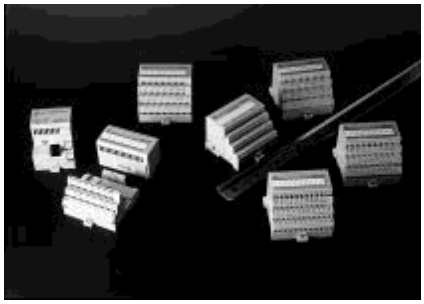
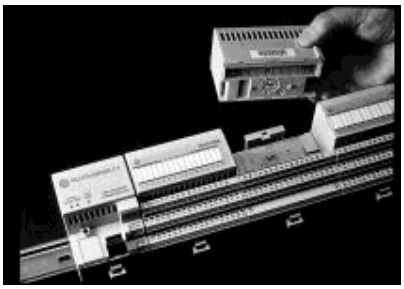
Allen-Bradley

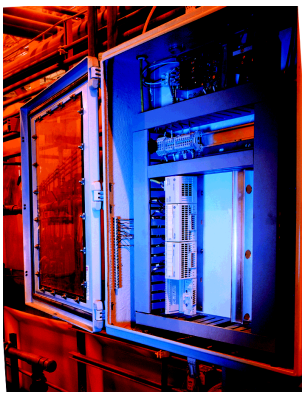
Technical Data

FLEX I/O and FLEX Integra

1794 Series and 1793 Series







Flexible, Inexpensive, and Compact

FLEX I/O™ and FLEX Integra™ are flexible, low-cost, modular I/O systems for distributed applications that offer all the functions of larger, rack-based I/O without the space requirements. With FLEX I/O and FLEX Integra, you can independently select the I/O to meet your application needs.

Additional Savings for Larger Systems

FLEX I/O and FLEX Integra require only one adapter to communicate with up to eight I/O modules. When you need more I/O or use a combination of different I/O modules, you can meet system requirements without buying additional power supplies.

Compatibility Now and In the Future

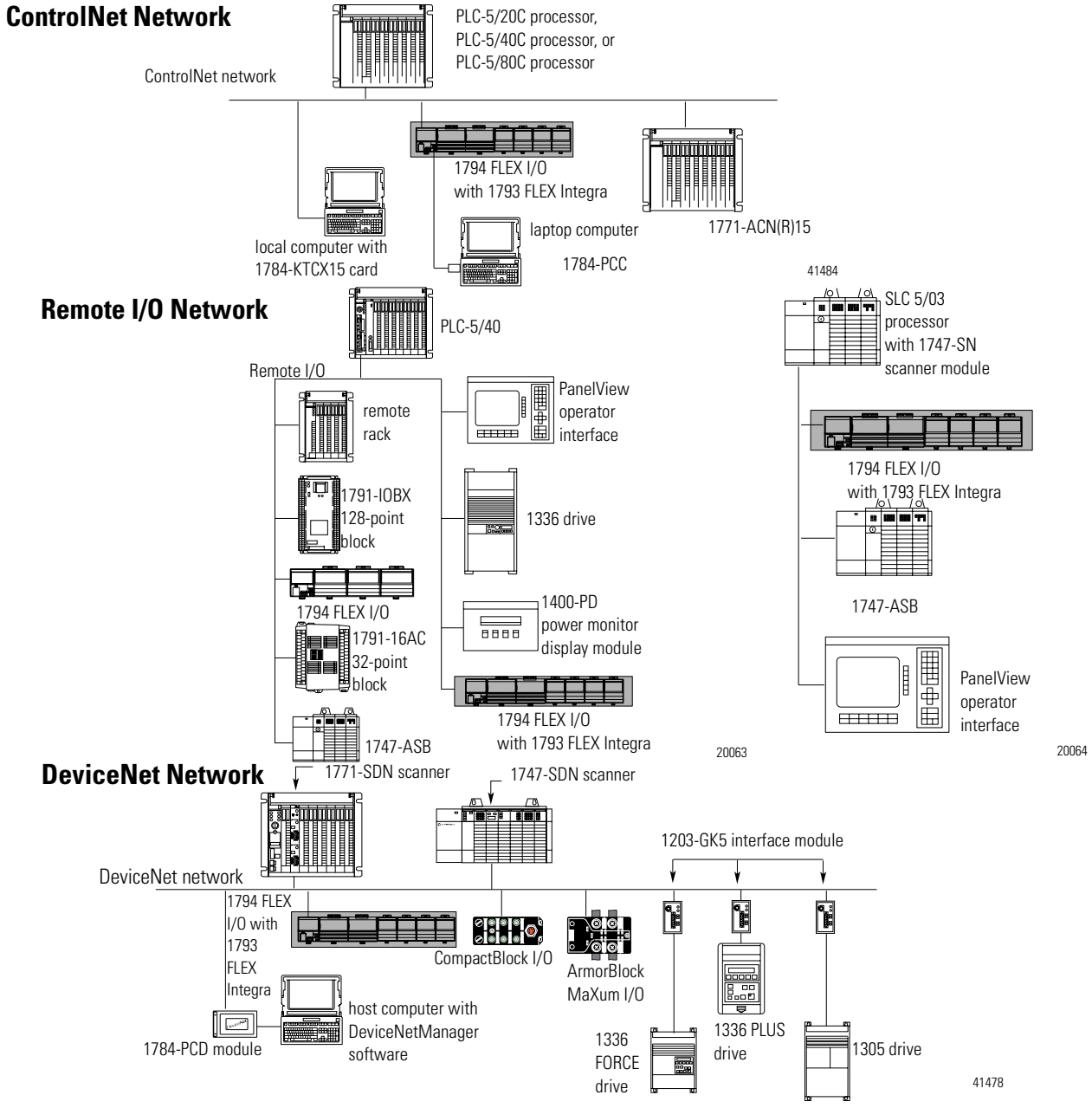
With the proper adapter, your FLEX I/O and/or FLEX Integra system can communicate over the Remote I/O network, DeviceNet™ network, and ControlNet™ network. You can add components as your system requirements change.

Low Installation, Wiring, and Maintenance Costs

FLEX I/O consists of a terminal strip with an I/O interface. Use the terminal strip on the terminal base to wire your field devices directly. Differing from FLEX I/O, FLEX Integra integrates the terminal strip and I/O modules into one compact unit. Wiring directly saves you:

- installation and testing time
- additional wiring and external terminal blocks
- control marshalling panel space

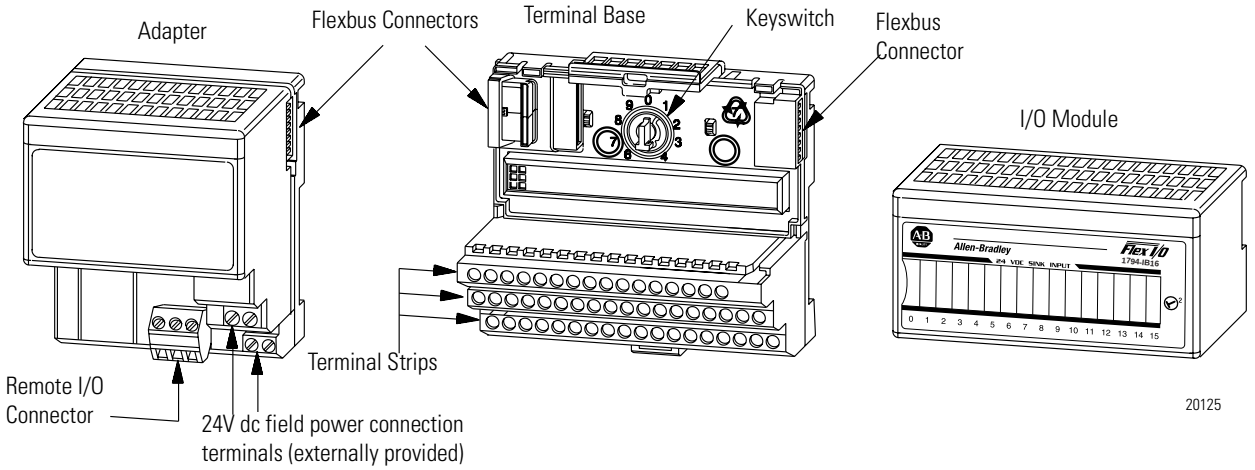
FLEX I/O and FLEX Integra provide additional savings if system problems develop. Combining your field-wiring terminations and the I/O interface into the same location saves you time and money by making your system easier to maintain and troubleshoot. Additionally, the full-featured FLEX I/O system allows you to remove and insert modules under backplane power without disrupting your system.



About the FLEX I/O System

FLEX I/O consists of three space-saving components:

- adapters
- terminal base units
- I/O modules



Use the adapter to power the internal logic for as many as eight I/O modules and transfer the I/O data back to a PLC™ processor or a SLC™ processor via one of several available networks.

Two separate connection terminals for field power let you daisy-chain power connections to adjacent terminal bases.

Insert the terminal base into your system using the positive-locking flexbus connectors.

Use a three-wire terminal base to wire directly to a two- or three-wire device.

Terminate most of your wiring on the terminal base with almost no need for terminal blocks.

Use the terminals to daisy-chain power connections to adjacent terminal bases, or connect individual power supplies to each base to isolate modules.

Adjust the keyswitch to prevent incorrect module insertion into a preconfigured terminal base.

Exchange terminal bases without moving other bases in your system.

Plug the I/O module into the terminal base. Use the module to connect to the I/O bus and field devices.

Remove and insert a module without disturbing the field wiring, other I/O modules, or system power.

ATTENTION

Remove field-side power before removing or inserting an I/O module. Modules are designed so you can remove and insert them under backplane power. When you remove or insert a module while field-side power is applied, you may cause an electrical arc. An electrical arc can cause personal injury or property damage because it may:

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

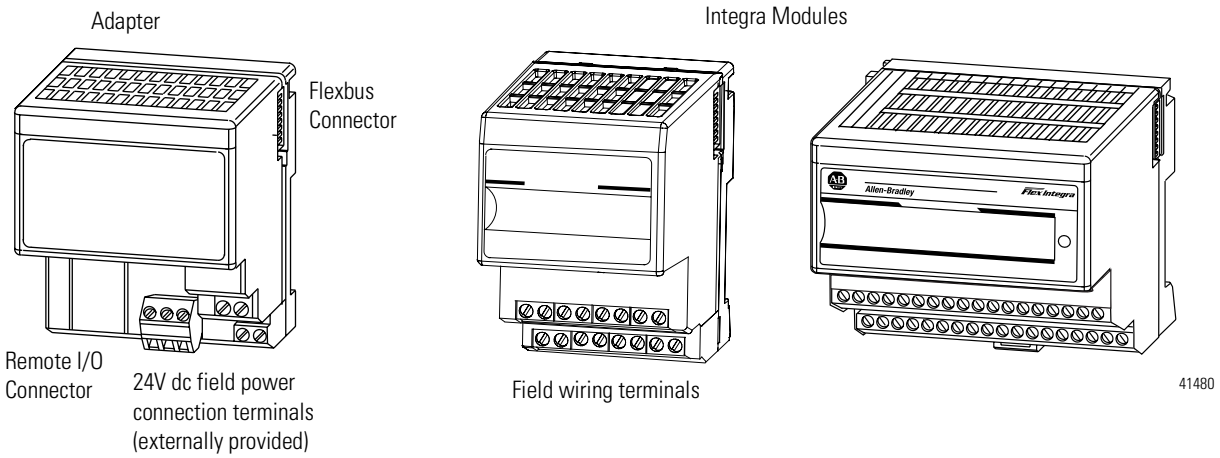
Repeated electrical arcing causes excessive wear to the contacts on both the module and its mating connector. Worn contacts may create electrical resistance.

