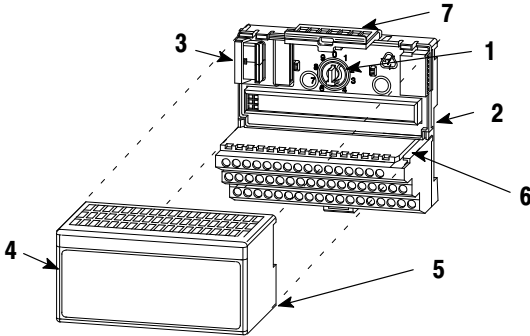




## 24V dc FLEX I/O Sensor Input Module (Cat. No. 1794-IB8S) Installation Instructions



### Module Installation

This module mounts on a 1794 terminal base unit.

1. Rotate keyswitch (1) on terminal base unit (2) clockwise to position 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.
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.
6. Repeat the above steps to install the next module in its terminal base unit.



**ATTENTION:** This module does not support complementary I/O. It uses both the input and output image tables since it is a combination input and output module.



**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.

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### 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 50081-2EMC – Generic Emission Standard, Part 2 – Industrial Environment
- EN 50082-2EMC – 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
- Guidelines for Handling Lithium Batteries, publication AG-5.4
- Automation Systems Catalog, publication B111

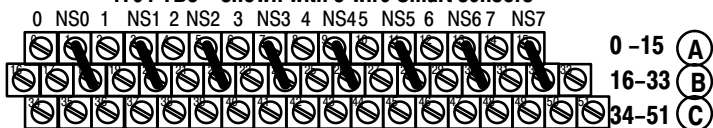


**ATTENTION:** Total current draw through the terminal base unit is limited to 10A. Separate power connections to the terminal base unit may be necessary.

## Wiring

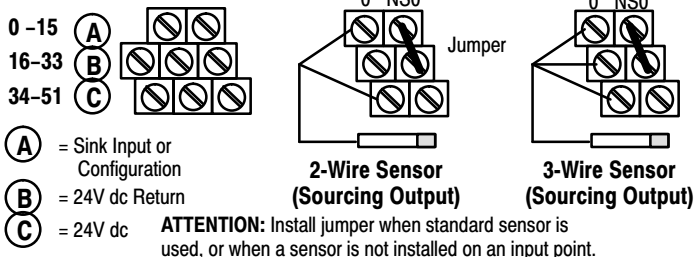


### 1794-TB3 – shown with 3-wire Smart sensors



### 1794-TB3 – shown with jumpers for standard 3-wire sensors

## Smart/Standard Sensor Interfacing to Sensor Block I/O Module



## 2-Wire Smart and Standard Sensors

1. Connect the sourcing output wire to the associated input terminal on row **A**.
2. Connect the power wire to its associated terminal on row **C** (24V dc).

## 3-Wire Smart and Standard Sensors

1. Connect the sourcing output wire to the associated input terminal on row **A**.
2. Connect the return wire to its associated terminal on row **B** (24V dc Return).
3. Connect the power wire to its associated terminal on row **C** (24V dc).

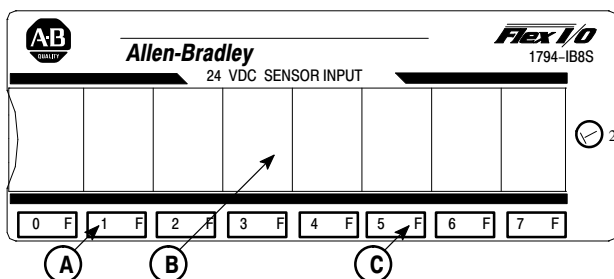
#### 4 24V dc FLEX I/O Sensor Input Module (Cat. No. 1794-IB8S)

Channel	Signal Type	2-Wire Sensor Terminals	3-Wire Sensor Terminals	Jumper position terminals <sup>1</sup>
0	Sink Input	0	0	1
	dc Return		17	18
	24V dc supply	35	35	
1	Sink Input	2	2	3
	dc Return		19	20
	24V dc supply	37	37	
2	Sink Input	4	4	5
	dc Return		21	22
	24V dc supply	39	39	
3	Sink Input	6	6	7
	dc Return		23	24
	24V dc supply	41	41	
4	Sink Input	8	8	9
	dc Return		25	26
	24V dc supply	43	43	
5	Sink Input	10	10	11
	dc Return		27	28
	24V dc supply	45	45	
6	Sink Input	12	12	13
	dc Return		29	30
	24V dc supply	47	47	
7	Sink Input	14	14	15
	dc Return		31	32
	24V dc supply	49	49	
	24V dc Common	16 thru 33		
	+24V dc power	34 thru 51		

NOTE: 2-wire devices use two terminals, 3-wire devices use three terminals.

<sup>1</sup> Jumper connections for standard (Non-Smart) sensors or unused input connections.

