



Installation Instructions

FLEX I/O 240V AC Digital Input and Output Modules

1794-IM16, 1794-OM16

Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls (Publication SGI-1.1 available from your local Rockwell Automation sales office or online at <http://www.literature.rockwellautomation.com>) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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Throughout this manual we use notes to make you aware of safety considerations.

	Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.
	Identifies information that is critical for successful application and understanding of the product.
	Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you: • identify a hazard • avoid a hazard • recognize the consequence

	Environment and Enclosure This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC 60664-1), at altitudes up to 2000 m (6562 ft) without derating. This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR 11. Without appropriate precautions, there may be potential difficulties ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbance. This equipment is supplied as open-type equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The enclosure must have suitable flame-retardant properties to prevent or minimize the spread of flame, complying with a flame spread rating of 5VA, V2, V1, V0 (or equivalent) if non-metallic. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications. In addition to this publication, see: • Industrial Automation Wiring and Grounding Guidelines, for additional installation requirements, Allen-Bradley publication 1770-4.1. • NEMA Standards 250 and IEC 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosure.
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ATTENTION



Preventing Electrostatic Discharge

This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
- Wear an approved grounding wriststrap.
- Do not touch connectors or pins on component boards.
- Do not touch circuit components inside the equipment.
- If available, use a static-safe workstation.
- Store the equipment in appropriate static-safe packaging when not in use.

ATTENTION



FLEX I/O is grounded through the DIN rail to chassis ground. Use zinc plated yellow-chromate steel DIN rail to assure proper grounding. The use of other DIN rail materials (for example, aluminum or plastic) that can corrode, oxidize, or are poor conductors, can result in improper or intermittent grounding. Secure DIN rail to mounting surface approximately every 200 mm (7.8 in.) and use end-anchors appropriately.

WARNING



If you insert or remove the module while backplane power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

WARNING



Do not connect control circuit directly to line voltage. Line voltage must be supplied by a suitable, approved isolating transformer or power supply having short circuit capacity not exceeding 100 VA maximum or equivalent.

North American Hazardous Location Approval

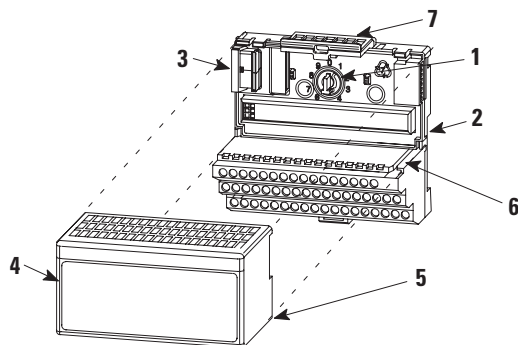
The following modules are North American Hazardous Location approved:

1794-IM16, 1794-OM16.

The following information applies when operating this equipment in hazardous locations:	Informations sur l'utilisation de cet équipement en environnements dangereux :
Products marked "CL I, DIV 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest "T" number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.	Les produits marqués "CL I, DIV 2, GP A, B, C, D" ne conviennent qu'à une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un système, le code de température le plus défavorable (code de température le plus faible) peut être utilisé pour déterminer le code de température global du système. Les combinaisons d'équipements dans le système sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.
WARNING 	AVERTISSEMENT 
EXPLOSION HAZARD • Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous. • Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product. • Substitution of components may impair suitability for Class I, Division 2. • If this product contains batteries, they must only be changed in an area known to be nonhazardous.	RISQUE D'EXPLOSION • Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement. • Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher les connecteurs. Fixer tous les connecteurs externes reliés à cet équipement à l'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens fournis avec ce produit. • La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe I, Division 2. • S'assurer que l'environnement est classé non dangereux avant de changer les piles.

WARNING

If you connect or disconnect wiring while the field-side power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

Install Your Digital Module

Description	Description
1 Keyswitch	5 Alignment bar
2 Terminal base	6 Groove
3 Flexbus connector	7 Latching mechanism
4 Module	

The module mounts on a 1794 terminal base.**ATTENTION**

Do not remove or replace a Terminal Base unit when power is applied. Interruption of the backplane can result in unintentional operation or machine motion.