About the FLEX Integra System

FLEX Integra I/O consists of a range of digital and analog modules, all capable of use with 1794 FLEX I/O adapters and other FLEX I/O modules. Each module is available with either screw-cage or spring-clamp wire terminations.

TIP

FLEX Integra modules were designed to fit to the right of your FLEX I/O modules. Be sure to place your FLEX Integra modules to the right of your FLEX I/O modules when designing your system.



Use the adapter to power the internal logic for as many as eight I/O modules and transfer the I/O data back to a PLC™ processor or a SLC™ processor via one of several available networks.

Two separate connection terminals for field power let you daisy-chain power connections to adjacent FLEX I/O terminal bases.

Insert the module into your system using the positive-locking flexbus connectors.

Terminate all of your wiring on the module with no need for terminal blocks.

Use the terminals to daisy-chain power connections to adjacent FLEX I/O terminal bases, or connect individual power supplies to each base to isolate modules.

ATTENTION

Do not remove an Integra module under power. Removing the module under power will break the electrical backplane (flexbus) connections. This 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
- breaking communications beyond this module

Mount and Remove Your System Easily

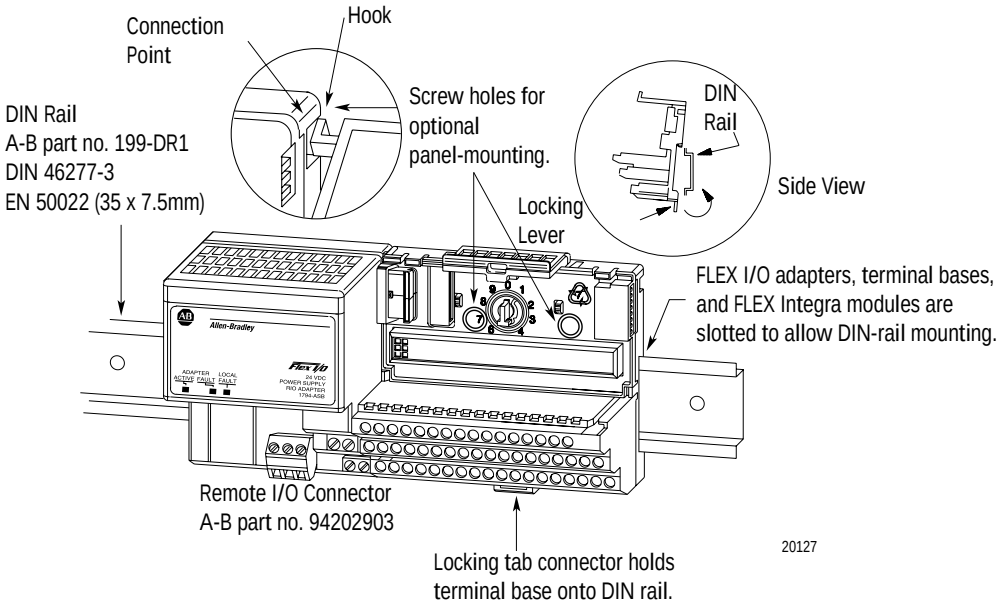
You can horizontally or vertically mount the FLEX I/O system and FLEX Integra modules on a standard 35mm DIN rail. The adapter and FLEX I/O terminal base easily snap on the DIN rail by hand. Use a flat-blade screwdriver to remove components from the DIN rail.

Screw holes allow you to horizontally or vertically panel-mount your FLEX I/O system in an enclosure. To panel-mount your FLEX I/O system, use the optional mounting kit (1794-NM1). An example of a DIN-rail mounted system is shown below.

ATTENTION

When properly installed, FLEX I/O and FLEX Integra are 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. Mount FLEX Integra only on zinc-plated, yellow-chromated steel DIN rail. Refer to Mounting Dimensions and Spacing Requirements on page 154 for more information.

FLEX I/O



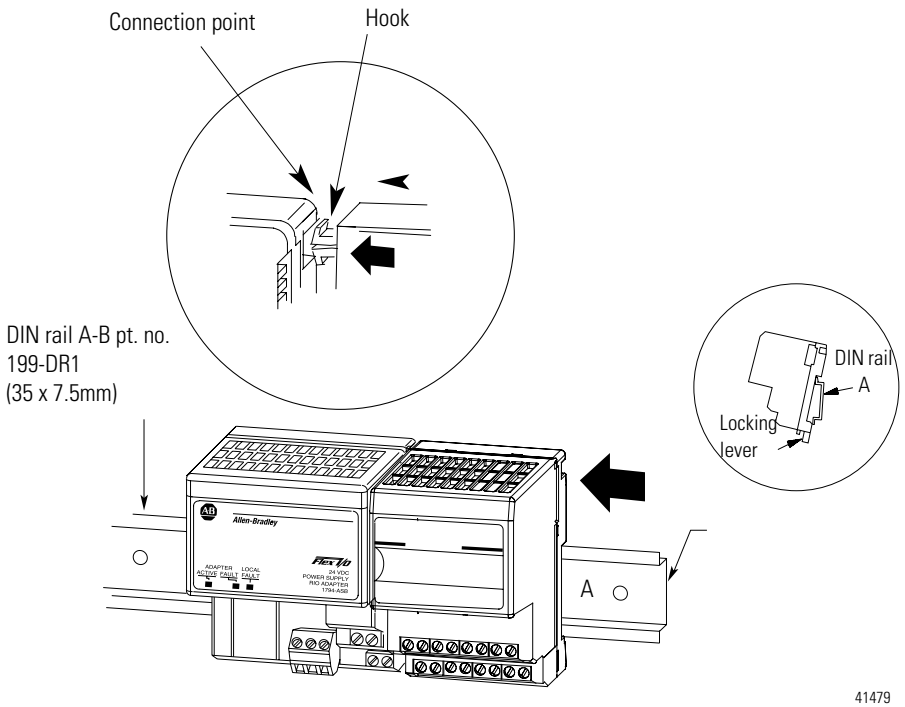
When you use FLEX I/O modules in a high-vibration installation, and particularly when mounting the modules vertically, we recommend using DIN-rail locks (Allen-Bradley part no. 1492-EA35).

ATTENTION

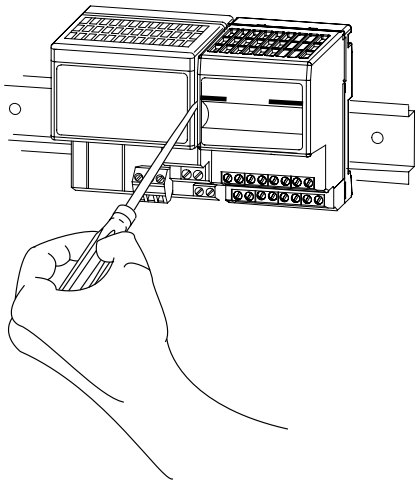
The hook (on the terminal base) and adjacent connection point (on the adapter) keep the terminal bases tight together (see exploded view above). These components are capable of maintaining a reliable connection in case of shock and/or vibration. Refer to the environmental conditions information in each module's specifications.

FLEX Integra modules mount on the DIN rail. After the module locks into place, firmly push the Integra module into the adjacent module to complete the backplane connection. When removing an Integra module, insert a flat-bladed screwdriver between the modules, and twist 1/4 turn. Then release the locking lever and remove the module.

FLEX Integra



To remove:



ATTENTION

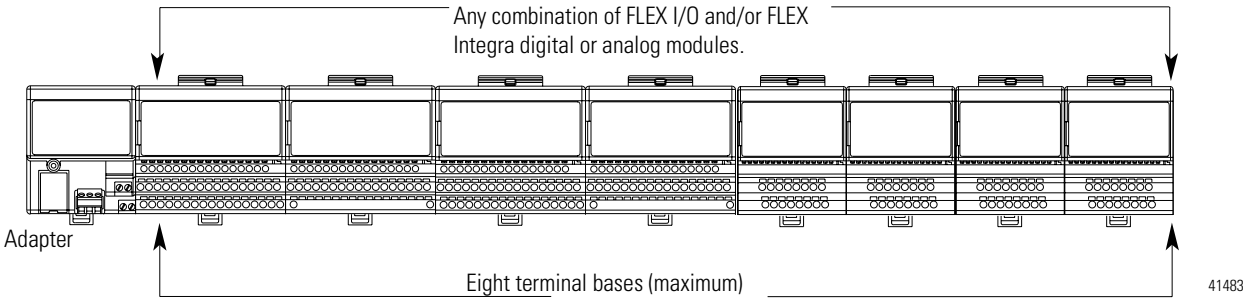
The hook (on the terminal base) and adjacent connection point (on the adapter) keep the terminal bases tight together (see exploded view above). These components are capable of maintaining a reliable connection in case of shock and/or vibration. Refer to the environmental conditions information in each module's specifications.

Design Your Configuration

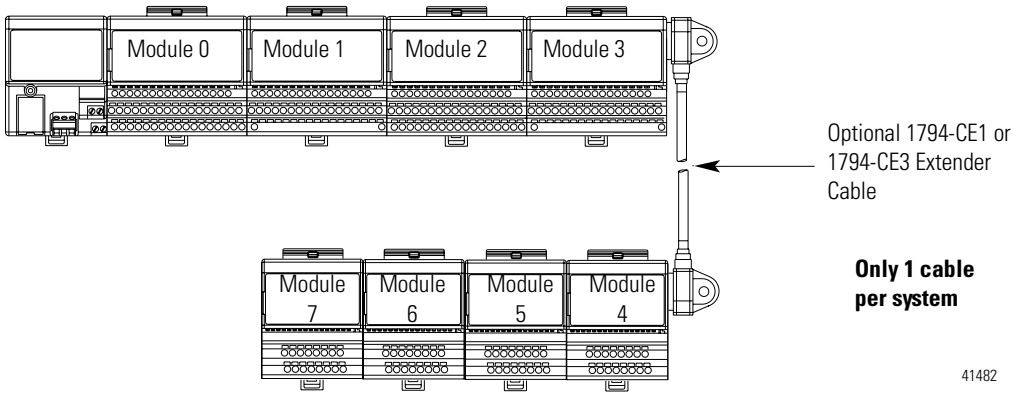
You can use as many as eight FLEX I/O and/or FLEX Integra modules per adapter. This flexibility allows a wide range of digital and analog I/O points per adapter. Mix and match digital and analog I/O to meet your application needs.

You can use FLEX Integra modules with FLEX I/O modules.

TIP Place Integra modules to the right of your FLEX I/O modules when designing your system.



The number of bases that make up an I/O group depends upon the adapter used.



When using the optional extender cable, module groups are numbered sequentially along the length of the system.

What this Product Data Contains

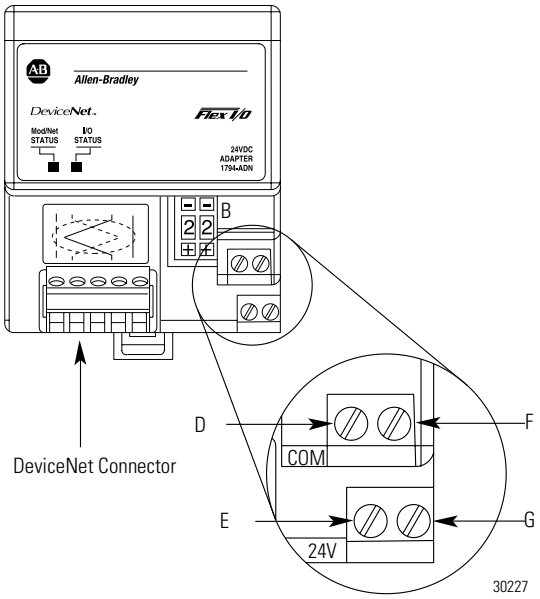
Use the following tables to find information in this technical data.

