

OFFICIAL TECHNICAL DATA EXTRACT

1C31232G03

Ovation 16-Channel 125 VAC/VDC Compact Digital Input Module

Manufacturer: Emerson

Source: Ovation I/O Reference Manual R3-1150, Compact Digital Input Module section

Technical reference prepared by Apter Power

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Section 11. Compact Digital Input Module

11-1. Description

The Compact Digital Input module contains 16 channels where each channel has voltage level sensing circuitry used to detect whether an input is on or off. The input voltage level sensed by the module is determined by the particular card group of the module.

The module is available for three options:

- 16 isolated differential inputs (unfused) (24/48 VAC/VDC or 125 VAC/VDC).
- 16 single-ended (common return) digital inputs with a common fuse and on-card blown fuse detection for the auxiliary power supply (24/48 VDC).
- 16 individually fused digital inputs using a common power supply. Blown fuse detection is not available with this option (24/48 VAC/VDC or 125 VAC/VDC).

The field side circuitry for the single-ended configuration is shown in [Figure 11-1](#) and for the differential configuration in [Figure 11-2](#). The field side circuitry for the 16 individually fused configuration is shown in [Figure 11-3](#). An input resistor provides the normal mode surge protection and limits the current during normal operation. An opto-isolator provides high dielectric isolation between the field side and the logic or I/O bus side.

The Single-Ended Digital Input configuration has a circuit used to monitor the presence of the auxiliary supply (blown fuse detection). Two cases cause this monitor circuitry to report a blown fuse status and issue an attention status to the Ovation Controller:

- Fuse is blown on the Electronics Module.
- Auxiliary supply level is lower than minimum On Input Voltage.

In addition, a foam insert that includes a wiring diagram is available for placement in the Personality module cavity in the Base Unit in all configurations except the 16 point individually fused option which requires a personality module (5X00034). The compact digital input module is applicable for CE Mark certified systems

Note

See [Section 3. I/O Modules](#) for environmental, installation, wiring, and fuse information.

Compact Digital Input Module

11-2. Module Groups

11-2.1. Electronics Modules

There are three Electronics module groups for the Compact Digital Input Module:

- 1C31232G01 provides for 24/48 VDC single-ended inputs.
- 1C31232G02 provides for 24/48 VAC/VDC differential inputs and supports the 16 point individually fused option.
- 1C31232G03 provides for 125 VAC/VDC differential inputs and supports the 16 point individually fused option.

11-2.2. Personality Module

There is one Personality module group for the Compact Digital Input Module:

- 5X00034G01 provides for 16 point individual fusing with a common supply.

This is an optional Personality module that is available for use with the differential input Electronics modules (1C31232G02, 1C31232G03) for applications requiring individual point fusing with a common supply.

Note

This Personality Module is not available for use with Single Ended Electronics Module 1C3123G01.

11-2.3. Foam Insert

In the event that individual fusing is not required, a foam insert is available that fits into the Personality module cavity in the Base Unit and provides wiring information.

- 1C31238H01

Compact Digital Input Module

Table 11-1. Compact Digital Input Subsystem

Range	Channels	Electronic Module	Personality Module or Cavity Insert ¹
24/48 VDC Single-ended	16	1C31232G01	1C31238H01 ¹ (Cavity Insert)
24/48 VAC/VDC & 24VAC Differential	16	1C31232G02	1C31238H01 ¹ (Cavity Insert)
Individually fused with common power supply	16	1C31232G02	5X00034G01 (Fused Pmod)
125 VAC/VDC Differential	16	1C31232G03	1C31238H01 ¹ (Cavity Insert)
Individually fused with common power supply	16	1C31232G03	5X00034G01 (Fused Pmod)
1 This is an insert that fits into the Personality module position and provides a wiring schematic label for the module.			

All Configurations are CE Mark Certified.

When the 125VAC/VDC Compact Digital Input Emod (1C31232G03) is used in applications without the Fused Pmod (5X00034G01), additional external fusing or other current limiting devices are recommended on the hazardous inputs to provide additional protection to the external wiring and power source.