ATTENTION

During mounting of all devices, be sure that all debris (metal chips, wire strands, etc.) is kept from falling into the module. Debris that falls into the module could cause damage on power up.

1. Rotate the keyswitch (1) on the terminal base (2) clockwise to position 8 as required for this type of module.
2. Make certain the flexbus connector (3) is pushed all the way to the left to connect with the neighboring terminal base/adaptor.
You cannot install the module unless the connector is fully extended.
3. Make sure the pins on the bottom of the module are straight so they will align properly with the connector in the terminal base.
4. Position the module (4) with its alignment bar (5) aligned with the groove (6) on the terminal base.
5. Press firmly and evenly to seat the module in the terminal base unit. The module is seated when the latching mechanism (7) is locked into the module.

Connect Wiring for your 1794-IM16 Module
(using a 1794-TBN Terminal Base)

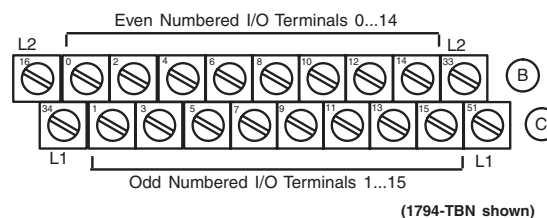
1. Connect individual input wiring to terminals 0...15 on the 16-33 row (B), and on the 34-51 row (C) as indicated in Table 1.
- Auxiliary terminal blocks are required to distribute 240V AC power (L1) to each device.
2. Connect 240V AC power (L1) to terminal 34 on the 34-51 row (C).
 3. Connect 240V AC common (L2) to terminal 16 on the 16-33 row (B).
 4. If daisy chaining power to the next terminal base, connect a jumper from terminal 51 (240V AC L1) on this base unit to terminal 34 on the next base unit.
 5. If continuing AC common to the next base unit, connect a jumper from terminal 33 (240V common L2) on this base unit to terminal 16 on the next base unit.

Table 1 Wiring Connections for 1794-IM16 and 1794-OM16

1794-IM16		1794-OM16	
Input	1794-TBN Input Terminal ⁽¹⁾	Output	1794-TBN, 1794-TBNF Output Terminal ⁽²⁾
Input 0	B-0	Output 0	B-0
Input 1	C-1	Output 1	C-1
Input 2	B-2	Output 2	B-2
Input 3	C-3	Output 3	C-3
Input 4	B-4	Output 4	B-4
Input 5	C-5	Output 5	C-5
Input 6	B-6	Output 6	B-6
Input 7	C-7	Output 7	C-7
Input 8	B-8	Output 8	B-8
Input 9	C-9	Output 9	C-9
Input 10	B-10	Output 10	B-10
Input 11	C-11	Output 11	C-11
Input 12	B-12	Output 12	B-12
Input 13	C-13	Output 13	C-13
Input 14	B-14	Output 14	B-14
Input 15	C-15	Output 15	C-15
Input 0	B-0	Output 0	B-0
240V AC L1	Power terminals C-34 and C-51 are internally connected together. Connect 240V AC L1 to C-34		
240V AC L2	Common terminals B-16 and B-33 are internally connected together. Connect 240V AC common L2 to terminal B-16		

⁽¹⁾ Auxiliary terminal blocks are required to distribute 240V AC power L1 to each device.

⁽²⁾ Auxiliary terminal blocks are required to connect the associated L2 common for each channel.