	For Information On	Catalog Number	Description	See Page
	Adapters	1794-ADN	24V dc DeviceNet Adapter	11
		1794-ACN15	24V dc ControlNet Adapter	12
		1794-ACNR15	24V dc ControlNet Redundant Media Adapter	13
		1794-ASB2/C	24V dc Remote I/O Adapter (to 2 modules)	14
		1794-ASB/D	24V dc Remote I/O Adapter (to 8 modules)	15
	Terminal Base Units	1794-TB2	2-Wire Screw Clamp Terminal Base Unit	19
		1794-TB3	3-Wire Screw Clamp Terminal Base Unit	20
		1794-TB3S	3-Wire Spring Clamp Terminal Base Unit	21
		1794-TB3T	Temperature Terminal Base Unit	22
		1794-TB3TS	Spring Clamp Temperature Terminal Base Unit	24
		1794-TB3G	Screw Clamp Grounded Terminal Base Unit	24
		1794-TB3GS	Spring Clamp Grounded Terminal Base Unit	25
		1794-TBN	Terminal Base Unit (NEMA-Style Screws)	26
		1794-TBNF	Fused Terminal Base Unit (NEMA-Style Screws)	27
		1203-FB1	SCANport™ Terminal Base Unit	29
1794 AC	120V ac Modules	1794-IA8	120V ac 8 Input Module	32
		1794-IA8I	120V ac 8 Isolated Input Module	34
		1794-IA16	120V ac 16 Input Module	36
		1794-OA8	120V ac 8 Output Module	38
		1794-OA8I	120V ac 8 Isolated Output Module	40
		1794-OA16	120V ac 16 Output Module	42
	220V ac Modules	1794-IM8	220V ac 8 Input Module	44
		1794-OM8	220V ac 8 Output Module	46
1793 DC	24V dc Modules	1793-IB4, -IB4S	24V dc 4 Sink Input Module	51
		1793-IB16, -IB16S	16 Sink Input Module	53
		1793-IV16, IV16S	16 Source Input Module	55
		1793-OB4P, -OB4PS	24V dc 4 Source Output (Protected) Module	57
		1793-OB16P, -OB16PS	16 Protected Source Output Module	59
		1793-OV16P, -OV16PS	16 Protected Sink Output Module	61
		1793-IB2XOB2P, -IB2XOB2PS	24V dc 2 Input/2 Protected Output Combo Module	63
1794 DC	24V dc Modules	1794-IB8	24V dc 8 Sink Input Module	65
		1794-IB16	24V dc 16 Sink Input Module	67
		1794-IV16	24V dc 16 Source Input Module	69
		1794-OB8	24V dc 8 Source Output Module	71
		1794-OB16	24V dc 16 Source Output Module	73
		1794-OB16P	24V dc 16 Source Output (Protected) Module	75

	For Information On	Catalog Number	Description	See Page
1794 DC		1794-OV16	24V dc 16 Sink Output Module	77
		1794-OV16P	24V dc 16 Sink Output (Protected) Module	79
		1794-OB8EP	24V dc Electronically Fused 8 Output Module	81
		1794-IB10XOB6	24V dc 10 Input/6 2A Output Combo Module	83
	48V dc Modules	1794-IC16	48V dc 16 Sink Input Module	86
		1794-OC16	48V dc 16 Source Output Module	88
1793 Analog	24V dc Modules	1793-IE4, -IE4S	24V dc 4 Input Analog Module	91
		1793-OE2, -OE2S	24V dc 2 Output Analog Module	93
		1793-IE2XOE1, -IE2XOE1S	24V dc 2 Input/1 Output Analog Combo Module	95
1794 Analog	24V dc Modules	1794-IE8/B	24V dc Selectable Analog 8 Input Module	98
		1794-OE4/B	24V dc Selectable Analog 4 Output Module	100
		1794-IE4XOE2/B	24V dc 4 Input/2 Output Analog Combo Module	103
Isolated Analog	24V dc Source Modules	1794-IF4I	24V dc Source Isolated Analog 4 Input Module	108
		1794-OF4I	24V dc Source Isolated Analog 4 Output Module	111
		1794-IF2XOF2I	24V dc 2 Input/2 Output Isolated Analog Combo Module	114
1793 Relay	Relay Module	1793-OW4, -OW4S	4 Relay Sink/Source Output Module	118
1794 Relay	Relay Module	1794-OW8	8 Relay Sink/Source Output Module	120
Specialty	RTD Input Module	1794-IR8	24V dc RTD Input Module	123
	Thermocouple/RTD Input Module	1794-IRT8	24V dc Thermocouple/RTD Module	126
	Thermocouple/mV Input Module	1794-IT8	24V dc Thermocouple/mV Module	129
	SCANport Module	1203-FM1	24V dc SCANport Module	132
Counters	Frequency Input Module	1794-IJ2	24V dc 2 Input Frequency Module	135
	Very High Speed Counter Module	1794-VHSC	24V dc 2 Channels Very High Speed Counter Module (Used with 1794-ACN15 or ACNR15 only)	139
	2-Channel Pulse Counter Input Module	1794-ID2	24V dc 2 Input Pulse Counter Module	142
	4-Channel Pulse Counter Input Module	1794-IP4	12/24V dc 4 Input Pulse Counter Module	145
Power Supply	Power Supply	1794-PS13	Power Supply Module	148
Accessories	Accessories	1794-CE1	Extender Cable, 0.3m (1ft)	150
		1794-CE3	Extender Cable, 0.9m (3ft)	150
		1794-NM1	Mounting Kit	150
		1794-CJC2	Cold Junction Compensator Kit	150
		1794-LBL	Label Kit	151
			RSWire Software	151
			ABECAD Software	151

Use the following table to determine which adapter will meet your application needs.

Wiring



Connect	To
BLK Wire	-V
BLU Wire	CAN[1] Low
Bare Wire	Drain
WHT Wire	CAN High
RED Wire	+V

1 CAN = Controller Area Network

ATTENTION When connecting wiring, torque terminal screws D, E, F, and G to 7-9 inch-pounds.

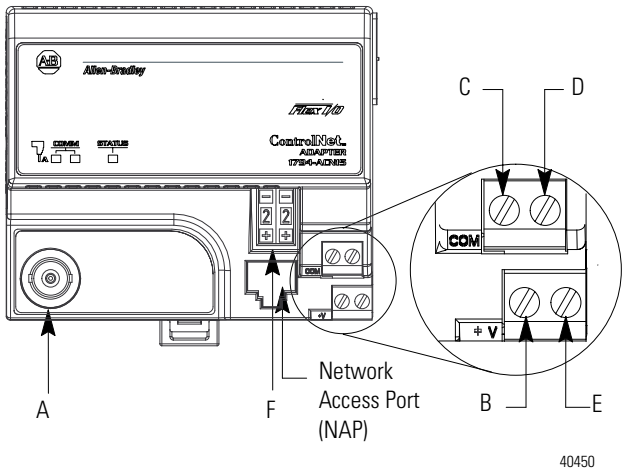
NOTE: The wiring label on the front of the module shows the cable colors.

1. Connect the DeviceNet cable to the removable connector.
2. Insert connector into mating connector on DeviceNet adapter module.
3. Connect +24V dc input to the left side of the lower connector, terminal **E**.
4. Connect 24V common to the left side of the upper connector, terminal **D**.
5. Connections **G** and **F** are used to pass 24V dc power and common to the next module in the series (if required).
6. Set the network address using the 2-position thumbwheel switch **B**. Valid settings range from 00 to 63. Press either the + or - buttons to change the number.

Specifications - 1794-ADN	
I/O Capacity	8 modules
Connector Screw Torque	7-9 inch-pounds
Power Supply	Note: In order to comply with CE Low Voltage Directives, you must use a Safety Extra Low Voltage (SELV) or a Protected Extra Low Voltage (PELV) power supply to power this adapter.
Input Voltage Rating	24V dc nominal
Input Voltage Range	19.2V to 31.2V dc (includes 5% ac ripple)
Communication Rate	125k bit/s 250k bit/s 500k bit/s
Indicators	Mod/Net status - red/grn I/O status - red/grn
Flexbus Output Current	640mA maximum @ 5V dc
Isolation Voltage	500V ac for 1s between user power and flexbus
Power Consumption	400mA maximum from external 24V supply
Power Dissipation	7.6W maximum @ 19.2V dc
Thermal Dissipation	26 BTU/hr @ 19.2V dc
DeviceNet Power Requirements	24V dc (±4%) @ 90mA maximum
DeviceNet Cable	Allen-Bradley part no. 1485C-P1-Cxxx. Refer to publication DN-2.5 for more information.
General Specifications	
Dimensions HxWxD	87mm x 68mm x 69mm (3.4in x 2.7in x 2.7in)
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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Power Conductors Type Wire Size Category	 Copper (stranded or solid) 12 gauge (4mm^2) stranded maximum 3/64 (1.2mm) inch insulation max. 2[1]
Publications Installation Instructions User Manual	 1794-5.14 1794-6.5.5
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Groups IIC certified DeviceNet CONFORMANCE TESTED

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

Wiring



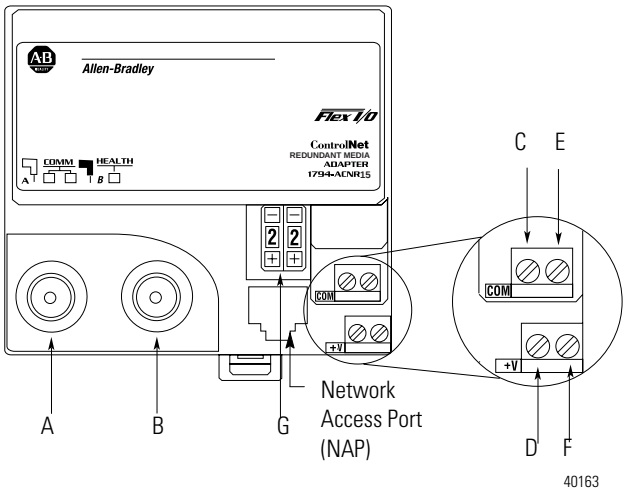
ATTENTION When connecting wiring, torque terminal screws B, C, D, and E to 7-9 inch-pounds.

1. Connect the ControlNet network cable to connector, terminal **A**.
2. Connect +24V dc input to the left side of the lower connector, terminal **B**.
3. Connect 24V common to the left side of the upper connector, terminal **C**.
4. Connections **D** and **E** are used to pass 24V dc power (E) and 24V common (D) to the next module in the series (if required).
5. Set the network address using the 2-position thumbwheel switch **F**. Valid settings range from 01 to 99. Press either the + or - buttons to change the number.

Specifications - 1794-ACN15	
I/O Capacity	8 modules
Connector Screw Torque	7-9 inch-pounds
Power Supply	Note: In order to comply with CE Low Voltage Directives, you must use a Safety Extra Low Voltage (SELV) or a Protected Extra Low Voltage (PELV) power supply to power this adapter.
Input Voltage Rating	24V dc nominal
Input Voltage Range	19.2V to 31.2V dc (includes 5% ac ripple)
Communication Rate	5M bit/s
Supports Redundant ControlNet Cabling	No
Indicators	Comm A - red/grn I/O Status - red/grn
Programming Ports	1 RJ-45 Network Access Port (NAP) for use with ControlNet programming cable (e.g. 1786-CP cable)
Flexbus Output Current	640mA maximum @ 5V dc
Isolation Voltage	500V ac between user power and flexbus
Power Consumption	400mA maximum from external 24V supply
Power Dissipation	4.6W maximum @ 19.2V dc
Thermal Dissipation	15.7 BTU/hr @ 19.2V dc
General Specifications	
Dimensions HxWxD	87mm x 94mm x 69mm (3.4in x 3.7in x 2.7in)
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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
ControlNet Cable	Belden RG-6/U Quad Shield
Power Conductors Type Wire Size Category	 Copper (stranded or solid) 12 gauge (4mm^2) stranded maximum 3/64 (1.2mm) inch insulation max. 2[1]
Publication Installation Instructions	 1794-5.47
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified ControlNet

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

Wiring



ATTENTION

When connecting wiring, torque terminal screws C, D, E, and F to 7-9 inch-pounds.

