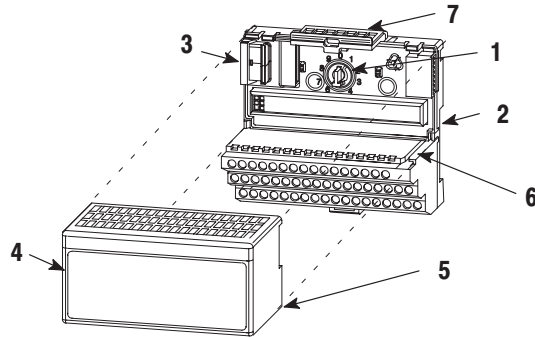




Installation Instructions

24V dc FLEX I/O 32 Input Module (Cat. No. 1794-IB32)



ATTENTION



This module must be used with a 1794-TB32 or -TB32S terminal base unit. When used in a remote I/O system, the adapter must be a 1794-ASB Series E or later. When used in a ControlNet system, you must structure this module as a Direct Connection in order to access both read words. The Rack Optimized Connection cannot be used.

Module Installation

This module mounts on a 1794 terminal base unit.

1. Rotate keyswitch (1) on terminal base unit (2) clockwise to position 2 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 that the pins on the bottom of the module are straight so they will align properly with the connector in the terminal base unit.

WARNING



If you remove or insert the module while the 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.

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.

Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of these products must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards. In no event will Allen–Bradley be responsible or liable for indirect or consequential damage resulting from the use or application of these products.

Any illustrations, charts, sample programs, and layout examples shown in this publication are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Allen–Bradley does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen–Bradley publication SGI–1.1, Safety Guidelines for Application, Installation, and Maintenance of Solid–State Control (available from your local Allen–Bradley office), describes some important differences between solid–state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

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Throughout this publication, notes may be used to make you aware of safety considerations. The following annotations and their accompanying statements help you to identify a potential hazard, avoid a potential hazard, and recognize the consequences of a potential hazard.

WARNING



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.

ATTENTION



Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss.

IMPORTANT

Identifies information that is critical for successful application and understanding of the product.

ATTENTION



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 publication 60664-1), at altitudes up to 2000 meters without derating.

This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR Publication 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 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.

See NEMA Standards publication 250 and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosures. Also, see the appropriate sections in this publication, as well as the Allen-Bradley publication 1770-4.1, (“Industrial Automation Wiring and Grounding Guidelines”), for additional installation requirements pertaining to this equipment.

ATTENTION



FLEX I/O is grounded through the DIN rail to chassis ground. Use zinc plated, yellow chromated steel DIN rail to assure proper grounding. Using other DIN rail materials (e.g. aluminum, plastic, etc.) which can corrode, oxidize or are poor conductors can result in improper or intermittent platform grounding.

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.
- When not in use, keep modules in appropriate static-safe packaging.

ATTENTION

Remove field-side power before removing or inserting this module. This module is designed so you can **remove and insert it under backplane power**. When you remove or insert a module with field-side power applied, an electrical arc may occur. An electrical arc can cause personal injury or property damage by:

- sending an erroneous signal to your system's field devices causing unintended machine motion
- causing an explosion in a hazardous environment

Repeated electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance.

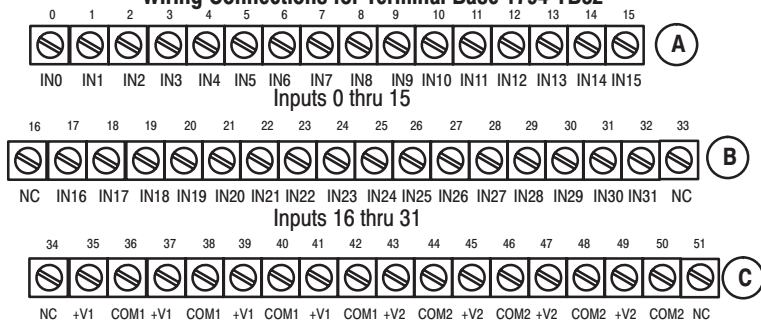
Wiring to a 1794-TB32 or -TB32S Terminal Base Unit

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.