## Indicators



**A** = Status Indicators – yellow – show status of individual sinking inputs.

**B** = Insertable label for writing input designations

**C** = Diagnostic fault indicators

Indication	Description
<b>Diagnostic Indicators for Standard Sensors</b>	
Red ON	Jumper or sensor not installed – install jumper or sensor
Red OFF	Diagnostic reporting disabled – normal operation
Yellow ON	Normal on-state condition
Yellow OFF	Normal off-state condition, or 24V dc supply off
<b>Diagnostic Indicators for Smart Sensors</b>	
<b>Red ON</b>	Bad sensor, marginal signal from sensor, wire open, or input shorted to power supply (+24V or dc return)
Red OFF	Normal – no diagnostic faults
Yellow ON	Normal on-state condition
Yellow OFF	Normal off-state condition, or 24V dc supply off
If indicators are on but no data appears in the input image table, reset the module by cycling power to the adapter module, or by removing and reinserting the sensor module while under power (RIUP).	

### Memory Map of Input Image Table

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
Type	D	D	D	D	D	D	D	D	S	S	S	S	S	S	S	S

#### Smart Sensor

Bits 08-15 (10-17)	D = Diagnostic data – (Smart) 1 = Fault present 0 = Normal (no errors)	Bits 00-07 (00-07)	S = Sensor data 1 = Sensor on 0 = Sensor off
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#### Standard Sensor

Bits 08-15 (10-17)	D = Diagnostic data – disabled (Disabled) 1 = Diagnostics not 0 = Normal	Bits 00-07 (00-07)	S = Sensor data 1 = Sensor on 0 = Sensor off
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### Memory Map of Output Image Table

Dec.	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Read	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
Write	Not used										DT 12-15			DT 00-11		

Where: D = Input  
DT = Input Delay Time

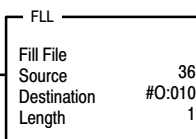
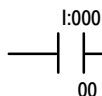
### Setting the Input Delay Time

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

For example, to set a delay time of 8ms for a dc input module at address rack 1, module group 0, set bits 05, 04, 03, 02, 01, and 00 as shown below.

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	<b>Dec.</b>
<b>0:010</b>											1	0	0	1	0	0	= 44 Octal or 36 Decimal
											DT = 12-15			DT = 00-11			

Write Delay Time on system startup.



Write DT to complement of input module.

## Input Delay Times

Bits			Description	Selected Delay Time
02	01	00	Delay Time for Inputs 00–11 (00–13)	
05	04	03	Delay Time for Inputs 12–15 (14–17)	
0	0	0	Delay Time 0 (default)	512 $\mu$ s
0	0	1	Delay Time 1	1ms
0	1	0	Delay Time 2	2ms
0	1	1	Delay Time 3	4ms
1	0	0	Delay Time 4	8ms
1	0	1	Delay Time 5	16ms
1	1	0	Delay Time 6	32ms
1	1	1	Delay Time 7	64ms

## Specifications – 24V dc Sensor Input Module Cat. No. 1794-IB8S

Number of Inputs	8 (1 group of 8), non-isolated, sinking
Module Location	Cat. No. 1794-TB3 Terminal Base Unit
ON-state Voltage	10V dc minimum; 24V dc nominal; 31.2V dc maximum
ON-state Current	2.0mA minimum; 8.0mA nominal at 24V dc; 11.0mA maximum
OFF-state Voltage	5.0V dc maximum
OFF-state Current	1.5mA minimum
Input Impedance	4.4K ohms maximum
Diagnostic Detect Time (Smart Sensors only)	300ms maximum to detect a diagnostic fault
Isolation Voltage	100% tested at 850V dc for 1s between user and system No isolation between individual channels
Input Delay Time Off to On On to Off	512 $\mu$ s, 1ms, 2ms, 4ms, 8ms, 16ms, 32ms, 64ms 512 $\mu$ s, 1ms, 2ms, 4ms, 8ms, 16ms, 32ms, 64ms 512 $\mu$ s default – Selectable thru output image table
Flexbus Current (maximum)	30mA

**Specifications continued on next page**

**Specifications – 24V dc Sensor Input Module Cat. No. 1794-IB8S**

Power Dissipation	Maximum 4.0W @ 31.2V dc
Thermal Dissipation	Maximum 13.6 BTU/hr @ 31.2V dc
Indicators (field side indication, customer device driven)	8 yellow status indicators 8 red diagnostic indicators
Keyswitch Position	2

**General Specifications**

External dc Power	Supply Voltage Voltage Range Supply Current	24V dc nominal 19.2 to 31.2V dc (includes 5% ac ripple) 40mA maximum
Dimensions	Inches (Millimeters)	1.8H x 3.7W x 2.1D (45.7 x 94.0 x 53.3)
Environmental Conditions	Operational Temperature Storage Temperature Relative Humidity Shock      Operating Non-operating Vibration	0 to 55°C (32 to 131°F) –40 to 85°C (–40 to 185°F) 5 to 95% noncondensing 30 g peak acceleration, 11(+1)ms pulse width 50 g peak acceleration, 11(+1)ms pulse width Tested 5 g @ 10–500Hz per IEC 68-2-6
Conductors	Wire Size  Category	12 gauge (4mm <sup>2</sup> ) stranded maximum 3/64 inch (1.2mm) insulation maximum 2 <sup>1</sup>
Agency Certification (when product or packaging is marked)		<ul style="list-style-type: none"> <li>• CSA certified</li> <li>• CSA Class I, Division 2   Groups A, B, C, D certified</li> <li>• UL listed</li> <li>• CE marked for all applicable directives</li> </ul>

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



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