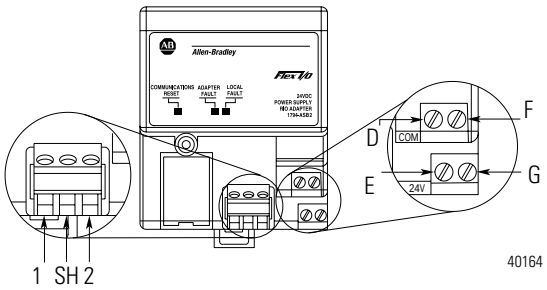
1. Connect the ControlNet network cable to connector **A**.
2. Connect the redundant ControlNet network cable to connector **B**.

   When using the 1794-ACNR15 as a single channel, use channel A.
3. Connect +24V dc input to the left side of the lower connector, terminal **D**.
4. Connect 24V common to the left side of the upper connector, terminal **C**.
5. Connections **E** and **F** are used to pass 24V dc power (F) and 24V common (E) to the next module in the series (if required).
6. Set the network address using the 2-position thumbwheel switch **G**. Valid setting range from 01 to 99. Press either the + or - buttons to change the number.

Specifications - 1794-ACNR15	
I/O Capacity	8 modules
Connector Screw Torque	7-9 inch-pounds
Power Supply	Note: In order to comply with CE Low Voltage Directives, you must use a Safety Extra Low Voltage (SELV) or a Protected Extra Low Voltage (PELV) power supply to power this adapter.
Input Voltage Rating	24V dc nominal
Input Voltage Range	19.2V to 31.2V dc (includes 5% ac ripple)
Communication Rate	5M bit/s
Supports Redundant ControlNet Cabling	Yes
Indicators	Comm A - red/grn (channel A) Comm B - red/grn (channel B) I/O status - red/grn
Programming Ports	1 RJ-45 Network Access Port (NAP) for use with ControlNet programming cable (e.g. 1786-CP cable)
Flexbus Output Current	640mA maximum @ 5V dc
Isolation Voltage	500V ac between user power and flexbus
Power Consumption	400mA maximum from external 24V supply
Power Dissipation	4.6W maximum @ 19.2V dc
Thermal Dissipation	15.7 BTU/hr @ 19.2V dc
General Specifications	
Dimensions HxWxD	87mm x 94mm x 69mm (3.4in x 3.7in x 2.7in)
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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
ControlNet Cable	Belden RG-6/U Quad Shield
Power Conductors Type Wire Size Category	 Copper (stranded or solid) 12 gauge (4mm^2) stranded maximum 3/64 (1.2mm) inch insulation max. 2[1]
Publication Installation Instructions	 1794-5.48
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified ControlNet

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

Wiring



The series C adapter can communicate with FLEX Integra analog modules.

ATTENTION When connecting wiring, torque terminal screws D, E, F, and G to 7-9 inch-pounds.

1. Connect the remote I/O cable to the removable remote I/O connector.
2. Connect +24V dc input to the left side of the lower connector, terminal **E**.
3. Connect 24V common to the left side of the upper connector, terminal **D**.
4. Connections **G** and **F** are used to pass 24V dc power (G) and 24V common (F) to the next module in the series (if required).
5. Make wiring connections as described in the installation instructions included with the module that mounts on your terminal base unit.

This adapter module is shipped configured for standard addressing mode. In standard addressing mode, this module can be used as a replacement for 1794-ASB2/A 2-slot Remote I/O adapters.

The 1794-ASB2/C adapter module can interface a maximum of 2 I/O modules. This adapter can be used in the mode that requires a unique location address for each I/O module and can also be used in a mode that allows duplicate addressing of I/O modules.

Duplicate addressing of I/O modules allows the maximum amount of I/O in a system for a given amount of I/O image area. An input module can have the same location address as an output module because they complement each other. The input module uses only the input image area corresponding to the address. The output module uses only the output image area corresponding to the address.

Description of Modes

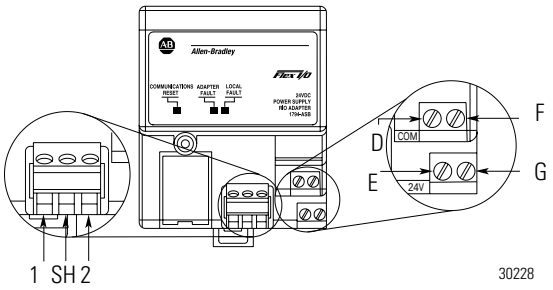
Addressing Type	Module Placement Rules	Legal Module Placements
Standard	• 2 terminal bases per adapter • Each terminal base represents 1 I/O group	• Any module in any slot
Compact 16-point addressing	• 2 terminal bases per adapter • Each module represents 1/2 of an I/O group • 2 modules represent 1 I/O group	• A 16-point input module and a 16-point output module in an I/O group
Compact 8-point addressing digital modules	• Do not place the 1794-IB8 next to an output module. If this combination is used the ASB will fault.	• Not applicable
Compact 8-point addressing analog modules	• Not applicable	• Not applicable
Complementary 16-point addressing	• 2 terminal bases per adapter • 2 modules, 1 in primary, and 1 in complement represent 1 I/O group	• Any module in any I/O position of the primary chassis, input modules complemented by output modules, analog modules complemented by analog modules or empty base
Complementary 8-point addressing	• 2 terminal bases per adapter • 4 modules, 2 in the primary and 2 in the complement, represents 1 I/O group	• 2 inputs in a group complemented by 2 outputs • 2 outputs in a group complemented by 2 inputs • 2 block transfer modules complemented by 2 empty slots • 1 block transfer module and 1 input in a group complemented by 1 empty slot and 1 output module

Specifications - 1794-ASB2/C

The 1794-ASB2/C adapter cannot be used with PLC-2 processors.	
I/O Capacity	2 modules
Power Supply	Note: In order to comply with CE Low Voltage Directives, you must use a Safety Extra Low Voltage (SELV) or a Protected Extra Low Voltage (PELV) power supply to power this adapter.
Input Voltage Rating	24V dc nominal
Input Voltage Range	19.2V to 31.2V dc (includes 5% ac ripple)
Communication Rate	57.6, 115.2, 230.4k bit/s
Indicators	Adapter active - green Adapter fault - red, Local fault - red
Flexbus Output Current	640mA maximum
Isolation Voltage	500V ac between user power and flexbus
Power Consumption	450mA maximum from external 24V supply
Power Dissipation	4.6W maximum @ 31.2V dc
Thermal Dissipation	15.7 BTU/hr @ 31.2V dc
General Specifications	
Dimensions HxWxD	87mm x 68mm x 69mm (3.4in x 2.7in x 2.7in)
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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Remote I/O Cable	Belden 9463 or equivalent as specified in A-B Approved Vendor List, publication ICCG-2.2 A-B pin connector part no. 942029-03
Power Conductors Wire Size Category	 12 gauge (4mm^2) stranded maximum 3/64 (1.2mm) inch insulation max. 2[1]
Publication Installation Instructions User Manual	 1794-5.46 1794-6.5.9
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

Wiring



The series D adapter can communicate with FLEX Integra analog modules.

ATTENTION When connecting wiring, torque terminal screws D, E, F, and G to 7-9 inch-pounds.

1. Connect the remote I/O cable to the removable remote I/O connector.
2. Connect +24V dc input to the left side of the lower connector, terminal **E**.
3. Connect 24V common to the left side of the upper connector, terminal **D**.
4. Connections **G** and **F** are used to pass 24V dc power (G) and 24V common (F) to the next module in the series (if required).
5. Make wiring connections as described in the installation instructions included with the module that mounts on your terminal base unit.

The 1794-ASB adapter module can interface a maximum of 8 I/O modules. This adapter can be used in the mode that requires a unique location address for each I/O module and can also be used in a mode that allows duplicate addressing of I/O modules.

Duplicate addressing of I/O modules allows the maximum amount of I/O in a system for a given amount of I/O image area. An input module can have the same location address as an output module because they complement each other. The input module uses only the input image area corresponding to the address. The output module uses only the output image area corresponding to the address.

Description of Modes

Addressing Type	Module Placement Rules	Legal Module Placements
Standard	• 8 terminal bases per adapter • Each terminal base represents 1 I/O group	• Any module in any slot
Compact 16-point addressing	• 8 terminal bases per adapter • Each module represents 1/2 of an I/O group • 2 modules represent 1 I/O group • 8 modules = 1/2 I/O rack	• A 16-point input module and a 16-point output module in an I/O group
Compact 8-point addressing digital modules	• 8 terminal bases per adapter • Each module represents 1/4 of an I/O group • 4 modules represent 1 I/O group • Do not place the 1794-IB8 next to an output module. If this combination is used the ASB will fault.	• Two 8-point input modules and two 8-point output modules in an I/O group • Module type must alternate within an I/O group: input, output, etc.
Compact 8-point addressing analog modules	• 8 terminal bases per adapter • Each module and adjacent empty base represents 1/2 of an I/O group	• Two block transfer modules and their adjacent empty base = 1 I/O group - An empty slot must accompany each block transfer module in 8-point compact addressing
Complementary 16-point addressing	• 8 terminal bases per adapter • 2 modules, 1 in primary, and 1 in complement represent 1 I/O group	• Any module in any I/O position of the primary chassis, input modules complemented by output modules, analog modules complemented by analog modules or empty base
Complementary 8-point addressing	• 8 terminal bases per adapter • 4 modules, 2 in the primary and 2 in the complement, represents 1 I/O group	• 2 inputs in a group complemented by 2 outputs • 2 outputs in a group complemented by 2 inputs • 2 block transfer modules complemented by 2 empty slots • 1 block transfer module and 1 input in a group complemented by 1 empty slot and 1 output module

Specifications - 1794-ASB/D

The 1794-ASB/D adapter cannot be used with PLC-2 processors.