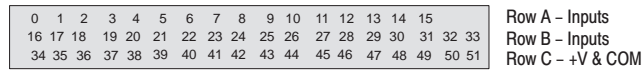
1. Connect individual input wiring (IN0 to IN15) to numbered terminals on the **0–15** row (**A**) as indicated in the table below.
2. Connect the associated power to the +V1 terminal (35, 37, 39 or 41) on the 34–51 row (**C**) as indicated in the table below.
3. Connect individual input wiring (IN16 to IN31) to numbered terminals 17 thru 32 on the **16–33** row (**B**) as indicated in the table below. **Do not connect to terminals 16 or 33.**
4. Connect the associated power to the +V2 terminal (43, 45, 47 or 49) on the 34–51 row (**C**) as indicated in the table below.
5. Connect the associated common (–V1) for IN0 to IN15 to COM1 (terminal 36, 38, 40 or 42) on the 34–51 row (**C**).
6. Connect the associated common (–V2) for IN16 to IN31 to terminal COM2 (terminal 44, 46, 48 or 50) on the 34–51 row (**C**).
7. If continuing input wiring power for IN0–IN15 to the next terminal base unit, connect a jumper from terminal 41 (+V1) on this base unit to the power terminal on the next terminal base unit (refer to the installation instructions for the next type of terminal base unit).
8. If continuing input wiring IN0–IN15 return to the next terminal base unit, connect a jumper from terminal 42 (COM1) on this base unit to the next terminal base unit (refer to the installation instructions for the next type of terminal base unit).
9. If continuing input wiring power for IN16–IN31 to the next terminal base unit, connect a jumper from terminal 49 (+V2) on this base unit to the power terminal on the next terminal base unit (refer to the installation instructions for the next type of terminal base unit).
10. If continuing input wiring IN16–IN31 return to the next terminal base unit, connect a jumper from terminal 50 (COM2) on this base unit to the next terminal base unit (refer to the installation instructions for the next type of terminal base unit).

Wiring Connections for Terminal Base 1794-TB32

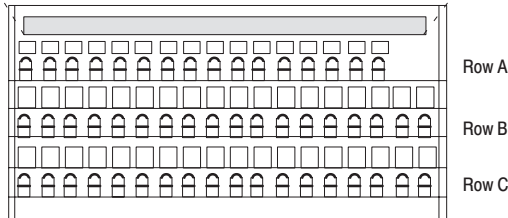


+V1 = Voltage applied to inputs IN0 thru IN15
 +V2 = Voltage applied to inputs IN16 thru IN31
 COM1 = Common for inputs IN0 thru IN15
 COM2 = Common for inputs IN16 thru IN31
 NC = No connection

Wiring Connections for Terminal Base 1794-TB32S



Label placed at top of wiring area.



+V1 = Voltage applied to inputs IN0 thru IN15
 +V2 = Voltage applied to inputs IN16 thru IN31
 COM1 = Common for inputs IN0 thru IN15
 COM2 = Common for inputs IN16 thru IN31
 NC = No connection

ATTENTION

Total current draw through the terminal base unit is limited to 10A. Separate power connections to the terminal base unit may be necessary.



8 24V dc FLEX I/O 32 Input Module

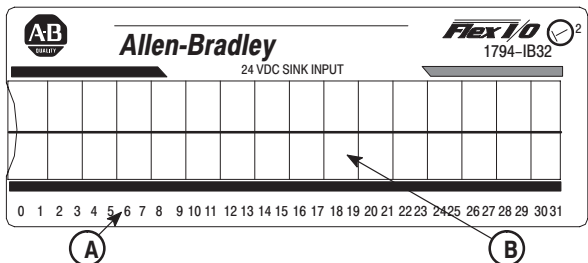
Channel	Signal Type ¹	1794-TB32, -32S		
		Signal	Return	Supply
Input				
0	Sink Input	A-0	V1 return connected to terminals 36, 38, 40 and 42	+V1 connected to terminals 35, 37, 39 and 41
1	Sink Input	A-1		
2	Sink Input	A-2		
3	Sink Input	A-3		
4	Sink Input	A-4		
5	Sink Input	A-5		
6	Sink Input	A-6		
7	Sink Input	A-7		
8	Sink Input	A-8		
9	Sink Input	A-9		
10	Sink Input	A-10		
11	Sink Input	A-11		
12	Sink Input	A-12		
13	Sink Input	A-13		
14	Sink Input	A-14		
15	Sink Input	A-15		
	COM1 dc Return	Common Terminals 36, 38, 40 and 42		
	+V1 dc power	Power Terminals 35, 37, 39 and 41		

¹ Two-wire input devices use signal and supply terminals, 3-wire input devices use signal, return and supply terminals.