1794-TBN Terminal Base Wiring for 1794-IM16 and 1794-OM16

L1 = 240V AC - Connect to terminal C-34

L2 = 240V AC common - Connect to terminal B-16

Use B-33 and C-51 for daisy chaining to the next terminal base unit

Specifications - Flex I/O 240V AC Output Module 1794-OM16

Attribute	Value
Number of I/O channels	16, nonisolated
Module location	Cat. No. 1794-TBN, 1794-TBNF
Output voltage	159V AC min @ 47...63 Hz 240V AC nom @ 47...63 Hz 264V DC max @ 47...63 Hz
On-state current	50 mA min per output, min 0.5 A per output, 4 A max per module ⁽²⁾
Surge current	7 A for 40 ms each, repeatable every 8 seconds
Off-state leakage, max	2.5 mA
Isolation voltage	250V (continuous), Basic Insulation Type Type tested at 1706V DC for 60 s, between field side and system No isolation between individual channels
Field Bus current	116 mA
Power dissipation, max	6 W @ 264V AC
Thermal dissipation, max	20.47 BTU/hr @ 264V AC
Indicators (field side)	16 yellow status indicators
Output signal delay ⁽¹⁾	
Off to On	1/2 cycle max
On to Off	1/2 cycle max

⁽¹⁾ Delay time is the time from the receipt of an output on or off command to the output actually turning on or off.

⁽²⁾ If using 0.5 A outputs, alternate wiring so that no two 0.5 A outputs are next to each other.

ATTENTION

1794-OM16 module outputs are not fused. Fused outputs are recommended.



If not using a 1794-TBNF terminal base and fusing is required, external fusing must be provided.

General Specifications

Attribute	Value
Terminal base screw torque	Determined by installed terminal base
Dimensions (with module installed) H x W x D	94 x 94 x 91 mm (3.7 x 3.7 x 3.6 in.)
External AC power supply voltage, nom	240V AC
External AC power voltage range	159...264V AC, 47...63 Hz
Terminal base load current, max	1794-OM16: 10 A
Pilot duty rating	OM16: C300
North American temp code	T4
Keyswitch position	8
Enclosure type rating	None (open-style)
Wire size	Determined by installed terminal base
Wiring category ⁽¹⁾	2 - on signal ports

⁽¹⁾ Use this Conductor Category information for planning conductor routing. Refer to Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#).

Environmental Specifications

Attribute	Value
Operating temperature	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): 0...55 °C (32...131 °F)
Storage temperature	IEC 60068-2-1 (Test Ab, Unpackaged Non-operating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Non-operating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Non-operating Thermal Shock): -40...85 °C (-40...185 °F)
Relative humidity	IEC 60068-2-30 (Test Db, Unpackaged Damp Heat): 5...95% non-condensing
Vibration	IEC60068-2-6 (Test Fc, Operating): 2 g @ 10...500 Hz
Shock	IEC60068-2-27 (Test Ea, Unpackaged shock): Operating 15 g Non-operating 15 g
Emissions	CISPR 11: Group 1, Class A (with appropriate enclosure)
ESD immunity	IEC 61000-4-2: 6kV contact discharges 8kV air discharges
Radiated RF immunity	IEC 61000-4-3: 10V/m with 1 kHz sine-wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 1890 MHz 1V/m with 1 kHz sine-wave 80% AM from 2000...2700 MHz
EFT/B immunity	IEC 61000-4-4: ±2kV at 5 kHz on power ports ±2kV at 5 kHz on signal ports
Surge transient immunity	IEC 61000-4-5: ±1kV line-line(DM) and ±2kV line-earth(CM) on power ports ±1kV line-line(DM) and ±2kV line-earth(CM) on signal ports
Conducted RF immunity	IEC 61000-4-6: 10V rms with 1 kHz sine-wave 80% AM from 150 kHz...80 MHz
Damped oscillatory wave immunity	±1kV line-line(DM) and ±2.5kV line-earth(CM) on signal ports ±1kV line-line(DM) and ±2.5kV line-earth(CM) on power ports

Certifications

Certifications (when product is marked) ⁽¹⁾	Value
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CE	European Union 2004/108/EC EMC Directive, compliant with: EN 61326-1; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2006/95/EC LVD, compliant with: EN 61131-2; Programmable Controllers (Clause 11)
C-Tick	Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions

⁽¹⁾ See the Product Certification link at [www.ab.com](#) for Declarations of Conformity, Certificates, and other certification details.

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