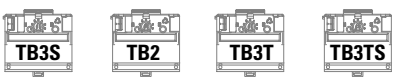
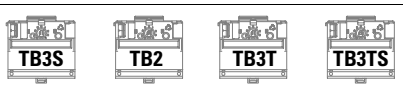
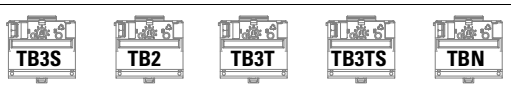
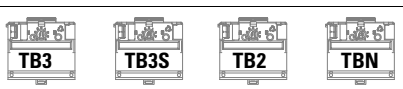
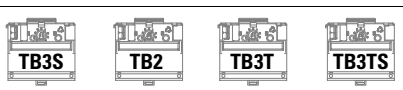
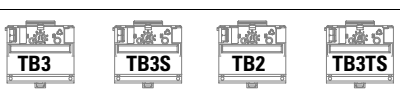
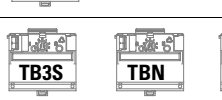
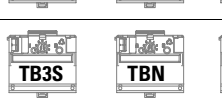
I/O Capacity	8 modules
Power Supply	Note: In order to comply with CE Low Voltage Directives, you must use a Safety Extra Low Voltage (SELV) or a Protected Extra Low Voltage (PELV) power supply to power this adapter.
Input Voltage Rating	24V dc nominal
Input Voltage Range	19.2V to 31.2V dc (includes 5% ac ripple)
Communication Rate	57.6, 115.2, 230.4k bit/s
Indicators	Adapter active - green Adapter fault - red, Local fault - red
Flexbus Output Current	640mA maximum
Isolation Voltage	500V ac between user power and flexbus
Power Consumption	450mA maximum from external 24V supply
Power Dissipation	4.6W maximum @ 31.2V dc
Thermal Dissipation	15.7 BTU/hr @ 31.2V dc
General Specifications	
Dimensions HxWxD	87mm x 68mm x 69mm (3.4in x 2.7in x 2.7in)
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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Remote I/O Cable	Belden 9463 or equivalent as specified in A-B Approved Vendor List, publication ICCG-2.2 A-B pin connector part no. 942029-03
Power Conductors Wire Size Category	 12 gauge (4mm^2) stranded maximum 3/64 (1.2mm) inch insulation max. 2[1]
Publication Installation Instructions User Manual	 1794-5.46 1794-6.5.9
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

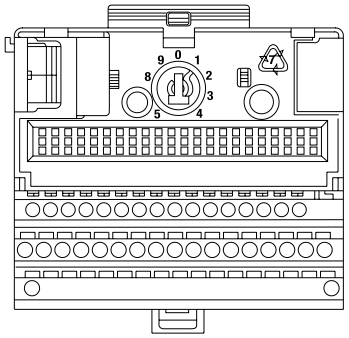
Use the following table to determine which FLEX I/O terminal base unit will meet your application needs.

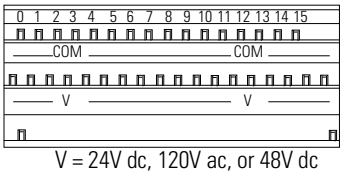
The following table illustrates the recommended FLEX I/O terminal base unit(s) for each module. Many terminal base units can be used with most modules, but auxiliary terminal strips may be required.

	FLEX I/O Product	Catalog Number	Recommended Base	Compatible Base(s)
AC	120V ac Modules	1794-IA8		  
		1794-IA8I		  
		1794-IA16		  Auxiliary terminal strips are required when using the TBN for the IA16
		1794-OA8		   
		1794-OA8I		   
		1794-OA16		   Auxiliary terminal strips are required when using the TBN for the OA16
	220V ac Modules	1794-IM8		None
		1794-OM8		
DC	24V dc Modules	1794-IB8		
		1794-IB16		
		1794-IV16		 
		1794-OB8		 
		1794-OB16		 
		1794-OB16P		 
		1794-OV16		
		1794-OV16P		

	FLEX I/O Product	Catalog Number	Recommended Base	Compatible Base(s)	
DC	24V dc Modules	1794-OB8EP			
		1794-IB10XOB6			
	48V dc Modules	1794-IC16			
		1794-OC16			
Analog	24V dc Modules	1794-IE8/B			
		1794-OE4/B			
		1794-IE4XOE2/B			
Isolated Analog	24V dc Source Modules	1794-IF4I			
		1794-OF4I			
		1794-IF2XOF2I			
Relay	Relay Module	1794-OW8			
Specialty	RTD Input Module	1794-IR8			
	Thermocouple/RTD Input Module	1794-IRT8			
	Thermocouple/mV Input Module	1794-IT8			You can use a TB2, TB3, or TB3S for mV inputs only.
	SCANport Module	1203-FM1			
Counter	Frequency Input Module	1794-IJ2			
	Very High Speed Counter Module	1794-VHSC			For use with 1794-ACN(R)15 only.
	2 Channel Pulse Counter Input Module	1794-ID2			Auxiliary terminal strips are required when using the TBN or TBNF for the ID2
	4 Channel Pulse Counter Input Module	1794-IP4			Auxiliary terminal strips are required when using the TBN or TBNF for the IP4

1794-TB2





A 0-15
B 16-33
C 34 & 51

V = 24V dc, 120V ac, or 48V dc

COM = 24V dc common, 120V ac common, or 48V dc common

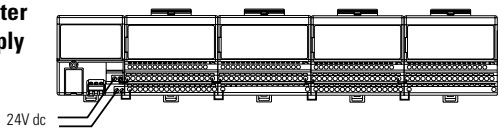
41705

1794-TB2 Terminal Base Unit	
A - 0 through 15	Input/Output
B - 16 through 33	24V dc Common, 120V ac Common, or 48V dc Common
C - 34 and 51	+24V dc Power, 120V ac, or 48V dc

ATTENTION

- Make certain that the hook on the terminal base you are installing is properly hooked into the adjacent terminal base/adapter. Failure to lock the hook into the adjacent base/adapter can result in loss of communication on the backplane.
- Do not force the terminal base into the adjacent base/adapter. Forcing the units together can bend or break the hook and allow the units to separate and break communication over the backplane.

Daisy-chaining Using Adapter Power Supply

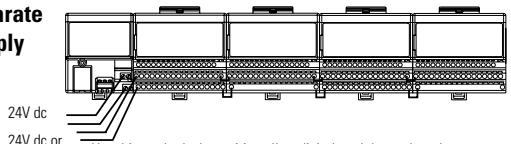


Use this method when wiring all digital modules and total current draw through terminal base units is less than 10A.

Wiring when total current draw is less than 10A

40093

Daisy-chaining with a Separate Power Supply



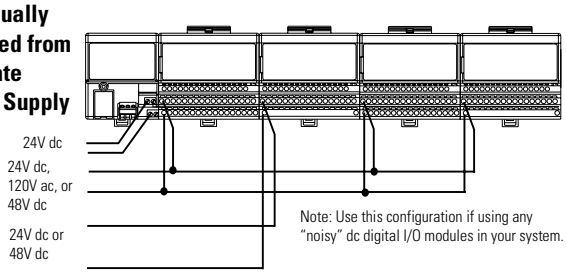
Use this method when wiring all ac digital modules and total current draw through terminal base units is less than 10A.

Wiring when total current draw is less than 10A

Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method.

42149

Individually Powered from Separate Power Supply



Note: Use this configuration if using any "noisy" dc digital I/O modules in your system.

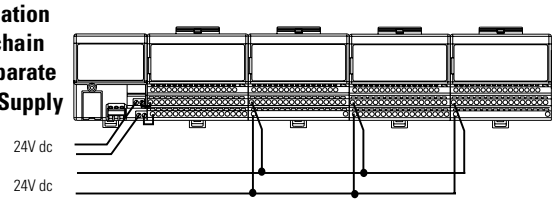
Thermocouple Module wiring is separate from digital wiring.

Wiring when total current draw is greater than 10A

Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method.

40094

Combination Daisy-chain and Separate Power Supply



Use this method when wiring both digital and analog modules. Analog modules must be wired separately from "noisy" digital modules.

Total current draw through any base unit must not be greater than 10A

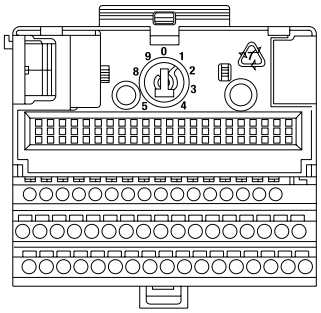
Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method.

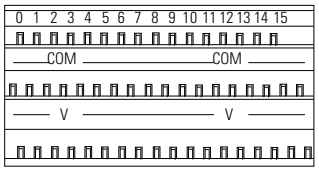
40095

Specifications - 1794-TB2	
Number of Terminals	1 row of 16 1 row of 18 1 row of 2
Terminal Screw Torque	7-9 inch-pounds
Current Capacity	10A maximum
Voltage Rating	132V ac maximum
Isolation Voltage	Channel-to-channel isolation determined by inserted module (see publication 1794-5.2)
General Specifications	
Dimensions (with module installed in base) HxWxD	94mm x 94mm x 69mm (3.7in x 3.7in x 2.7in)
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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 22 gauge (0.35mm^2) minimum 3/64 inch (1.2mm) insulation maximum 2[1]
Publication Installation Instructions	 1794-5.2
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

1794-TB3





0-15 Ⓐ

16-33 Ⓑ

34-51 Ⓒ

V = 24V dc, 120V ac, or 48V dc

COM = 24V dc common, 120V ac common, or 48V dc common

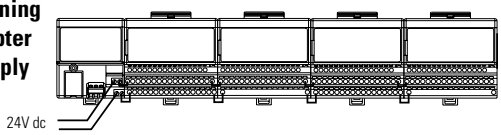
40090

1794-TB3 Terminal Base Unit	
A - 0 through 15	Input/Output
B - 16 through 33	24V dc Common, 120V ac Common, or 48V dc Common
C - 34 through 51	+24V dc Power, 120V ac, or 48V dc

ATTENTION

- Make certain that the hook on the terminal base you are installing is properly hooked into the adjacent terminal base/adapter. Failure to lock the hook into the adjacent base/adapter can result in loss of communication on the backplane.
- Do not force the terminal base into the adjacent base/adapter. Forcing the units together can bend or break the hook and allow the units to separate and break communication over the backplane.

Daisy-chaining Using Adapter Power Supply

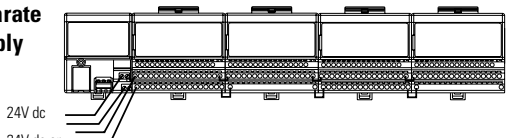


Use this method when wiring all digital modules and total current draw through terminal base units is less than 10A.

Wiring when total current draw is less than 10A

40093

Daisy-chaining with a Separate Power Supply



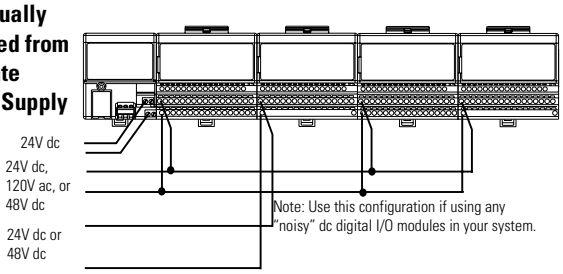
Use this method when wiring all ac digital modules and total current draw through terminal base units is less than 10A.

Wiring when total current draw is less than 10A

Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method.

42149

Individually Powered from Separate Power Supply



Note: Use this configuration if using any "noisy" dc digital I/O modules in your system.

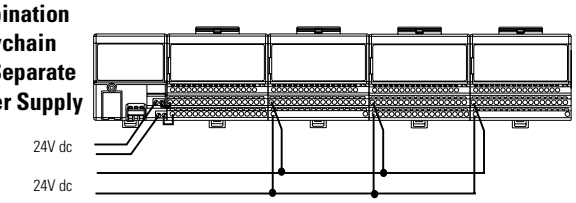
Thermocouple Module wiring is separate from digital wiring.

Wiring when total current draw is greater than 10A

Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method.

40094

Combination Daisychain and Separate Power Supply



Use this method when wiring both digital and analog modules. Analog modules must be wired separately from "noisy" digital modules.

Total current draw through any base unit must not be greater than 10A

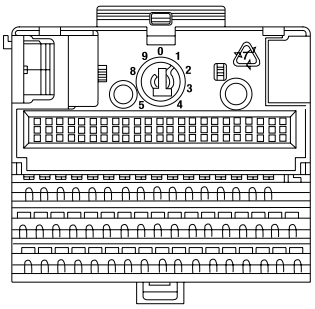
Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method.