Channel	Signal Type ¹	1794-TB32, -32S		
		Signal	Return	Supply
16	Sink Input	B-17	V2 return connected to terminals 44, 46, 48 and 50	+V2 connected to terminals 43, 45, 47 and 49
17	Sink Input	B-18		
18	Sink Input	B-19		
19	Sink Input	B-20		
20	Sink Input	B-21		
21	Sink Input	B-22		
22	Sink Input	B-23		
23	Sink Input	B-24		
24	Sink Input	B-25		
25	Sink Input	B-26		
26	Sink Input	B-27		
27	Sink Input	B-28		
28	Sink Input	B-29		
29	Sink Input	B-30		
30	Sink Input	B-31		
31	Sink Input	B-32		
	COM2 dc Return	Common Terminals 44, 46, 48 and 50		
	+V2 dc power	Power Terminals 43, 45, 47 and 49		

¹ Two-wire input devices use signal and supply terminals, 3-wire input devices use signal, return and supply terminals.

Indicators



- A** = Status Indicators – show status of individual inputs.
- B** = Insertable label for writing individual input or output designations.

Image Table Memory Map

Dec.	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
(Octal)	17	16	15	14	13	12	11	10	07	06	05	04	03	02	01	00
Word 1 (Read)	I15	I14	I13	I12	I11	I10	I9	I8	I7	I6	I5	I4	I3	I2	I1	I0
Word 2 (Read)	I31	I30	I29	I28	I27	I26	I25	I24	I23	I22	I21	I20	I19	I18	I17	I16
Word 3 (Write)	Not used						Input Filter FT			Not used						

Where I = Input Channel
 FT = Input Filter Time

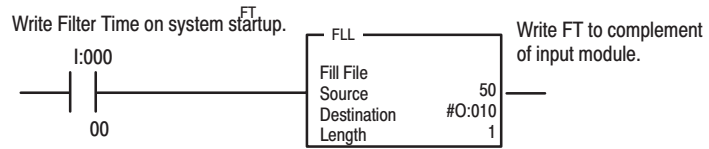
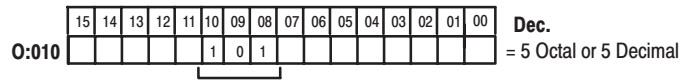
Configuration

Bits			Description	Filter Time
10	09	08	Filter Time for Inputs 00-31	Off to On/On to Off
0	0	0	Filter Time 0 (default)	0.25ms
0	0	1	Filter Time 1	0.5ms
0	1	0	Filter Time 2	1ms
0	1	1	Filter Time 3	2ms
1	0	0	Filter Time 4	4ms
1	0	1	Filter Time 5	8ms
1	1	0	Filter Time 6	16ms
1	1	1	Filter Time 7	32ms

Setting the Input Filter Time

You can select the input filter time (FT) for the input channels (channels 00 through 31). Select the input filter time by setting the corresponding bits in the configuration word (word 3) for the module.

For example, to set a filter time of 8ms for a dc input module at address rack 1, module group 0, set bits 08, 09 and 10 in configuration word 3 as shown below.



Safety Approvals

The following information applies when operating this equipment in hazardous locations:

Products marked "CL I, DIV 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, and 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.

WARNING



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.

Informations sur l'utilisation de cet équipement en environnements dangereux:

Les produits marqués CL I, DIV 2, GP A, B, C, D ne conviennent que 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.

AVERTISSEMENT



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 1, Division 2.
- S'assurer que l'environnement est classé non dangereux avant de changer les piles.

Specifications – 24V dc Input Module Cat. No. 1794-IB32**Input**

Number of Inputs	32 input channels – isolated in 2 groups
Module Location	Cat. No. 1794-TB32 or -TB32S Terminal Base Unit
ON-state Voltage	19.2V dc minimum; 24V dc nominal; 31.2V dc maximum
ON-state Current	2.0mA minimum; 4.1mA nominal at 24V dc; 6.0mA maximum
OFF-state Voltage	5.0V dc maximum
OFF-state Current	1.5mA minimum
Input Impedance	6.0K ohms maximum
Input Filter Time ¹ Off to On On to Off	0.25ms, 0.5ms, 1ms, 2ms, 4ms, 8ms, 16ms, 32ms 0.25ms, 0.5ms, 1ms, 2ms, 4ms, 8ms, 16ms, 32ms 0.25ms default– Selectable using configuration word 3.
Indicators (field side indication, customer device driven)	32 yellow status indicators

General Specifications

Keyswitch Position	2
Flexbus Current (maximum)	35mA
Power Dissipation	6.0W maximum @ 31.2V
Thermal Dissipation	20.5 BTU/hr @ 31.2V dc
Isolation Voltage (minimum)	Input to Backplane – Tested to withstand 2121V dc for 1s
External dc Power Supply Voltage Voltage Range	24V dc nominal 19.2 to 31.2V dc (includes 5% ac ripple)
Dimensions Inches (Millimeters)	1.8H x 3.7W x 2.1D (45.7 x 94.0 x 53.3)
Terminal Base Screw Torque	7 pound-inches (0.6Nm)

Specifications continued on next page.

Specifications – 24V dc Input Module Cat. No. 1794-IB32

Environmental Conditions	
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) 32 to 131°F (0 to 55°C)
Storage Temperature	IEC 60068-2-1 (Test Ab, Unpackaged, Nonoperating Cold) IEC 60068-2-2 (Test Bb, Unpackaged, Nonoperating Dry Heat) IEC 60068-2-14 (Test Na, Unpackaged, Nonoperating Thermal Shock) -40 to 185°F (-40 to 85°C)
Relative Humidity	IEC 60068-2-30 (Test Db, Unpackaged, Nonoperating Damp Heat) 5 to 95%, noncondensing
Shock Operating Nonoperating	IEC 60068-2-27 (Test Ea, Unpackaged Shock) 30g 50g
Vibration	IEC 60068-2-6 (Test Fc, Operating) 5g @ 10-500Hz
ESD Immunity	IEC 61000-4-2 4kV contact discharges 8kV air discharges
Radiated RF Immunity	IEC 61000-4-3 10V/m with 1kHz sine-wave 80% AM from 30MHz to 1000MHz
EFT/B Immunity	IEC 61000-4-4 ±2kV @ 5kHz on signal ports
Surge Transient Immunity	IEC 61000-4-5 ±1kV line-line (DM) and ±2kV line-earth (CM) on signal ports
Conducted RF Immunity	IEC 61000-4-6 10V rms with 1kHz sine wave 80% AM from 150kHz to 80MHz
Emissions	CISPR 11: Group 1, Class A (with appropriate enclosure)
Enclosure Type Rating	None (open-style)

Specifications continued on next page.

Specifications – 24V dc Input Module Cat. No. 1794-IB32

Conductors Wire Size	12 gauge (4mm ²) stranded copper wire maximum rated at 75°C or greater	
Category	3/64 inch (1.2mm) insulation maximum 2 ²	
Agency Certification (when product is marked)	UL	UL Listed Industrial Control Equipment
	UL	UL Listed for Class I, Division 2 Group A, B, C and D Hazardous Locations
	CSA	CSA Certified Process Control Equipment for Class I, Division 2 Group A, B, C, D Hazardous Locations
	CE ³	European Union 89/336/EEC EMC Directive, compliant with: EN 50081-2, Industrial Emissions EN 50082-2, Industrial Immunity EN 61326, Meas./Control/Lab., Industrial Requirements EN 61000-6-2, Industrial Immunity
	C-Tick ³	Australian Radiocommunications Act, compliant with: AS/NZS 2064, Industrial Emissions

¹ Input off-to-on filter time is the time from a valid input signal to recognition by the module. Input on-to-off filter is time from the input signal dropping below the valid level to recognition by the module.

² You use this conductor category information for planning conductor routing as described in publication 1770-4.1, Industrial Automation Wiring and Grounding Guidelines.

³ See the Product Certification link at www.ab.com for Declarations of Conformity, Certificates and other certification details



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