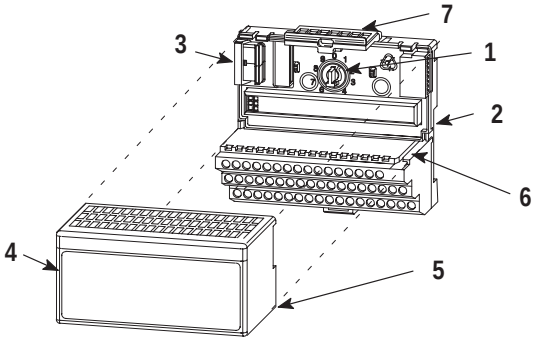
Installation Instructions

24V dc FLEX I/O 16 Sink Input Module

(Cat. No. 1794-IB16)

English



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/adapter. **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.
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.

ATTENTION: To use this module in a complementary I/O system, refer to your Remote I/O Adapter module documentation.

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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.

European Union Directive Compliance

If this product has the CE mark it is approved for installation within the European Union and EEA regions. It has been designed and tested to meet the following directives.

EMC Directive

This product is tested to meet Council Directive 89/336/EEC Electromagnetic Compatibility (EMC) and the following standards, in whole or in part, documented in a technical construction file:

- EN 50081-2 EMC – Generic Emission Standard, Part 2 – Industrial Environment
- EN 50082-2 EMC – Generic Immunity Standard, Part 2 – Industrial Environment

This product is intended for use in an industrial environment.

Low Voltage Directive

This product is tested to meet Council Directive 73/23/EEC Low Voltage, by applying the safety requirements of EN 61131–2 Programmable Controllers, Part 2 – Equipment Requirements and Tests.

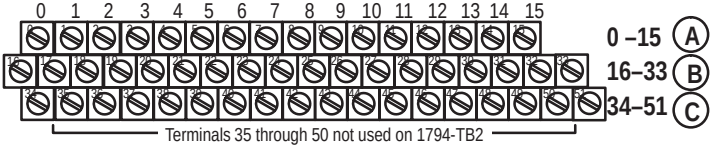
For specific information required by EN 61131-2, see the appropriate sections in this publication, as well as the following Allen-Bradley publications:

- Industrial Automation Wiring and Grounding Guidelines For Noise Immunity, publication 1770-4.1
- Automation Systems Catalog, publication B111

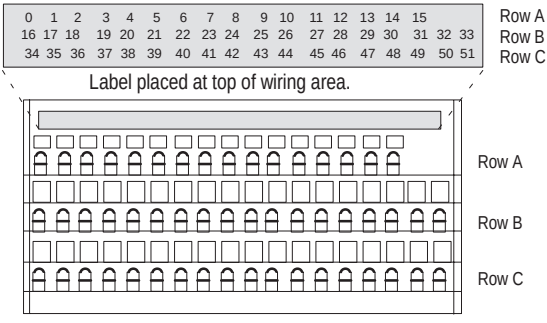
This equipment is classified as open equipment and must be mounted in an enclosure during operation to provide safety protection.

Wiring to a 1794-TB2, -TB3 or -TB3S Terminal Base Unit

1. Connect individual input wiring to numbered terminals on the **0–15** row **(A)** as indicated in the table below.
2. Connect the associated input common (3-wire devices only) to the corresponding terminal on the 16-33 row **(B)** for each input as indicated in the table below. (Commons are internally connected together.)
3. Connect +24V dc power to terminal 34 on the **34–51** row **(C)**.
4. Connect dc return to terminal 16 on the **16–33** row **(B).**
5. If continuing power to the next terminal base unit, connect a jumper from terminal 51 (+24V dc) on this base unit to terminal 34 on the next base unit.
6. If continuing common to the next terminal base unit, connect a jumper from terminal 33 (common) on this base unit to terminal 16 on the next base unit.