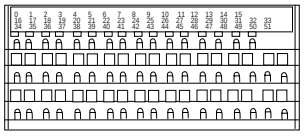
40095

Specifications - 1794-TB3	
Number of Terminals	1 row of 16 2 rows of 18
Terminal Screw Torque	7-9 inch-pounds
Current Capacity	10A maximum
Voltage Rating	132V ac maximum
Isolation Voltage	Channel-to-channel isolation determined by inserted module (see publication 1794-5.2)
General Specifications	
Dimensions (with module installed in base) HxWxD	94mm x 94mm x 69mm (3.7in x 3.7in x 2.7in)
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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 22 gauge (0.35mm^2) minimum 3/64 inch (1.2mm) insulation maximum 2[1]
Publication Installation Instructions	 1794-5.2
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

1794-TB3S



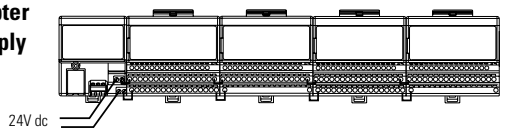


1794-TB3S Terminal Base Unit	
A - 0 through 15	Input/Output
B - 16 through 33	24V dc Common, 120V ac Common, or 48V dc Common
C - 34 through 51	+24V dc Power, 120V ac, or 48V dc

ATTENTION

- Make certain that the hook on the terminal base you are installing is properly hooked into the adjacent terminal base/adapter. Failure to lock the hook into the adjacent base/adapter can result in loss of communication on the backplane.
- Do not force the terminal base into the adjacent base/adapter. Forcing the units together can bend or break the hook and allow the units to separate and break communication over the backplane.

Daisy-chaining Using Adapter Power Supply

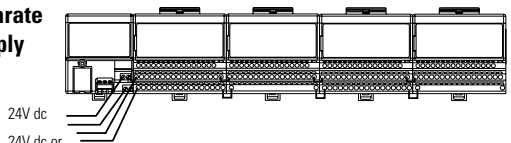


Use this method when wiring all digital modules and total current draw through terminal base units is less than 10A.

Wiring when total current draw is less than 10A

40093

Daisy-chaining with a Separate Power Supply



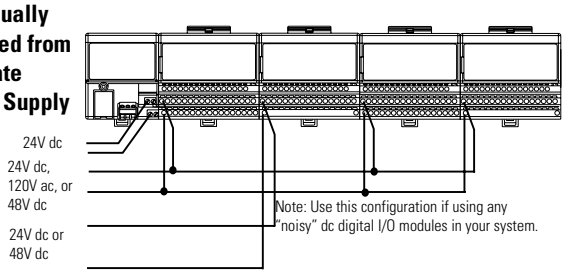
Use this method when wiring all ac digital modules and total current draw through terminal base units is less than 10A.

Wiring when total current draw is less than 10A

Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method.

42149

Individually Powered from Separate Power Supply



Note: Use this configuration if using any "noisy" dc digital I/O modules in your system.

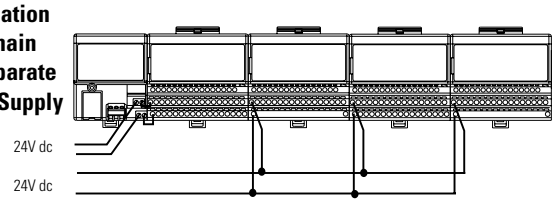
Thermocouple Module wiring is separate from digital wiring.

Wiring when total current draw is greater than 10A

Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method.

40094

Combination Daisychain and Separate Power Supply



Note: All modules powered by the same power supply must be analog modules for this configuration.

Total current draw through any base unit must not be greater than 10A

Use this method when wiring both digital and analog modules. Analog modules must be wired separately from "noisy" digital modules.

Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method.

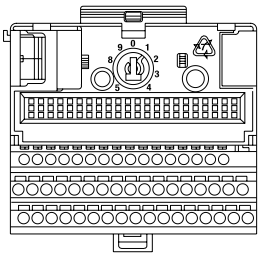
40095

Specifications - 1794-TB3S	
Number of Terminals	1 row of 16 2 rows of 18
Terminal Type	Spring-clamp - To open, insert bladed screwdriver (0.100-0.120in/2.54-3.05mm) and lift up.
Current Capacity	10A maximum
Voltage Rating	132V ac maximum
Isolation Voltage	Channel-to-channel isolation determined by inserted module (see publication 1794-5.2)
General Specifications	
Dimensions (with module installed in base) HxWxD	94mm x 94mm x 69mm (3.7in x 3.7in x 2.7in)
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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum, 22 gauge (0.35mm^2) minimum 3/64 inch (1.2mm) insulation maximum (Established by inserted module.)[1]
Publication Installation Instructions	 1794-5.42
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

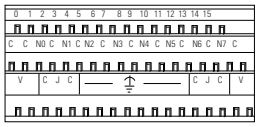
1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

1794-TB3T

The temperature terminal base has connections for cold junction compensation, and 8 terminals designated for shield termination to chassis ground.



V = 24V dc
N = add. input
C = 24V dc common
CJC = cold junction compensation



Ⓐ **0-15**
Ⓑ **16-33**
Ⓒ **34 - 51**

⏚ = chassis ground

40092

Wiring

1794-TB3T Terminal Base Unit

Channel	High Sig (+)	Low Sig (-)	Sig Ret	Reserved	Shld Ret[1]
0	0	1	17(C)	18(N0)	39
1	2	3	19(C)	20(N1)	40
2	4	5	21(C)	22(N2)	41
3	6	7	23(C)	24(N3)	42
4	8	9	25(C)	26(N4)	43
5	10	11	27(C)	28(N5)	44
6	12	13	29(C)	30(N6)	45
7	14	15	31(C)	32(N7)	46

24V dc Common	16, 17, 19, 21, 23, 25, 27, 29, 31, and 33
+24V dc power	34, 35, 50, and 51

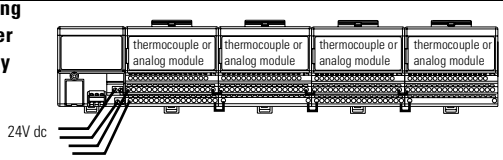
Terminals 36-38 and 47-49 are used with cold junction compensators only.

1 Terminals 39-46 are chassis ground.

ATTENTION

- Total current draw through the terminal base unit is limited to 10A. Separate power connections may be necessary.
- Do not daisy chain power or ground from the thermocouple terminal base unit to any ac or dc digital module terminal base unit.
- Make certain that the hook on the terminal base you are installing is properly hooked into the adjacent terminal base adapter. Failure to lock the hook into the adjacent base/adapter can result in loss of communication on the backplane.
- Do not force the terminal base into the adjacent base/adapter. Forcing the units together can bend or break the hook and allow the units to separate and break communication over the backplane.

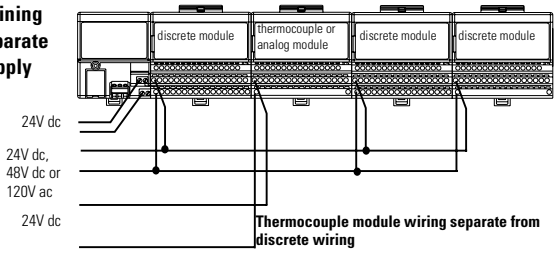
Daisy-chaining Using Adapter Power Supply



Note: All modules must be analog or thermocouple modules for this configuration. Use this method when wiring all analog modules and total current draw through terminal base units is less than 10A.

Wiring when total current draw is less than 10A 42150

Daisy-chaining with a Separate Power Supply



Thermocouple module wiring separate from discrete wiring

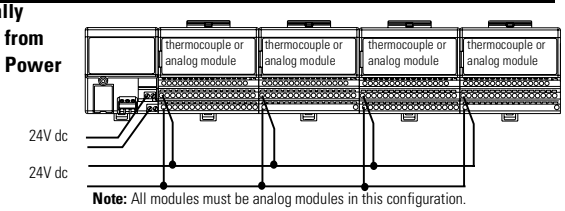
Use this method when mixing digital modules and analog modules and total current draw through terminal base units is greater than 10A.

Note: Use this configuration if using any "noisy" dc discrete I/O modules in your system.

Wiring when total current draw is greater than 10A

Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method. 42151

Individually Powered from Separate Power Supply

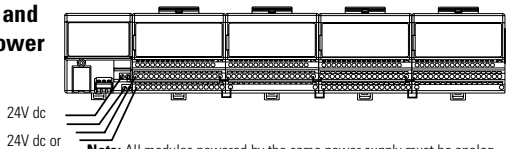


Note: All modules must be analog modules in this configuration.

Total current draw through any base unit must not be greater than 10A

Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method. 42152

Combination Daisychain and Separate Power Supply



Note: All modules powered by the same power supply must be analog modules for this configuration.

Use this method when wiring both digital and analog modules. Analog modules must be wired separately from "noisy" digital modules.

Wiring when total current draw is less than 10A

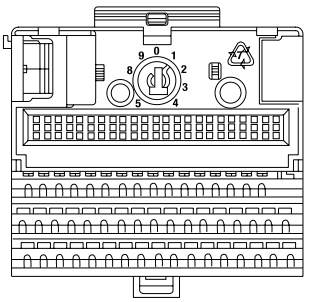
Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method. 42149

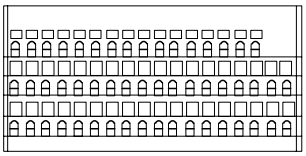
Specifications - 1794-TB3T	
Number of Terminals	1 row of 16; 2 rows of 18
Terminal Screw Torque	7-9 inch-pounds
Current Capacity	10A maximum
Voltage Rating	132V ac maximum
Isolation Voltage	Ch-to-ch isolation determined by inserted mod
General Specifications	
Dimensions (w/mod in base)	94mm x 94mm x 69mm (3.7in x 3.7in x 2.7in)
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	30g peak acceleration, 11(±1)ms pulse width
Non-operating	50g peak acceleration, 11(±1)ms pulse width
Vibration	Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size	12 gauge (4mm^2) stranded maximum 22 gauge (0.35mm^2) minimum 3/64 inch (1.2mm) insulation maximum
Category	(Established by inserted module.)[1]
Publication Installation Instructions	1794-5.41
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

1794-TB3TS

The temperature terminal base has connections for cold junction compensation, and 8 terminals designated for shield termination to chassis ground.





Wiring

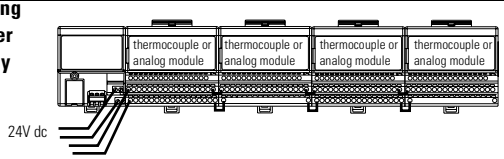
1794-TB3TS Terminal Base Unit

Channel	High Sig (+)	Low Sig (-)	SigRet	Reserved	Shld Ret[1]
0	0	1	17(C)	18(N0)	39
1	2	3	19(C)	20(N1)	40
2	4	5	21(C)	22(N2)	41
3	6	7	23(C)	24(N3)	42
4	8	9	25(C)	26(N4)	43
5	10	11	27(C)	28(N5)	44
6	12	13	29(C)	30(N6)	45
7	14	15	31(C)	32(N7)	46
24V dc Common	16, 17, 19, 21, 23, 25, 27, 29, 31, and 33				
+24V dc power	34, 35, 50, and 51				
Terminals 36-38 and 47-49 are used with cold junction compensators only.					
1 Terminals 39-46 are chassis ground.					