Compact Digital Input Module

11-2.4. Field Wiring Considerations for the Compact Digital Input Configuration

The following maximum resistances of the cable and the interfaced device apply:

24/48VDC - 175 K Ω

24 VAC - 50 K Ω

125 VDC - 225 K Ω

125 VAC - 50 K Ω

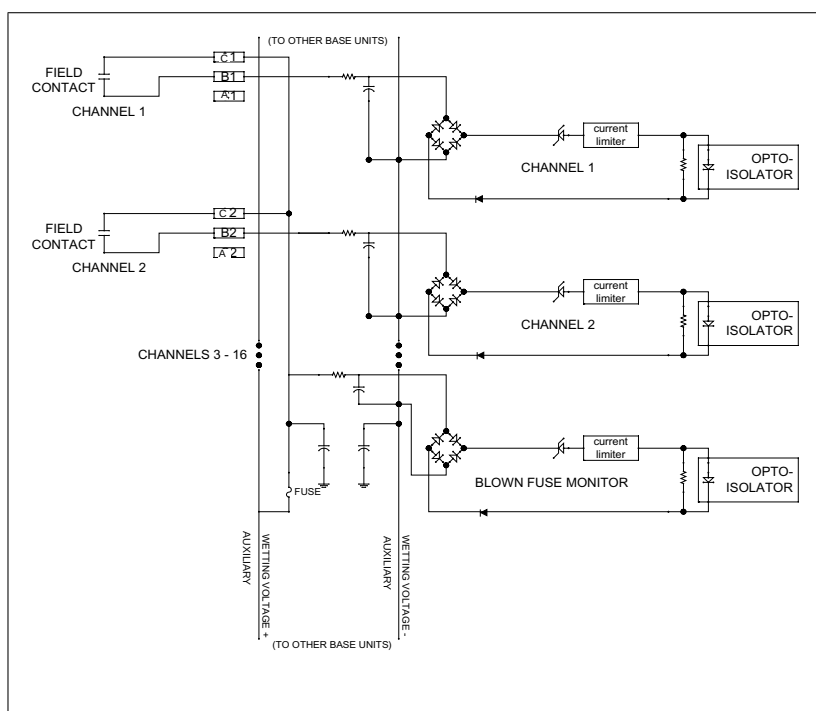


Figure 11-1. Single-Ended Compact Digital Input Front End

Compact Digital Input Module



Caution for CE Mark certified systems:

Any base unit that contains a 125VAC/DC Compact Digital Input Electronics module (1C31232G03) with foam insert (1C31238H01) and interfaces to hazardous voltage (>30 V RMS, 42.4 V peak, or 60 VDC) must include a hazardous voltage warning label (1B30025H01) on that base unit.

Any base unit that contains a 125VAC/DC Compact Digital Input Electronics module (1C31232G03) with the individually fused Personality Module (5X00034G01) and interfaces to hazardous voltage (>30 V RMS, 42.4 V peak, or 60 VDC) must include a hazardous voltage warning label (1B30025H01) on **ALL** base units on the branch.

This label must be placed in a visible location on the base unit, preferably above the spare fuse location. The project drawings must indicate this.

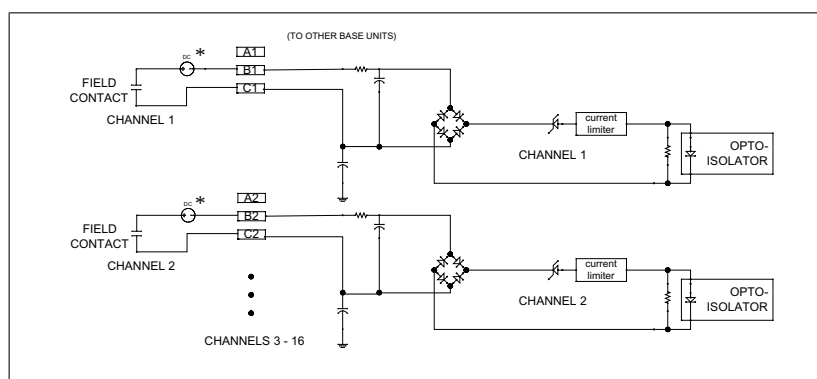


Figure 11-2. Differential Compact Digital Input Front End

* Auxiliary power supply may be AC or DC. If a DC supply is used, the polarity can be opposite of what is shown.