1794-TB2, -TB3

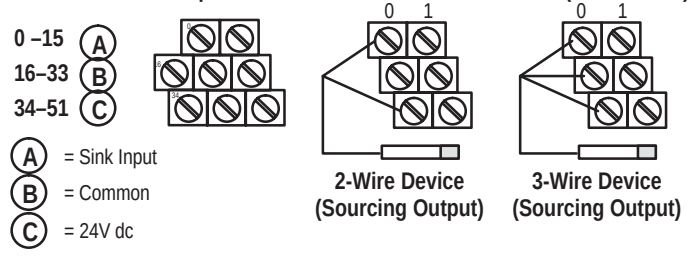


1794-TB3S

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

Input	Input Terminal	Voltage Terminal	Input	Input Terminal	Voltage Terminal
Input 0	A–0	C–35	Input 8	A–8	C–43
Input 1	A–1	C–36	Input 9	A–9	C–44
Input 2	A–2	C–37	Input 10	A–10	C–45
Input 3	A–3	C–38	Input 11	A–11	C–46
Input 4	A–4	C–39	Input 12	A–12	C–47
Input 5	A–5	C–40	Input 13	A–13	C–48
Input 6	A–6	C–41	Input 14	A–14	C–49
Input 7	A–7	C–42	Input 15	A–15	C–50
Common	B–16 thru B–33		+24v dc	C–34 thru C–51 (1794-TB3, -TB3S) C-34 and C-51 (1794-TB2)	

2-wire and 3-wire Inputs to the 1794-IB16 FLEX I/O Module (-TB3 shown)

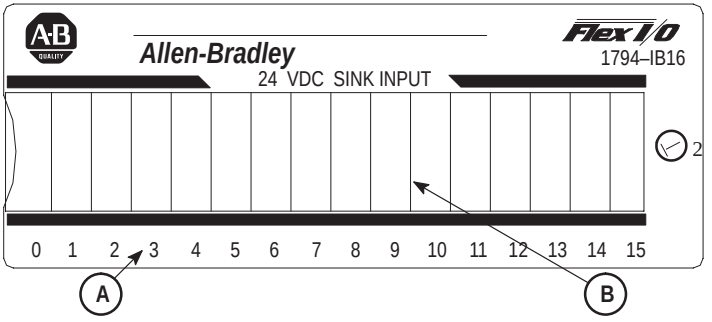


A = Sink Input
B = Common
C = 24V dc

2-Wire Device (Sourcing Output)

3-Wire Device (Sourcing Output)

Indicators



A = Status indicators – yellow – show status of individual inputs.

B = Insertable label for writing individual input designations.

Memory Map

Dec.	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Read 0	D 15	D 14	D 13	D 12	D 11	D 10	D 9	D 8	D 7	D 6	D 5	D 4	D 3	D 2	D 1	D 0
Read 1	C = 16 bit Counter Value of Input 15															
Write	Not used		CF	CR	Not used						FT 12–15			FT 00–11		

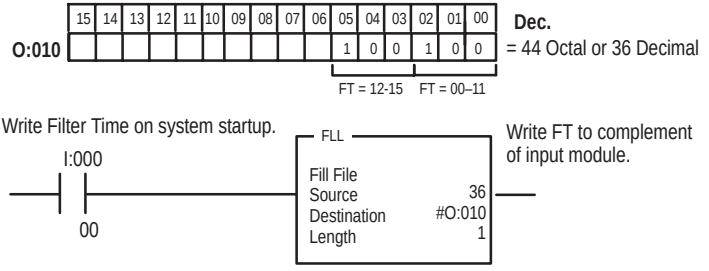
Where: D = Data Input – 0 = input off, 1 = input on
C = Counter value for input 15
FT = Input Filter Time
CR = Counter Reset
CF = Counter Fast – where 1 = Fast Input (raw) data, 0 = Standard Input filtered data

NOTE: C, CR and CF not available when used with any series 1794-ASB or 1794-ASB2 Remote I/O Adapter Modules

Setting the Input Filter Time

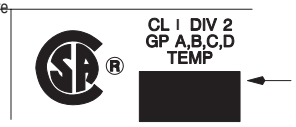
You can select the input filter time (FT) for each group of channels (channels 00 through 11, or channels 12 through 15). Select the input filter time by setting the corresponding bits in the **output** image table (complementary word) for the module.

For example, to set a filter time of 4ms for a dc input module at address rack 1, module group 0, set bits 05, 04, 03, 02, 01, and 00 as shown below.