ATTENTION

- Total current draw through the terminal base unit is limited to 10A. Separate power connections may be necessary.
- Do not daisy chain power or ground from the thermocouple terminal base unit to any ac or dc digital module terminal base unit.
- Make certain that the hook on the terminal base you are installing is properly hooked into the adjacent terminal base adapter. Failure to lock the hook into the adjacent base/adapter can result in loss of communication on the backplane.
- Do not force the terminal base into the adjacent base/adapter. Forcing the units together can bend or break the hook and allow the units to separate and break communication over the backplane.

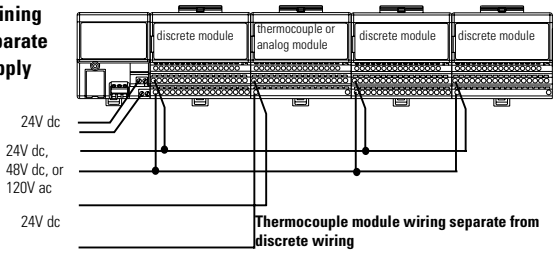
Daisy-chaining Using Adapter Power Supply



Note: All modules must be analog or thermocouple modules for this configuration. Use this method when wiring all analog modules and total current draw through terminal base units is less than 10A.

Wiring when total current draw is less than 10A 42150

Daisy-chaining with a Separate Power Supply



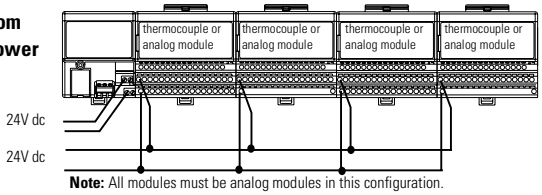
Use this method when mixing digital modules and analog modules and total current draw through terminal base units is greater than 10A.

Note: Use this configuration if using any "noisy" dc discrete I/O modules in your system.

Wiring when total current draw is greater than 10A

Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method. 42151

Individually Powered from Separate Power Supply

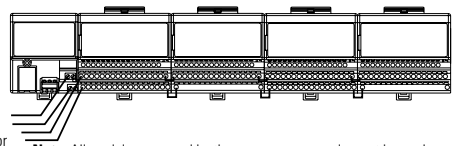


Note: All modules must be analog modules in this configuration.

Total current draw through any base unit must not be greater than 10A

Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method. 42152

Combination Daisychain and Separate Power Supply



Note: All modules powered by the same power supply must be analog modules for this configuration.

Use this method when wiring both digital and analog modules. Analog modules must be wired separately from "noisy" digital modules.

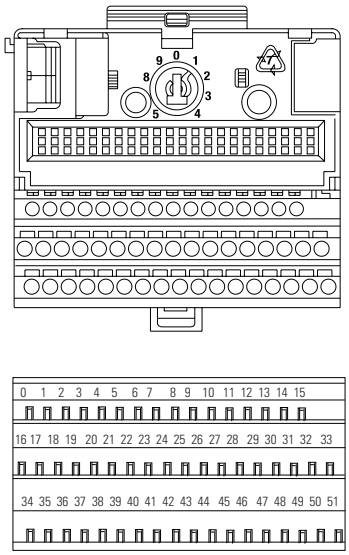
Wiring when total current draw is less than 10A

Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method. 42149

Specifications - 1794-TB3TS	
Number of Terminals	1 row of 16; 2 rows of 18
Terminal Type	Spring-clamp - To open, insert bladed screwdriver (0.120-0.125in/2.54-3.05mm) and lift up.
Current Capacity	10A maximum
Voltage Rating	132V ac maximum
Isolation Voltage	Ch-to-ch isolation determined by inserted module
General Specifications	
Dimensions (w/mod in base)	94mm x 94mm x 69mm (3.7in x 3.7in x 2.7in)
Environmental Conditions	
Operational Temperature	0 to 55ºC (32 to 131ºF)
Storage Temperature	-40 to 85ºC (-40 to 185ºF)
Relative Humidity	5 to 95% noncondensing
Shock Operating	30g peak acceleration, 11(±1)ms pulse width
Shock Non-operating	50g peak acceleration, 11(±1)ms pulse width
Vibration	Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size	12 gauge (4mm^2) stranded maximum, 22 gauge (0.35mm^2) minimum 3/64 inch (1.2mm) insulation maximum
Category	2[1]
Publication Installation Instructions	1794-5.43
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

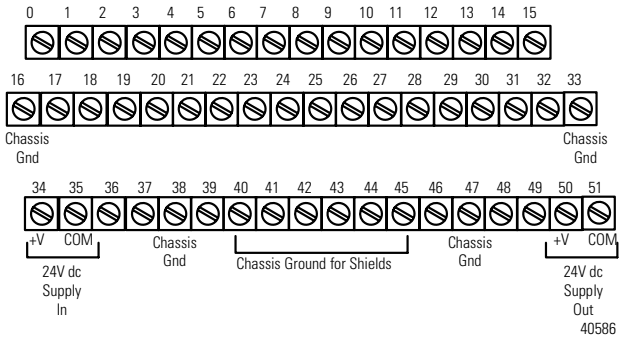
1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

1794-TB3G



41901

Wiring

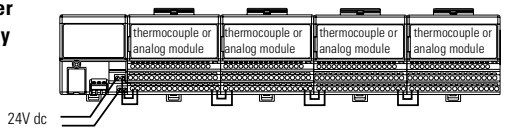


40586

ATTENTION

- Total current draw through the terminal base unit is limited to 10A. Separate power connections may be necessary.
- Do not daisy chain power or ground from the thermocouple terminal base unit to any ac or dc digital module terminal base unit.
- Make certain that the hook on the terminal base you are installing is properly hooked into the adjacent terminal base adapter. Failure to lock the hook into the adjacent base/adapter can result in loss of communication on the backplane.
- Do not force the terminal base into the adjacent base/adapter. Forcing the units together can bend or break the hook and allow the units to separate and break communication over the backplane.

Daisy-chaining Using Adapter Power Supply



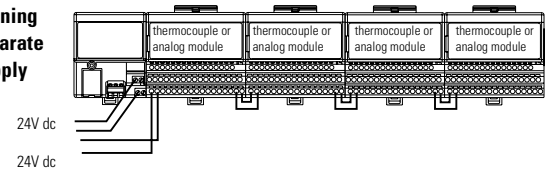
Use this method when wiring all analog modules and total current draw through terminal base units is less than 10A.

Note: All modules must be thermocouple or analog modules for this configuration.

Wiring when total current draw is less than 10A

42153

Daisy-chaining with a Separate Power Supply



Use this method when wiring thermocouple or analog modules and total current draw through terminal base units is greater than 10A.

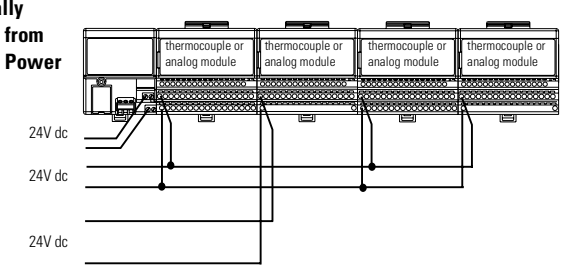
Note: All modules powered by the same power supply must be thermocouple or analog modules for this configuration.

Wiring when total current draw is greater than 10A

Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method.

42154

Individually Powered from Separate Power Supply

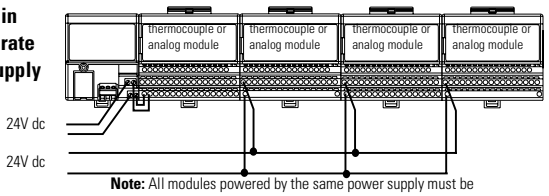


Wiring when total current draw is greater than 10A

Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method.

42155

Combination Daisychain and Separate Power Supply



Note: All modules powered by the same power supply must be thermocouple or analog modules for this configuration.

Total current draw through any base unit must not be greater than 10A

Use this method to balance current draw if necessary.

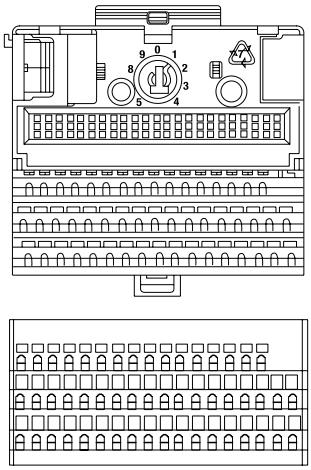
Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method.

42156

Specifications - 1794-TB3G	
Number of Terminals	1 row of 16; 2 rows of 18
Terminal Screw Torque	7-9 inch-pounds
Current Capacity	10A maximum
Voltage Rating	31.2V dc maximum
Isolation Voltage	Channel-to-channel isolation determined by inserted module
General Specifications	
Dimensions (w/mod in base)	94mm x 94mm x 69mm (3.7in x 3.7in x 2.7in)
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	30g peak acceleration, 11(±1)ms pulse width
Non-operating	50g peak acceleration, 11(±1)ms pulse width
Vibration	Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size	12 gauge (4mm^2) stranded maximum 22 gauge (0.35mm^2) minimum 3/64 inch (1.2mm) insulation maximum
Category	Category is dependent upon installed module.[1]
Publication Installation Instructions	1794-5.51
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

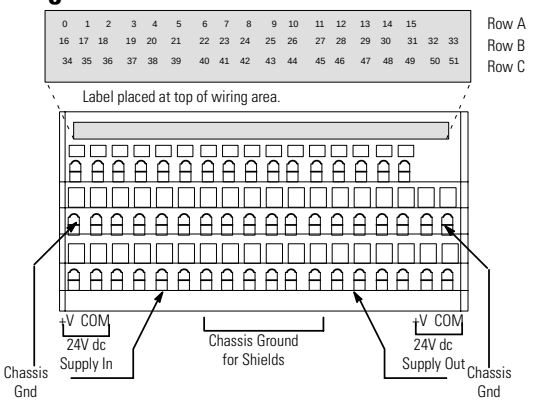
1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

1794-TB3GS



40836

Wiring

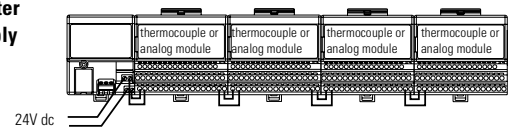


40592

ATTENTION

- Total current draw through the terminal base unit is limited to 10A. Separate power connections may be necessary.
- Do not daisy chain power or ground from the thermocouple terminal base unit to any ac or dc digital module terminal base unit.
- Make certain that the hook on the terminal base you are installing is properly hooked into the adjacent terminal base adapter. Failure to lock the hook into the adjacent base/adapter can result in loss of communication on the backplane.
- Do not force the terminal base into the adjacent base/adapter. Forcing the units together can bend or break the hook and allow the units to separate and break communication over the backplane.

Daisy-chaining Using Adapter Power Supply



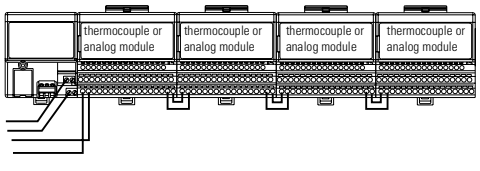
Use this method when wiring all analog modules and total current draw through terminal base units is less than 10A.

Note: All modules must be analog modules for this configuration.

Wiring when total current draw is less than 10A

42153

Daisy-chaining with a Separate Power Supply



Use this method when wiring all analog modules and total current draw through terminal base units is greater than 10A.

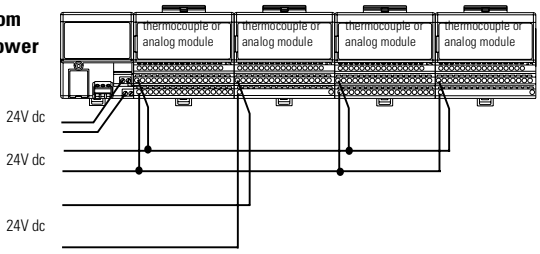
Note: All modules powered by the same power supply must be analog modules for this configuration.