Compact Digital Input Module

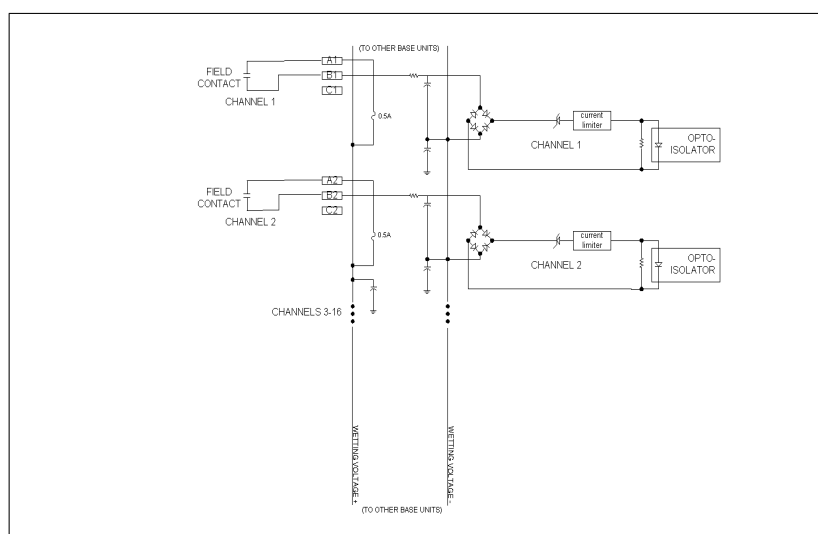


Figure 11-3. 16 Individually Fused Compact Digital Inputs Front End

11-3. External Power Supplies

The required voltage source may be obtained from the internal auxiliary power supply (backplane) or it may be obtained from an external power supply when using the following modules:

- 1C31232G01 single-ended Electronic module (configured for 16 single-ended inputs).
- 1C31232G02 or 1C31232G03 16 point individually fused configuration Electronic modules with 5X00034 Personality module.

If an external voltage power supply is used, see [Appendix D](#) for the steps to be undertaken before connecting the external power supply to the Compact Digital Input module base unit terminal block.

Compact Digital Input Module

11-4. Specifications

Electronics Module (1C31232)

Table 11-2. Compact Digital Input Module Specifications

Description	Value
Number of channels	16
Input range (single-ended or differential) ¹	Refer to Table 11-3 .
Propagation delay of contact change of state ² 24V/48V DC 24VAC 125VDC 125VAC	16.0 mSec maximum 14.0 mSec maximum 20.0 mSec maximum 25.0 mSec maximum
Cable length (quality is 50pF/ft or better)	1000 feet maximum @ 50pF/ft or better
Diagnostics	Internal module operating faults. Blown fuse detection. ³
Dielectric isolation: Channel to channel ⁴ Channel to logic	1000 VAC 2000 VAC (differential);1000 VAC (single-ended)
Module power (drawn from logic supply)	Main: 1.1 W typical, 1.5 W maximum
Operating temperature range	0 to 60°C (32°F to 140°F)
Storage temperature range	-40°C to 85°C (-40°F to 185°F)
Humidity (non-condensing)	0 to 95%
¹ Input range level is dependent on module group. ² Does not include cable capacitance. ³ Blown fuse detection applies to single-ended channel configuration only when an on-board fuse is provided for the auxiliary power supply. ⁴ Channel to channel isolation applies to differential channel configuration only.	

Compact Digital Input Module

Table 11-3. Compact Digital Input Ranges

Input Level	On Input Voltage (VDC or VAC RMS)		Off Input Voltage (VDC or VAC RMS) Max	On Input Current (mA)		Off Input Current (mA) Max	Power in Front End (Watts) Typical
	Min	Max		Min	Max		
24 VDC	20	60	9	1.3	2.6	0.33	0.69
24 VAC	22	30	7	2.8	5.5	0.6	0.80
48 VDC	18	60	9	1.3	2.6	0.33	1.75
125 VDC	80	140	55	1.3	2.8	0.33	4.26
125 VAC	85	132	40	8.2	14.0	3.00	5.10

11-5. Compact Digital Input Terminal Block Wiring Information

The available foam insert or Personality module has a simplified wiring diagram label on top, which appears above the terminal block. This diagram indicates how the wiring from the field is to be connected to the terminal block in the base unit.

The wiring diagram for the Compact Digital Input module is illustrated in [Figure 11-4](#). The following table lists and defines the abbreviations used in the diagram.

Abbreviation	Definition
1+ through 16+	Digital input positive terminal connection
1- through 16-	Digital input negative terminal connection
	Earth ground terminals
PS+, PS-	Auxiliary Power Supply terminals
RSV	Reserved terminal. Do not use.

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	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
A	RSV	RSV	RSV	RSV	RSV	RSV	RSV	RSV	RSV	RSV	RSV	RSV	RSV	RSV	RSV	RSV	PS+	PS-
B	1-	2-	3-	4-	5-	6-	7-	8-	9-	10-	11-	12-	13-	14-	15-	16-	PS+	
C	1+	2+	3+	4+	5+	6+	7+	8+	9+	10+	11+	12+	13+	14+	15+	16+		

Note

On the differential modules (1C31232G02 and 1C31232G03 only), each channel has a diode bridge at the front-end. Therefore, the inputs to Row B and C are reversible.

Configuration Using the Foam Insert (16 point single-ended or differential)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
A	1+	2+	3+	4+	5+	6+	7+	8+	9+	10+	11+	12+	13+	14+	15+	16+	PS+	PS-
B	1-	2-	3-	4-	5-	6-	7-	8-	9-	10-	11-	12-	13-	14-	15-	16-	PS+	
C	RSV	RSV	RSV	RSV	RSV	RSV	RSV	RSV	RSV	RSV	RSV	RSV	RSV	RSV	RSV	RSV		

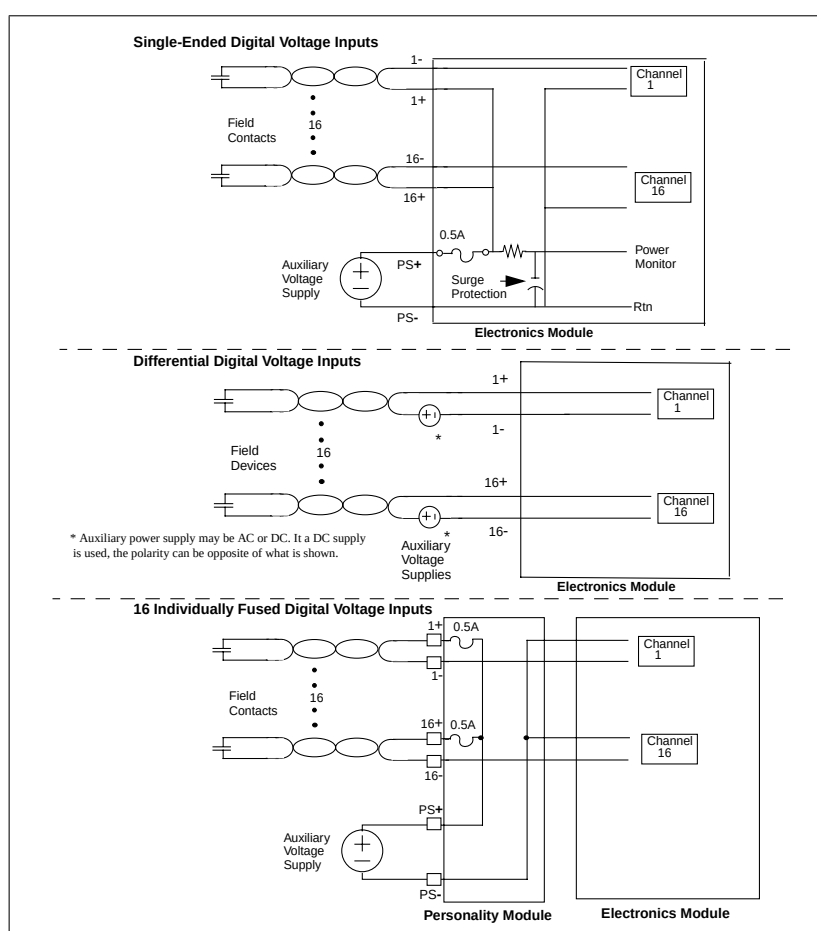
Configuration Using the 16 Point Individually Fused Personality Module

Figure 11-4. Terminal Block Connections for the Compact Digital Input Module

Compact Digital Input Module

11-6. Compact Digital Input Field Connection Wiring Diagrams

Non-CE Mark Certified System



R3-1150 (Rev 3)

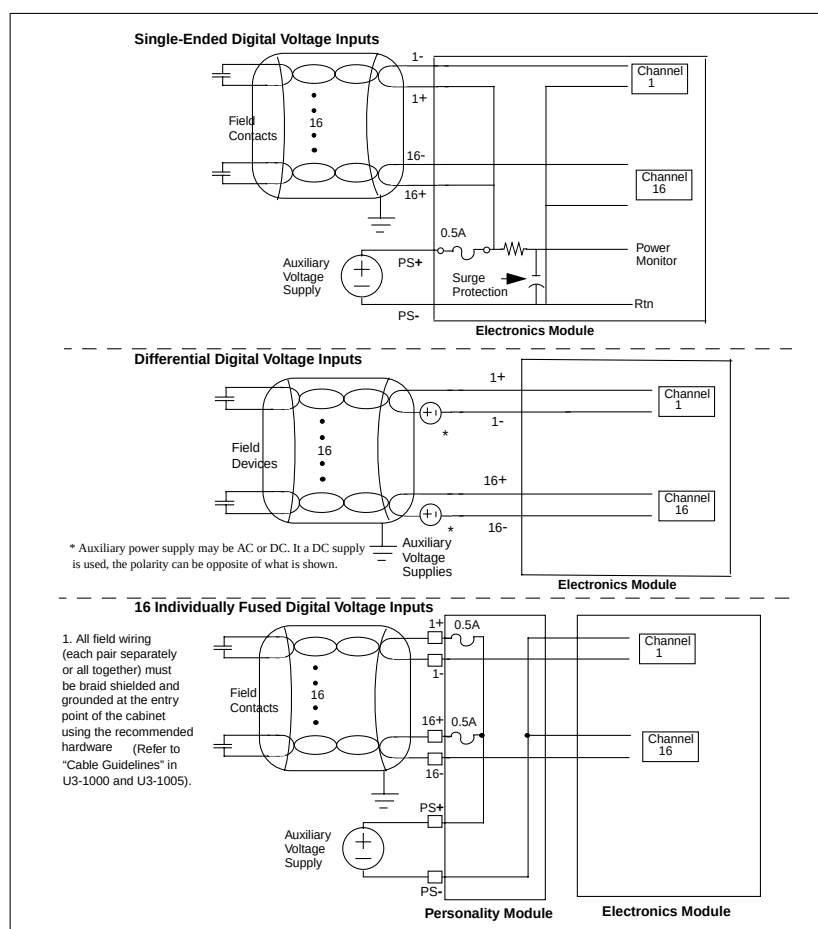
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Emerson Process Management Proprietary Class 2C

Compact Digital Input Module

CE Mark Certified System



Compact Digital Input Module

11-7. Compact Digital Input Address Locations

11-7.1. Configuration and Status Register

Word address 13 (D in Hex) is used to write to the Module Configuration Register and to read the Module Status Register. The status register can be read by using the Point Information window at an Operator Station (see the Bit Pattern Field on the Hardware Tab).

Table 11-4. Compact Digital Input Configuration/Status Register (Address 13 or D in Hex)

Bit	Data Description - Configuration Register (Write)	Data Description - Status Register (Read)
0	Configure Module (1 = configure; 0 = unconfigure, causing an attention status)	Module Configured (1 = configured; 0 = unconfigured)
1	Force Error (1 = force an attention status to be read by Controller; 0 = no forced error)	Forced error (1 = forced error set by Controller; 0 = no forced error)
2	Not defined	Not defined (1)
3	Not defined	Not defined (1)
4	Not defined	Not defined (1)
5	Not defined	Not defined (1)
6	Blown fuse enable ¹ (1 = enable blown fuse detection; 0 = disable blown fuse detection)	Blown fuse enable (1 = blown fuse detection is enabled; 0 = blown fuse detection is disabled)
7	Not defined	Blown fuse (1 = fuse blown or auxiliary voltage not present; 0 = fuse OK and auxiliary voltage present)
8	Not defined	Reserved
9	Reserved	Reserved
10	Not defined	Reserved
11	Not defined	Not defined (1)
12	Not defined	Not defined (1)
13	Not defined	Not defined (1)
14	Not defined	Not defined (1)
15	Not defined	Not defined (1)

¹ Blown Fuse Enable should always be set to “0” on the differential modules (1C31232G02 and 1C31232G03).

Compact Digital Input Module

Bit 0: After the Compact Digital Input Module power is cycled, this bit is “0.” A “1” must be written to this bit. If the module is not configured in this manner, an attention status will be sent to the Controller upon an attempt to read the point data.

The bit may be read back through the Module Status Register.

Bit 1: This bit is “0” after the Compact Digital Input Module power is cycled. If the Controller sets this bit, an attention status is issued.

Bits 2-5: These bits are not defined in the Configuration register and will be read as high in the Status register.

Bit 6: The Blown Fuse Enable bit is “0” after the Digital Input module power is cycled. This bit must be set by the Controller for Compact Digital Input Modules, using the single-ended personality module, to detect a blown auxiliary power supply fuse when it reads the Status Register. Blown Fuse Enable should always be set to “0” on the differential modules (1C31232G02 and 1C31232G03).

The bit may be read back through the Module Status Register.

Bits 7-8: These bits are not defined in the Configuration Register.

Bit 7: This bit is set in the Status Register only if the Blown Fuse Enable bit (6) is set and the single-ended on-board auxiliary supply fuse has blown or the auxiliary voltage is not present.

Bit 8: This bit is reserved.

Bit 9: This bit is reserved.

Bit 10: This bit is reserved.

Bits 10-15: These bits are not defined in the Configuration register.

Bits 11-15: These bits will always be read as high in the Status register.

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