Input Filter Times

Bits			Description	Selected Filter Time
02	**01**	**00**	**Filter Time for Inputs 00–11(00–13)**	
05	**04**	**03**	**Filter Time for Inputs 12–15(14–17)**	
0	0	0	Filter Time 0 (default)	256µs
0	0	1	Filter Time 1	512µs
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

CSA Hazardous Location Approval	**Approbation d'utilisation dans des emplacements dangereux par la CSA**
CSA® certifies products for general use as well as for use in hazardous locations. **Actual CSA certification is indicated by the product label** as shown below, and not by statements in any user documentation.	La CSA® certifie les produits d'utilisation générale aussi bien que ceux qui s'utilisent dans des emplacements dangereux. **La certification CSA en vigueur est indiquée par l'étiquette du produit** et non par des affirmations dans la documentation à l'usage des utilisateurs.
Example of the CSA certification product label 	Exemple d'étiquette de certfication d'un produit par la CSA 
To comply with CSA certification for use in hazardous locations, the following information becomes a part of the product literature for CSA-certified Allen-Bradley industrial control products. • This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D, or non-hazardous locations only. • The products having the appropriate CSA markings (that is, Class I Division 2, Groups A, B, C, D), are certified for use in other equipment where the suitability of combination (that is, application or use) is determined by the CSA or the local inspection office having jurisdiction.	Pour satisfaire à la certification de la CSA dans des endroits dangereux, les informations suivantes font partie intégrante de la documentation des produits industriels de contrôle Allen-Bradley certifiés par la CSA. • Cet équipement convient à l'utilisation dans des emplacements de Classe I, Division 2, Groupes A, B, C, D, ou ne convient qu'à l'utilisation dans des endroits non dangereux. • Les produits portant le marquage approprié de la CSA (c'est à dire, Classe I, Division 2, Groupes A, B, C, D) sont certifiés à l'utilisation pour d'autres équipements où la convenance de combinaison (application ou utilisation) est déterminée par la CSA ou le bureau local d'inspection qualifié.
Important: Due to the modular nature of a PLC® control system, the product with the highest temperature rating determines the overall temperature code rating of a PLC control system in a Class I, Division 2 location. The temperature code rating is marked on the product label as shown.	**Important:** Par suite de la nature modulaire du système de contrôle PLC®, le produit ayant le taux le plus élevé de température détermine le taux d'ensemble du code de température du système de contrôle d'un PLC dans un emplacement de Classe I, Division 2. Le taux du code de température est indiqué sur l'étiquette du produit.
Temperature code rating  Look for temperature code rating here	Taux du code de température  Le taux du code de température est indiqué ici
The following warnings apply to products having CSA certification for use in hazardous locations.	Les avertissements suivants s'appliquent aux produits ayant la certification CSA pour leur utilisation dans des emplacements dangereux.

CSA Hazardous Location Approval	Approbation d'utilisation dans des emplacements dangereux par la CSA
 **ATTENTION:** Explosion hazard — • Substitution of components may impair suitability for Class I, Division 2. • Do not replace components unless power has been switched off or the area is known to be non-hazardous. • Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous. • Do not disconnect connectors unless power has been switched off or the area is known to be non-hazardous. Secure any user-supplied connectors that mate to external circuits on an Allen-Bradley product using screws, sliding latches, threaded connectors, or other means such that any connection can withstand a 15 Newton (3.4 lb.) separating force applied for a minimum of one minute.	 **AVERTISSEMENT:** Risque d'explosion — • La substitution de composants peut rendre ce matériel inacceptable pour lesemplacements de Classe I, Division 2. • Couper le courant ou s'assurer quel'emplacement est désigné non dangereux avant de remplacer lescomposants. • Avant de débrancher l'équipement, couper le courant ou s'assurer que l'emplacement est désigné non dangereux. • Avant de débrancher les connecteurs, couper le courant ou s'assurer que l'emplacement est reconnu non dangereux. Attacher tous connecteurs fournis par l'utilisateur et reliés aux circuits externes d'un appareil Allen-Bradley à l 'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens permettant aux connexions de résister à une force de séparation de 15 newtons (3,4 lb. - 1,5 kg) appliquée pendant au moins une minute.

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Specifications – 24V dc Input Module Cat. No. 1794-IB16	
Number of Inputs	16 (1 group of 16), non-isolated, sinking
Module Location	Cat. No. 1794-TB2, -TB3, -TB3S Terminal Base
ON-state Voltage	10V dc minimum; 24V dc nominal; 31.2V dc maximum
Mounting	Refer to Derating Curve
ON-state Current	2.0mA minimum; 8.0mA nominal at 24V dc; 12.0mA maximum
OFF-state Voltage	5.0V dc maximum
OFF-state Current	1.5mA minimum
Input Impedance	4.6K ohms maximum
Isolation Voltage	100% tested at 850V dc for 1s between user and system No isolation between individual channels
Input FilterTime Off to On On to Off	256µs, 512µs, 1ms, 2ms, 4ms, 8ms, 16ms, 32ms, 256µs, 512µs, 1ms, 2ms, 4ms, 8ms, 16ms, 32ms, 256µs default – Selectable thru output image table,
Flexbus Current (maximum)	30mA
Power Dissipation	Maximum 6.1W @ 31.2V dc
Thermal Dissipation	Maximum 20.8 BTU/hr @ 31.2V dc
Indicators (field side indication, customer device driven)	16 yellow status indicators
Keyswitch Position	2
General Specifications	
External dc Power Supply Voltage Voltage Range	 24V dc nominal 19.2 to 31.2V dc (includes 5% ac ripple) See derating curve.
Dimensions Inches (Millimeters)	1.8H x 3.7W x 2.1D (45.7 x 94.0 x 53.3)
Specifications continued on next page.	

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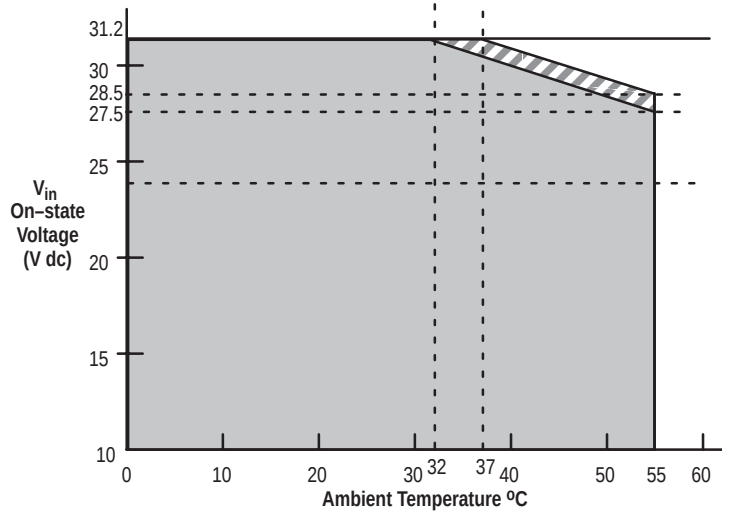
Environmental Conditions		
Operational Temperature		0 to 55°C (32 to 131°F)
Storage Temperature		–40 to 85°C (–40 to 185°F)
Relative Humidity		5 to 95% noncondensing
Shock	Operating	30 g peak acceleration, 11(±1)ms pulse width
	Non-operating	50 g peak acceleration, 11(±1)ms pulse width
Vibration		Tested 5 g @ 10–500Hz per IEC 68-2-6
Conductors	Wire Size	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) insulation maximum
	Category	2[1]
Agency Certification (when product is marked)		• CSA certified • CSA Class I, Division 2 Groups A, B, C, D certified • UL listed • CE marked for all applicable directives

1 You use this conductor category information for planning conductor routing as described in the system level installation manual.

Derating Curve

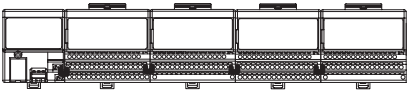


The area within the curve represents the safe operating range for the module under various conditions of user supplied 24V dc supply voltages and ambient temperatures.

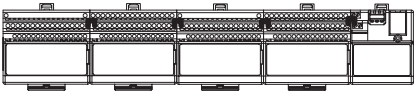
= Normal mounting safe operating range, (includes).

= Other mounting positions (including inverted horizontal) safe operating range

Normal Mounting – Horizontal



Other Mounting (including Vertical, and Inverted Horizontal Mounting)



Voltage (max.)	Temperature (max.) Normal	Other	Voltage (max.)	Temperature (max.) Normal	Other
31.2	37	32	29.0	51	45
30.5	41	36	28.5	55	48
30.0	45	39	28.0		51
29.5	48	42	27.5		55

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