Wiring when total current draw is greater than 10A

Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method.

42154

Individually Powered from Separate Power Supply

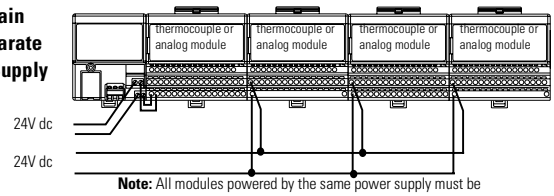


Wiring when total current draw is greater than 10A

Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method.

42155

Combination Daisychain and Separate Power Supply



Note: All modules powered by the same power supply must be analog modules for this configuration.

Total current draw through any base unit must not be greater than 10A

Use this method to balance current draw if necessary.

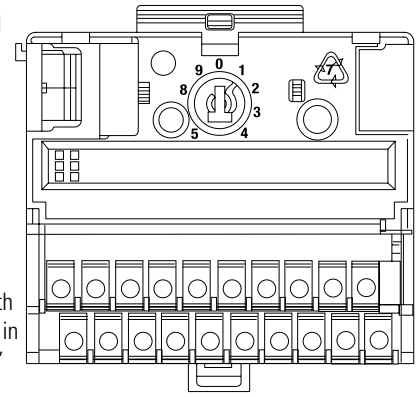
Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method.

42156

Specifications - 1794-TB3GS	
Number of Terminals	1 row of 16; 2 rows of 18
Terminal Type	Spring-clamp - To open, insert bladed screwdriver (0.100-0.120in/2.54-3.05mm) and lift up.
Current Capacity	10A maximum
Voltage Rating	31.2V dc maximum
Isolation Voltage	Ch-to-ch isolation determined by inserted module
General Specifications	
Dimensions (w/module in base)	94mm x 94mm x 69mm (3.7in x 3.7in x 2.7in)
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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum, 22 gauge (0.35mm^2) minimum 3/64 inch (1.2mm) insulation maximum Category is dependent upon installed module.[1]
Publication Installation Instructions	1794-5.59
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

1794-TBN



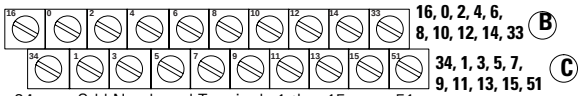
Shown with fuse cover in the "open" position

40096

Wiring

1794-TBN

16 Even Numbered Terminals 0 thru 14 33



34 Odd Numbered Terminals 1 thru 15 51

40097

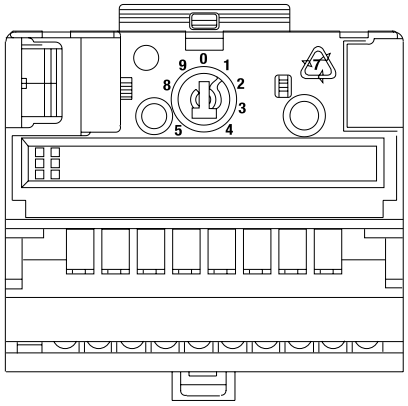
ATTENTION

- Total current draw through the terminal base unit is limited to 10A. Separate power connections may be necessary.
- Make certain that the hook on the terminal base you are installing is properly hooked into the adjacent terminal base adapter. Failure to lock the hook into the adjacent base/adapter can result in loss of communication on the backplane.
- Do not force the terminal base into the adjacent base/adapter. Forcing the units together can bend or break the hook and allow the units to separate and break communication over the backplane.

Specifications - 1794-TBN	
Number of Terminals	2 rows of 10 terminals with cover
Terminal Screw Torque	7-9 inch-pounds
Current Capacity	10A maximum
Voltage Rating	264V ac maximum
Isolation Voltage	Tested at 2500V dc for 1s between user terminals and logic side circuitry Channel-to-channel isolation determined by inserted module.
General Specifications	
Dimensions (with module installed in base) HxWxD	94mm x 94mm x 69mm (3.7in x 3.7in x 2.7in)
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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 22 gauge (0.35mm^2) minimum 3/64 inch (1.2mm) insulation maximum (Established by inserted module.)[1]
Publication Installation Instructions	 1794-5.16
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

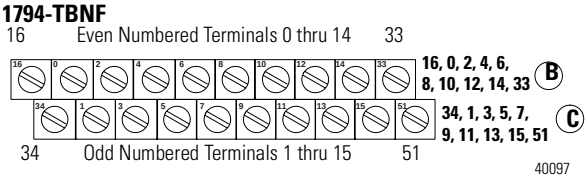
1794-TBNF



Shown with fuse cover in the "closed" position

Wiring

1794-TBNF



ATTENTION

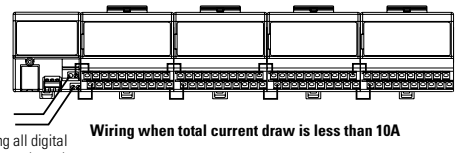
- Total current draw through the terminal base unit is limited to 10A. Separate power connections may be necessary.
- Make certain that the hook on the terminal base you are installing is properly hooked into the adjacent terminal base adapter. Failure to lock the hook into the adjacent base/adapter can result in loss of communication on the backplane.
- Do not force the terminal base into the adjacent base/adapter. Forcing the units together can bend or break the hook and allow the units to separate and break communication over the backplane.
- On the 1794-TBNF, only even-numbered terminals 0 through 14 (row B) are fused.

Specifications - 1794-TBNF	
Number of Terminals	2 rows of 10 terminals with cover
Terminal Screw Torque	7-9 inch-pounds
Current Capacity	10A maximum
Voltage Rating	264V ac maximum
Isolation Voltage	Tested at 2500V dc for 1s between user terminals and logic side circuitry Channel-to-channel isolation determined by inserted module.
Fusing	8 - 5x20mm fuses (1 for each even-numbered terminal - 0 through 14 on row B) Shipped with 1.6A, 250V ac Slow Blow fuses suitable for 1794-OA8 ac output module. Refer to individual installation instructions for fusing recommendations for other modules. Littelfuse PN23901.6, A-B PN94171304, SAN-O PNSD6-1.6A
General Specifications	
Dimensions (with module installed in base) HxWxD	94mm x 94mm x 69mm (3.7in x 3.7in x 2.7in)
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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 22 gauge (0.35mm^2) minimum 3/64 inch (1.2mm) insulation maximum (Established by inserted module.)[1]
Publication Installation Instructions	 1794-5.17
Agency Certification	

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

1794-TBN and -TBNF Wiring

Daisy-chaining Using Adapter Power Supply

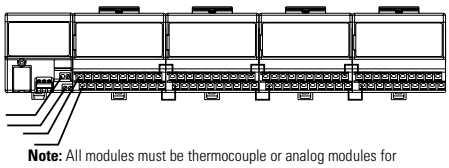


Wiring when total current draw is less than 10A

Use this method when wiring all digital modules and total current draw through terminal base units is less than 10A.

42157

Daisy-chaining with a Separate Power Supply



Note: All modules must be thermocouple or analog modules for this configuration.

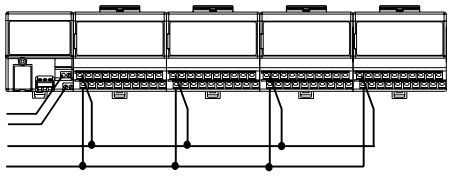
Wiring when total current draw is less than 10A

Use this method when wiring all ac digital modules and total current draw through terminal base units is less than 10A.

Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method.

42158

Individually Powered from Separate Power Supply



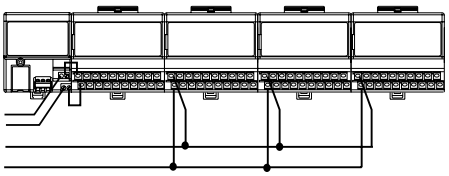
Wiring when total current draw is greater than 10A

1 = voltage depends on type of module.

Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method.

42159

Combination Daisychain and Separate Power Supply



1 = voltage depends on type of module.

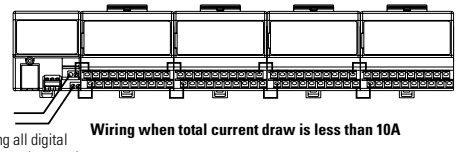
Use this method when wiring both digital and analog modules. Analog modules must be wired separately from "noisy" digital modules.

Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method.

42160

Alternate Power Input Wiring

Daisy-chaining Using Adapter Power Supply

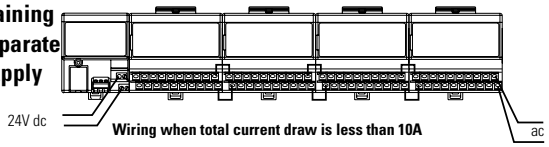


Wiring when total current draw is less than 10A

Use this method when wiring all digital modules or all analog modules when total current draw through terminal base units is less than 10A.

42157

Daisy-chaining with a Separate Power Supply



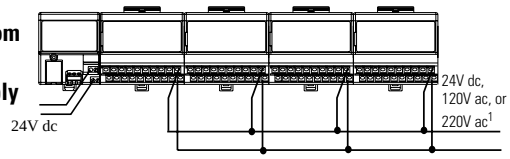
Wiring when total current draw is less than 10A

Use this method when wiring all ac digital modules and total current draw through terminal base units is less than 10A.

Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method.

42161

Individually Powered from Separate Power Supply



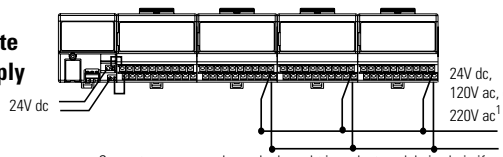
Wiring when total current draw is greater than 10A

1 = voltage depends on type of module.

Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method.

42162

Combination Daisychain and Separate Power Supply



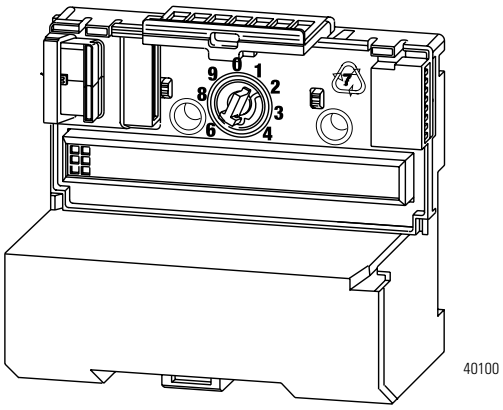
1 = voltage depends on type of module.

Use this method when wiring both digital and analog modules. Analog modules must be wired separately from "noisy" digital modules.

Separate power supply can be brought in on last module in chain if necessary. Make sure you do not jumper to adapter if using this method.

42163

1203-FB1



If you are using this number of standard (1794) modules:	Then, the maximum number of 1203 modules that you can use is:	And, the number of SCANport connections provided is:
7 or 8	0	0
5 or 6	1	2
3 or 4	2	4
1 or 2	3	6
0	4	8

ATTENTION

- The 1203 FLEX I/O modules that use this base may require up to twice the adapter power supply current of standard FLEX I/O modules. When installing FLEX I/O modules, you can use a maximum of four 1203 modules with any FLEX I/O adapter. As a general rule, each 1203 module requires the power capacity of two of the standard FLEX I/O modules, so you cannot install as many standard modules as you normally would when using the 1203 modules. Refer to the following chart to determine the number of 1203 and standard modules that may be installed together in your system.
- