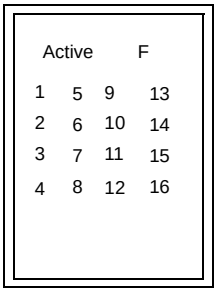
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DAO 842 20 module.



Descriptions

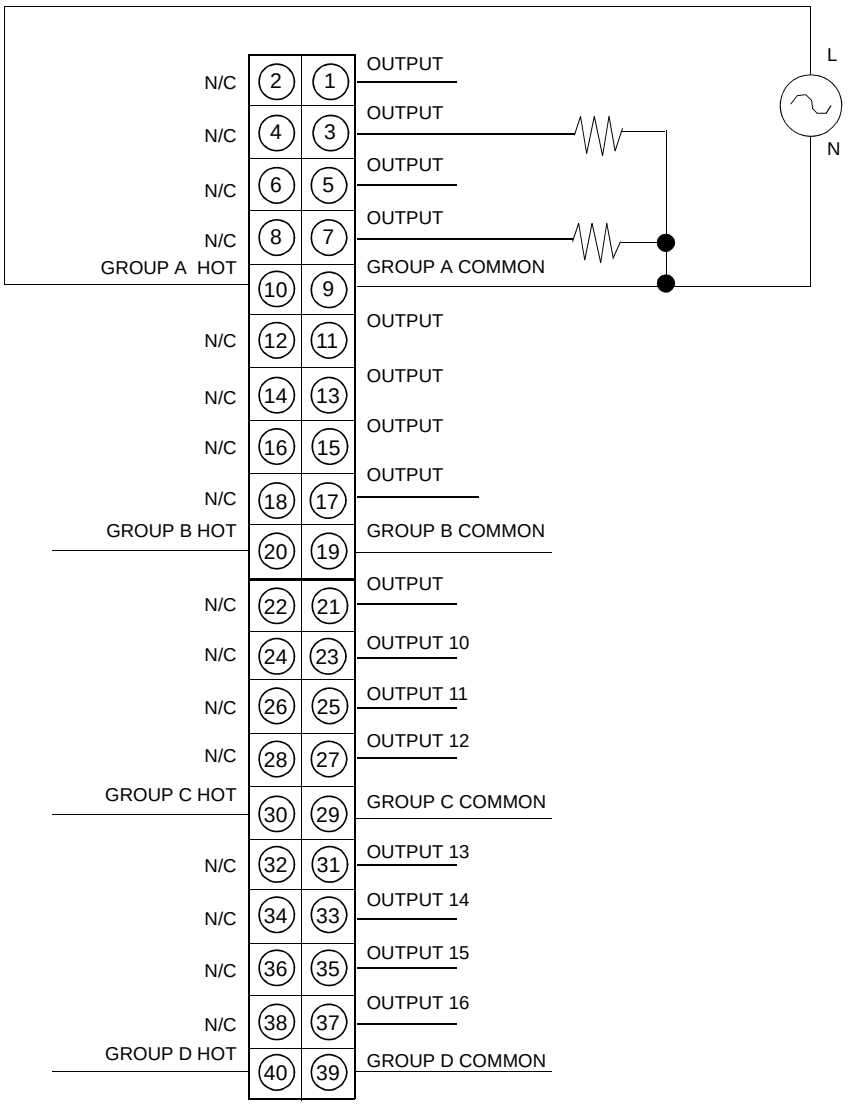
The following table shows the LED descriptions for the 140 DAO 842 20 module.

LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
1 ... 16	Green	The indicated point or channel is turned ON.
1 ... 4 5 ... 8 9 ... 12 13 ... 16	Red	The indicated group has a blown fuse or no field power.

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Wiring Diagram

Illustration The following figure shows the 140 DAO 842 20 wiring diagram.



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	**CAUTION** **Power Compatibility** The AC power energizing each group must be from a common, single-phase AC power source. **Failure to follow this precaution can result in injury or equipment damage.**

	**CAUTION** **Wiring Compatibility** If an external switch is wired to control an inductive load in parallel with the module output, then an external varistor (Harris V390ZA05 or equivalent) must be wired in parallel with the switch. **Failure to follow this precaution can result in injury or equipment damage.**

Note: 1. This module is not polarity sensitive.
- N / C = Not Connected

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	16 OUT (4 groups x 4 points)
External Power	20 ... 56 VAC
Power Dissipation	1.85 W + 1.1 V x Total module load Currents
Bus Current required (Module)	350 mA
I/O map	1 output words
Fault Detection	Blown fuse detect, loss of field power

Absolute Maximum Input

Absolute Maximum Input

10 s	63 VAC
1 Cycle	100 VAC
1.3 ms	111 VAC peak

Voltage

Voltage

Operating Voltage (max.)	20 ... 56 VAC
ON State Drop / Point	1.5 VAC

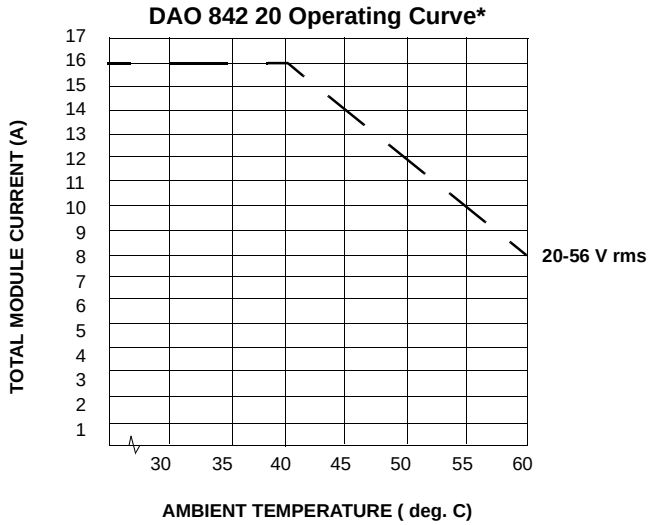
Maximum Load Current

Maximum Load Current

Each Point	4.0 A continuous, 20 ... 56 VAC rms
Each Group	4.0 A continuous
Per Module	16 A continuous (see the chart below)

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The following figure shows the 140 DAO 842 20 Operating Curve.



Frequency and Minimum Load Current

Frequency	47 ... 63 Hz
Minimum Load Current	5 mA

Surge Current (max. rms) / Leakage

Surge Current (max. rms) / Leakage

One Cycle	30 A per point, 45 A per group
Two Cycles	20 A per point, 30 A per group
Three Cycles	10 A per point, 25 A per group
Applied dV/dT	400 V / µs
OFF State Leakage / Point	1 mA max.

Isolation / Protection

Isolation / Protection

Group to Group	1000 VAC rms for 1 minute, galvanically isolated
Output to Bus	1780 VAC rms for 1 minute
Output Protection (internal)	RC snubber suppression

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Response

Response

OFF - ON	0.5 of one line cycle max.
ON - OFF	0.5 of one line cycle max.

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Maintenance

Fuses

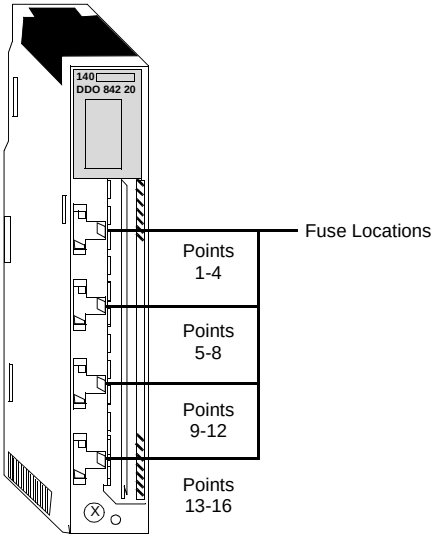
Fuses

Internal	5 A fuse for each group. (Part # 043502405 or equivalent). For the location of the fuses see the figure below.
External	User Discretion

	**WARNING** **Possible injury to personnel or equipment** First turn off the power to the module to remove the field wiring terminal strip to gain access to the fuses. **Failure to follow this precaution can result in death, serious injury, or equipment damage.**

Illustration

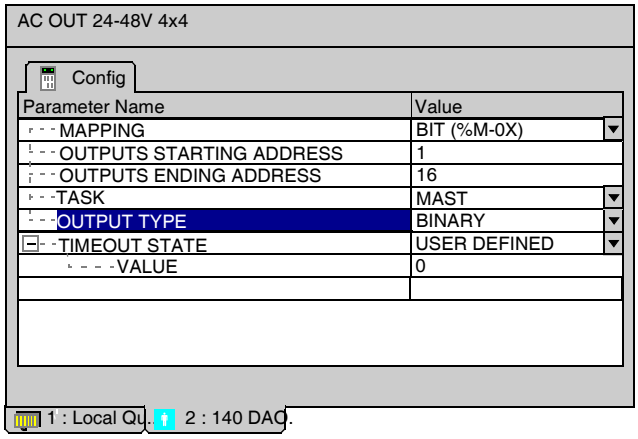
The following figure shows the 140 DAO 842 20 fuse locations.



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140 DAO 842 20 Parameter Configuration

Parameter Configuration Window



Parameter and Default Values

Name	Default Value	Options	Description
Mapping	BIT (%M-0x)	WORD (%MW-4X)	
Outputs Starting Address	1	1	
Outputs Ending Address	16	1	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Output Type	BINARY	BCD	
Timeout State	USER DEFINED	HOLD LAST VALUE	
Value	0	0-65535	only enabled if Timeout State=USER DEFINED

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140 DAO 853 00: 230 VAC 4x8 Source OUT Module

42

Overview

Purpose

The following chapter provides information of the Quantum 140 DAO 853 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	420
Indicators	421
Wiring Diagram	422
Specifications	424
Maintenance	427
140 DAO 853 00 Parameter Configuration	428

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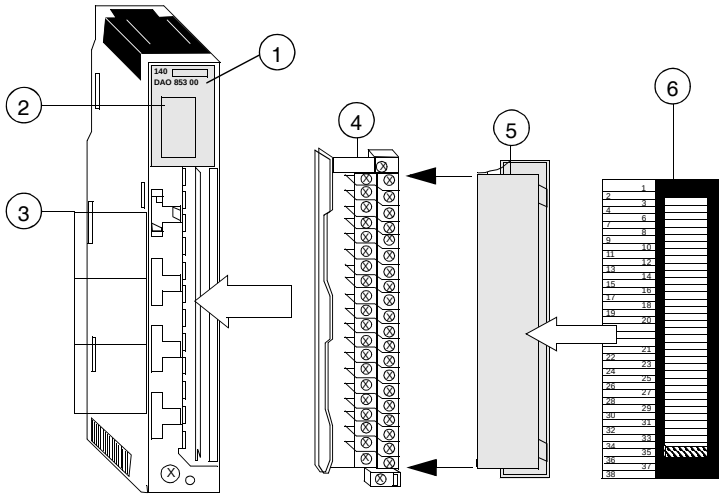
Presentation

Function

The AC Output 230 VAC 4x8 module accepts 230 VAC powered loads.

Illustration

The following figure shows the 140 DAO 853 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

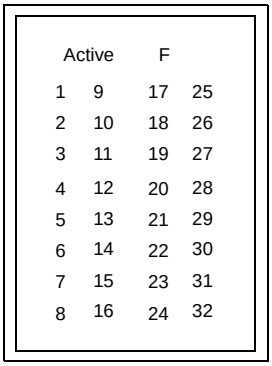
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DAO 853 00 module.



Descriptions

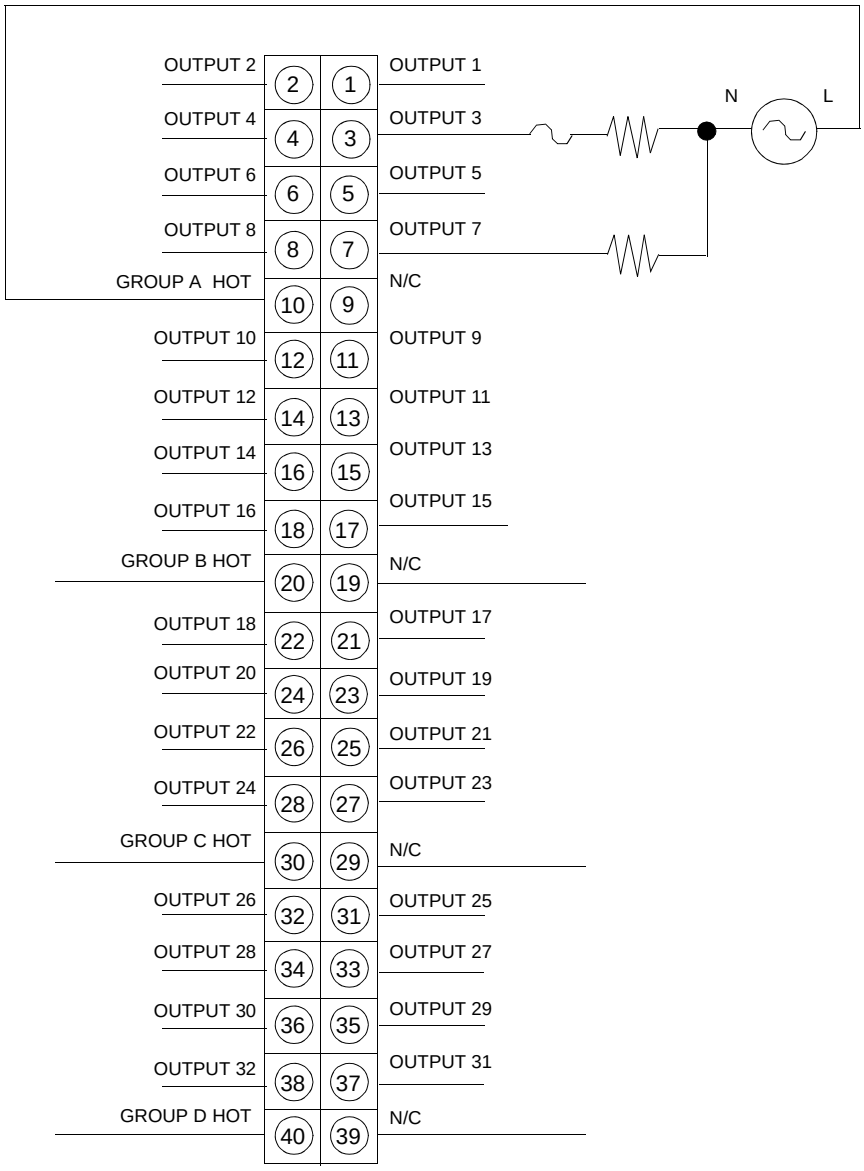
The following table shows the LED descriptions for the 140 DAO 853 00 modul.

LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
1 ... 32	Green	The indicated point or channel is turned ON.

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Wiring Diagram

Illustration The following figure shows the 140 DAO 853 00 wiring diagram.



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	**CAUTION** **Power Compatibility** The AC power energizing each group must be from a common, single-phase AC power source. **Failure to follow this precaution can result in injury or equipment damage.**

	**CAUTION** **Wiring Compatibility** If an external switch is wired to control an inductive load in parallel with the module output, then an external varistor (Harris V390ZA05 or equivalent) must be wired in parallel with the switch. **Failure to follow this precaution can result in injury or equipment damage.**

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	32 OUT (4 groups x 8 points)
Logic	True High
External Power	Not required for this module
Power Dissipation	1.60 W + 1.0 V x Total module load Currents
Bus Current required (Module)	320 mA
I/O map	2 output words

Absolute Maximum Input

Absolute Maximum Input

10 s	300 VAC
1 Cycle	400 VAC

Voltage

Voltage

Operating Voltage (max.)	20 ... 253 VAC
ON State Drop / Point	1.5 VAC

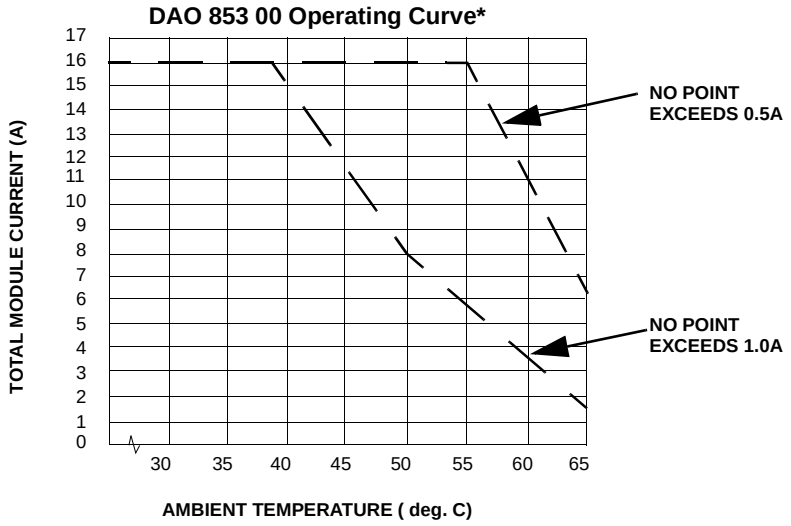
Maximum Load Current

Maximum Load Current

Each Point	1.0 A continuous, 20 ... 253 VAC rms
Each Group	4.0 A (max.)
Per Module	16 A continuous (see chart below)

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The following figure shows the 140 DAO 853 00 Operating Curve.



Frequency and Minimum Load Current

Frequency	47 ... 63 Hz
Minimum Load Current	30 mA

OFF State Leakage / Point (max.)

OFF State Leakage / Point (max.)

OFF State Leakage / Point (max.)	0.88 mA @ 230 VAC 0.44 mA @ 115 VAC 0.18 mA @ 48 VAC 0.09 mA @ 24 VAC

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Surge Current (max. rms)

Surge Current (max. rms)

One Cycle	30 A per point
Two Cycles	20 A per point
Three Cycles	10 A per point
Applied dV/dT	400 V / µs

Isolation / Protection

Isolation / Protection

Group to Group	1780 VAC rms for 1 minute
Output to Bus	1780 VAC rms for 1 minute
Output Protection (internal)	RC snubber protection

Response

Response

OFF - ON	0.5 of one line cycle max.
ON - OFF	0.5 of one line cycle max.

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Maintenance

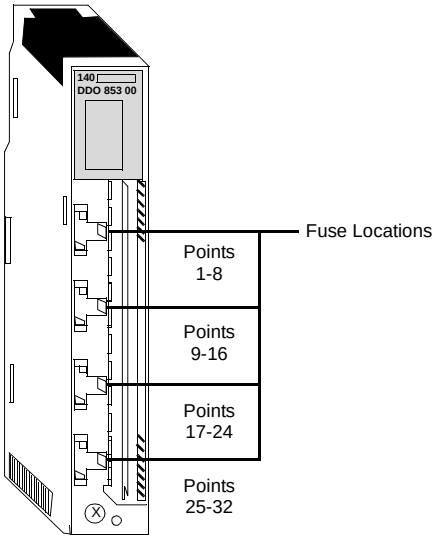
Fuses

Fuses

Internal	4 A, 250 V fuse (Little fuse 217004) for each group. For location of fuses see below
External	User discretion

Illustration

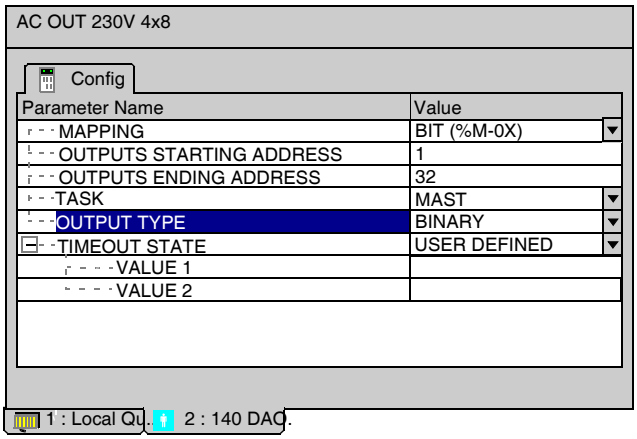
The following figure shows the fuse locations for the DAO 853 00 module.



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140 DAO 853 00 Parameter Configuration

Parameter Configuration Window



Parameter and Default Values

Name	Default Value	Options	Description
Mapping	BIT (%M-0x)	WORD (%MW-4X)	
Output Starting Address	1	1	
Output Ending Address	32	2	
Output Type	BINARY	BCD	
Task (Grayed if module in other than local)	Mast	Fast	fixed to Mast if module in other than local
Timeout State	Userdefined	Hold Last Value	
Value 1, Value 2	0	0-65535	only if Timeout State=Userdefined

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140 DRA 840 00: Relay 16x1 Normally Open OUT Module

43

Overview

Purpose

The following chapter provides information of the Quantum 140 DRA 840 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	430
Indicators	431
Wiring Diagram	432
Specifications	434
140 DRA 840 00 Parameter Configuration	436

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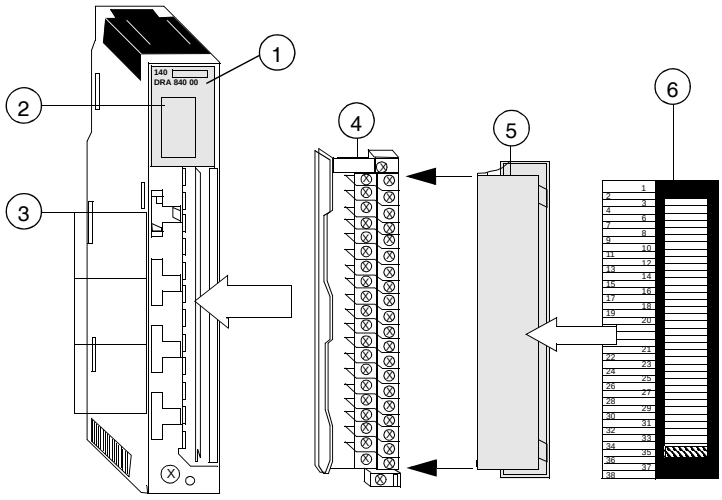
Presentation

Function

The Relay Output 16x1 Normally Open module is used to switch a voltage source using 16 relays with normally open contacts.

Illustration

The following figure shows the 140 DRA 840 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

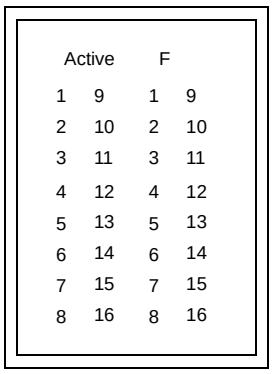
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DRA 840 00 module.



Descriptions

The following table shows the LED descriptions for the 140 DRA 840 00 module.

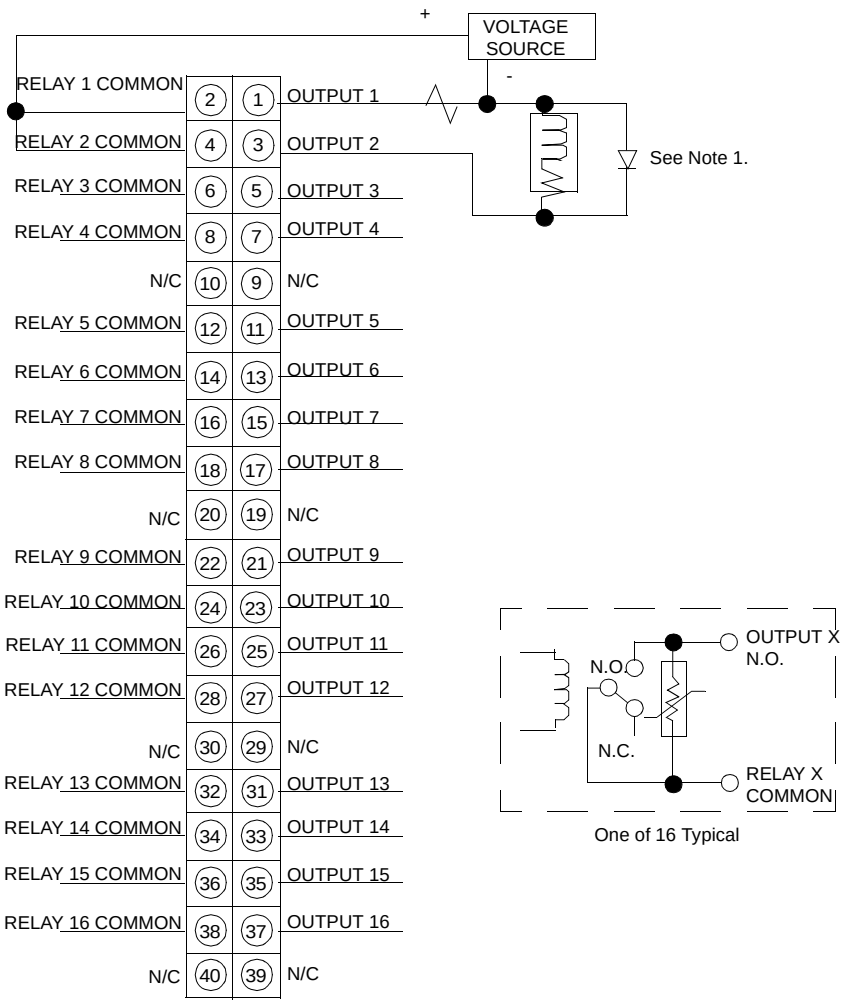
LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
1 ... 16	Green	The indicated point or channel is turned ON.

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Wiring Diagram

Illustration

The following figure shows the 140 DRA 840 00 wiring diagram.



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Notes on Wiring Diagram

- For 125 VDC inductive loads, external clamping is recommended to extend relay contact life. (1N 4004 or equivalent).
- N / C = Not Connected.
- N.O. = Normally Open.
- N.C. = Normally Closed.

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	16 OUT (normaly open)
External Power	Not required for this module
Power Dissipation	5.5 W + 0.5 W x input points ON
Bus Current required (Module)	1100 mA
I/O map	1 output word

Operating Voltage

Operating Voltage

AC	20 ... 250 VAC
DC	5 ... 30 VDC 30 ... 150 VDC (reduced load Current)

Maximum Load Current

Maximum Load Current

Each Point	2 A max. @ 250 VDC @ 60 degrees C ambient, resistive load 1 A Tungsten lamp load 1 A @ a power factor of 0.4 1/8 hp @ 125 / 250 VAC
Each Point (30 ... 150 VDC)	300 mA (restive load) 100 mA (L/R = 10 msec)
Surge Current (max.)	10 A capacitive load @ t = 10 ms

Minimum Load Current

Minimum Load Current

Minimum Load Current	50 mA Note: Minimum load Current if the contact is used at rated loads of 5 ... 150 VDC or 20 ... 250 VDC
Each Point	2 A max. @ 250 VDC @ 60 degrees C ambient, resistive load
OFF State Leakage	< 100 µA

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Isolation

Isolation

Output to Output	1780 VAC rms for one minute
Field to Bus	1780 VAC rms for one minute 2500 for one minute

Response

Response

OFF - ON	10 ms (max.)
ON - OFF	20 ms (max.)

Relay

Relay

Relay type	Form A
Contact Protection	Varistor 275 V (internal)
Mechanical Operations	10,000,000
Electrical Operations	200,000 (resistive load @ max. Voltage and Current)
Electrical Operations (30 ... 150 VDC) (see note below)	100,000 @ 300 mA (resistive load) 50,000 @ 500 mA (resistive load) 100,000 @ 100 mA (L/R = 10 msec) 100,000 Interposing Relay (Westinghouse Style 606B, Westinghouse type SG, Struthers Dunn 219 x 13 XP)
Switching Capability	500 VA (resistive load)

Fuses

Fuses

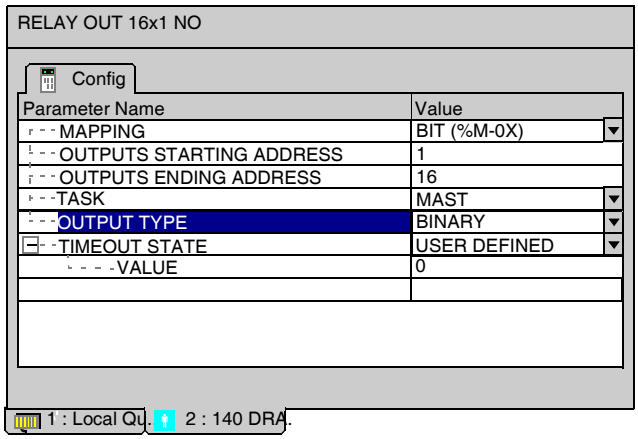
Internal	None
External	User discretion

Note: Relay contact life for inductive loads may be significantly increased by using external contact protection such as a clamping diode across the load.

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140 DRA 840 00 Parameter Configuration

Parameter Configuration Window



Parameter and Default Values

Name	Default Value	Options	Description
Mapping	BIT (%M-0x)	WORD (%MW-4X)	
Outputs Starting Address	1	1	
Outputs Ending Address	16	1	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Output Type	BINARY	BCD	
Timeout State	USER DEFINED	HOLD LAST VALUE	
Value	0	0-65535	only if Timeout State=USER DEFINED

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140 DRC 830 00: Relay 8x1 Normally Open / Normally Closed OUT Module

44

Overview

Purpose

The following chapter provides information of the Quantum 140 DRC 830 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	438
Indicators	439
Wiring Diagram	440
Specifications	442
140 DRC 830 00 Parameter Configuration	445

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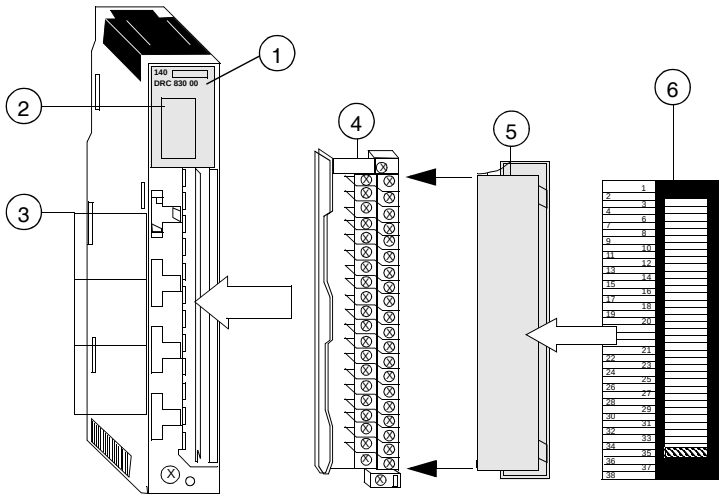
Presentation

Function

The Relay Output 8x1 Normally Open / Normally Closed module is used to switch voltage sources using eight relays with normally open and normally closed contacts.

Illustration

The following figure shows the 140 DRC 830 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

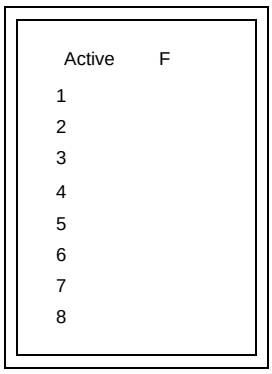
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DRC 830 00 module.



Descriptions

The following table shows the LED descriptions for the 140 DRC 830 00 module.

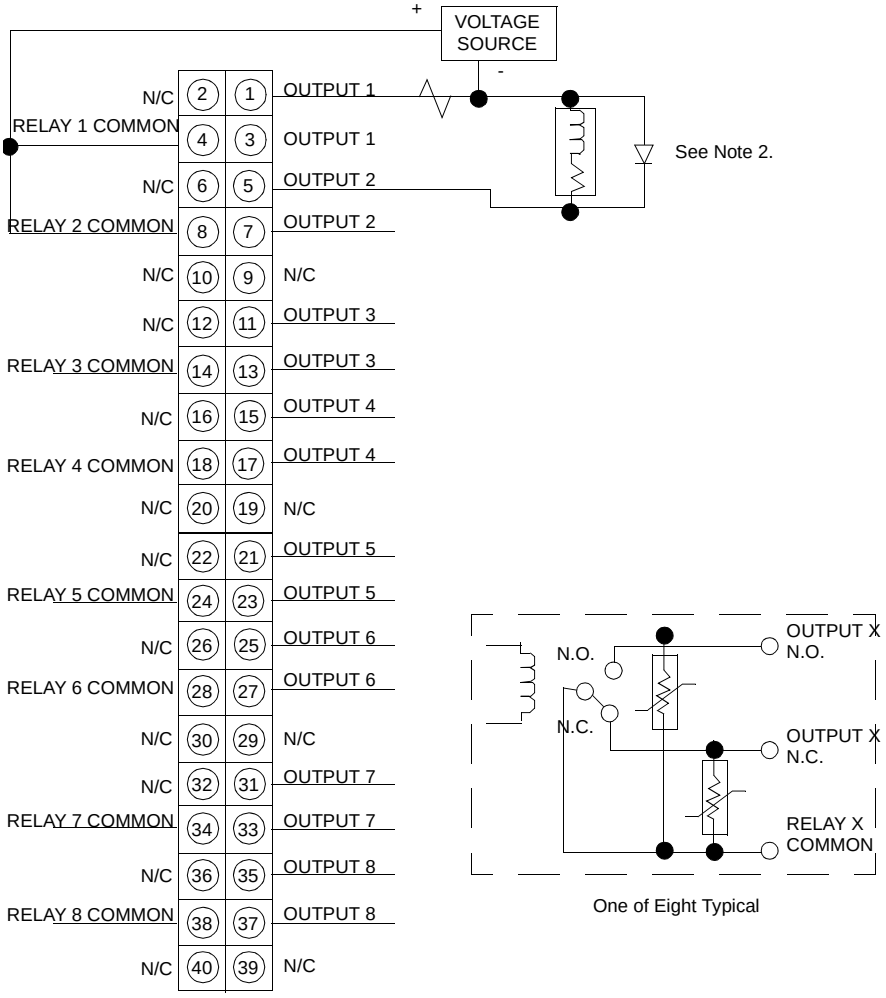
LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
1 ... 8	Green	The indicated point or channel is turned ON.

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Wiring Diagram

Illustration

The following figure shows the 140 DRC 830 00 wiring diagram.



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Notes on Wiring Diagram

- When switching DC voltages, it is recommended that the source be connected to the common pin and the load be connected to the N.O. or N.C. contact.
- For 125 VDC inductive loads, external clamping is recommended to extend relay contact life (1N 4004 or equivalent).
- N / C = Not Connected.
- N.O. = Normally Open.
- N.C. - Normally Closed.

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	8 OUT (normaly open)
External Power	Not required for this module
Power Dissipation	2.75 W + 0.5 W x input points ON
Bus Current required (Module)	560 mA
I/O map	0.5 output word

Operating Voltage

Operating Voltage

AC	20 ... 250 VAC
DC	5 ... 30 VDC 30 ... 150 VDC (reduced load Current)

Maximum Load Current

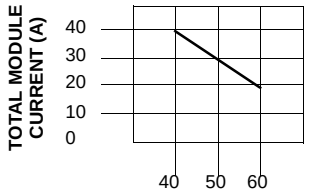
Maximum Load Current

Each Point	5 A max. @ 250 VDC @ 60 degrees C ambient, resistive load 2 A Tungsten lamp load 3 A @ a power factor of 0.4 1/4 hp @ 125 / 250 VAC
Each Point (30 ... 150 VDC)	300 mA (restive load) 100 mA (L/R = 10 msec)
Maximum module Current	40 A (see the derating curve below)
Surge Current (max.)	20 A capacitive load @ t = 10 ms

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The following figure shows the relay derating curve.

Relay Derating Curve



Minimum Load Current

Minimum Load Current

Minimum Load Current	50 mA Note: Minimum load Current if the contact is used at rated loads of 5 ... 150 VDC or 20 ... 250 VDC
OFF State Leakage	< 100 μA

Isolation

Isolation

Output to Output	1780 VAC rms for one minute
Field to Bus	1780 VAC rms for one minute 2500 for one minute

Response

Response

OFF - ON	10 ms (max.)
ON - OFF	20 ms (max.)

Relay

Relay

Relay type	Form C, NO / NC contacts
Contact Protection	Varistor 275 V (internal)
Mechanical Operations	10,000,000
Electrical Operations	200,000 (resistive load @ max. Voltage and Current)

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Electrical Operations (30 ... 150 VDC) (see note below)	100,000 @ 300 mA (resistive load) 50,000 @ 500 mA (resistive load) 100,000 @ 100 mA (L/R = 10 msec) 100,000 Interposing Relay (Westinghouse Style 606B, Westinghouse type SG, Struthers Dunn 219 x 13 XP)
Switching Capability	500 VA (reistive load)

Fuses

Fuses

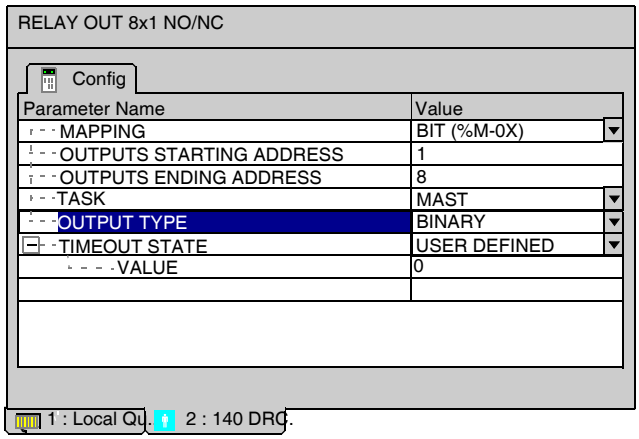
Internal	None
External	User discretion

Note: Relay contact life for inductive loads may be significantly increased by using external contact protection such as a clamping diode across the load.

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140 DRC 830 00 Parameter Configuration

Parameter Configuration Window



Parameter and Default Values

Name	Default Value	Options	Description
Mapping	BIT (%M-0x)	WORD (%MW-4X)	
Outputs Starting Address	1	1	
Outputs Ending Address	8	1	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Output Type	BINARY	BCD	
Timeout State	USER DEFINED	HOLD LAST VALUE	
Value	0	0-65535	only if Timeout State=USER DEFINED

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140 DVO 853 00: 10 ... 30 VDC 32x1 Verified OUT Module

45

Overview

Purpose

The following chapter provides information of the Quantum 140 DVO 853 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	448
Indicators	449
Wiring Diagram	450
Specifications	451
Maintenance	453
Addressing	454
Parameter Configuration	456

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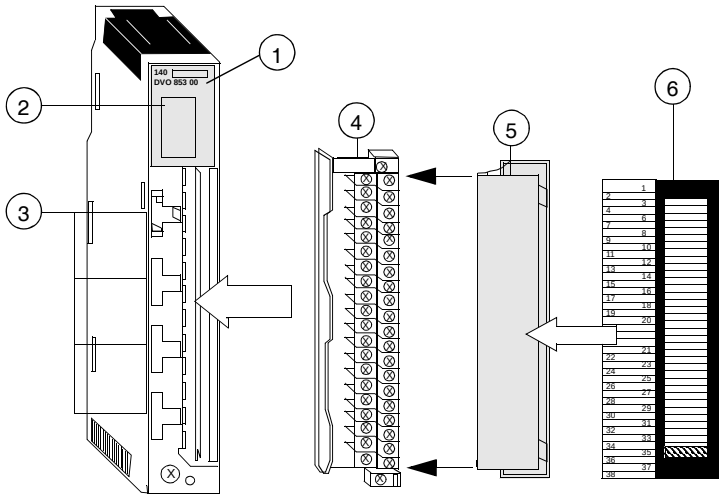
Presentation

Function

The Quantum 140 DVO 853 00 is a 10 ... 30 VDC, 32 point output module with diagnostic capability. The module will detect and report the output state sensed at the field connector and, depending on the selected configuration, will verify that the output point is in the state commanded by the PLC. The module is configured in four groups of eight outputs.

Illustration

The following figure shows the 140 DVO 853 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

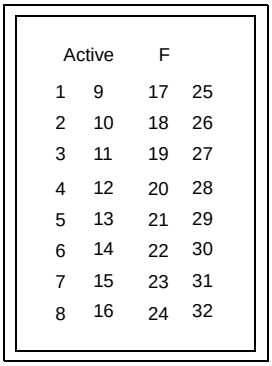
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DVO 853 00 module.



Descriptions

The following table shows the LED descriptions for the 140 DVO 853 00 module.

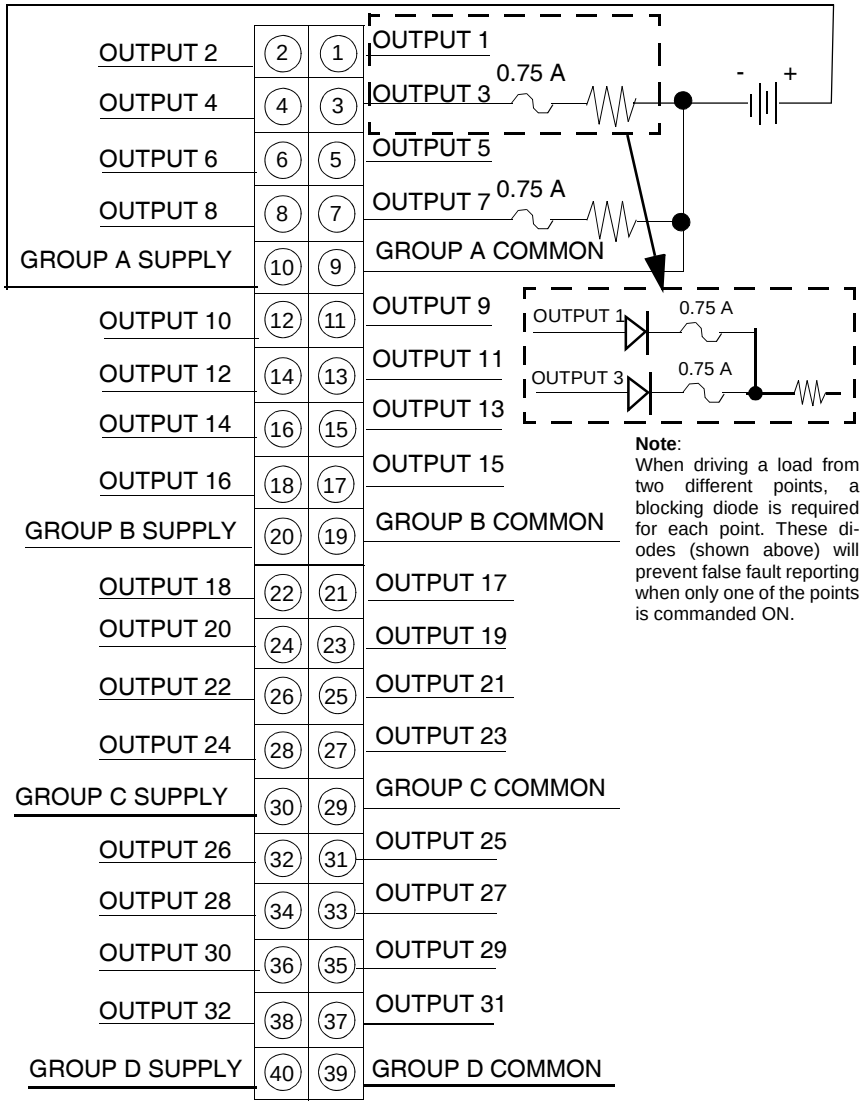
LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
1 ... 32	Green	The indicated point or channel is turned ON.

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Wiring Diagram

Illustration

The following figure shows the 140 DVO 853 00 wiring diagram.



Note:
When driving a load from two different points, a blocking diode is required for each point. These diodes (shown above) will prevent false fault reporting when only one of the points is commanded ON.

Note: When field wiring the I/O module, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	32 OUT (4 groups x 8 points)
External Power	10 ... 30 VDC
Power Dissipation	2.5 W + 0.1 W x input points ON + 0.4 V x total load Currents
Bus Current required (Module)	500 mA
I/O map	2 input word 2 output word
Fault Detection	Blown fuse detect, loss of field power, incorrect output state.

Voltage

Voltage

Operating Voltage (max.)	10 ... 30 VDC
Absolute Voltage (max.)	50 VDC for 1.0 ms decaying voltage pulse
ON State Drop / Point	0.4 VDC @ 0.5 A

Maximum Load Current

Maximum Load Current

Each Point	0.5 A
Each Group	4.0 A
Per Module	16 A
OFF State Leakage / Point	0.4 mA @ 30 VDC
Surge Current (max.)	Each Point: 2.5 A @ 1 ms duration (no more than 6 per minute)

Load Inductance / Capacitance (max.)

Load Inductance / Capacitance (max.)

Load Inductance (max.)	0.5 Henry @ 4 Hz switch frequency, or: $L = \frac{0.5}{I^2 F}$ where: L = Load inductance (henry) I = Load current (A) F = Switching Frequency (Hz)
Load Capacitance (max.)	75 mF
Tungsten Load (max.)	2.5 W @ 10 VDC 3 W @ 12 VDC 6 W @ 24 VDC

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Isolation / Protection

Isolation / Protection

Group to Group	500 VAC rms for 1 minute
Group to Bus	1780 VAC rms for 1 minute
Output Protection	Transient Voltage Suppression (internal), overload (short circuit) protecton

Response

Response

OFF - ON	1 ms (typical), 2 ms (max.)
ON - OFF	1 ms (typical), 2 ms (max.)

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Maintenance

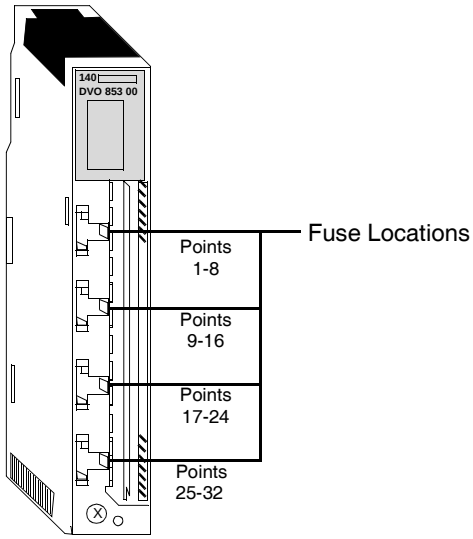
Fuses

Fuses

Internal	5.0 Amp fuse per group, P/N 0043502405
External	Nor required. If desired, q 3/4 A, 250 V fuse (P/N 57-0078-00) may be used

Illustration

The following figure shows the 140 DVO 853 00 module Fuse Locations.



	**CAUTION** **Possible danger to equipment or personnel.** Turn off power to the module and remove the field wiring terminal strip to gain access to fuses. **Failure to follow this precaution can result in injury or equipment damage.**

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Addressing

Flat Addressing

This module requires 32 contiguous, output references (%M) or 2 contiguous output words (%MW) for output data and 32 contiguous, input references (%I) or 2 contiguous input words (%IW) for verification input data. For a description of how to access the input points, please refer to *Discrete I/O Bit Numbering, p. 36*.
Output Words:

	MSB - First Word															
Output Point 1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

	MSB - Second Word															
Output Point 17	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

Input Words:

	MSB - First Word															
Input Sense Point 1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

	MSB - Second Word															
Input Sense Point 17	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

Topological Addressing

Topological addresses in Bit Mapping format:

Point	I/O Object	Comment
Input 1	%I[\b.e\]r.m.1	Value
Input 2	%I[\b.e\]r.m.2	Value
	• • •	
Input 31	%I[\b.e\]r.m.31	Value
Input 32	%I[\b.e\]r.m.32	Value
Output 1	%Q[\b.e\]r.m.1	Value
Output 2	%Q[\b.e\]r.m.2	Value
	• • •	
Output 31	%Q[\b.e\]r.m.31	Value
Output 32	%Q[\b.e\]r.m.32	Value

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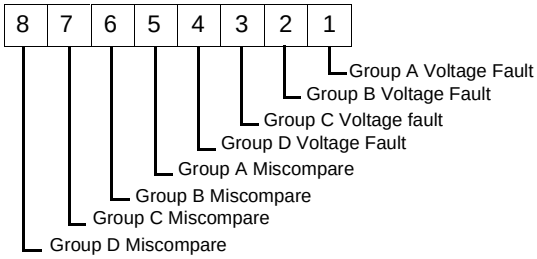
Topological addresses in Word Mapping format:

Point	I/O Object	Comment
Inputword 1	%IW[\b.e\]r.m.1.1	Value
Inputword 2	%IW[\b.e\]r.m.1.2	Value
Outputword 1	%QW[\b.e\]r.m.1.1	Value
Outputword 2	%QW[\b.e\]r.m.1.2	Value

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

I/O Map Status Byte

The eight bits in the I/O map status byte are used as follows:



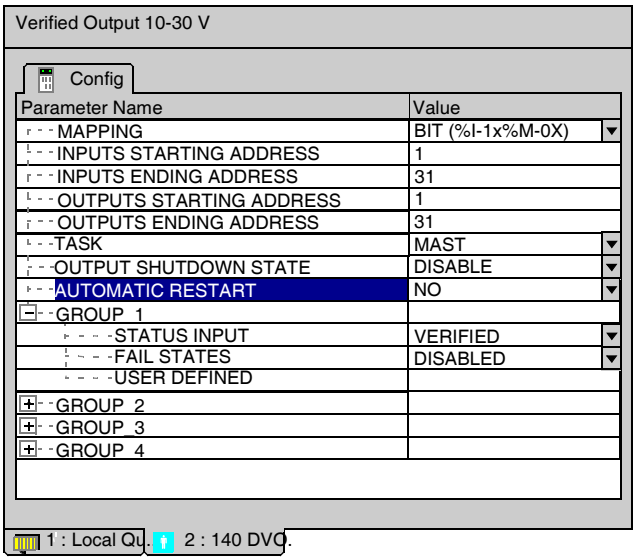
The voltage fault bit is set when the field supply is not present, or the group fuse is blown.
The miscompare bit is set when any point within the group does not match its commanded state.

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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



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Name	Default Value	Options	Description
Mapping	BIT (%I-1x%M-0x)	WORD (%MW-4X)	
Inputs Starting Address	1	1	
Inputs Ending Address	31	2	
Outputs Starting Address	1	1	
Outputs Ending Address	31	2	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Output Shutdown State	DISABLE	FAILE STATES	
Automatic Restart	No	Yes	
Group_1			
Status Input	VERIFIED HEALTH	VERIFIED FAULT INPUT ONLY ACTUAL	
Fail States	DISABLE	LAST VALUE USER DEFINED	
User Defined	0	0-255	only enabled if Fail States=USER DEFINED
Group_2 Group_3 Group_4			see Group_1

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Discrete IN / OUT Modules

VII

At a Glance

Introduction

The following part provides information on the Quantum Discrete IN / OUT modules.

What's in this Part?

This part contains the following chapters:

Chapter	Chapter Name	Page
46	General Information	461
47	140 DDM 390 00: 24 VDC 2x8 Sink IN / 2x4 Source OUT Module	463
48	140 DDM 690 00: 125 VDC High Power IN/OUT Module	475
49	140 DAM 590 00: 115 VAC 2x8 IN / 2x4 OUT Module	487

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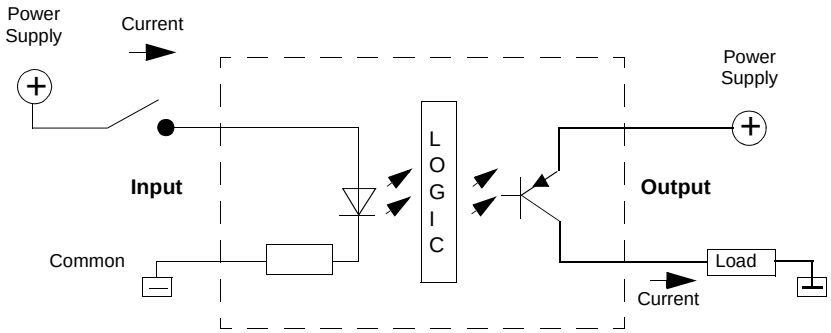
General Information

46

Discrete I/O Logic Circuits

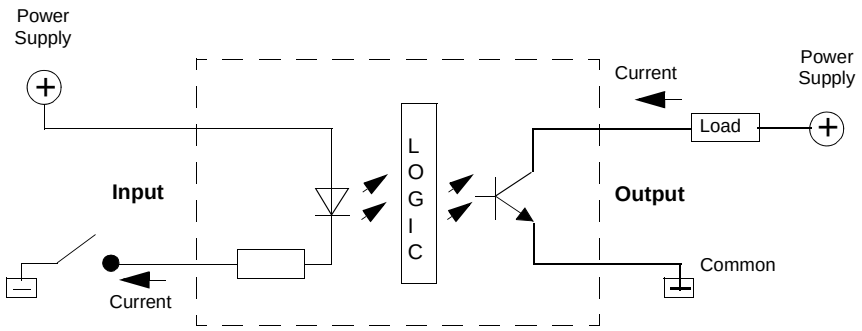
Discrete I/O True High Figure

The following figure shows true high/current sink input/current source output schematic.



Discrete I/O True Low Figure

The following figure shows true low/current source input/current sink output schematic.



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Current Sinking	This describes a physical implementation of the I/O hardware, which when in the true state, sinks current from the external load.
Current Sourcing	This describes a physical implementation of the I/O hardware, which when in the true state, sources current to the external load.

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140 DDM 390 00: 24 VDC 2x8 Sink IN / 2x4 Source OUT Module

47

Overview

Purpose

The following chapter provides information of the Quantum 140 DDM 390 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	464
Indicators	465
RIO Drop Location	466
Wiring Diagram	467
Specifications	469
Maintenance	471
140 DDM 390 00 Parameter Configuration	472

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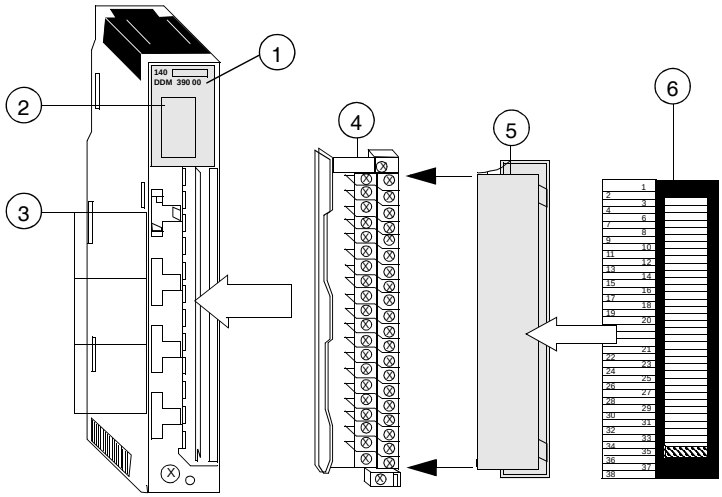
Presentation

Function

The DC Input 24 VDC 2x8 Sink / DC Output 24 VDC 2x4 Source module accepts and switches 24 VDC inputs/outputs and is for use with sink input and source output devices.

Illustration

This section contains a photograph of the front panel of the 140 DDM 390 00 module
The following figure shows the I/O module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

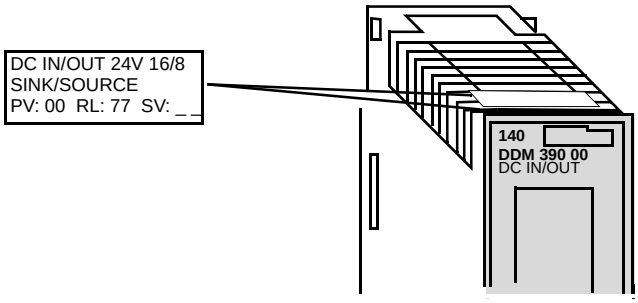
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

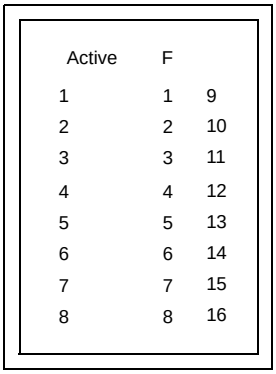
Version Label Figure

The following figure shows the location of the version label.



Illustration

The following table shows the LED indicators for the 140 DDM 390 00 module.



Descriptions

The following table shows the LED descriptions for the 140 DDM 390 module.

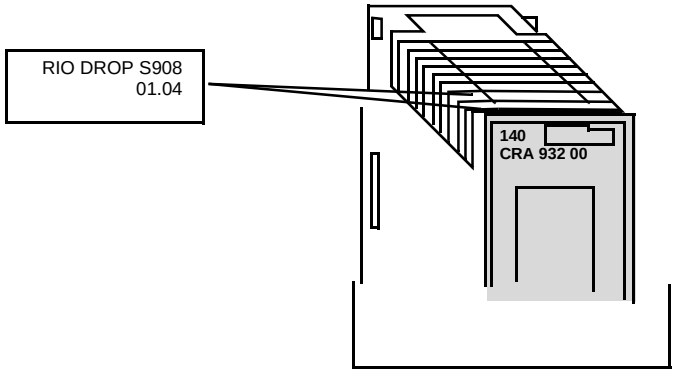
LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
1 ... 8 (left columns)	Green	The indicated output point and channel is turned ON.
1 ... 16 (right two columns)	Green	The indicated input point and channel is turned ON.

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RIO Drop Location

RIO Drop Location Figure

The following figure shows the RIO drop location.

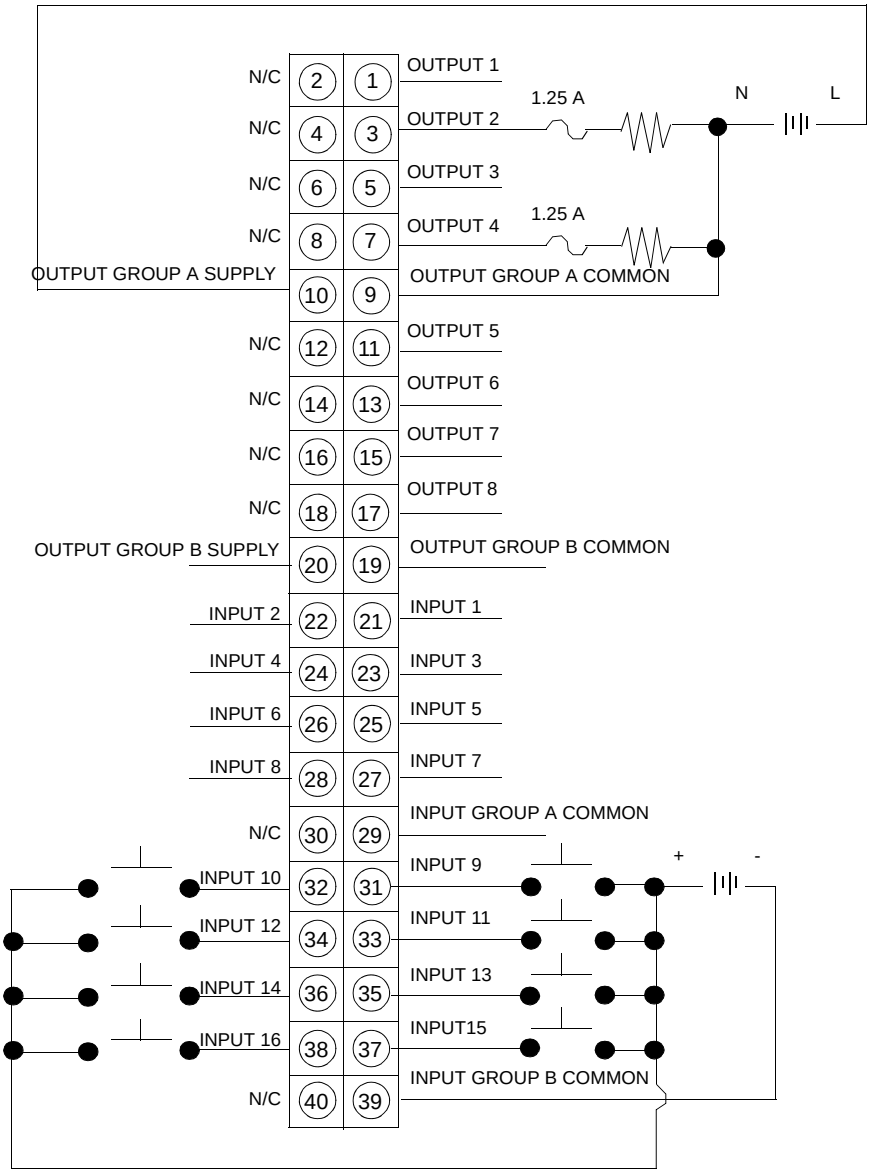


Note: If the 140 DDM 390 00 module is used in a RIO drop, the 140 CRA 93X 00 RIO Drop must be Version 1.04 at a minimum. Check the version label (see below) on the top front of the 140 CRA 93X 00 module and ensure that it is at the proper revision level

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Wiring Diagram

Illustration The following figure shows the 140 DDM 390 00 wiring diagram.



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Note: N / C = Not Connected

Note: When field wiring the I/O modules, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.



CAUTION

Possible Equipment Failure

Each group is protected with a 5 A fuse to protect the module from catastrophic failure. The group fuse will not be guaranteed to protect each output switch for all possible overload conditions. It is recommended that each point be fused with a 1.25 A fuse, Part # 043508930 (Littlefuse 3121.25, 1.25 A, 250 V).

Failure to follow this precaution can result in injury or equipment damage.



CAUTION

Electrical safety hazard

Turn off power to the module and remove the field wiring terminal strip to gain access to fuses.

Failure to follow this precaution can result in injury or equipment damage.

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Specifications

General Specifications

General Specifications

Module Type	16 IN (2 groups x 8 points) 8 OUT (2 groups x 4 points)
External Power	Not required for this module
Power Dissipation	1.75 W + 0.36 x input points ON + 1.1 V x total outputs load Currents
Bus Current required (Module)	330 mA
I/O map	1 input word 0.5 output word
Fault Detection	Input: None Output: Blown fuse detect, loss of field power.

Input Rating

Input Rating

ON level voltage	+15 ... +30 VDC
ON level current	2.0 mA (min.)
OFF leve voltage	+3 ... +5 VDC
OFF level current	0.5 mA (max.)
Internal Resistance	2.5 kohm

Absolute Maximum Input

Absolute Maximum Input

Continuous	30 VAC
1.3 ms	56 VAC decaying pulse

Voltage (Output)

Voltage (Output)

Operating Voltage (max.)	19.2 ... 30 VDC
Absolute Voltage (max.)	56 VDC for 1.3 ms decaying voltage pulse
ON State Drop / Point	0.4 VDC @ 0.5 A

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Maximum Load Current

Maximum Load Current

Each Point	0.5 A
Each Group	2.0 A
Per Module	4 A
OFF State Leakage / Point	0.4 mA @ 30 VDC
Surge Current (max.)	Each Point: 5 A @ 500 ms duration (no more than 6 per minute)

Load Inductance / Capacitance (max.)

Load Inductance / Capacitance (max.)

Load Inductance (max.)	0.5 Henry @ 4 Hz switch frequency, or: $L = \frac{0.5}{I^2 F}$ where: L = Load inductance (henry), I = Load current (A), F = Switching Frequency (Hz)
Load Capacitance (max.)	50 microF

Isolation

Isolation

Group to Group	500 VAC rms for 1 minute
Group to Bus	1780 VAC rms for 1 minute

Response (Input and Output)

Response (Input and Output)

OFF - ON	1 ms (max) - (resistive load output)
ON - OFF	1 ms (max) - (resistive load output)

Module Protection

Module Protection

Input Protection	Resistor limited
Output Protection	Transient Voltage Suppression (internal)

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Maintenance

Fuses

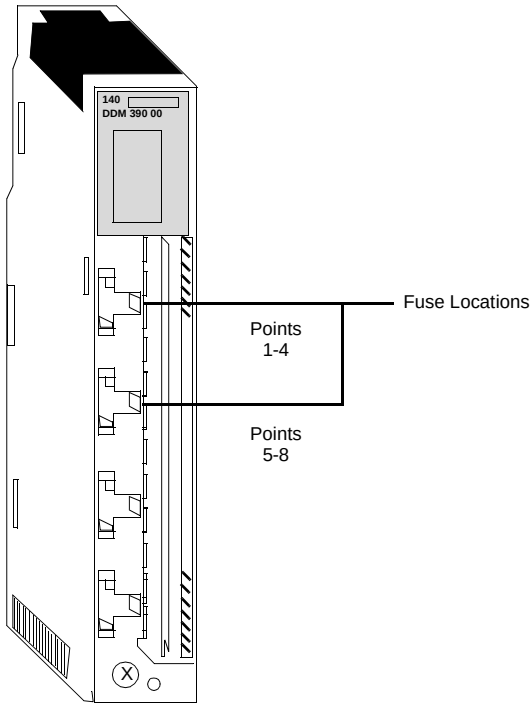
Fuses

Input	Internal - None External - User discretion
Output	Internal - 5 A fuse for each group (Part # 043502405 or equivalent). Forthe location of the fuses, see figure External - 5 A for each group

	**CAUTION** **Possible injury to personnel or equipment.** Turn off power to the module and remove the field wiring terminal strip to gain access to fuses. **Failure to follow this precaution can result in injury or equipment damage.**

Illustration

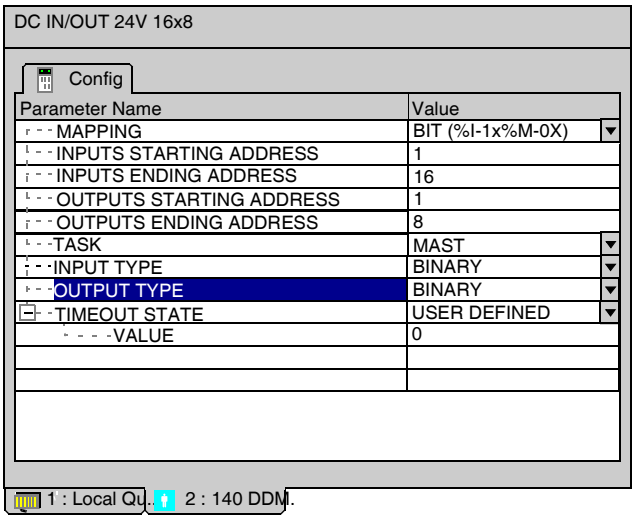
The following figure shows the fuse locations of the 140 DDM 390 00 module.



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140 DDM 390 00 Parameter Configuration

Parameter Configuration Window



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Parameter and Default Values

Name	Default Value	Options	Description
Mapping	BIT (%I-1x%M-0x)	WORD (%IW-3x%MW-4X)	
Inputs Starting Address	1	1	
Inputs Ending Address	16	1	
Outputs Starting Address	1	1	
Outputs Ending Address	8	1	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Input Type	BINARY	BCD	
Output Type	BINARY	BCD	
Timeout State	USER DEFINED	HOLD LAST VALUE	
Value	0	0-65535	only enabled if Timeout State=USER DEFINED

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140 DDM 690 00: 125 VDC High Power IN/OUT Module

48

Overview

Purpose

The following chapter provides information of the Quantum 140 DDM 690 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	476
Indicators	478
Wiring Diagram	480
Specifications	482
140 DDM 690 00 Parameter Configuration	485

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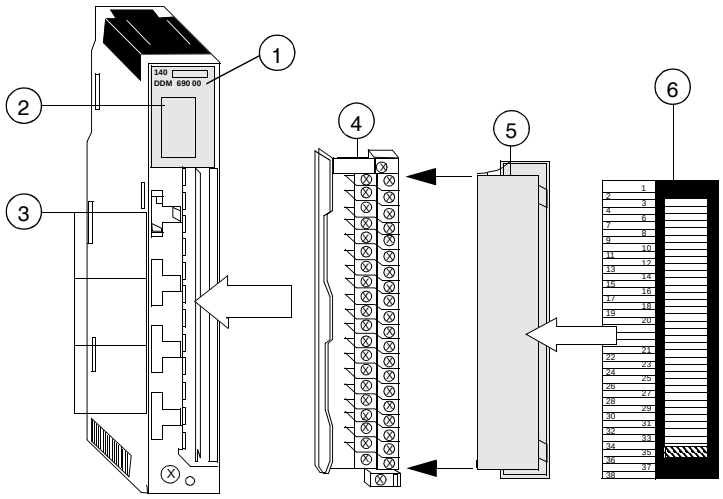
Presentation

Function

The 125 VDC High Power IN/OUT module provides four isolated outputs and four grouped inputs. The outputs switch 24 to 125 VDC powered loads and are for use with sink and source devices. The outputs also have short-circuit sense, indication, and shutdown circuitry. The inputs accept 125 VDC inputs and are for use with source output devices. The inputs have software-selectable response times to provide additional input filtering.

Illustration

This section contains a photograph of the front panel of the 140 DDM 690 00 module
The following figure shows the I/O module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Note: The following information baselines minimum version levels that will support this module.

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Indicators

Version Levels Table

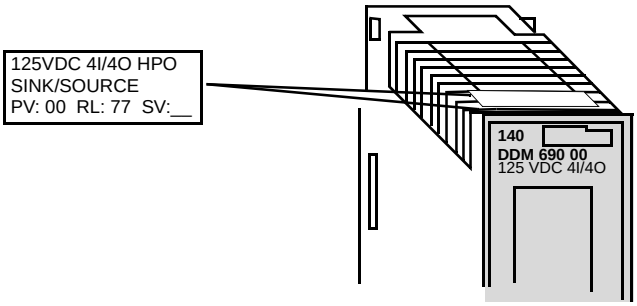
The following table shows the version levels for the Module Types.

Products	Minimum Version Level (see label illustration below)	User Action Required
CPUs and NOMs	< V02.20	Executive upgrade to ≥ V02.10
	≥ V02.20	None
RIOs	< V02.00	Module upgrade
	≥ V02.00 and < V02.20	Executive upgrade to ≥ V01.10
	≥ V02.20	None
DIOs	< V02.10	Module upgrade
	≥ V02.10	None

Note: The version label, see figure, is found on the top front of the module.

Version Label Figure

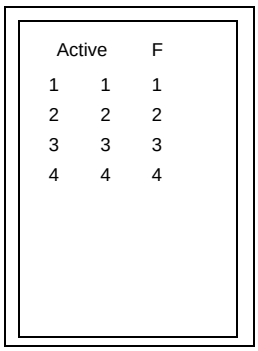
The following figure shows the version number location.



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Illustration

The following table shows the LED indicators for the 140 DDM 690 00 module.



Descriptions

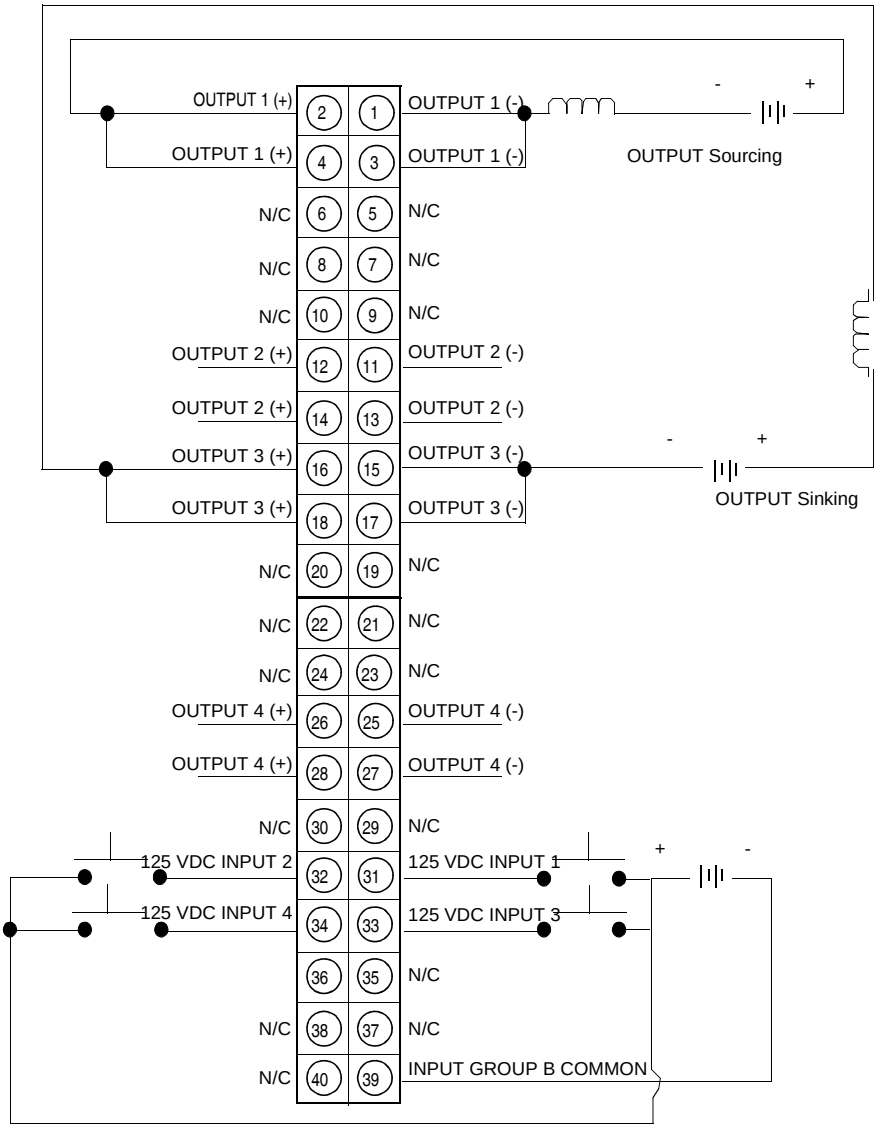
The following table shows the LED descriptions for the 140 DDM 690 module.

LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	Over current condition on any point.
1 ... 4 (left columns)	Green	The indicated output point is turned ON.
1 ... 4 (middle columns)	Red	The indicated input point has an over current condition.
1 and 4 (right columns)	Green	The indicated input point is turned ON.

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Wiring Diagram

Illustration The following figure shows the 140 DDM 690 00 wiring diagram.



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	**CAUTION** **Polarity awareness** The output points are not protected against reverse polarity. Reverse polarity will turn an output point ON. **Failure to follow this precaution can result in injury or equipment damage.**

Note: Each output has two terminals for multiple wire connections.
N / C = Not Connected.

Note: When field wiring the I/O modules, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.

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Specifications

General Specifications

General Specifications

Module Type	4 IN (4 groups x 1 point) 4 OUT isolated
External Power	Not required for this module
Power Dissipation	0.4 W x (1.0) x number of input points ON + (0.75) x total module outputs Currents
Bus Current required (Module)	350 mA
I/O map	1 input word 1 output word
Fault Detection	Input: None Over Current - each point

Input Rating

Input Rating

ON level voltage	+88 ... +156 VDC including ripple
ON level current	2.0 mA (min.)
OFF leve voltage	0 ... +36 VDC
OFF level current	1.2 mA (max.)
Internal Resistance	24 kohms (nominal)
Absolute Voltage (max.)	Continuous: 156.2 VDC including ripple

Input Response (OFF-ON, ON-OFF)

Input Response (OFF-ON, ON-OFF)

Default Filter	0.5 ms
Non-Default Filter	1.5 ms

Voltage (Output)

Voltage (Output)

Operating Voltage (max.)	19.2 ... 156.2 VDC including ripple
ON State Drop / Point	0.75 VDC @ 4 A

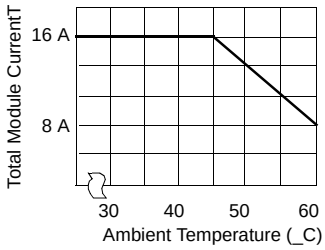
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Maximum Load Current

Maximum Load Current

Each Point	4 A continuous
Per Module	16 A continuous (see the derating curve)
OFF State Leakage / Point	1.2 mA @ 150 VDC
Surge Current (max.)	Each Point: 30 A @ 500 ms duration
Output Response (OFF-ON, ON-OFF)	0.2 ms (max.) (resistive load output

The following figure shows the 140 DDM 690 00 Derating Curve.



Load Inductance / Capacitance (max.)

Load Inductance / Capacitance (max.)

Load Inductance (max.)	For switching intervals ≥ 15 seconds per ANSI/IEEE C37.90- 1978/1989): $L \leq \frac{9}{I^2}$ For repetitive switching: $L \leq \frac{9}{I^2 F}$ where: L = Load Inductance (Henry). I = Load Current (A). F = Switching Frequency (Hz)
Load Capacitance (max.)	0.1 microF @ 150 VDC 0.6 microF @ 24 VDC

Isolation

Isolation

Input Group to Output	1780 VAC rms for 1 minute
Output to Output	2500 VAC rms for 1 minute

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Module Protection

Module Protection

Input Protection	Resistor limited
Output Protection	Transient Voltage Suppresion (internal)

Fuses

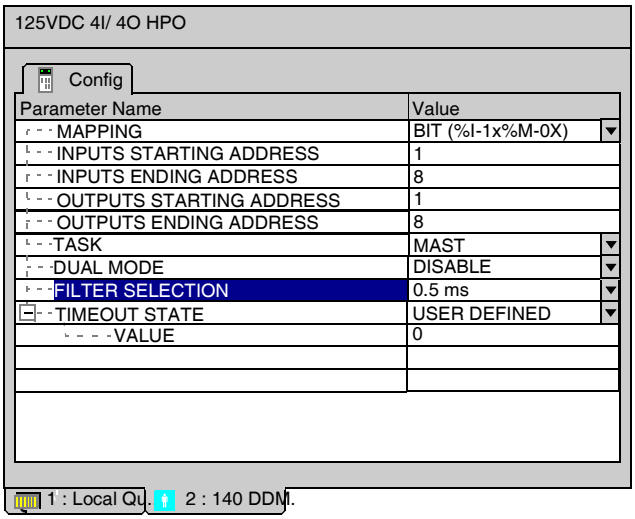
Fuses

Input	Internal - None External - User discretion
Output	Each output is protected by an electronic shutdown: For current output surges between 4 A and 30 A, the input point will shutdown after 0.5 s. For current surges greater than 30 A, the output will shutdown immediately.

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140 DDM 690 00 Parameter Configuration

Parameter Configuration Window



Parameter and Default Values

Name	Default Value	Options	Description
Mapping	BIT (%I-1x%M-0x)	WORD (%IW-3x%MW-4X)	
Inputs Starting Address	1	1	
Inputs Ending Address	8	1	
Outputs Starting Address	1	1	
Outputs Ending Address	8	1	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Dual Mode	DISABLE	ENABLE	
Filter Selection	0.5 ms	1.5 ms	
Timeout State	USER DEFINED	HOLD LAST VALUE	
Value	0	0-65535	only enabled if Timeout State=USER DEFINED

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140 DAM 590 00: 115 VAC 2x8 IN / 2x4 OUT Module

49

Overview

Purpose

The following chapter provides information of the Quantum 140 DAM 590 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	488
Indicators	489
RIO Drop Location	490
Wiring Diagram	491
Specifications	493
Maintenance	496
140 DAM 590 00 Parameter Configuration	497

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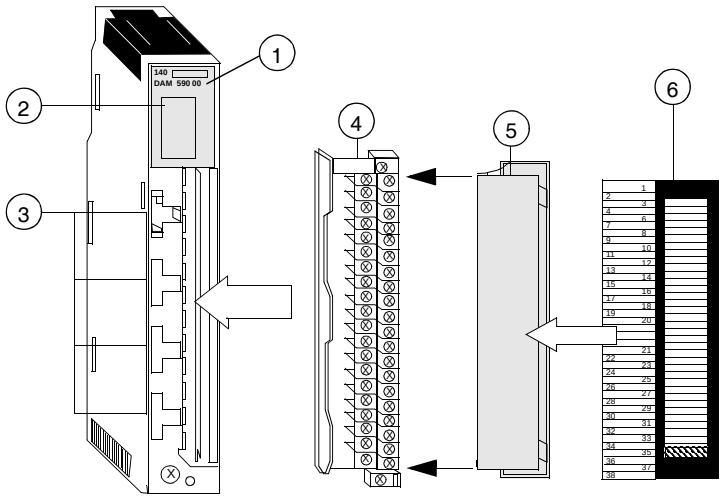
Presentation

Function

The AC Input 115 VAC 2x8 / AC Output 115 VAC 2x4 module accepts 115 VAC inputs and switches 115 VAC loads.

Illustration

This section contains a photograph of the front panel of the 140 DAM 590 00 module The following figure shows the 140 DAM 590 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

6 Customer Identification Label (Fold label and place it inside door)

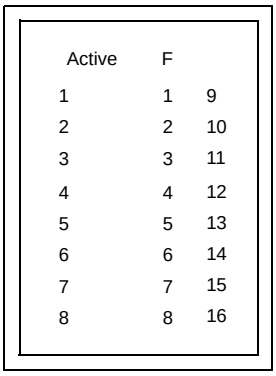
Note: The field wiring terminal strip (Modicon #140 XTS 002 00) must be ordered separately. (The terminal strip includes the removable door and label.)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DAM 590 00 module.



Descriptions

The following table shows the LED descriptions for the 140 DAM 590 module.

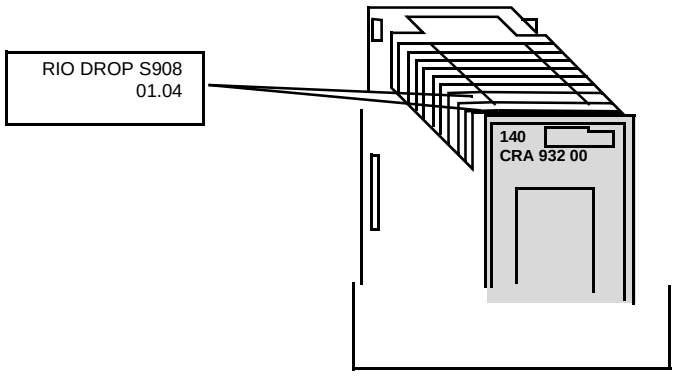
LEDs	Color	Indication when ON
Active	Green	Bus communication is present.
F	Red	A fault (external to the module) has been detected.
1 ... 8 (left columns)	Green	The indicated output point and channel is turned ON.
1 ... 16 (right two columns)	Green	The indicated input point and channel is turned ON.

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RIO Drop Location

RIO Drop Location Figure

The following figure shows the RIO drop location.

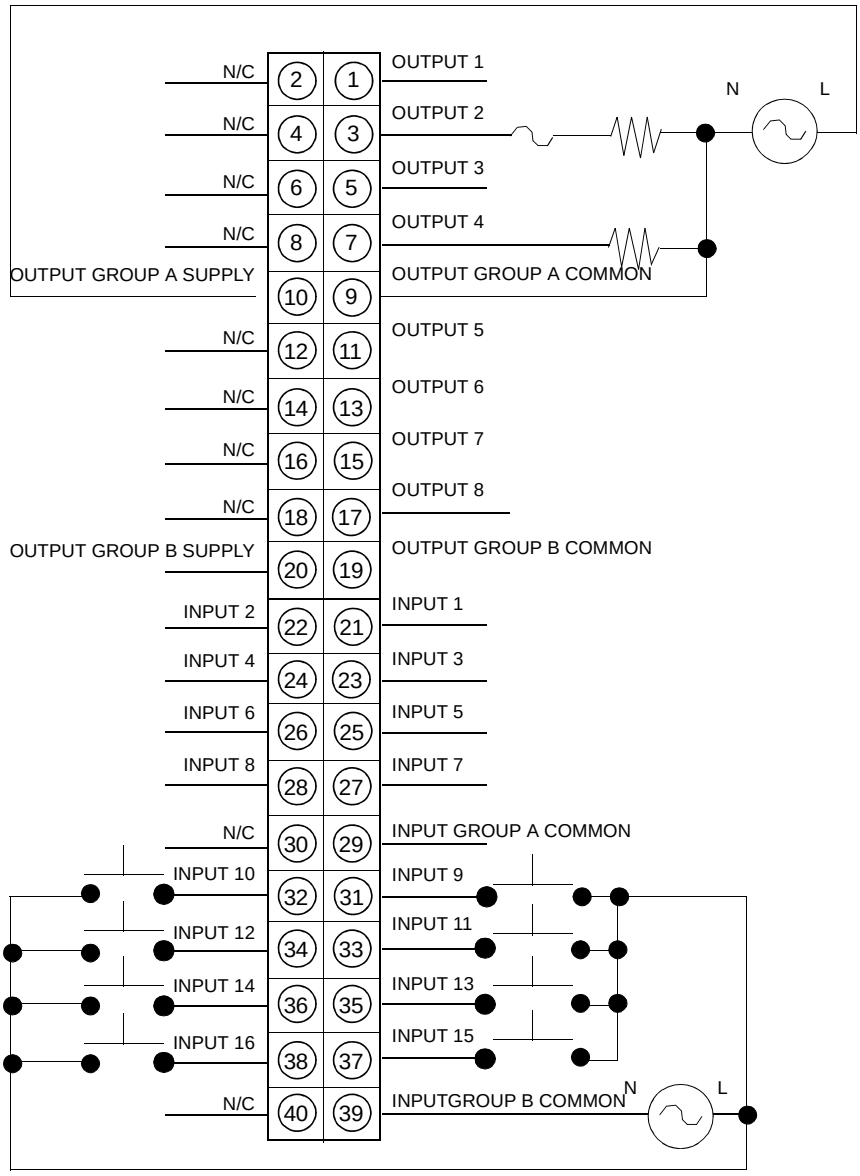


Note: If the 140 DAM 590 00 module is used in a RIO drop, the 140 CRA 93X 00 RIO Drop must be Version 1.04 at a minimum. Check the version label (see below) on the top front of the 140 CRA 93X 00 module and ensure that it is at the proper revision level

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Wiring Diagram

Illustration The following figure shows the 140 DAM 590 00 wiring diagram.



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Note: When field wiring the I/O modules, the maximum wire size that should be used is 1-14 AWG or 2-16 AWG; the minimum size is 20 AWG.



CAUTION

Electrical shock hazard

Turn off power to the module and remove the field wiring terminal strip to gain access to the fuses.

Failure to follow this precaution can result in injury or equipment damage.



CAUTION

Wiring Compatibility

If an external switch is wired to control an inductive load in parallel with the module output, then an external varistor (Harris V390ZA05 or equivalent) must be wired in parallel with the switch.

Failure to follow this precaution can result in injury or equipment damage.

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Specifications

General Specifications

General Specifications

Module Type	16 IN (2 groups x 8 points) 8 OUT (2 groups x 4 points)
External Power	85 ... 132 VAC required for output groups
Power Dissipation	5.5 W + 1.1 V x Total module load current
Bus Current required	250 mA
I/O map	1 input word 0.5 output word
Fault Detection	Input: None Output: Blown fuse detect, loss of field power.

Operating Voltage and Input Current*

Operating Voltage and Input Current*

50 Hz	ON: 85 ... 132 VAC (11.1 mA max) OFF: 0 ... 20 VAC
60 Hz	ON: 79 ... 132 VAC (13.2 mA max) OFF: 0 ... 20 VAC * Do not use outside the 47 ... 63 Hz range
Maximum Allowable Leakage Current from an External Device to be recognized as an OFF Condition.	2.1 mA

Typical Input Impedance

Typical Input Impedance

50 Hz	14.4 kohms capacitive
60 Hz	12 kohms capacitive

Absolute Maximum Input

Absolute Maximum Input

Continuous	132 VAC
10 s	156 VAC
1 Cycle	200 VAC

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Response (Inputs)

Response (Inputs)

OFF - ON	Min: 4.9 ms. Max: 0.75 line cycle.
ON - OFF	Min: 7.3 ms. Max: 12.3 ms.

Note: Input signals must be sinusoidal with less than 6% THD and 63 Hz maximum frequency.

Maximum Voltage (Output)

Maximum Voltage (Output)

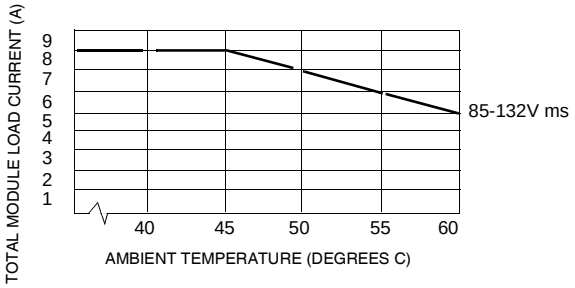
Continuous	85 ... 132 VDC
10 sec	156 VDC
1 Cycle	200 VDC
ON State Drop / Point	1.5 VDC

Maximum Load Current / OFF State Leakage

Maximum Load Current / OFF State Leakage

Each Point	4 A continuous
Each Group	4 A continuous
Per Module	8 A continuous (see chart below for derating above 50 degree)
OFF State Leakage / Point	2 mA @ 115 VDC

The following figure shows the 140 DAM 590 00 Operating Curve.



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Maximum Surge Current / Min. Load Current

Maximum Surge Current / Min. Load Current

One Cycle	30 A per point, 45 A per group
Two Cycle	20 A per point, 30 A per group
Three Cycle	10 A per point, 25 A per group
Min. Load Current	5 mA

Response

Response

OFF - ON / ON - OFF	0.5 of one line cycle max.
Applied DV / DT	400 V / micro sec

Isolation

Isolation

Group to Group	1000 VAC for 1 minute
Input or Output to Bus	1780 VAC for 1 minute

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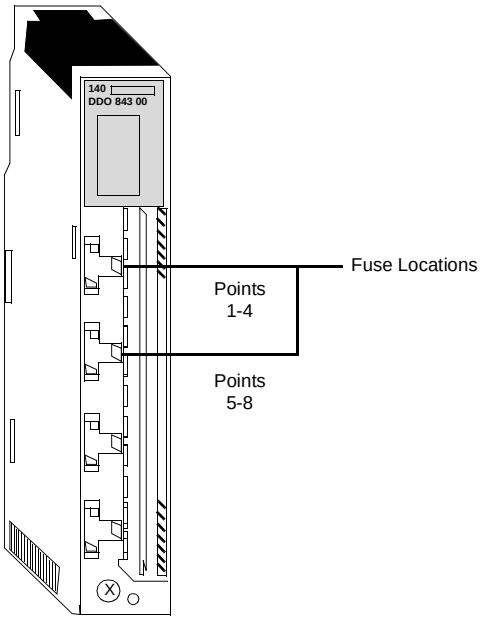
Maintenance

Fuses

Fuses

Input	Internal - None External - User discretion
Output	Internal - 5 A fuse for each group (Part # 043502405 or equivalent). For the location of the fuses, see figure. External - User discretion

The following figure shows the fuse locations for the 140 DAM 590 00 module.

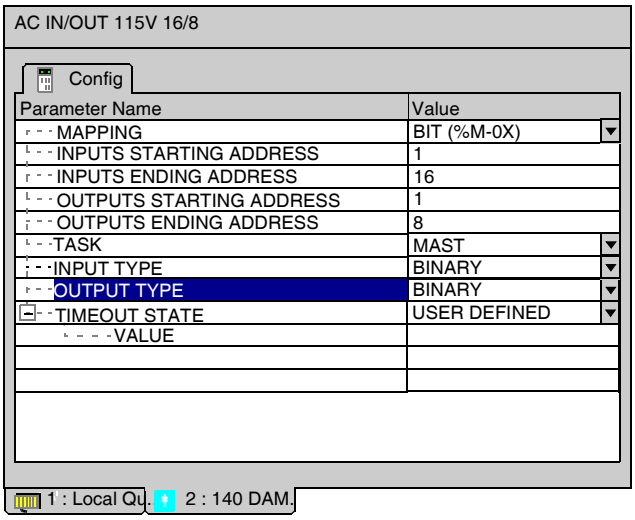


Note: Turn off power to the module and remove the field wiring terminal strip to gain access to the fuses.

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140 DAM 590 00 Parameter Configuration

Parameter Configuration Window



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Parameter and Default Values

Name	Default Value	Options	Description
Mapping	BIT (%I-1x%M-0x)	WORD (%IW-3x%MW-4X)	
Inputs Starting Address	1	1	
Inputs Ending Address	16	1	
Outputs Starting Address	1	1	
Outputs Ending Address	8	1	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Input Type	BINARY	BCD	
Output Type	BINARY	BCD	
Timeout State	USER DEFINED	HOLD LAST VALUE	
Value	0	0-65535	only enabled if Timeout State=USER DEFINED

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Quantum Intrinsically Safe Analog/Digital Modules

VIII

At a Glance

Introduction

The following part provides information on the Quantum Intrinsically Safe Analog/ Digital Modules.

What's in this Part?

This part contains the following chapters:

Chapter	Chapter Name	Page
50	General Information	501
51	140 AII 330 00: Safe Analog IN Module	505
52	140 AII 330 10: Safe Analog IN Module	527
53	140 AIO 330 00: Safe Analog OUT Module	541
54	140 DII 330 00: Safe Discrete IN Module	555
55	140 DIO 330 00: Safe Discrete OUT Module	565

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General Information

50

Overview

Purpose

This chapter provides general information on Intrinsically Safe Modules.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Purpose and Considerations	502
Wiring Practices	503

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Purpose and Considerations

Purpose

Intrinsic safety is a technique for ensuring that electrical energy supplied to circuits in a hazardous area is too low to ignite volatile gases either by spark or thermal means. Intrinsically safe circuits use energy limiting devices known as intrinsically safe barriers to prevent excess electrical energy from being applied to electrical equipment located in the hazardous area.

Module Location

The Quantum Intrinsically Safe family of modules are entity certified to be installed in safe areas to monitor/control intrinsically safe apparatus located In hazardous areas.

Intrinsically Safe Barriers

All Quantum Intrinsically Safe modules use galvanic isolation to provide the intrinsically safe barrier between them and the field devices located in hazardous areas. Galvanic isolation in the form of an opto-isolatior and DC/DC converter is provided between the field side output circuitry and the Quantum bus circuitry. The maximum agency specified intrinsically safe parameters are:

$$V_{oc} \leq 28 \text{ VDC} \quad \text{and} \quad I_{sc} \leq 100\text{mA}$$

Intrinsically Safe Power Supply

DC/DC converters in Quantum Intrinsically Safe modules provide intrinsically safe power to field devices located in hazardous areas. No external field power is required where these modules are installed.

Installation of Quantum Intrinsically Safe Modules

Quantum Intrinsically Safe modules are designed to fit into a standard 140 XBP OXX 00 Quantum backplane. The modules can be installed in any slot position in the backplane. (The first slot is normally reserved for the power supply module.)

Hot Swapping

	**WARNING**
	Hot Swap Do not attempt to hot swap a Quantum Intrinsically Safe module. **Failure to follow this precaution can result in death, serious injury, or equipment damage.**

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Wiring Practices

Safe Area Wiring Practices

Intrinsically safe wiring between Quantum Intrinsically Safe modules and the field devices located in the hazardous area must be separated from all other wiring. This can be accomplished by the following methods:

- Separate blue wire ducts, raceways or conduits
- Grounded metal or insulated partitions between the intrinsically safe and non-intrinsically safe wiring
- a separation of two inches (50 mm) of air space between the intrinsically safe and non-intrinsically safe wiring. With this method, the intrinsically safe and non-intrinsically safe wires must be tied down in separate bundles to maintain the required separation.

Identification and Labeling

Intrinsically safe wiring must be properly identified and labeled. Light blue color coding should be used for all intrinsically safe wiring. The terminal strip wiring connector on all Quantum Intrinsically Safe modules is colored blue to distinguish it from all non-intrinsically safe modules.
All wire ducts, raceways, cable trays, and open wiring must be labeled "Intrinsically Safe Wiring" with a maximum spacing of 25 ft. between labels.

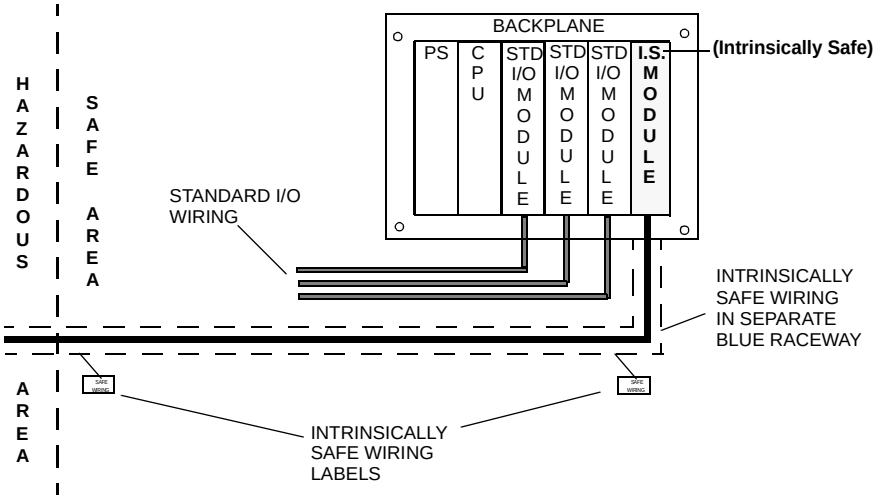
Wiring Type and Grounding

Shielded twisted pair wires shall be used for each of the input or output pairs connected to the Quantum Intrinsically Safe module blue terminal strip. The wire gauge size can be between AWG 20 and AWG 12. Each twisted pair wire shield must be connected to the ground screws on the backplane, at the module end, and left open at the field device connection end in the hazardous area. The instruction sheet packaged with each Quantum Intrinsically Safe module contains a wiring diagram applicable to that type of module.

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Intrinsically Safe Wiring Diagram

The following diagram illustrates a Quantum Intrinsically Safe module using a separate raceway to isolate its external wiring to the hazardous area. This is just one of the possible ways of field wiring the module. Other methods would include bundling and laying the intrinsically safe wires in the same wiring trough with the bundled non-intrinsically safe wires, with each bundle tied down and separated by minimum of two inches of air space through out the wiring runs.



Questions Regarding Intrinsically Safe Wiring Practices

The information concerning intrinsic safety wiring practices, is general in-nature and is not intended to cover installation requirements for any specific site. Questions regarding intrinsic safety wiring requirements for your site should be referred to the approval agencies listed

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140 AII 330 00: Safe Analog IN Module

51

Overview

Purpose

The following chapter provides information of the Quantum 140 AII 330 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	506
Indicators	507
Wiring Diagrams	508
Specifications	517
Addressing	520
Parameter Configuration	523

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Presentation

Function

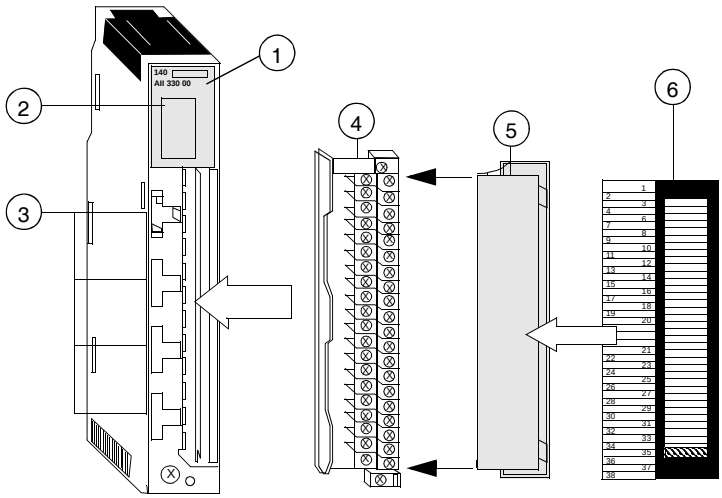
The Quantum 140 AII 330 00 Intrinsically Safe Analog Input module will interface with eight intrinsically safe analog inputs, which are software-configurable on a module basis with either RTD/Resistance or thermocouple/millivolt inputs.

When it is configured as an RTD/Resistance Input module, it supports 100W, 200W, 500W, and 1000W platinum (American or European) and nickel sensors. The module also allows any mix and match of sensor type or resistance inputs that can be configured by the software.

When it is configured as a Thermocouple/Millivolt Input module, it accepts B, J, K, E, R, S and T type thermocouples. The module also allows any mix and match of thermocouple or millivolt inputs that can be configured by the software.

Illustration

The following figure shows the 140 AII 330 00 Intrinsically Safe module and its components.



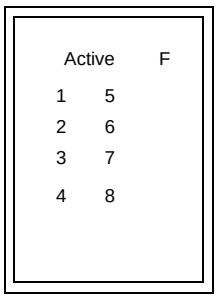
1 Model Number, Module Description, Color Code
2 LED Display
3 Fuse Cutouts
4 Field Wiring Terminal Strip
5 Removable Door
6 Customer Identification Label (Fold label and place it inside door)

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Indicators

Illustration

The following table shows the LED indicators for the 140 AII 330 00 module.



Descriptions

The following table shows the LED descriptions for the 140 AII 330 00 module.

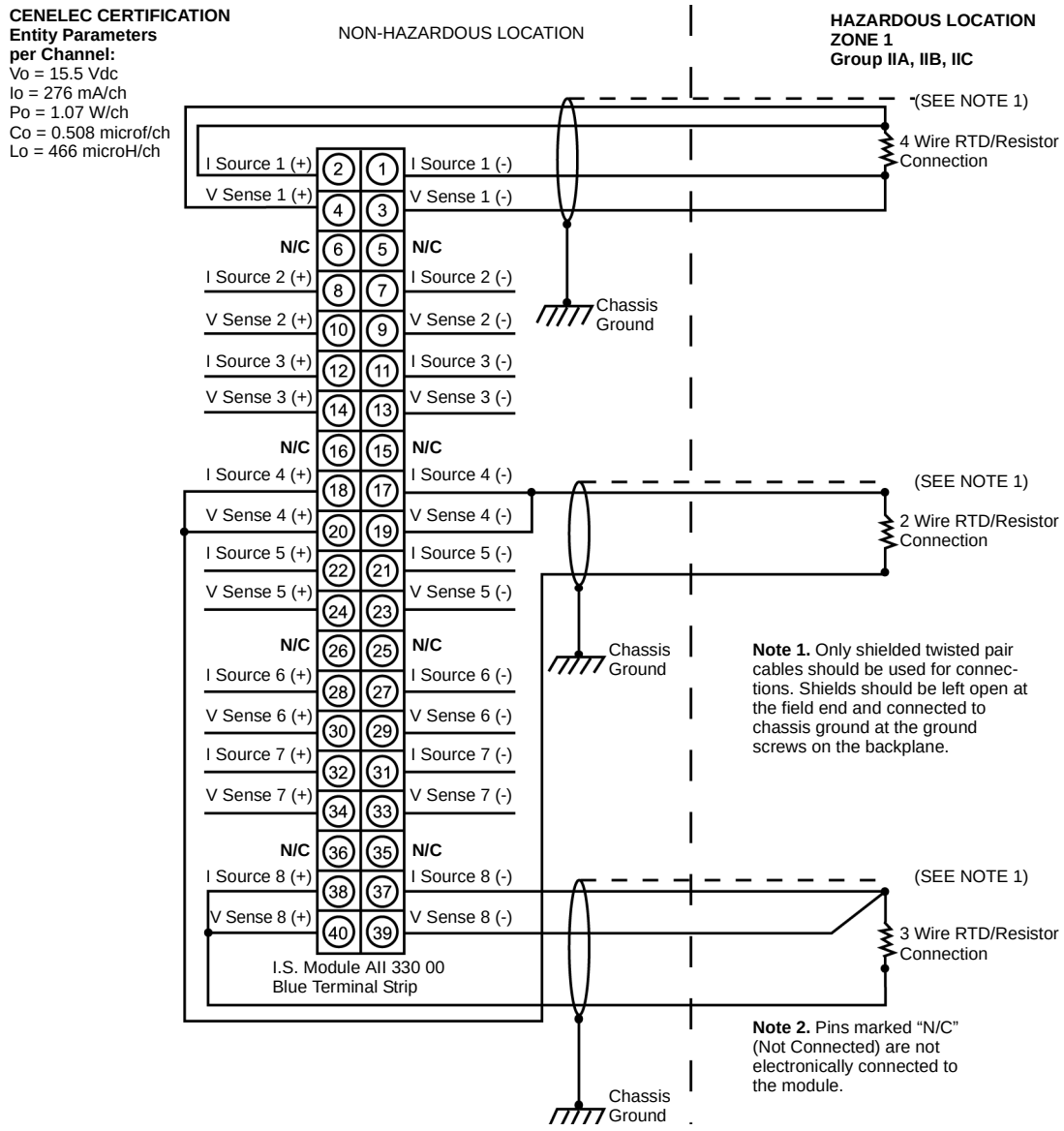
LEDs	Color	Indication When On
Active	Green	Communicating with the PLC
F	Red	A broken wire (4 ... 20 mA, only), out-of-range condition or short circuit on any channel
1 .. 8	Red	A broken wire, out-of-range condition or short circuit on the indicated channel

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Wiring Diagrams

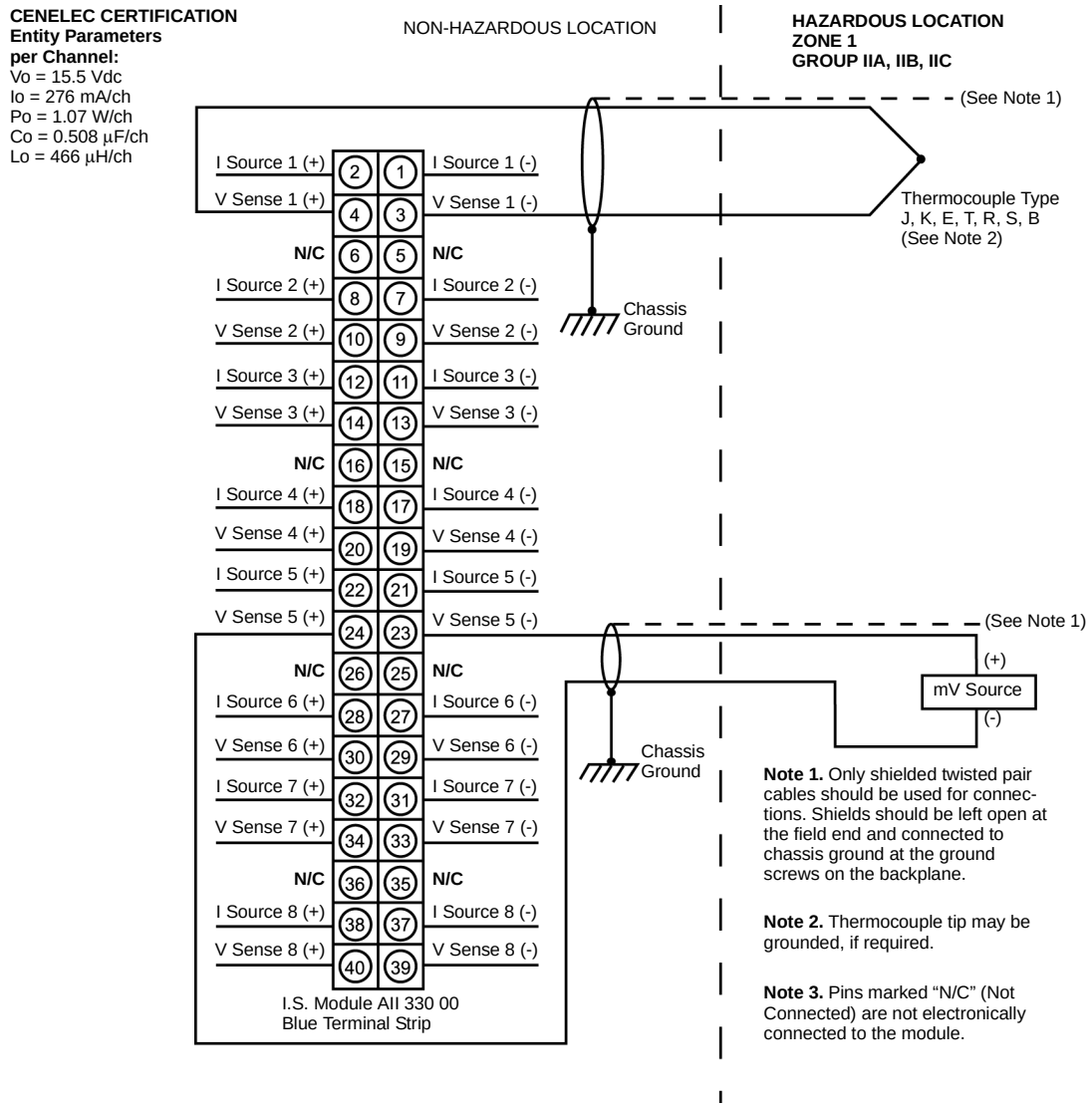
Cenelec Approved Wiring Diagrams

The following is a Cenelec certified wiring diagram for this module configured with an RTD/Resistance connection.



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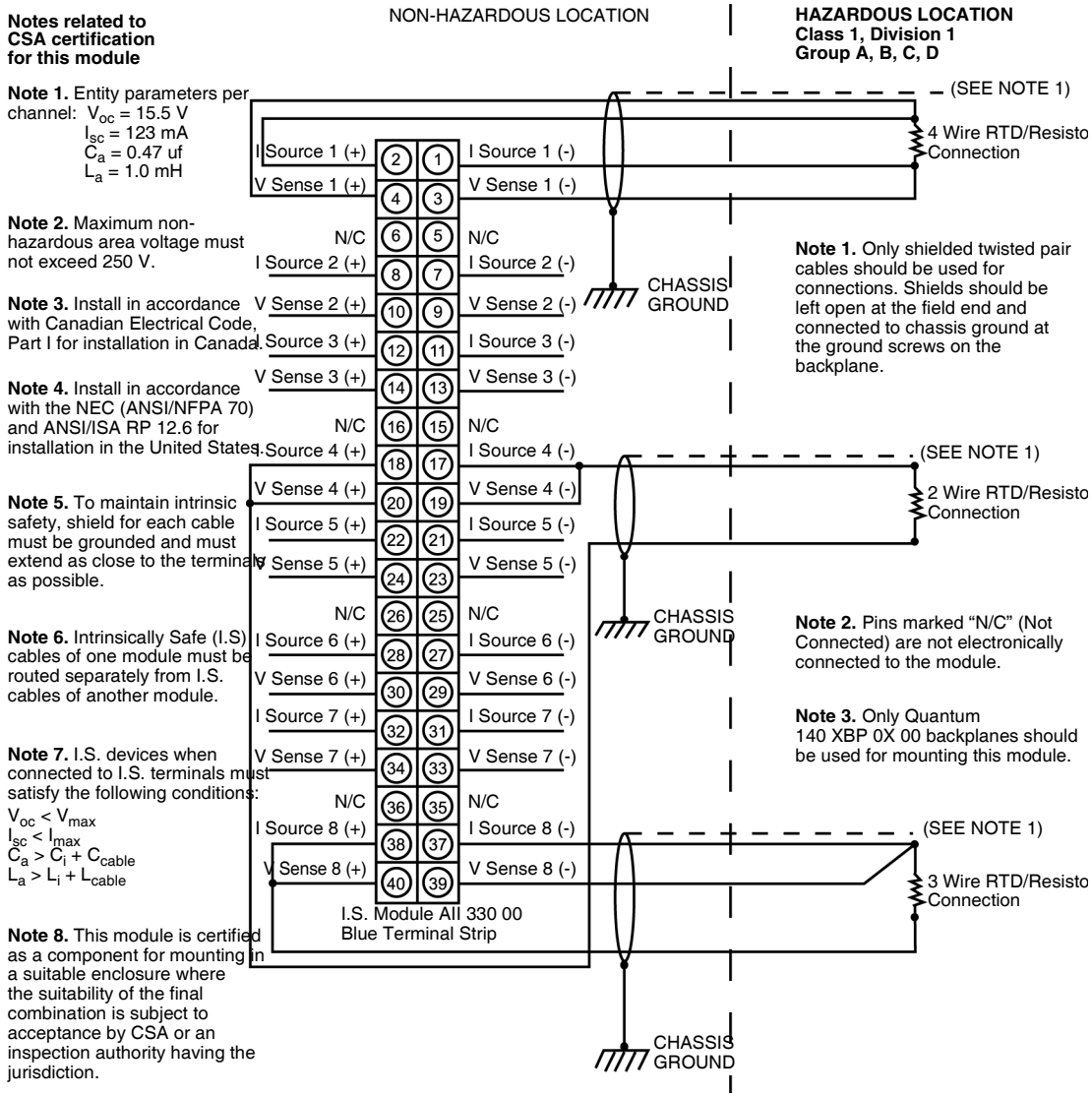
The following is a Cenelec certified wiring diagram for this module when configured with a Thermocouple connection.



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CSA Approved Wiring Diagrams

The following is a CSA certified wiring diagram for this module when configured with an RTD/resistor connection.



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The following is a CSA certified wiring diagram for this module when configured with a thermocouple connection.

Notes related to CSA certification for this module.

Note 1. Entity parameters per channel: V_{oc} = 15.5 V
I_{sc} = 123 mA
C_a = 0.47 uf
L_a = 1.0 mH

Note 2. Maximum non-hazardous area voltage must not exceed 250 V.

Note 3. Install in accordance with Canadian Electrical Code, Part I for installation in Canada.

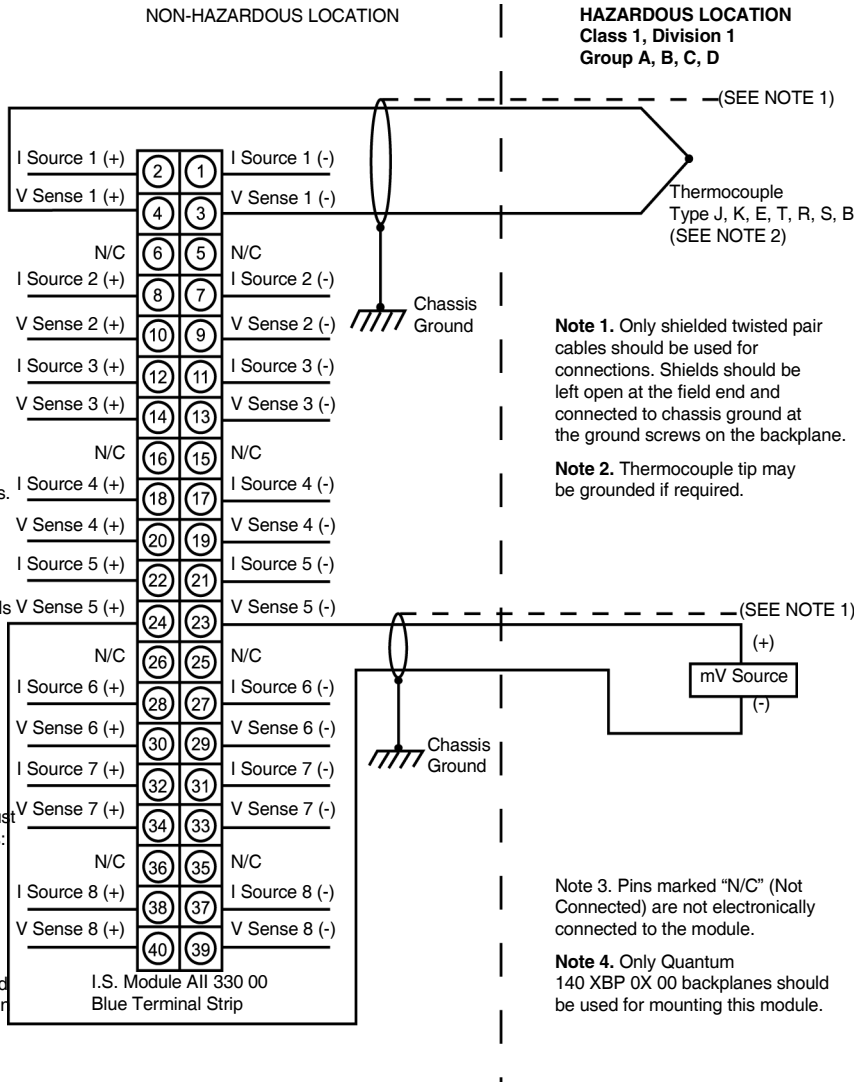
Note 4. Install in accordance with the NEC (ANSI/NFPA 70) and ANSI/ISA RP 12.6 for installation in the United States.

Note 5. To maintain intrinsic safety, shield for each cable must be grounded and must extend as close to the terminals as possible.

Note 6. Intrinsically Safe (I.S) cables of one module must be routed separately from I.S. cables of another module.

Note 7. I.S. devices when connected to I.S. terminals must satisfy the following conditions:
$V_{oc} < V_{max}$
$I_{sc} < I_{max}$
$C_a > C_i + C_{cable}$
$L_a > L_i + L_{cable}$

Note 8. This module is certified as a component for mounting in a suitable enclosure where the suitability of the final combination is subject to acceptance by CSA or an inspection authority having the jurisdiction.



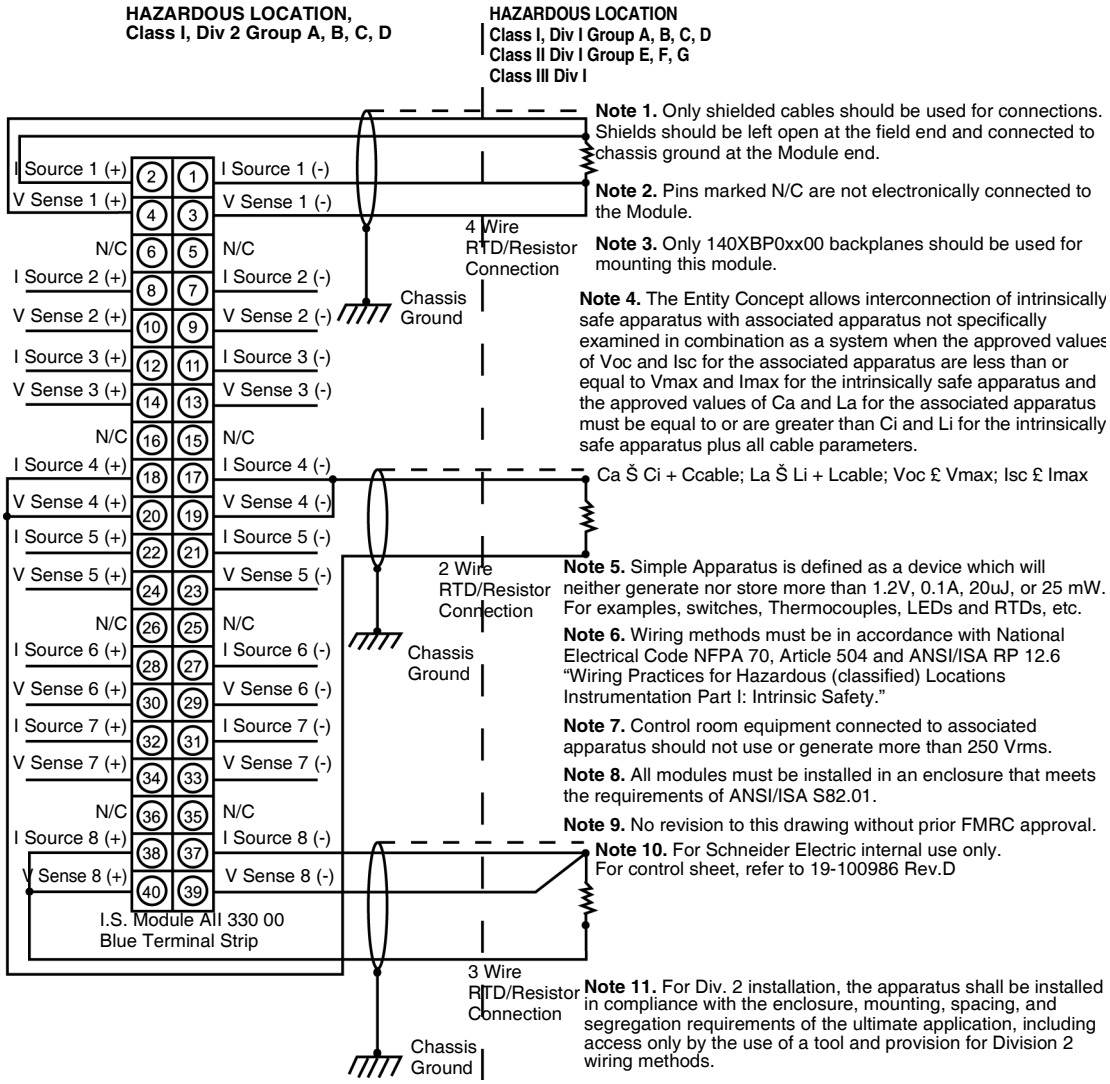
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FM Approved Wiring Diagrams

The following is a FM certified wiring diagram for this module when configured as a RTD/resistor connection.

Notes Related to FM Certification

This IS field device should meet Note 5 or should be FM approved with Entity Concept in Note 4 appropriate for connection with RTD/TC IN module with Concept Parameters listed below. The entity parameters are per channel.
Voc = 15.5 VDC
Isc = 276 mA/Ch
Ca = 500 nf/Ch
La = 0.3 mH/Ch
Po = 1070 mW/Ch



Note 1. Only shielded cables should be used for connections. Shields should be left open at the field end and connected to chassis ground at the Module end.

Note 2. Pins marked N/C are not electronically connected to the Module.

Note 3. Only 140XBP0xx00 backplanes should be used for mounting this module.

Note 4. The Entity Concept allows interconnection of intrinsically safe apparatus with associated apparatus not specifically examined in combination as a system when the approved values of Voc and Isc for the associated apparatus are less than or equal to Vmax and Imax for the intrinsically safe apparatus and the approved values of Ca and La for the associated apparatus must be equal to or are greater than Ci and Li for the intrinsically safe apparatus plus all cable parameters.

Note 5. Simple Apparatus is defined as a device which will neither generate nor store more than 1.2V, 0.1A, 20uJ, or 25 mW. For examples, switches, Thermocouples, LEDs and RTDs, etc.

Note 6. Wiring methods must be in accordance with National Electrical Code NFPA 70, Article 504 and ANSI/ISA RP 12.6 “Wiring Practices for Hazardous (classified) Locations Instrumentation Part I: Intrinsic Safety.”

Note 7. Control room equipment connected to associated apparatus should not use or generate more than 250 Vrms.

Note 8. All modules must be installed in an enclosure that meets the requirements of ANSI/ISA S82.01.

Note 9. No revision to this drawing without prior FMRC approval.

Note 10. For Schneider Electric internal use only. For control sheet, refer to 19-100986 Rev.D

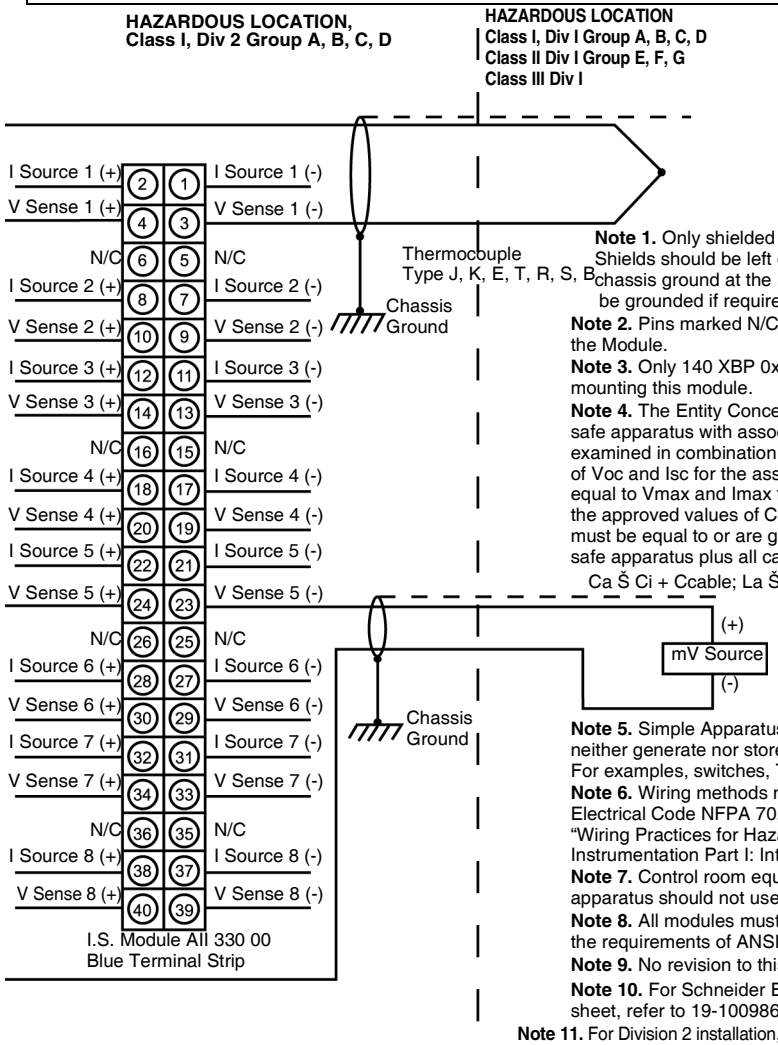
Note 11. For Div. 2 installation, the apparatus shall be installed in compliance with the enclosure, mounting, spacing, and segregation requirements of the ultimate application, including access only by the use of a tool and provision for Division 2 wiring methods.

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The following is a FM certified wiring diagram for this module when configured with a thermocouple connection.

Notes Related to FM Certification

This IS field device should meet Note 5 or should be FM approved with entity concept in Note 4 appropriate for connection with IS RTD/TC IN Module with Concept Parameters listed below. The entity parameters are per Channel.
Voc = 15.5 VDC
Isc = 276 mA/Ch
Ca = 500 nf/Ch
La = 0.3 mH/Ch
Po = 1070 mW/Ch



Note 1. Only shielded cables should be used for connections. Shields should be left open at the field end and connected to chassis ground at the Module end. Thermocouple tips may be grounded if required.

Note 2. Pins marked N/C are not electronically connected to the Module.

Note 3. Only 140 XBP 0xx 00 backplanes should be used for mounting this module.

Note 4. The Entity Concept allows interconnection of intrinsically safe apparatus with associated apparatus not specifically examined in combination as a system when the approved values of Voc and Isc for the associated apparatus are less than or equal to Vmax and Imax for the intrinsically safe apparatus and the approved values of Ca and La for the associated apparatus must be equal to or are greater than Ci and Li for the intrinsically safe apparatus plus all cable parameters.

Ca Š Ci + Ccable; La Š Li + Lcable; Voc £ Vmax; Isc £ Imax

Note 5. Simple Apparatus is defined as a device which will neither generate nor store more than 1.2V, 0.1A, 20uJ, or 25 mW For examples, switches, Thermocouples, LEDs and RTDs, etc.

Note 6. Wiring methods must be in accordance with National Electrical Code NFPA 70, Article 504 and ANSI/ISA RP 12.6 “Wiring Practices for Hazardous (classified) Locations Instrumentation Part I: Intrinsic Safety.”

Note 7. Control room equipment connected to associated apparatus should not use or generate more than 250 Vrms.

Note 8. All modules must be installed in an enclosure that meets the requirements of ANSI/ISA S82.01.

Note 9. No revision to this drawing without prior FMRC approval.

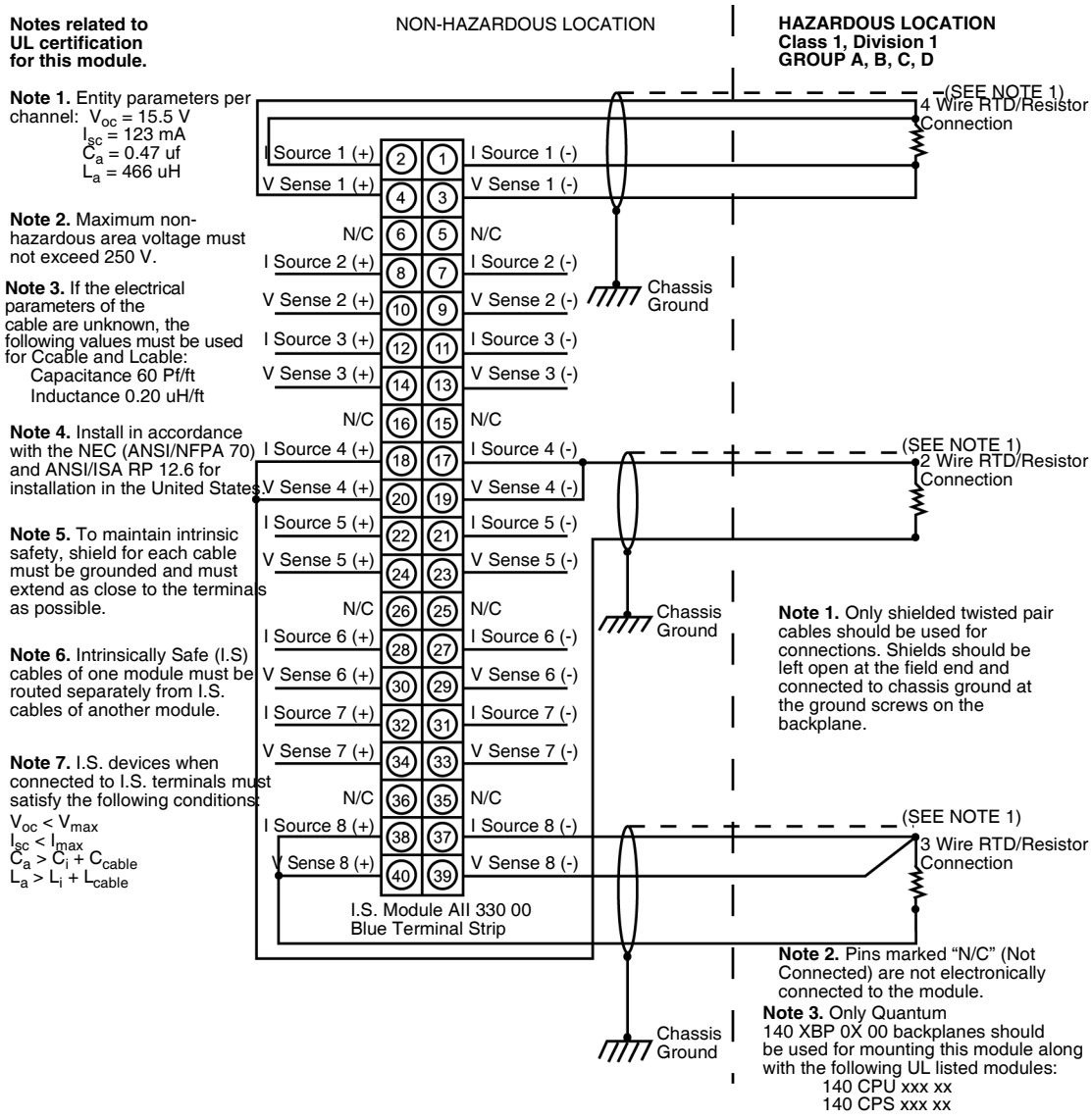
Note 10. For Schneider Electric internal use only. For control sheet, refer to 19-100986 Rev 1.

Note 11. For Division 2 installation, the apparatus shall be installed in compliance with the enclosure, mounting, spacing, and segregation requirements of the ultimate application, including access only by the use of a tool and provision for Div 2 wiring methods.

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UL Approved Wiring Diagrams

The following is a UL certified wiring diagram for this module when configured with an RTD/resistor connection.



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The following is a UL certified wiring diagram for this module when configured with a thermocouple connection.

Notes related to UL certification for this module.

Note 1. Entity parameters per channel: V_{oc} = 15.5 V
I_{sc} = 123 mA
C_a = 0.47 uf
L_a = 466 mH

Note 2. Maximum non-hazardous area voltage must not exceed 250 V.

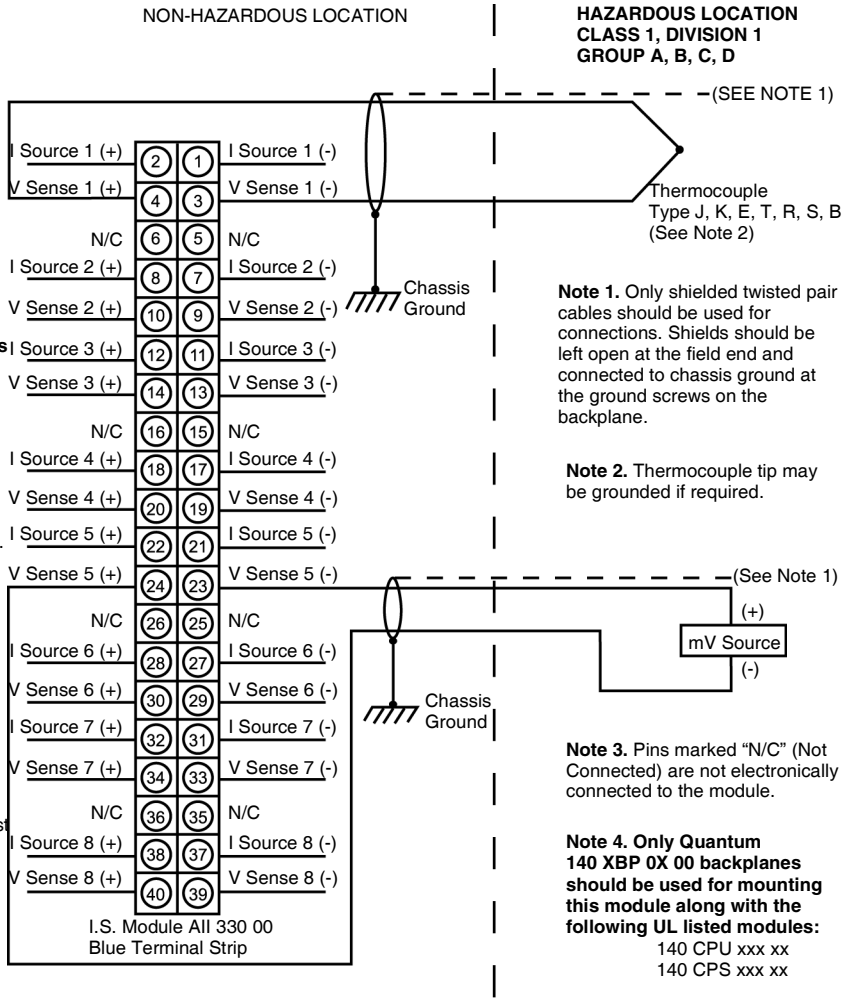
Note 3. If the electrical parameters of the cable are unknown, the following values must be used for Ccable and Lcable:
Capacitance60 Pf/ft
Inductance0.20 uH/ft

Note 4. Install in accordance with the NEC (ANSI/NFPA 70) and ANSI/ISA RP 12.6 for installation in the United States.

Note 5. To maintain intrinsic safety, shield for each cable must be grounded and must extend as close to the terminal as possible.

Note 6. Intrinsically Safe (I.S) cables of one module must be routed separately from I.S. cables of another module.

Note 7. I.S. devices when connected to I.S. terminals must satisfy the following conditions:
$V_{oc} < V_{max}$
$I_{sc} < I_{max}$
$C_a > C_i + C_{cable}$
$L_a > L_i + L_{cable}$



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Field Wiring

Field wiring to the module shall consist of separate shielded twisted pair wires. The acceptable field wire gauge shall be AWG 20 to AWG 12. In a 2-wire field configuration, the maximum field wire length is a function of the required accuracy. Wiring between the module and the intrinsically safe field device should follow intrinsically safe wiring practices to avoid the transfer of unsafe levels of energy to the hazardous area.

RTD/Resistance Input Wiring

When the Universal Input module is configured as a RTD/Resistance Input module, the maximum wire length (distance to a sensor) for a 3 or 4-wire configuration is 200 meters.

Thermocouple/ Millivolt Input Wiring

When the module is configured as a Thermocouple/Millivolt Input module, the sum of thermocouple source or voltage source impedance and wire resistance should not exceed 200 ohms for rated accuracy.

Fixed Wiring System

The Quantum140 AII 330 00 Intrinsically Safe Analog Input module is designed with a fixed wiring system where the field connections are made to a 40-pin, fixed position, blue terminal strip which is plugged into the module.

Terminal Strip Color and Keying Assignment

The module's 140 XTS 332 00 field wiring terminal strip is color-coded blue to identify it as an intrinsically safe connector.

The terminal strip is keyed to prevent the insertion of an inappropriate connector in the module. The following table provides the keying assignment.

Module Class	Module Part Number	Module Coding	Terminal Strip Coding
Intrinsically Safe	140 AII 330 00	CDF	ABE

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Specifications

RTD/Resistance Module Specifications

Specifications for the Quantum140 AII 330 00 module configured as an Intrinsically Safe RTD/Resistance input module are as follows.

Number of Channels	8 IN
RTD Types (Configurable)	
Platinum (American and European) – PT100, PT200, PT500, PT1000	-200 °C to +850 °C
Nickel – N100, N200, N500, N1000	-60 °C to +180 °C
Measurement Current	
PT100, PT200, N100, N200 PT500, PT1000, N500, N1000	2.5 mA 0.5 mA
Input Impedance	>10M ohms
Linearity	+/- 0.003% of full scale (0 ... 60°C)
Resolution	12 bits plus sign (0.1°C)
Absolute Accuracy	+/- 0.5 °C (25 °C) +/- 0.9 °C (0 .. 60 °C)
Accuracy Error @ 25°C	Typical: +/- 0.05% of full scale Maximum: +/- 0.1% of full scale
Isolation	
Channel to Channel	None
Channel to Bus	> 100 dB @ 50/60 Hz
Input Filter	1780 VAC @ 47-63 Hz or 2500 VDC for 1 min.
Update Time (All Channels)	
3-wire 2 or 4-wire	1.35 sec. 750 m sec.
Bus Current Required	400 mA
Power Dissipation	2 W
External Power	Not required for this module
Fault Detection	Out of range or broken wire conditions
Hot Swap	Not allowed per intrinsic safety standards
Fusing	Internal-not user accessible

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Thermocouple/ Millivolt Module Specifications

The following table shows the specifications for the Thermocouple/Millivolt module.

Number of Channels	8 IN
TC Types and Ranges	
Types J K E T S R B	Ranges (°C) -210 ... +760 -270 ... +1370 -270 ... +1000 -270 ... +400 -50 ... +1665 -50 ... +1665 +130 ... +1820
Millivolt Ranges	-100 mV ... +100 mV* -25 mV ... +25 mV* *Open circuit detect can be disabled on these ranges
TC Circuit Resistance/Max Source Resistance	200 ohms max for rated accuracy
Input Impedance	>1M ohms
Input Filter	Single low pass @ nominal 20 Hz. Plus notch filter at 50/60 Hz
Normal Noise Rejection	120 dB min @ 50 or 60 Hz
Cold Junction Compensation (CJC)	Internal CJC operates 0 ... 60°C (errors are included in the accuracy specification). The connector door must be closed. Remote CJC can be implemented by connecting the TC (which monitors the external junction block temperature) to channel 1. Types J, K, and T are recommended for best accuracy.
Resolution	
TC Ranges	Choice of: 1 degree C (Default) 0.1 degree C 1 degree F 0.1 degree F
Millivolt Ranges	+/- 100 mV range, 3.05 microvolts (16 bits) +/- 25 mV range, 0.76 microvolts (16 bits)
TC Absolute Accuracy (see Note 1)	
Types J, K, E, T (see Note 2)	+/- 2°C +/- 0.1% of reading
Types S, R, B (see Note 3)	+/- 4°C +/- 0.1% of reading
Millivolt Absolute Accuracy	

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@ 25°C	+/- 20 microvolts +/- 0.1% of reading
Accuracy Drift w/ Temperature	0.15 microvolts/°C + 0.0015% of reading/°C max.
Isolation	
Channel to Channel	None
Channel to Bus	1780 VAC @ 47-63 Hz or 2500 VDC for 1 min.
Update Time	1 sec. (all channels)
Fault Detection	Out of range or broken wire conditions
Bus Current Required	400 mA
Power Dissipation	2 W
External Power	Not required for this module
Hot Swap	Not allowed per intrinsic safety standards
Fusing	Internal - not user accessible

Note: 1. Absolute accuracy includes all errors from the internal CJC, TC curvature, offset plus gain, for module temperature of 0 ... 60 degrees C. User supplied TC errors not included.
2. For type J and K, add 1.5 degrees C inaccuracy for temperatures below -100 degrees C.
Type B cannot be used below 130 degrees C.
4. All TC ranges have an open TC detect and upscale output. This results in a reading 7FFFh or 32767 decimal when an open TC is detected.

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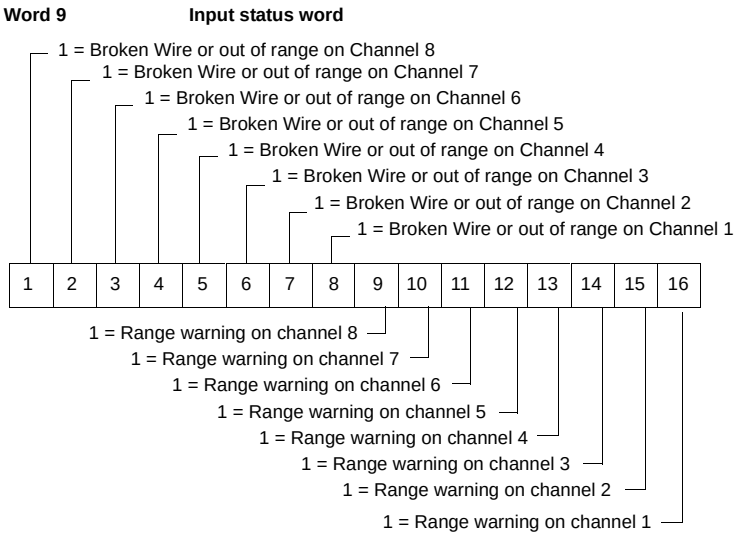
Addressing

Flat Addressing

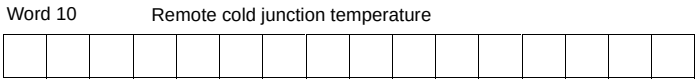
This module requires ten contiguous, 16-bit input words (%IW)—eight for input data, one for channel status, and one for the remote cold junction temperature. The data words formats are as follows.



The following shows the word 9 register.



The following figure shows the word 10 register.



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Topological Addressing

Topological addresses for the 140AII33000 Input Module:

Point	I/O Object	Comment
Input 1	%IW[\b.e\]r.m.1	Value
	%I[\b.e\]r.m.1.1	Out of range
	%I[[\b.e\]r.m.1.2	Range warning
• • •		
Input 8	%IW[\b.e\]r.m.8	Value
	%I[\b.e\]r.m.8.1	Out of range
	%I[\b.e\]r.m.8.2	Range warning
Status Word	%IW[\b.e\]r.m..9	Status of input channels
Cold Junction Temperature	%IW[\b.e\]r.m.10	Remote Cold Junction Temperature

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

IODDT

The 140AII33000 Input Module uses the `T_ANA_IN_VWE` IODDT:

IODDT Name	Object	Data Type	Name
T_ANA_IN_VWE	%CH[\b.e\]r.m.c	ANA_IN_VWE	userdefined
	%IWr.m.c.0	Int	.VALUE
	%Ir.m.c.1	Bool	.ERROR
	%Ir.m.c.2	Bool	.WARNING

Used abbreviations: **r** = rack, **m** = module slot, **c** = channel, **b** = bus, **e** = equipment (drop).

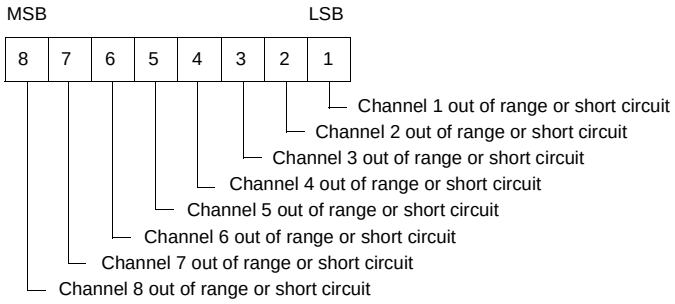
Bus and Drop default to 1 if not specified and can be left off.

Note: In Quantum IODDTs for analog modules and expert modules the data type **Bool** is used for **%I** and **%Q**.

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I/O Map Status Byte

The I/O map status byte is used by the 140AII33000 Input Module as follows.

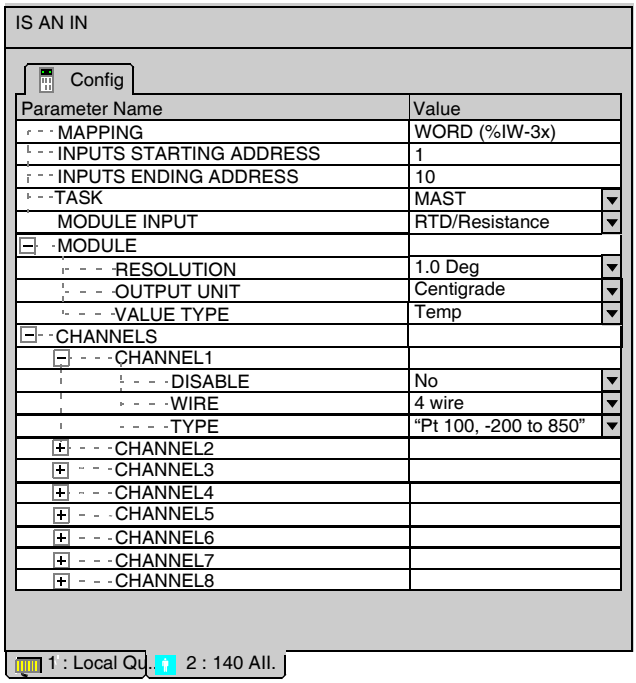


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Parameter Configuration

Parameter and Default values (RTD)

Parameter Configuration Window (RTD)



Name	Default Value	Options	Description
Mapping	WORD (%IW-3X)	-	
Inputs Starting Address	1	-	
Inputs Ending Address	10	-	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local

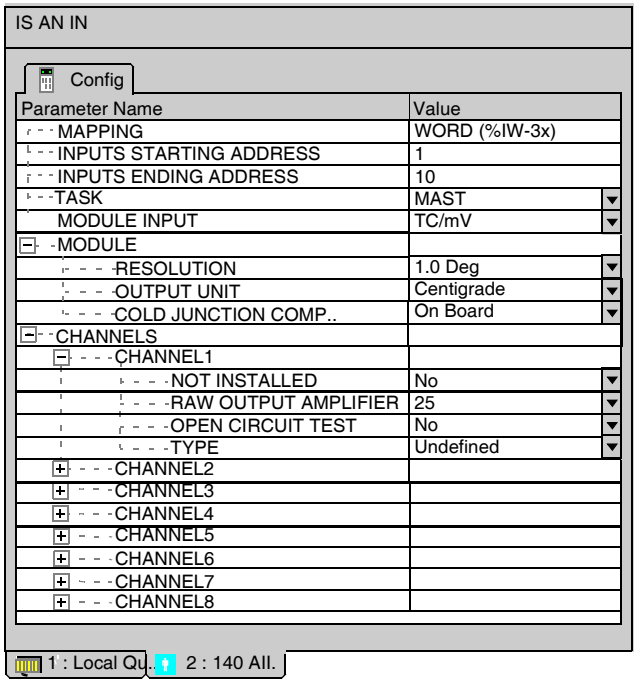
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Name	Default Value	Options	Description
Module Input	RTD/Resistance	TC/mV	for Module Input=TC/mV see *Parameter and Default values (TC), p. 525*
Module			
Resolution	1.0 Deg	0.1 Deg	
Output Unit	Centigrade	Fahrenheit	
Value Type	Temp	Raw Value	
Channel1			
Disable	No	Yes	
Wire	4 wire	2 wire 3 wire	
Type	"Pt 100, -200 to 850"	"Pt 200, -200 to 850" "Pt 500, -200 to 850" "Pt 1000, -200 to 850" "Ni 100, -200 to 850" "Ni 200, -200 to 850" "Ni 500, -200 to 850" "Ni 1000, -200 to 850" "R, 0 to 766,66 ohms" "R, 0 to 4000 ohms" "Apt 100, -100 to 450 ohms" "Apt 200, -100 to 450 ohms" "Apt 500, -100 to 450 ohms" "Apt 1000, -100 to 450 ohms"	
Channel2-Channel8			see Channel1

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Parameter and Default values (TC)

Parameter Configuration Window (TC)



Name	Default Value	Options	Description
Module Input	RTD/Resistance	TC/mV	for Module Input=RTD/ Resistance see *Parameter and Default values (RTD), p. 523*
Module			
Resolution	1.0 Deg	0.1 Deg	
Output Unit	Centigrade	Fahrenheit	
Cold Junction Compensator	On board	Channel 1	
Channel1			
Not installed	No	Yes	

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Name	Default Value	Options	Description
Raw Output Amplifier	25	100	
Open Circuit Test	No	Yes	
Type	Undefined	J, Gain=25 K, Gain=25 E, Gain=25 T, Gain=100 S, Gain=100 R, Gain=100 B, Gain=100	
Channel2-Channel8			see Channel1

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140 AII 330 10: Safe Analog IN Module

52

Overview

Purpose

The following chapter provides information of the Quantum 140 AII 330 10 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	528
Indicators	529
Wiring Diagrams	530
Specifications	536
Addressing	537
Parameter Configuration	539

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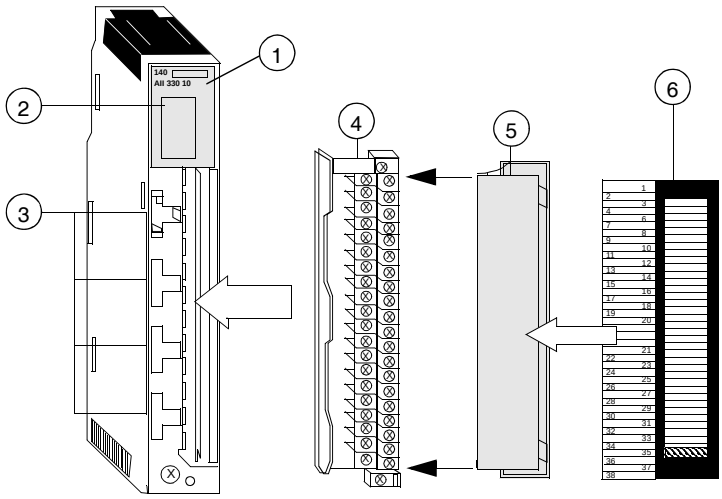
Presentation

Function

The Quantum 140 AII 330 10 Intrinsically Safe Current Input module interfaces with eight intrinsically safe analog inputs which are software-configurable. The module accepts 0 ... 20 mA, 0 ... 25 mA, and 4 ... 20 mA inputs. The module allows any mix and match of current input ranges that can be configured by the software. The module provides power to intrinsically safe transmitters located in hazardous areas.

Illustration

The following figure shows the 140 AII 330 10 Intrinsically Safe module and its components.



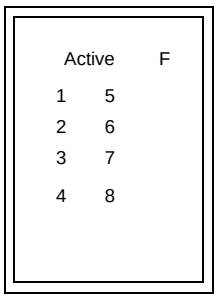
1 Model Number, Module Description, Color Code
2 LED Display
3 Fuse Cutouts
4 Field Wiring Terminal Strip
5 Removable Door
6 Customer Identification Label (Fold label and place it inside door)

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Indicators

Illustration

The following table shows the LED indicators for the 140 AII 330 10 module.



Descriptions

The following table shows the LED descriptions for the 140 AII 330 10 module.

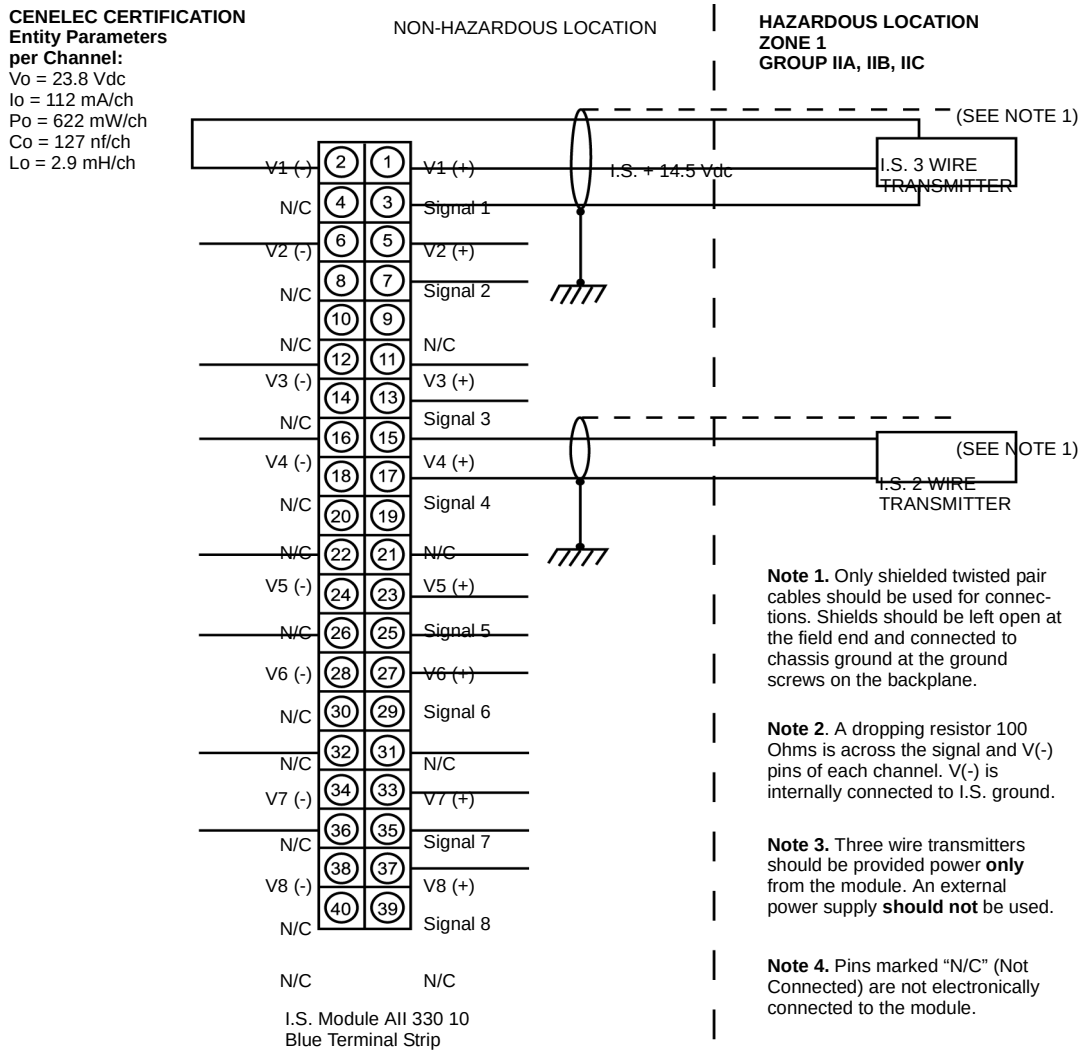
LEDs	Color	Indication When On
Active	Green	Communicating with the PLC
F	Red	A broken wire (4 ... 20 mA, only) or out-of-range condition on any channel
1 .. 8	Red	A broken wire or out-of-range condition on the indicated channel

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Wiring Diagrams

Cenelec Approved Wiring Diagrams

The following is a Cenelec certified wiring diagram for the 140 AII 330 10 instrinsically safe current input module.



31001363 Rev 00 140 AII 330 10 Wiring Diagram

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CSA Approved Wiring Diagram

The following is a CSA certified wiring diagram for this module.

Notes related to CSA certification for this module.

Note 1. Entity parameters per channel:

V_{oc} = 23.8 V
I_{sc} = 112 mA
C_a = 127nf
L_a = 1.0 mH

Note 2. Maximum non-hazardous area voltage must not exceed 250 V.

Note 3. Install in accordance with Canadian Electrical Code, Part I for installation in Canada.

Note 4. Install in accordance with the NEC (ANSI/NFPA 70) and ANSI/ISA RP 12.6 for installation in the United States.

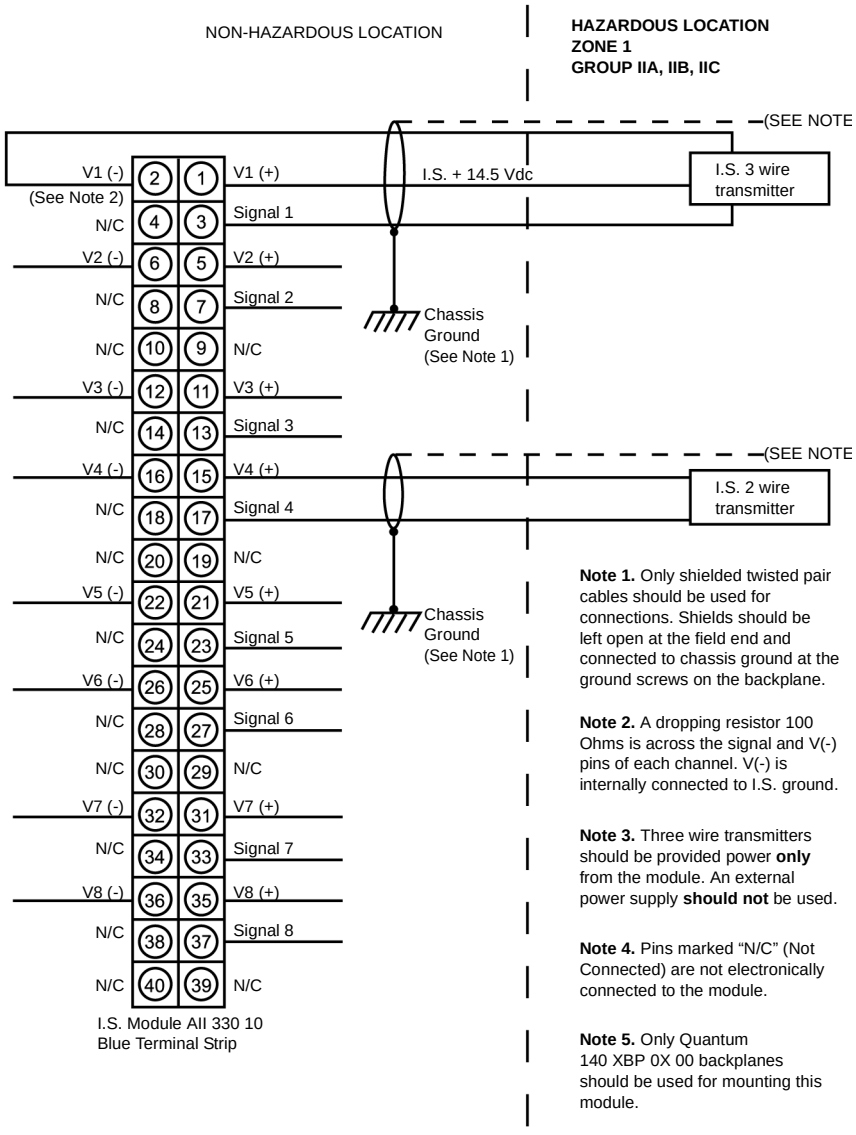
Note 5. To maintain intrinsic safety, shield for each cable must be grounded and must extend as close to the terminals as possible.

Note 6. intrinsically Safe (I.S.) cables of one module must be routed separately from I.S. cables of another module.

Note 7. I.S. devices when connected to I.S. terminals must satisfy the following conditions:

$V_{oc} < V_{max}$
$I_{sc} < I_{max}$
$C_{a > Ci} + C_{cable}$
$L_{a > Li} + L_{cable}$

Note 8. This module is certified as a component for mounting in a suitable enclosure where the suitability of the final combination is subject to acceptance by CSA or an inspection authority having the jurisdiction.



Note 1. Only shielded twisted pair cables should be used for connections. Shields should be left open at the field end and connected to chassis ground at the ground screws on the backplane.

Note 2. A dropping resistor 100 Ohms is across the signal and V(-) pins of each channel. V(-) is internally connected to I.S. ground.

Note 3. Three wire transmitters should be provided power **only** from the module. An external power supply **should not** be used.

Note 4. Pins marked "N/C" (Not Connected) are not electronically connected to the module.

Note 5. Only Quantum 140 XBP 0X 00 backplanes should be used for mounting this module.

31001363 Rev 00 140 AII 330 10 Wiring Diagram

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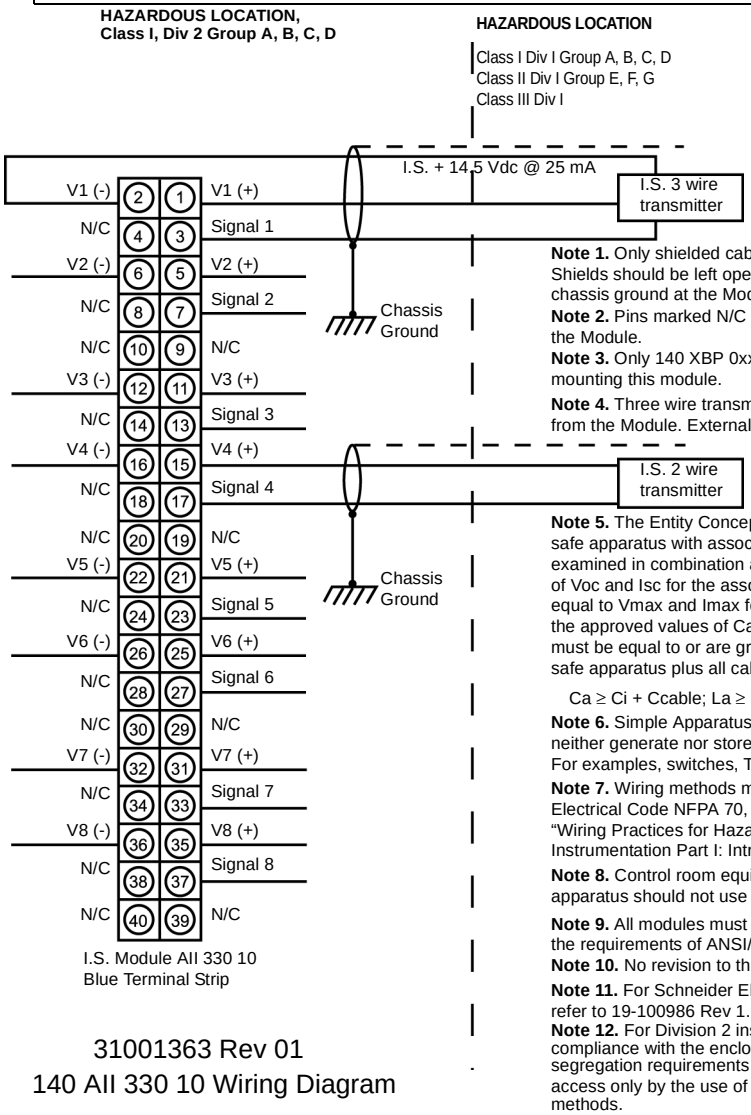
FM Approved Wiring Diagrams

The following is a FM certified wiring diagram for this module.

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Notes Related to FM Certification

This IS field device should meet note 6 or should be FM approved with entity concept in Note 5 appropriate for connection with IS Analog Current IN Module with Concept Parameters listed below. The entity parameters are per channel.
Voc = 23.8 VDC
Isc = 112 mA/Ch
Ca = 127 nf/CH
La = 2.9 mH/Ch
Po = 622 mW/CH



31001363 Rev 01
140 AII 330 10 Wiring Diagram

Note 1. Only shielded cables should be used for connections. Shields should be left open at the field end and connected to chassis ground at the Module end.
Note 2. Pins marked N/C are not electronically connected to the Module.
Note 3. Only 140 XBP 0xx 00 backplanes should be used for mounting this module.
Note 4. Three wire transmitters should be provided power only from the Module. External Power Supply should not be used.

Note 5. The Entity Concept allows interconnection of intrinsically safe apparatus with associated apparatus not specifically examined in combination as a system when the approved values of Voc and Isc for the associated apparatus are less than or equal to Vmax and Imax for the intrinsically safe apparatus and the approved values of Ca and La for the associated apparatus must be equal to or are greater than Ci and Li for the intrinsically safe apparatus plus all cable parameters.

$Ca \geq Ci + Ccable$; $La \geq Li + Lcable$; $Voc \leq Vmax$; $Isc \leq Imax$

Note 6. Simple Apparatus is defined as a device which will neither generate nor store more than 1.2V, 0.1A, 20uJ, or 25 mW. For examples, switches, Thermocouples, LEDs and RTDs, etc.
Note 7. Wiring methods must be in accordance with National Electrical Code NFPA 70, Article 504 and ANSI/ISA RP 12.6 “Wiring Practices for Hazardous (classified) Locations Instrumentation Part I: Intrinsic Safety.”
Note 8. Control room equipment connected to associated apparatus should not use or generate more than 250 Vrms.
Note 9. All modules must be installed in an enclosure that meets the requirements of ANSI/ISA S82.01.
Note 10. No revision to this drawing without prior FMRC approval.
Note 11. For Schneider Electric internal use only. For control sheet, refer to 19-100986 Rev 1.
Note 12. For Division 2 installation, the apparatus shall be installed in compliance with the enclosure, mounting, spacing, and segregation requirements of the ultimate application, including access only by the use of a tool and provision for Division 2 wiring methods.

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UL Approved Wiring Diagram

The following is a UL certified wiring diagram for this module.

Notes related to UL certification for this module.

Note 1. Entity parameters per channel: V_{cc} = 24.3 V
I_{sc} = 112 mA
C_a = 127 nf
L_a = 1.5 mH

Note 2. Maximum non-hazardous area voltage must not exceed 250 V.

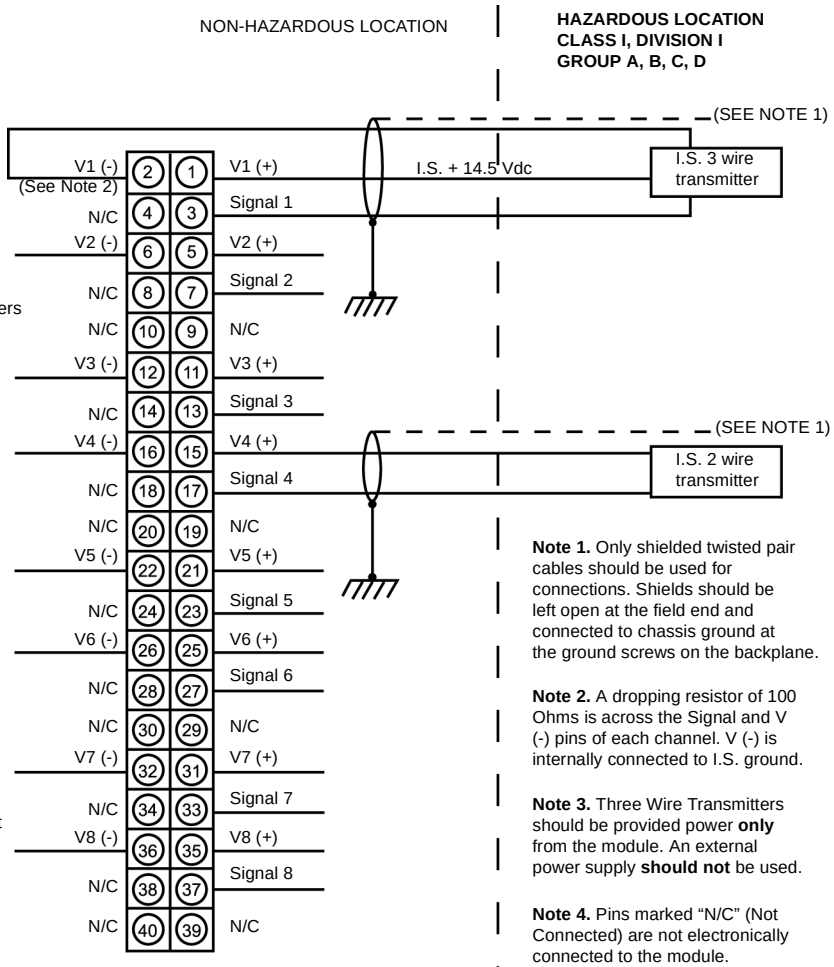
Note 3. If the electrical parameters of the cable are unknown, the following values must be used for Ccable and Lcable:
Capacitance 60Pf/ft
Inductance 0.20 uH/ft

Note 4. Install in accordance with the NEC (ANSI/NFPA 70) and ANSI/ISA RP 12.6 for installation in the United States.

Note 5. To maintain intrinsic safety, shield for each cable must be grounded and must extend as close to the terminals as possible.

Note 6. Intrinsically Safe (I.S) cables of one module must be routed separately from I.S. cables of another module.

Note 7. I.S. devices when connected to I.S. terminals must satisfy the following conditions:
$V_{cc} < V_{max}$
$I_{sc} < I_{max}$
$C_a > C_i + C_{cable}$
$L_a > L_i + L_{cable}$



Note 1. Only shielded twisted pair cables should be used for connections. Shields should be left open at the field end and connected to chassis ground at the ground screws on the backplane.

Note 2. A dropping resistor of 100 Ohms is across the Signal and V (-) pins of each channel. V (-) is internally connected to I.S. ground.

Note 3. Three Wire Transmitters should be provided power **only** from the module. An external power supply **should not** be used.

Note 4. Pins marked "N/C" (Not Connected) are not electronically connected to the module.

Note 5. Only Quantum 140 XBP 0X 00 backplanes should be used for mounting this module along with the following UL listed modules:
140 CPU xxx xx
140 CPS xxx xx

31001363 Rev 00 140 AII 330 10 Wiring Diagram

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Field Wiring

Field wiring to the module consists of separate shielded, twisted pair wires. The acceptable field wire gauge is AWG 20 to AWG 12. Wiring between the module and the intrinsically safe field device should follow intrinsically safe wiring practices to avoid the transfer of unsafe levels of energy to the hazardous area.

Fixed Wiring System

The Quantum 140 AII 330 10 Intrinsically Safe Current Input module is designed with a fixed wiring system, where the field connections are made to a 40-pin, fixed position, blue terminal strip which is plugged into the module.

Terminal Strip Color and Keying Assignment

The module's 140 XTS 332 00 field wiring terminal strip is color-coded blue to identify it as an intrinsically safe connector.

The terminal strip is keyed to prevent the wrong connector from being applied to the module. The keying assignment is given below.

Module Class	Module Part Number	Module Coding	Terminal Strip Coding
Intrinsically Safe	140 AII 330 10	CEF	ABD

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Specifications

General Specifications

Specifications for the Quantum 140 AII 330 10 Intrinsically Safe Current Input module are as follows.

Number of Channels	8 IN
Current Input	
Linear Measuring Range	4 ... 20 mA 0 ... 20 mA 0 ... 25 mA
Absolute Maximum Input	25 mA internally limited
Input Impedance	100 ohms +/- 0.1% between V+ and signal terminals
Resolution	4 ... 20 mA, 0 to 4,095 counts 4 ... 20 mA0 to 16,000 counts 0 ... 20 mA, 0 to 20,000 counts 0 ... 25 mA, 0 to 25,000 counts
Available Voltage	Terminals V+, V-, :~ 14.5 Vdc at 25 mA Terminals V+, Signal :~ 13.6 Vdc at 20 mA
Accuracy Error @ 25°C	Typical: +/- 0.05% of full scale Maximum: +/- 0.1% of full scale
Linearity	+ 0.003% of full scale
Accuracy Drift w/ Temperature	Typical: +/- 0.0025% of full scale /°C Maximum: +/- 0.005% of full scale /°C
Common Mode Rejection	> 100 dB @ 50/60 Hz
Input Filter	Single pole low pass, -3 dB cutoff @ 15 Hz, +/- 20%
Isolation	
Channel to Channel	None
Channel to Bus	1780 Vac @ 47-63 Hz or 2500 Vdc for 1 min.
Update Time	750 ms for all channels
Fault Detection	Broken wire (4 ... 20 mA mode)
Bus Current Required	1.5 A
Power Dissipation	7.5 W
External Power	Not required
Hot Swap	Not allowed per intrinsic safety standards
Fusing	Internal-not user accessible

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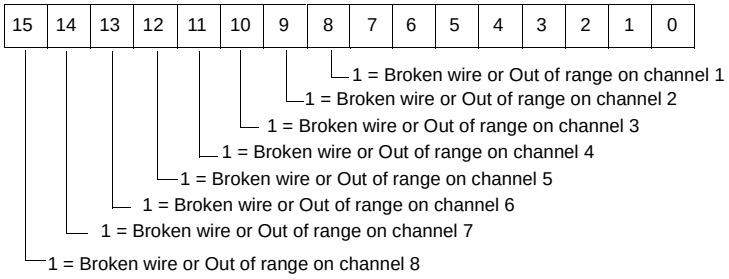
Addressing

Flat Addressing

This module requires nine contiguous, 16-bit input words (%IW)—eight for input data and one for channel status. The data words formats are as follows.



The following shows the word 9 register.



Note: The word 9 register is the status of input channels. This status work for all configurations beginning PV04 and for any version (PV) with configuration 4... 20 mA. But the status don't work for PV<04 with configurations 0...20 mA or 0...25 mA.

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Topological Addressing

Topological addresses for the 140AII03010 Input Module:

Point	I/O Object	Comment
Input 1	%IW[\b.e\]r.m.1	Value
	%I[\b.e\]r.m.1.1	Broken wire or Out of range
• • •		
Input 8	%IW[\b.e\]r.m.8	Value
	%I[\b.e\]r.m.8.1	Broken wire or Out of range
Status Word	%IW[\b.e\]r.m.9	Status of input channels

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

IODDT

The 140AII03010 Input Module uses the `T_ANA_IN_VE` IODDT:

IODDT Name	Object	Data Type	Name
T_ANA_IN_VE	%CH[\b.e\]r.m.c	ANA_IN_VWE	userdefined
	%IWr.m.c.0	Int	.VALUE
	%Ir.m.c.1	Bool	.ERROR

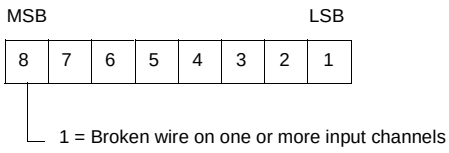
Used abbreviations: **r** = rack, **m** = module slot, **c** = channel, **b** = bus, **e** = equipment (drop).

Bus and Drop default to 1 if not specified and can be left off.

Note: In Quantum IODDTs for analog modules and expert modules the data type **Bool** is used for **%I** and **%Q**.

I/O Map Status Byte

The I/O map status byte is used by the 140AII03010 Input Module as follows.

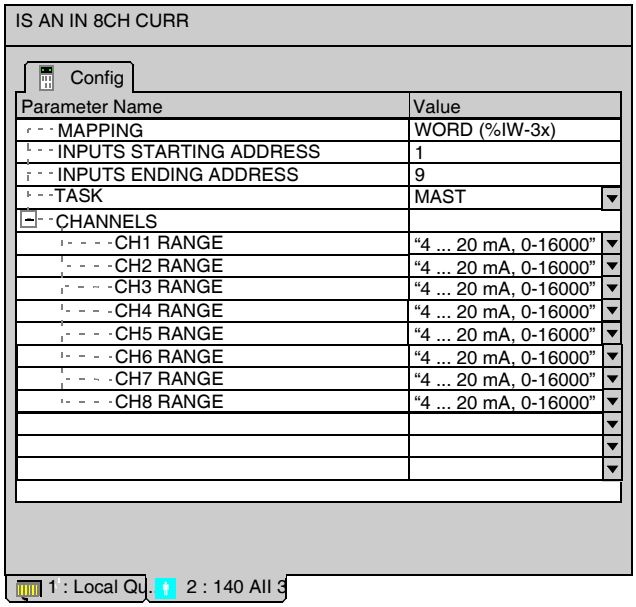


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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	WORD (%IW-3X)	-	
Inputs Starting Address	1	-	
Inputs Ending Address	9	-	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Channels			
CH1 Range	"4 ... 20 mA, 0-16000"	"0... 25 mA, 0-25000" "0 ... 20 mA, 0-20000" "4 ... 20 mA, 0-4095"	

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Name	Default Value	Options	Description
CH2 Range-CH8 Range			see CH1 Range

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140 AIO 330 00: Safe Analog OUT Module

53

Overview

Purpose

The following chapter provides information of the Quantum 140 AIO 330 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	542
Indicators	543
Wiring Diagrams	544
Specifications	550
Addressing	551
Parameter Configuration	552

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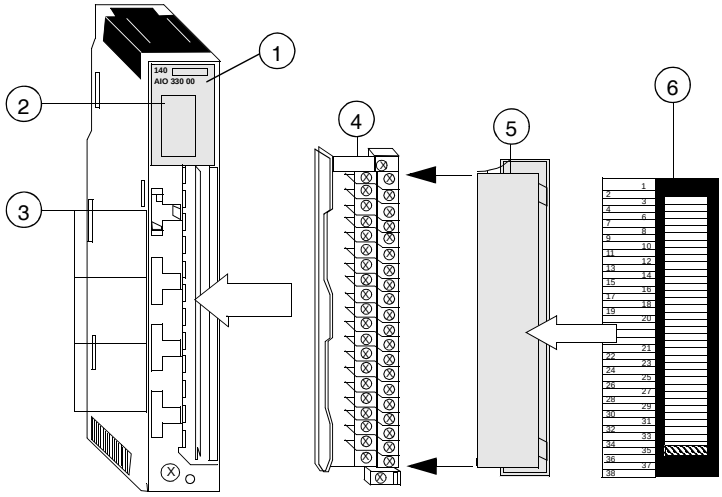
Presentation

Function

The Quantum 140 AIO 330 00 Intrinsically Safe Analog Output module controls and monitors current loops in intrinsically safe applications. The module provides 8 dual-ended output channels that are referenced over sense resistors to a single Common. The output ranges are 4 ... 20 mA, 0 ... 20 mA, and 0 ... 25 mA. This module detects broken wires on a per-channel basis indicates their location on the front panel LEDs, and transmits the status to the PLC.

Illustration

The following figure shows the140 AIO 330 00 module and its components.



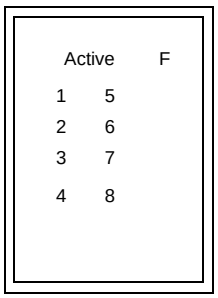
1 Model Number, Module Description, Color Code
2 LED Display
3 Fuse Cutouts
4 Field Wiring Terminal Strip
5 Removable Door
6 Customer Identification Label (Fold label and place it inside door)

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Indicators

Illustration

The following table shows the LED indicators for the 140 AIO 330 00 module.



Descriptions

The following table shows the LED descriptions for the 140 AIO 330 00 module.

LEDs	Color	Indication When On
Active	Green	Communicating with the PLC
F	Red	A broken wire (4 ... 20 mA, only) or out-of-range condition on any channel
1 .. 8	Red	A broken wire or out-of-range condition on the indicated channel

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Wiring Diagrams

CSA Approved Wiring Diagram

The following is a CSA certified wiring diagram for this module.

Notes related to CSA certification for this module.

Note 1. Entity parameters per channel: V_{cc} = 29.42 V
I_{sc} = 93 mA
C_a = 71 nf
L_a = 2.0 mH

Note 2. Maximum non-hazardous area voltage must not exceed 250 V.

Note 3. Install in accordance with Canadian Electrical Code, Part I for installation in Canada.

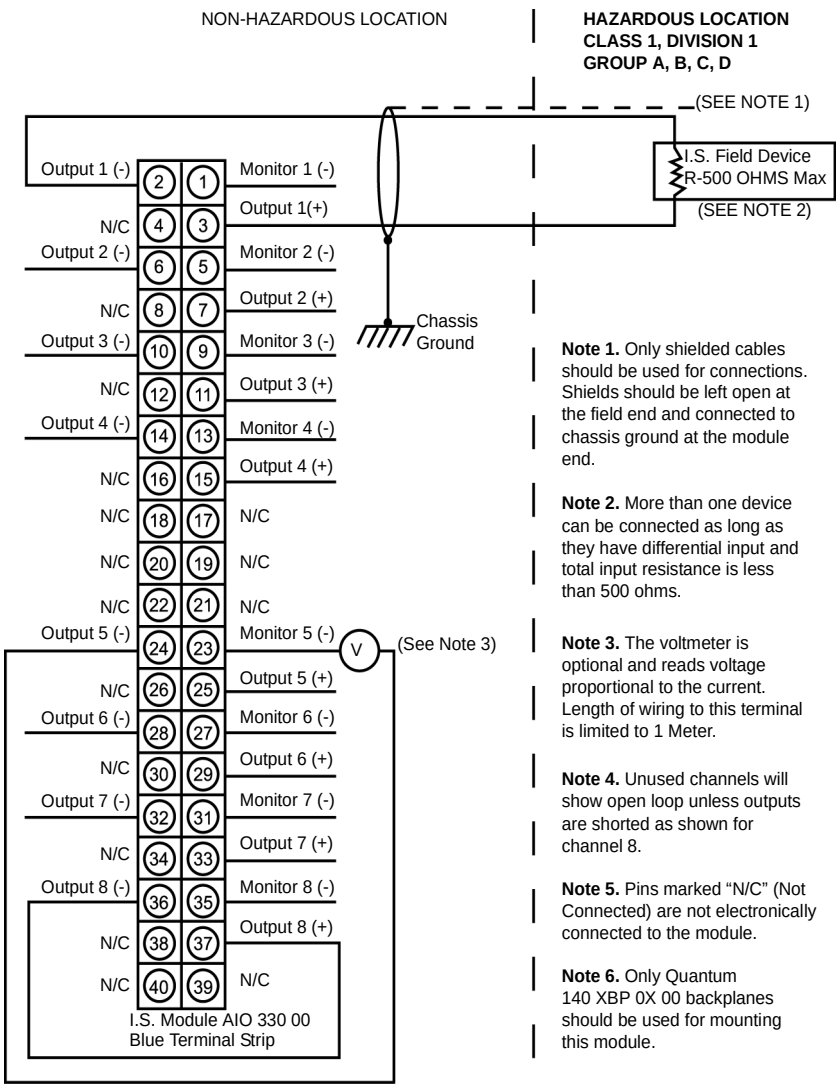
Note 4. Install in accordance with the NEC (ANSI/NFPA 70) and ANSI/ISA RP 12.6 for installation in the United States.

Note 5. To maintain intrinsic safety, shield for each cable must be grounded and must extend as close to the terminals as possible.

Note 6. Intrinsically Safe (I.S.) cables of one module must be routed separately from I.S. cables of another module.

Note 7. I.S. devices when connected to I.S. terminals must satisfy the following conditions:
$V_{cc} < V_{max}$
$I_{sc} < I_{max}$
$C_a > C_i + C_{cable}$
$L_a > L_i + L_{cable}$

Note 8. This module is certified as a component for mounting in a suitable enclosure where the suitability of the final combination is subject to acceptance by CSA or an inspection authority having the jurisdiction.



Note 1. Only shielded cables should be used for connections. Shields should be left open at the field end and connected to chassis ground at the module end.

Note 2. More than one device can be connected as long as they have differential input and total input resistance is less than 500 ohms.

Note 3. The voltmeter is optional and reads voltage proportional to the current. Length of wiring to this terminal is limited to 1 Meter.

Note 4. Unused channels will show open loop unless outputs are shorted as shown for channel 8.

Note 5. Pins marked “N/C” (Not Connected) are not electronically connected to the module.

Note 6. Only Quantum 140 XBP 0X 00 backplanes should be used for mounting this module.

31001364 Rev 00 140 AIO 330 00 Wiring Diagram

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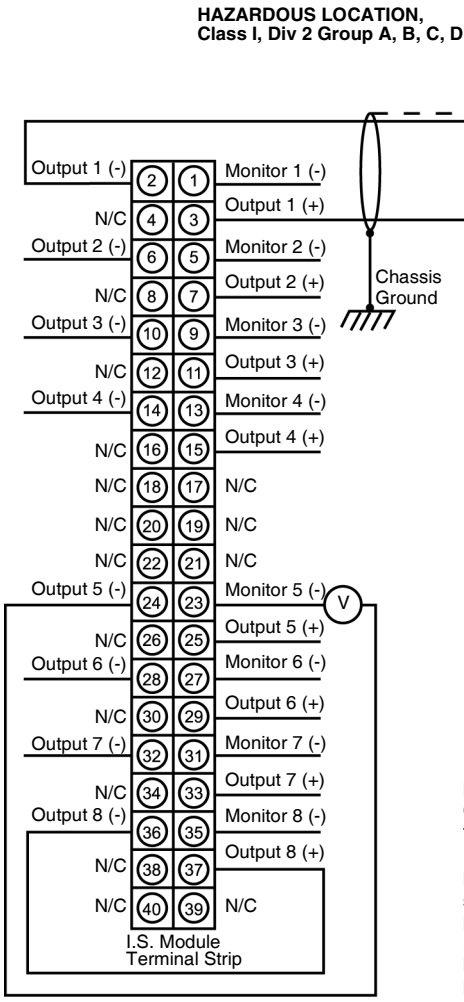
FM Approved Wiring Diagram

The following is a FM certified wiring diagram for this module.

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Notes Related to FM Certification

This IS field device should meet Note 7 or should be FM approved with entity concept in Note 6 appropriate for connection with IS RTD/TC IN Module with concept parameters listed below. The entity parameters listed are per channel.
Voc = 29.5 VDC
Isc = 94 mA/Ch
Ca = 68 nf/Ch
La = 4.2 mH/Ch
Po = 520 mW/Ch



140 AIO 330 00 Wiring Diagram
31001364 Rev 01

Note 1. Only shielded cables should be used for connections. Shields should be left open at the field end and connected to chassis ground at the module end.
Note 2. Pins marked “N/C” are not electronically connected to the module.
Note 3. Use only 140 XBP 0xx 00 backplanes to mount this module.

Note 4. More than one device can be connected in serieS, as long as they have differential input and total load resistance is less than 500 ohms.
Note 5. Voltmeter is an optional Voltmeter shown to read voltage proportional to the current. Wiring to this terminal is limited to 1 meter.
Unused channels will show Open Loop unless shorted as Shown in Channel 8.
Note 6. The Entity Concept allows interconnection of intrinsically safe apparatus with associated apparatus not specifically examined in combination as a system when the approved values of V_{oc} and Isc for the associated apparatus are less than or equal to V_{max} and Imax for the intrinsically safe apparatus and the approved values of C_a and L_a for the associated apparatus must be equal to or are greater than C_i and L_i for the intrinsically Safe apparatus plus all cable parameters.
C_a Š $C_i + C_{cable}$; L_a Š $L_i + L_{cable}$; V_{oc} £ V_{max} ; I_{sc} £ I_{max}
Note 7. Simple Apparatus is defined as a device which will neither generate nor store more than 1.2V, 0.1A, 20mJ, or 25 mW. For example: switches, thermocouplers, LEDs, RTDs, etc.
Note 8. Wiring methods must be in accordance with National Electrical Code NFPA 70, Article 504 and ANSI/ISA RP12.6, “Wiring Practices for Hazardous (classified) Locations Instrumentation, Part I: Intrinsic Safety.”
Note 9. Control room equipment connected to associated apparatus should not use or generate more than 250 Vrms.
Note 10. All modules must be installed in an enclosure that meets the requirements of ANSI / ISA S82.01
Note 11. No revisions to this drawing without prior FMRC Approval.
Note 12. For Schneider Electric internal use only. For control sheet, refer to 19-100986 Rev 1.
Note 13. For Division 2 installation, the apparatus shall be installed in compliance with the enclosure, mounting, spacing, and segregation requirements of the ultimate application, including access only by the use of a tool and provision for Division 2 wiring methods.

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UL Approved Wiring Diagrams

The following is a UL certified wiring diagram for this module.

Notes related to UL certification for this module.

Note 1. Entity parameters per channel: V_{cc} = 29.5 V
I_{sc} = 93 mA
C_a = 68 nf
L_a = 2.0 mH

Note 2. Maximum non-hazardous area voltage must not exceed 250 V.

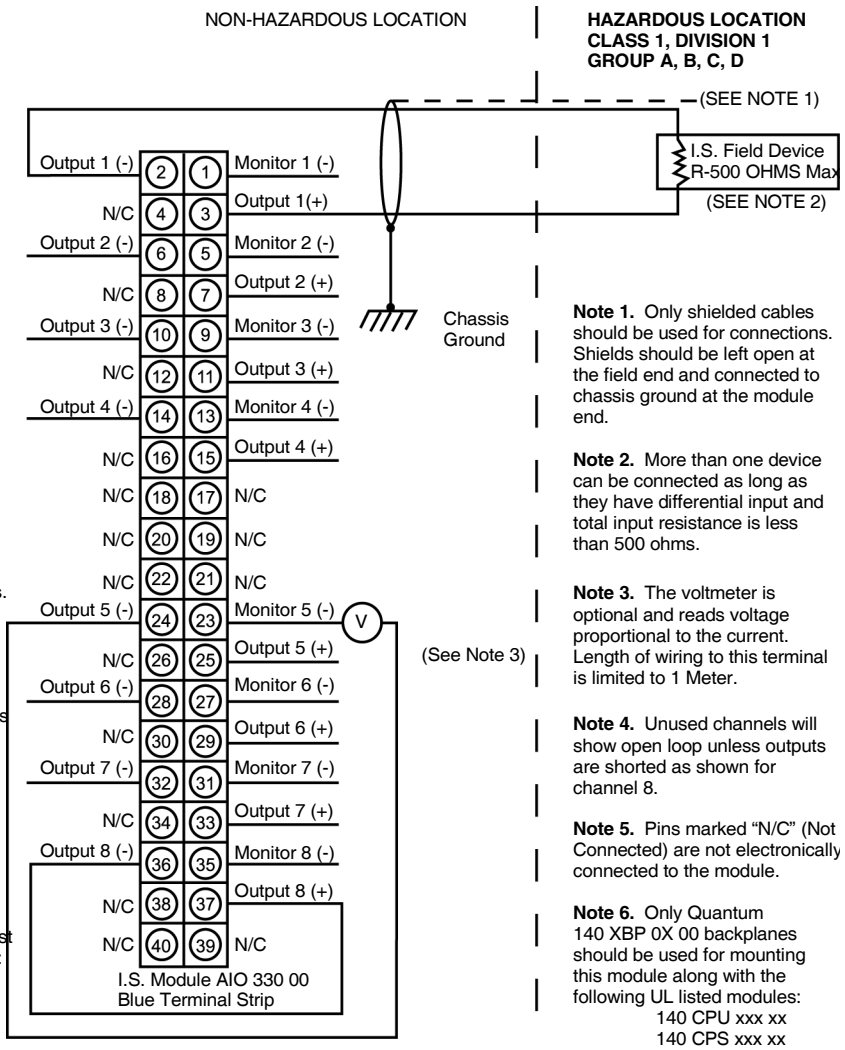
Note 3. If the electrical parameter of the cable are unknown, the following values must be used for Ccable and Lcable:
Capacitance 60 Pf/ft
Inductance 0.20 uH/ft

Note 4. Install in accordance with the NEC (ANSI/NFPA 70) and ANSI/ISA RP 12.6 for installation in the United States.

Note 5. To maintain intrinsic safety, shield for each cable must be grounded and must extend as close to the terminals as possible.

Note 6. Intrinsically Safe (I.S.) cables of one module must be routed separately from I.S. cables of another module.

Note 7. I.S. devices when connected to I.S. terminals must satisfy the following conditions:
$V_{cc} < V_{max}$
$I_{sc} < I_{max}$
$C_a > C_i + C_{cable}$
$L_a > L_i + L_{cable}$



Note 1. Only shielded cables should be used for connections. Shields should be left open at the field end and connected to chassis ground at the module end.

Note 2. More than one device can be connected as long as they have differential input and total input resistance is less than 500 ohms.

Note 3. The voltmeter is optional and reads voltage proportional to the current. Length of wiring to this terminal is limited to 1 Meter.

Note 4. Unused channels will show open loop unless outputs are shorted as shown for channel 8.

Note 5. Pins marked “N/C” (Not Connected) are not electronically connected to the module.

Note 6. Only Quantum 140 XBP 0X 00 backplanes should be used for mounting this module along with the following UL listed modules:
140 CPU xxx xx
140 CPS xxx xx

31001364 Rev 00

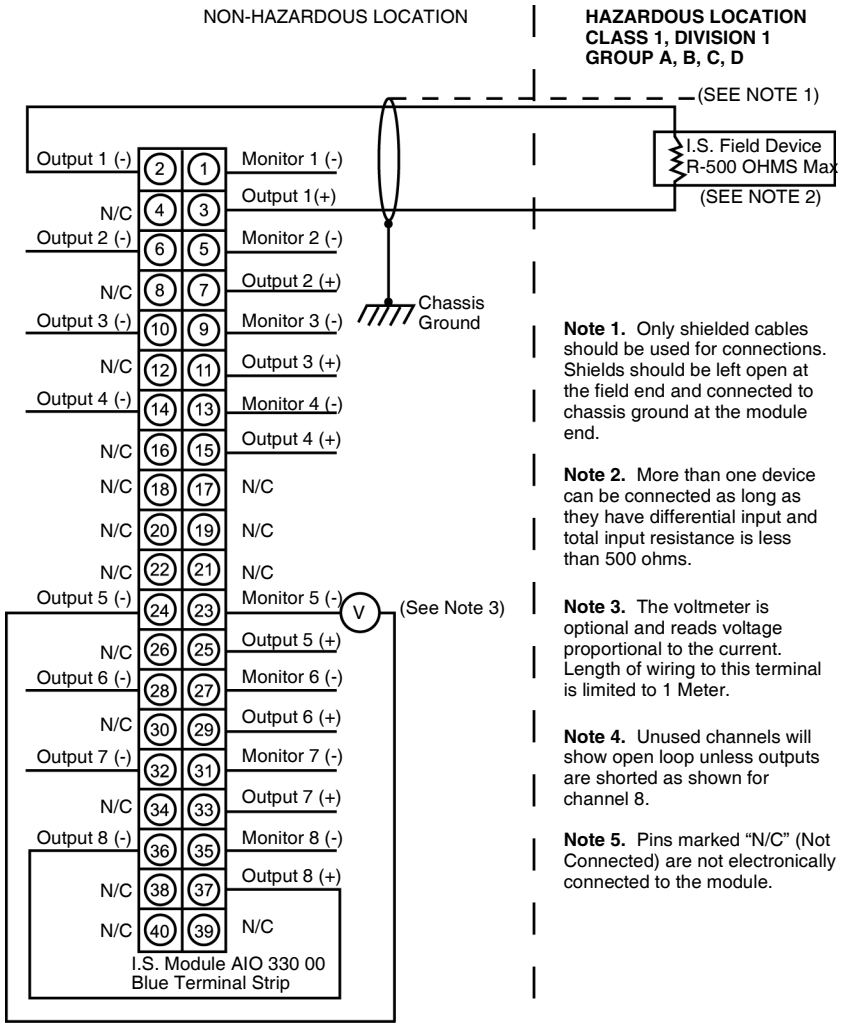
140 AIO 330 00 Wiring Diagram

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Cenelec Approved Wiring Diagram

The following is a Cenelec certified wiring diagram for this module.

CENELEC CERTIFICATION
Entity Parameters per channel:
Vo = 29.5 Vdc
Io = 94 mA/Ch
Po = 520 mW/ch
Co = 68 nf/ch
Lo = 4.2 mH/ch



31001364 Rev 00

AIO 330 00 Wiring Diagram (Analog Output)

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Field Wiring

Field wiring to the module should consist of separate shielded, twisted pair wires. The acceptable field wire gauge should be AWG 30 to AWG 18. Wiring between the module and the intrinsically safe field device should follow intrinsically safe wiring practices to avoid the transfer of unsafe levels of energy to the hazardous area.

Fixed Wiring System

The Quantum140 AIO 330 00 Intrinsically Safe Analog Output module is designed with a fixed wiring system where the field connections are made to a 40-pin, fixed position, blue terminal strip which is plugged into the module.

Terminal Strip Color and Keying Assignment

The module's 140 XTS 332 00 field wiring terminal strip is color-coded blue to identify it as an intrinsically safe connector.

The terminal strip is keyed to prevent the wrong connector from being applied to the module. The keying assignment is given below.

Module Class	Module Part Number	Module Coding	Terminal Strip Coding
Intrinsically Safe	140 AIO 330 00	CEF	ABD

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Specifications

General Specifications

Specifications for the Quantum 140 AIO 330 00 Intrinsically Safe Analog Output module are as follows.

Number of Channels	8 OUT
Loop Resistance	500 ohms maximum
Ranges	4 ... 20 mA (0 to 4095) 4 ... 20 mA (0 to 16000) 0 ... 20 mA (0 to 20000) 0 ... 25mA (0 to 25000)
Resolution	15 bits within 4 ... 20 mA
Accuracy Drift w/ Temperature	Typical: 40 PPM/°C. Maximum: 70 PPM/°C
Accuracy Error @ 25°C	+/- 0.2% of full scale
Linearity	+/- 1 LSB
Isolation	
Channel to Channel	None
Channel to Bus	1780 VAC RMS for 1 minute
Update Time	4 ms - for all channels
Settling Time	1 ms to +/- 0.1% of the final value
Bus Current Required	2.5 Amp
Power Dissipation	12.5 W
External Power	Not required for this module
Fault Detection	Open circuit in 4 ... 20 mA range
Voltmeter Monitor Specifications	
Range	0.250 ... 1.250 V
Scaling	V_{OUT} (Volts) = I_{LOOP} (mA) x 0.0625
Output Impedance	62.5 W Typical
Wire Length	1 m maximum
Hot Swap	Not allowed per intrinsic safety standards
Fusing	Internal - not user accessible

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Addressing

Flat Addressing

This module requires eight contiguous, 16-bit words (%MW) for output data. The data words formats are as follows.



Topological Addressing

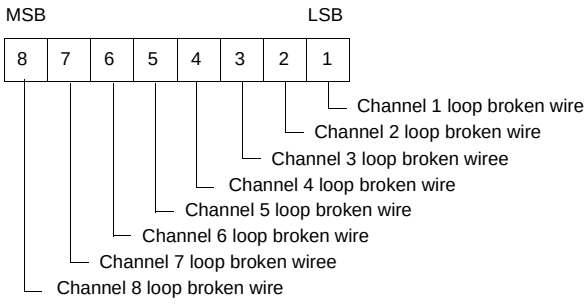
Topological addresses for the 140AIO33000 Output Module:

Point	I/O Object	Comment
Output 1	%QW[\b.e\]r.m.1	Value
Output 2	%QW[\b.e\]r.m.2	Value
• • •		
Output 7	%QW[\b.e\]r.m.7	Value
Output 8	%QW[\b.e\]r.m.8	Value

Used abbreviations: **b** = bus, **e** = equipment (drop), **r** = rack, **m** = module slot.

I/O Map Status Byte

The I/O map status byte is used by the 140AIO33000 Output Module as follows.

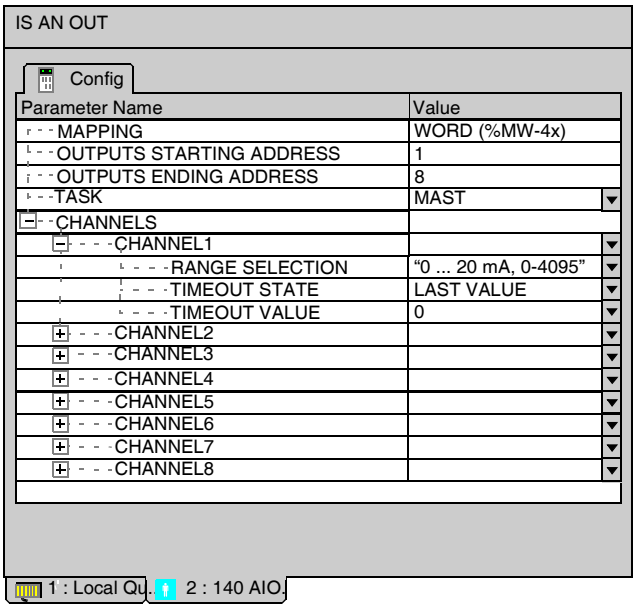


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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	WORD (%MW-4X)	-	
Outputs Starting Address	1	-	
Outputs Ending Address	8	-	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Channels Channel1			

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Name	Default Value	Options	Description
Range Selection	"4 ... 20 mA, 0-16000"	"4 ... 20 mA, 0-4095" "0 ... 20 mA, 0-20000" "0 ... 25 mA, 0-25000"	
Timeout State	DISABLED	LAST VALUE USER DEFINED	
Timeout Value	0	0-65535	only enabled Timeout State=USER DEFINED
Channel2-Channel8			see Channel1

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140 DII 330 00: Safe Discrete IN Module

54

Overview

Purpose

The following chapter provides information of the Quantum 140 DII 330 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	556
Indicators	557
Wiring Diagrams	558
Specifications	563
Parameter Configuration	564

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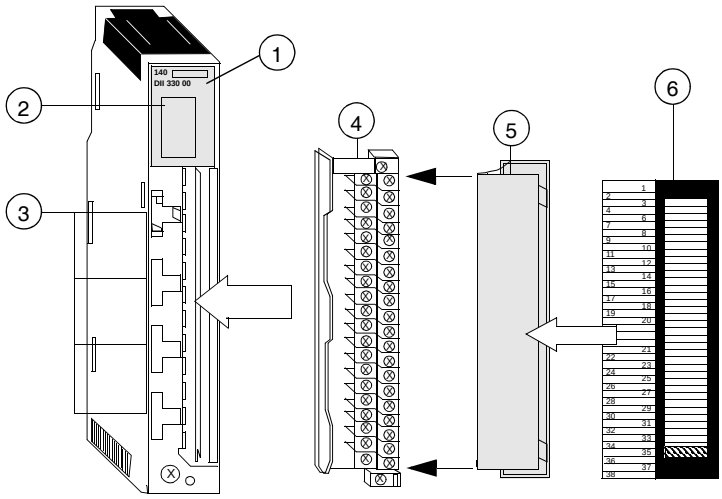
Presentation

Function

The Quantum 140 DII 330 00 Intrinsically Safe Digital Input module provides safe power to dry contact closures e.g., push buttons, selector switches, float switches, flow switches, limit switches, etc., in a hazardous area, and receives the proportional current to indicate an on/off state. The received current is converted into digital signals that is transferred to the PLC.

Illustration

The following figure shows the 140 DII 330 00 module and its components.



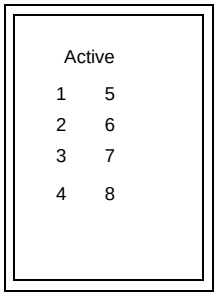
1 Model Number, Module Description, Color Code
2 LED Display
3 Fuse Cutouts
4 Field Wiring Terminal Strip
5 Removable Door
6 Customer Identification Label (Fold label and place it inside door)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DII 330 00 module.



Descriptions

The following table shows the LED descriptions for the 140 DII 330 00 module.

LEDs	Color	Indication When On
Active	Green	Bus communication is present
1 .. 8	Green	The indicated point or channel is on

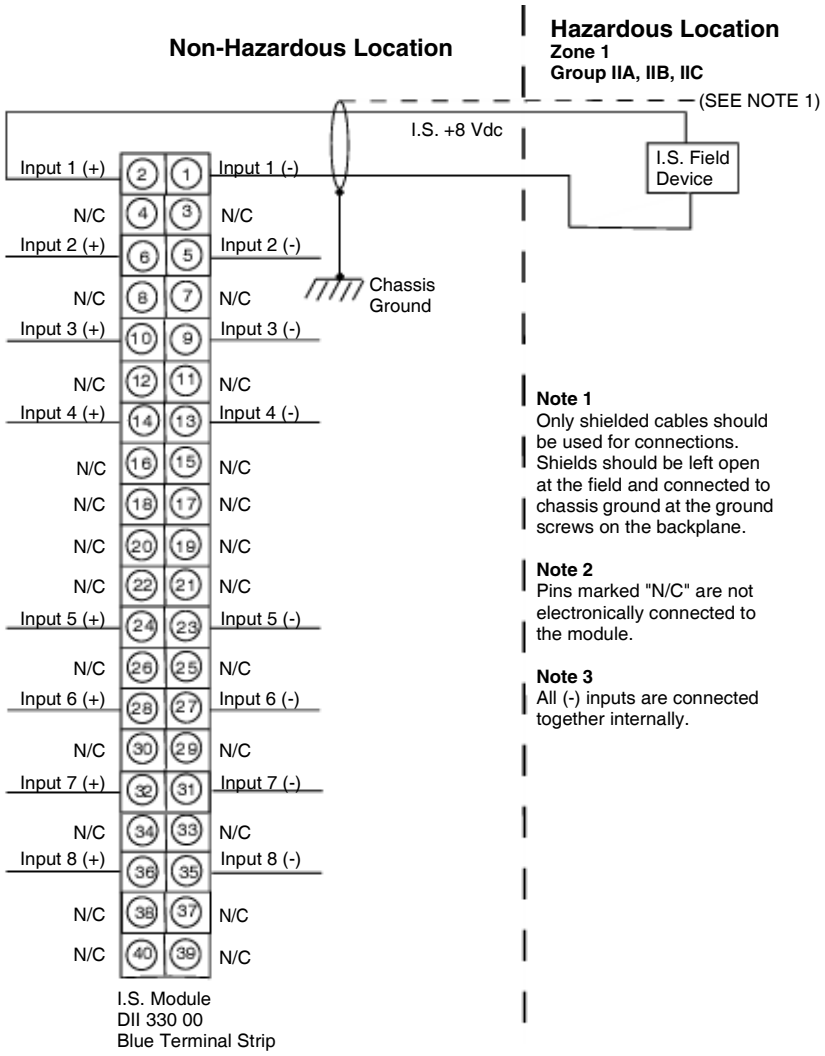
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Wiring Diagrams

Celenec Approved Wiring Diagram

The following is a Celenec certified wiring diagram for this module.

CENELEC CERTIFICATION
Entity Parameters per Channel:
Vo = 9.6 Vdc
Io = 80 mA/ch
Po = 192 mW/ch
Co = 450 nf/ch
Lo = 694 µH/ch



140 DII 330 00 Wiring Diagram

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CSA Approved Wiring Diagram

The following is a CSA certified wiring diagram for this module.

Notes Related to CSA Certification for this module

Note 1
Entity parameters are provided per channel:
V_{oc} = 9.5 V
I_{sc} = 80 mA
C_a = 450 nf
L_a = 694 mH

Note 2
Maximum non-hazardous area voltage must not exceed 250 V.

Note 3
In Canada, install in accordance with Canadian Electrical Code, Part I.

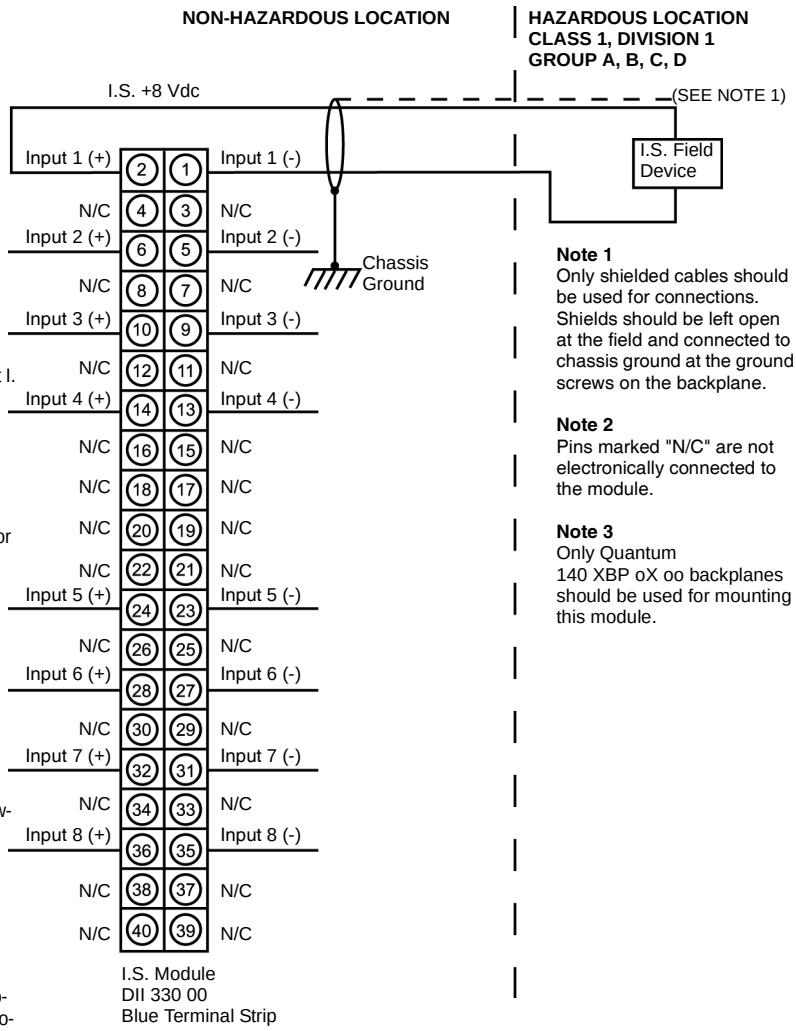
Note 4
In the United States, install in accordance with the NEC (ANSI/ NFPA 70) and ANSI / ISA RP 12.6.

Note 5
To maintain intrinsic safety, shield for each cable must be grounded and must extend as close to the terminals as possible.

Note 6
Intrinsically Safe (I.S.) cables of one module must be routed separately from I.S. cables of another module.

Note 7
I.S. devices when connected to I.S. terminals must satisfy the following conditions:
$V_{cc} < V_{max}$
$I_{sc} < I_{max}$
$C_{a > Ci + C_{cable}}$
$L_{a > Li + L_{cable}}$

Note 8
This module is certified as a component for mounting in a suitable enclosure where the suitability of the final combination is subject to acceptance by CSA or an inspection authority having the juridiction.



Note 1
Only shielded cables should be used for connections. Shields should be left open at the field and connected to chassis ground at the ground screws on the backplane.

Note 2
Pins marked "N/C" are not electronically connected to the module.

Note 3
Only Quantum 140 XBP oX oo backplanes should be used for mounting this module.

31001365 Rev 00 140 DII 330 00 Wiring Diagram

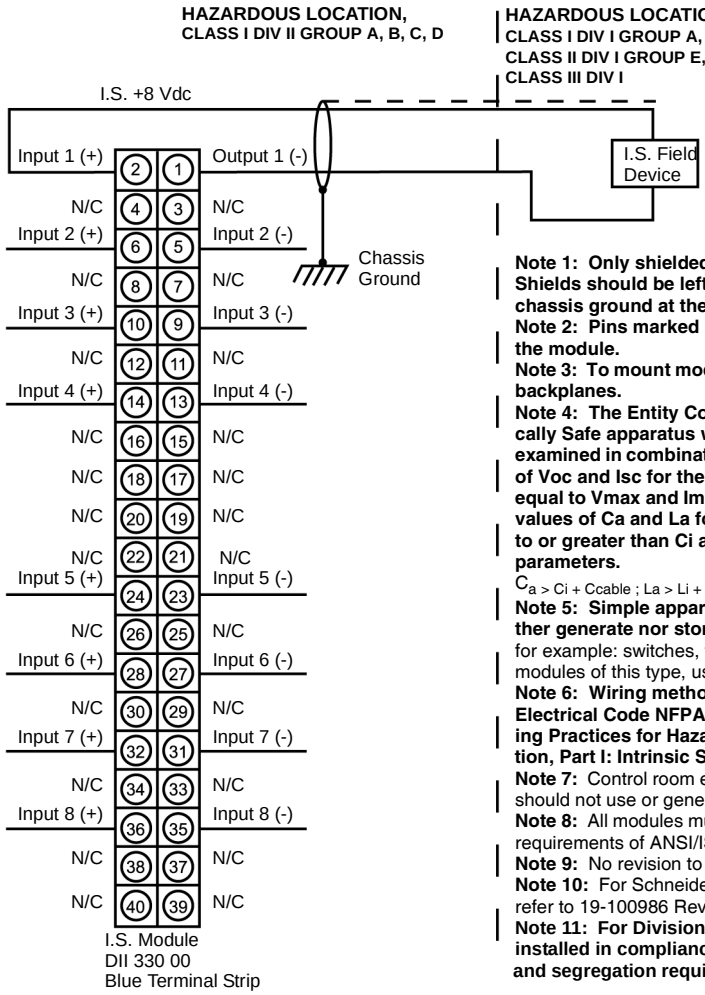
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FM Approved Wiring Diagram

The following is a FM certified wiring diagram for this module.

Notes Related to FM Certification

This IS field device should meet Note 5 or should be FM approved with entity concept in Note 4 appropriate for connection with IS RTD/TC IN Module with Concept Parameters LIsted below. The entity parameters are per Channel.
V_{oc} = 27.9 VDC
I_{sc} = 121 mA/Ch
C_a = 84 nf/Ch
L_a = 2.2 mH/Ch
P_o = 840 mW/Ch



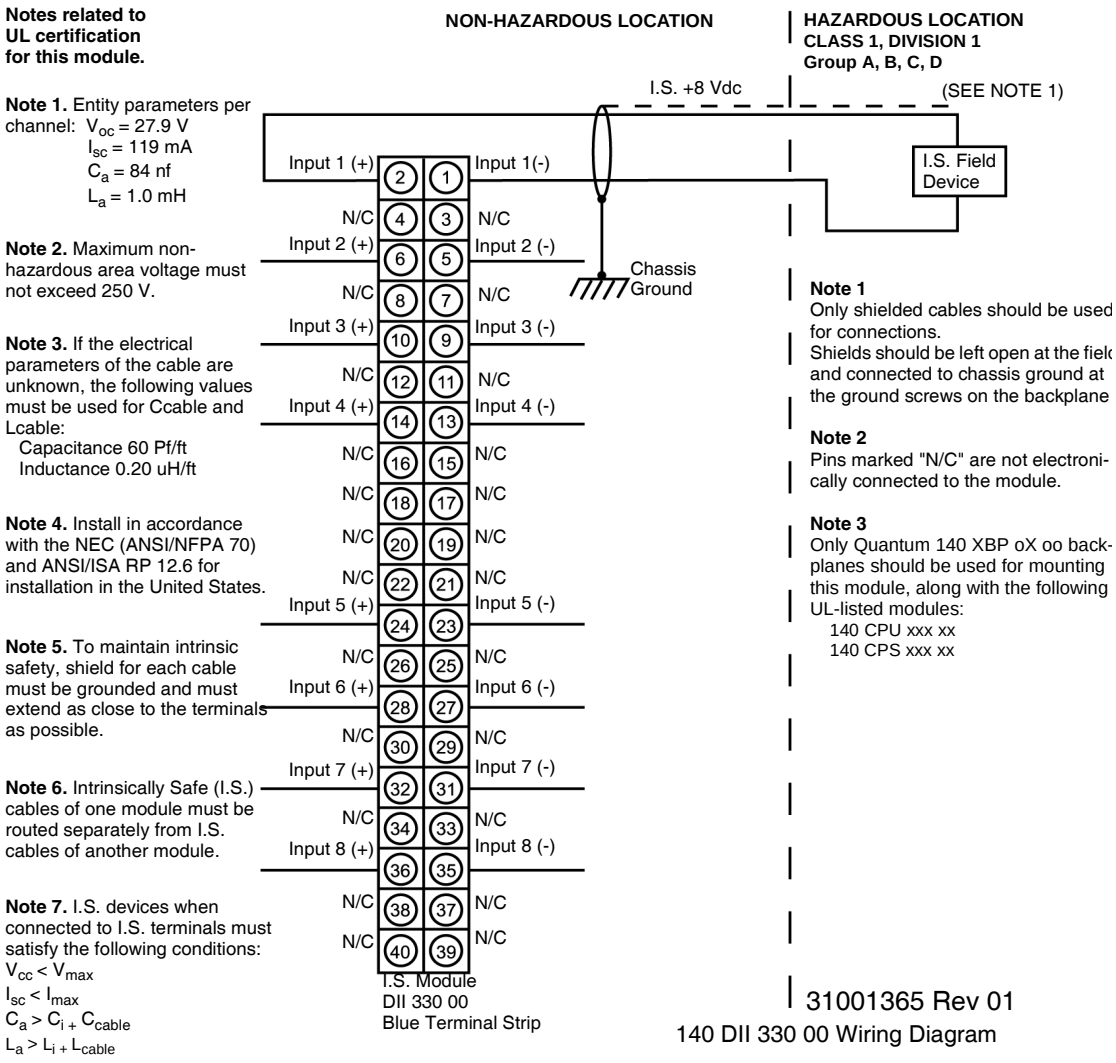
Note 1: Only shielded cables should be used for connections. Shields should be left open at the field end, and connected to chassis ground at the module end.
Note 2: Pins marked "N/C" are not electronically connected to the module.
Note 3: To mount modules of this type, use only 140 XBP 0xx 00 backplanes.
Note 4: The Entity Concept allows interconnection of Intrinsically Safe apparatus with associated apparatus not specifically examined in combination as a system when the approved values of Voc and Isc for the associated apparatus are less than or equal to Vmax and Imax for the I.S. apparatus, and the approved values of Ca and La for the associated apparatus must be equal to or greater than Ci and Li for the I.S. apparatus, plus all cable parameters.
$C_{a > Ci + Ccable}$; La > Li + Lcable ; Voc < Vmax ; Isc < I_{max}
Note 5: Simple apparatus is defined as a device which will neither generate nor store more than 1.2 V, 0.1 A, 20 mJ, or 25 mW; for example: switches, thermocouplers, LEDs, RTDs, etc. mount modules of this type, use only 140 XBP 0xx 00 backplanes.
Note 6: Wiring methods must be in accordance with National Electrical Code NFPA 70, Article 504 and ANSI/ISA RP12.6, "Wiring Practices for Hazardous (classified) Locations Instrumentation, Part I: Intrinsic Safety."
Note 7: Control room equipment connected to associated apparatus should not use or generate more than 250 Vrms.
Note 8: All modules must be installed in an enclosure that meets the requirements of ANSI/ISA S82.01.
Note 9: No revision to this drawing without prior FMRC approval.
Note 10: For Schneider Electric internal use only. For control sheet, refer to 19-100986 Rev. 1.
Note 11: For Division 2 installation, the apparatus shall be installed in compliance with the enclosure, mounting, spacing, and segregation requirements of the ultimate application, includ-

31001365 Rev 01 140 DII 330 00 Wiring Diagram

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UL Approved Wiring Diagram

The following is a UL certified wiring diagram for this module.



140 DII 330 00 Wiring Diagram

Fixed Wiring System

The Quantum 140 DII 330 00 Intrinsically Safe Digital Input module is designed with a fixed wiring system where the field connections are made to a 40-pin, fixed position, blue terminal strip which is plugged into the module.

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Field Wiring

Field wiring to the module consists of separate shielded twisted pair wires. The acceptable field wire gauge is AWG 20 to AWG 12. Wiring between the module and the intrinsically safe field device should follow intrinsically safe wiring practices, to avoid the transfer of unsafe levels of energy to the hazardous area.

Terminal Strip Color and Keying Assignment

The module's 140 XTS 332 00 field wiring terminal strip is color-coded blue to identify it as an intrinsically safe connector.

The terminal strip is keyed to prevent the wrong connector from being applied to the module. The keying assignment is given below.

Module Class	Module Part Number	Module Coding	Terminal Strip Coding
Intrinsically Safe	140 DII 330 00	CDE	ABF

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Specifications

General Specifications

Specifications for the Quantum140 DII 330 00 Intrinsically Safe Digital Input module are as follows.

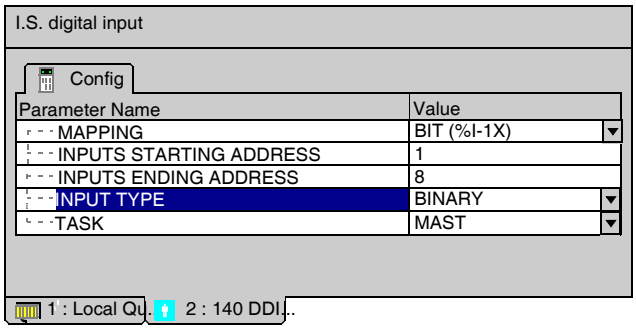
Number of Input Points	8 IN
Operating Voltages and Currents	
No load voltage (between input + and input -)	8 VDC
Short circuit current	8 mA
Switching point	1.2 mA ... 2.1 mA
Switching hysteresis	0.2 mA
Switching Frequency	100 Hz maximum
Response	
OFF-ON	1 ms
ON-OFF	1 ms
Isolation	
Channel to Channel	None
Channel to Bus	1780 VAC, 47-63 Hz or 2500 VDC for 1 min.
Internal Resistance	2.5 K ohms
Input Protection	Resistor limited
Fault Detection	None
Bus Current Required	400 mA
Power Dissipation	2 W
External Power	Not required
Hot Swap	Not allowed per intrinsic safety standards
Fusing	Internal - not user accessible

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Parameter Configuration

Parameter and Default values

Parameter Configuration Window



Name	Default Value	Options	Description
Mapping	BIT (%I-1x)	WORD (%IW-3X)	
Inputs Starting Address	1	1	
Inputs Ending Address	8	1	
Input Type	BINARY	BCD	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local

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140 DIO 330 00: Safe Discrete OUT Module

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Overview

Purpose

The following chapter provides information of the Quantum 140 DIO 330 00 Module.

What's in this Chapter?

This chapter contains the following topics:

Topic	Page
Presentation	566
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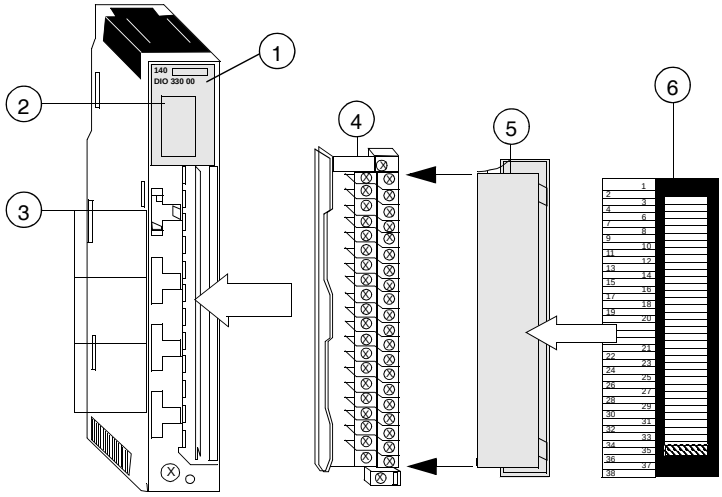
Presentation

Function

The Quantum 140 DIO 330 00 Intrinsically Safe Digital Output module provides intrinsically safe power to a variety of components such as solenoid valves, LEDs, etc., located in a hazardous area. This module is for use with sink devices only.

Illustration

The following figure shows the 140 DIO 330 00 module and its components.



1 Model Number, Module Description, Color Code

2 LED Display

3 Fuse Cutouts

4 Field Wiring Terminal Strip

5 Removable Door

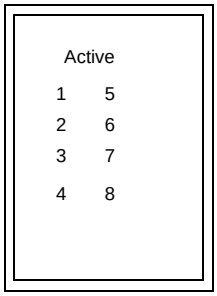
6 Customer Identification Label (Fold label and place it inside door)

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Indicators

Illustration

The following table shows the LED indicators for the 140 DIO 330 00 module.



Descriptions

The following table shows the LED descriptions for the 140 DIO 330 00 module.

LEDs	Color	Indication When On
Active	Green	Bus communication is present
1 .. 8	Green	The indicated point or channel is on

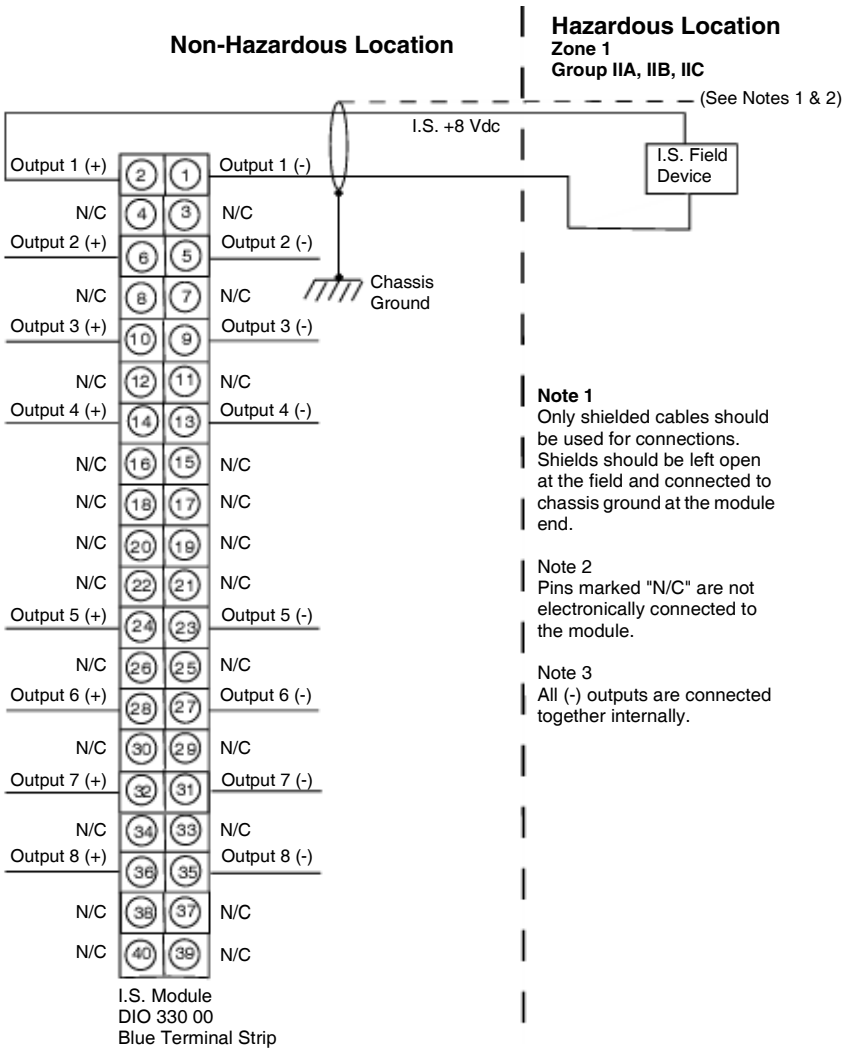
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Wiring Diagrams

Celenec Approved Wiring Diagram

The following is a Celenec certified wiring diagram for this module.

CENELEC CERTIFICATION
Entity Parameters per Channel:
Vo = 27.9 Vdc
Io = 121 mA/ch
Po = 840 mW/ch
Co = 84 nf/ch
Lo =2.2 mH/ch



140 DIO 330 00 Wiring Diagram

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CSA Approved Wiring Diagram

The following is a CSA certified wiring diagram for this module.

Notes Related to CSA Certification for this module

Note 1
Entity parameters are provided per channel:
V_{oc} = 27.9 V
I_{sc} = 119 mA
C_a = 84 nf
L_a = 1.0 mH

Note 2
Maximum non-hazardous area voltage must not exceed 250 V.

Note 3
In Canada, install in accordance with Canadian Electrical Code, Part I.

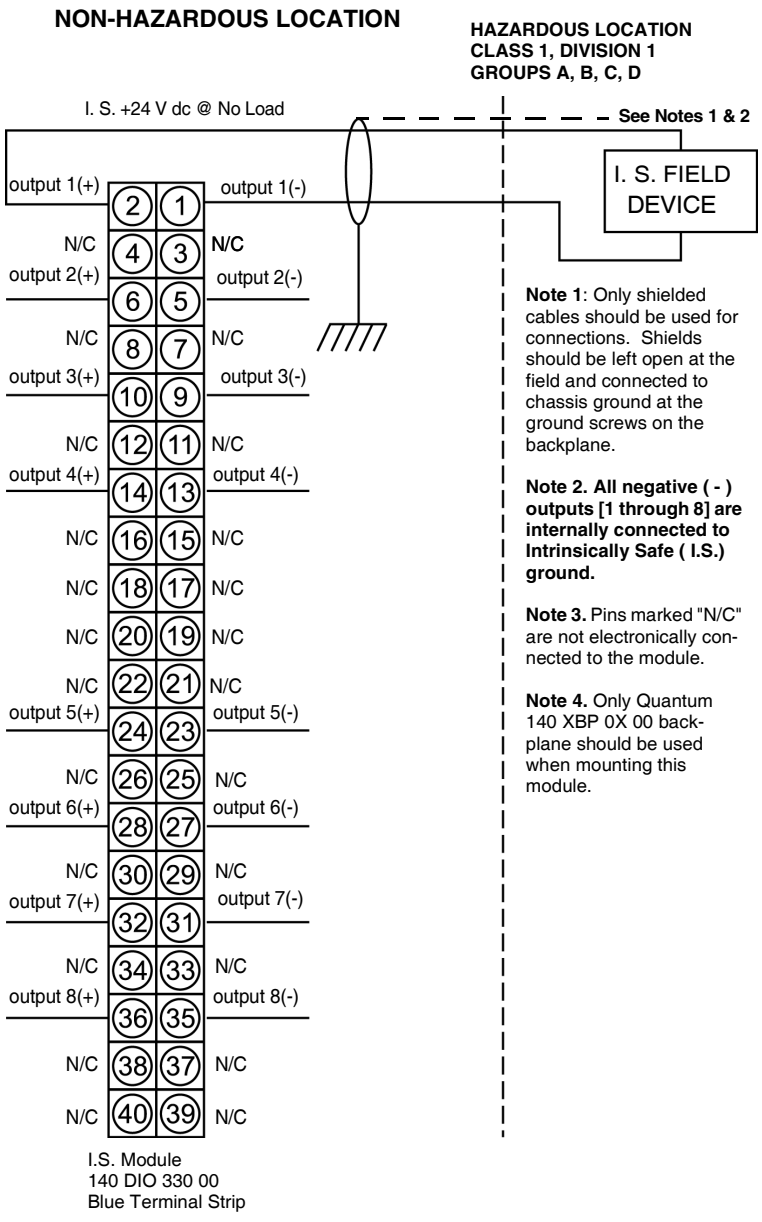
Note 4
In the United States, install in accordance with the NEC (ANSI/NFPA 70) and ANSI / ISA RP 12.6.

Note 5
To maintain intrinsic safety, shield for each cable must be grounded and must extend as close to the terminals as possible.

Note 6
Intrinsically Safe (I.S.) cables of one module must be routed separately from I.S. cables of another module.

Note 7
I.S. devices when connected to I.S. terminals must satisfy the following conditions:
$V_{cc} < V_{max}$
$I_{sc} < I_{max}$
$C_{a > Ci + C_{cable}}$
$La > Li + L_{cable}$

Note 8
This module is certified as a component for mounting in a suitable enclosure where the suitability of the final combination is subject to acceptance by CSA or an inspection authority having the juridiction.



I.S. Module
140 DIO 330 00
Blue Terminal Strip

Note 1: Only shielded cables should be used for connections. Shields should be left open at the field and connected to chassis ground at the ground screws on the backplane.

Note 2. All negative (-) outputs [1 through 8] are internally connected to Intrinsically Safe (I.S.) ground.

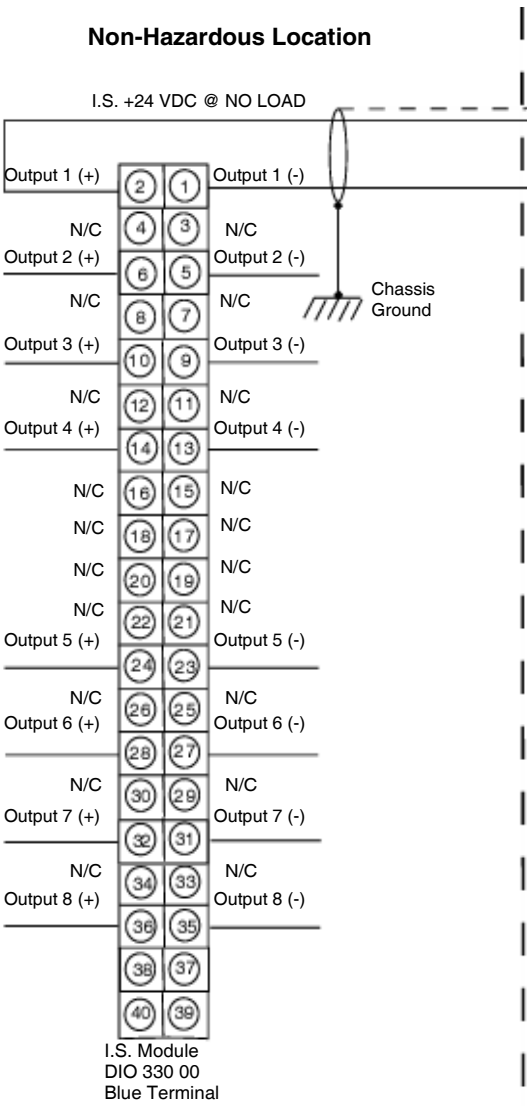
Note 3. Pins marked "N/C" are not electronically connected to the module.

Note 4. Only Quantum 140 XBP 0X 00 backplane should be used when mounting this module.

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FM Approved Wiring Diagram

The following is a FM certified wiring diagram for this module.



Notes Related to FM Certification

This I.S. field device should meet Note 5, or be FM-approved with the Entity Concept, as oulined in Note 4, appropriate for connection with the I.S. RTD/TC IN module, with the Concept parameters listed below.

Entity parameters provided are per channel.

V_{oc} = 27.9 Vdc
I_{sc} = 121 mA/ch
C_a = 84 nf/ch
L_a = 2.2 mH/ch
P_o = 840 mW/ch

Note 1: Only shielded cables should be used for connections. Shields should be left open at the field end, and connected to chassis ground at the module end.

Note 2: Pins marked "N/C" are not electronically connected to the module.

Note 3: To mount modules of this type, use only 140 XBP 0xx 00 backplanes.

Note 4: The Entity Concept allows interconnection of Intrinsically Safe apparatus with associated apparatus not specifically examined in combination as a system when the approved values of Voc and Isc for the associated apparatus are less than or equal to Vmax and Imax for the I.S. apparatus, and the approved values of Ca and La for the associated apparatus must be equal to or greater than Ci and Li for the I.S. apparatus, plus all cable parameters.

$C_{a\ >\ Ci\ +\ Ccable;\ La\ >\ Li\ +\ Lcable;\ Voc\ <\ Vmax;\ Isc\ <\ I_{max}}$

Note 5: Simple apparatus is defined as a device which will neither generate nor store more than 1.2 V, 0.1 A, 20 mJ, or 25 mW; for example: switches, thermocouplers, LEDs, RTDs, etc. mount modules of this type, use only 140 XBP 0xx 00 backplanes.

Note 6: Wiring methods must be in accordance with National Electrical Code NFPA 70, Article 504 and ANSI/ISA RP12.6, "Wiring Practices for Hazardous (classified) Locations Instrumentation, Part I: Intrinsic Safety."

Note 7: Control room equipment connected to associated apparatus should not use or generate more than 250 Vrms.

Note 8: All modules must be installed in an enclosure that meets the requirements of ANSI/ISA S82.01.

Note 9: No revision to this drawing without prior FMRC approval.

Note 10: For Schneider Electric internal use only. For control sheet, refer to 19-100986 Rev. 0.

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UL Approved Wiring Diagram

The following is a UL certified wiring diagram for this module.

Notes Related to UL Certification for this module

Note 1
Entity parameters are provided per channel:
V_{oc} = 27.9 V
I_{sc} = 119 mA
C_a = 84 nf
L_a = 1.0 mH

Note 2
Maximum non-hazardous area voltage must not exceed 250 V.

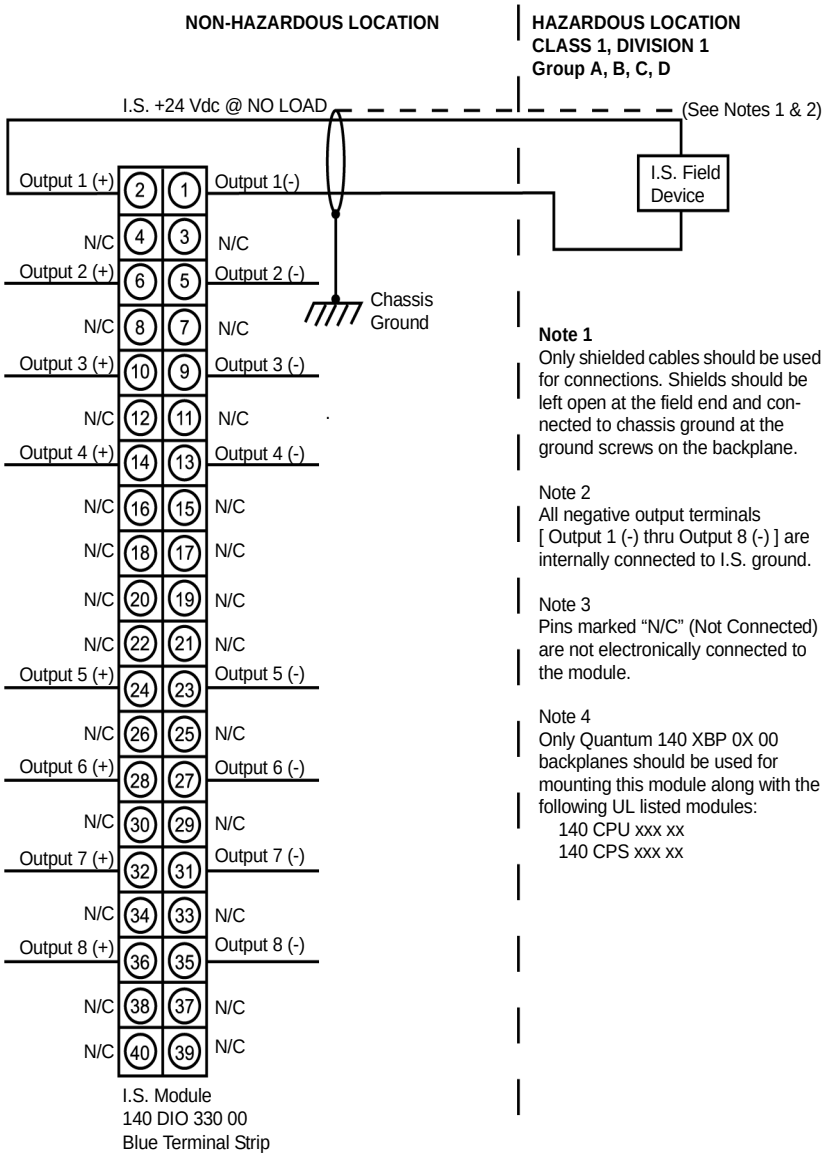
Note 3
If the electrical parameters of the cable are unknown, the following values must be used for Ccable and Lcable:
Capacitance: 60 Pf/ft
Inductance: 0.20 uH/ft

Note 4
Install in accordance with the NEC (ANSI/NFPA 70) and ANSI/ISA RP 12.6 for installation in the United States.

Note 5
To maintain intrinsic safety, shield for each cable must be grounded and must extend as close to the terminals as possible.

Note 6
Intrinsically Safe (I.S.) cables of one module must be routed separately from I.S. cables of another module.

Note 7
I.S. devices when connected to I.S. terminals must satisfy the following conditions:
$V_{cc} < V_{max}$
$I_{sc} < I_{max}$
$C_{a > Ci + C_{cable}}$
$La > Li + L_{cable}$



Note 1
Only shielded cables should be used for connections. Shields should be left open at the field end and connected to chassis ground at the ground screws on the backplane.

Note 2
All negative output terminals [Output 1 (-) thru Output 8 (-)] are internally connected to I.S. ground.

Note 3
Pins marked “N/C” (Not Connected) are not electronically connected to the module.

Note 4
Only Quantum 140 XBP 0X 00 backplanes should be used for mounting this module along with the following UL listed modules:
140 CPU xxx xx
140 CPS xxx xx

31001366 Rev 00 140 DIO 330 00 Wiring Diagram

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Fixed Wiring System

The Quantum 140 DIO 330 00 Intrinsically Safe Digital Output module is designed with a fixed wiring system where the field connections are made to a 40-pin, fixed position, blue terminal strip, which is plugged into the module.

Field Wiring

Field wiring to the module consists of separate shielded, twisted pair wires. Acceptable field wire gauges go from AWG 20 to AWG 12. Wiring between the module and the intrinsically safe field device should follow intrinsically safe wiring practices, to avoid the transfer of unsafe levels of energy to the hazardous area.

Terminal Strip Color and Keying Assignment

The module's 140 XTS 332 00 field wiring terminal strip is color-coded blue to identify it as an intrinsically safe connector.
The terminal strip is keyed to prevent the wrong connector from being applied to the module. The keying assignment is given below.

Module Class	Module Part Number	Module Coding	Terminal Strip Coding
Intrinsically Safe	140 DIO 330 00	CDE	ABF

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Specification

Specifications Table

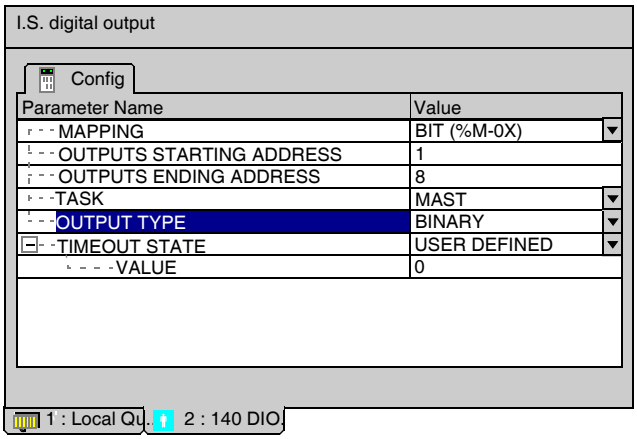
Specifications for the Quantum 140 DIO 330 00 Intrinsically Safe Digital Output module are as follows.

Number of Output Points	8 OUT
Output Voltage	24 V (open)
Maximum Load Current	
Each Point	45 mA
Per Module	360 mA
Off State Leakage/Point	0.4 mA
Response (Resistive Loads)	
OFF-ON	1 ms
ON-OFF	1 ms
Output Protection (Internal)	Transient voltage suppression
Isolation	
Channel to Channel	None
Channel to Bus	1780 VAC, 47-63 Hz or 2500 VDC for 1 min.
Fault Detection	None
Bus Current Required	2.2 Amp (full load)
Power Dissipation	5 W (full load)
External Power	Not required
Hot Swap	Not allowed per intrinsic safety requirements
Fusing	Internal - not user accessible

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140 DIO 330 00 Parameter Configuration

Parameter Configuration Window

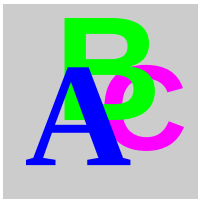


Parameter and Default Values

Name	Default Value	Options	Description
Mapping	BIT (%M-0x)	WORD (%MW-4X)	
Output Starting Address	1	1	
Output Ending Address	8	1	
Output Type	BINARY	BCD	
Task (Grayed if module in other than local)	MAST	FAST AUX0 AUX1 AUX2 AUX3	fixed to MAST if module in other than local
Timeout State	USERDEFINED	HOLD LAST VALUE	
Value	0	0-255	only enabled if Timeout State=USERDEFINED

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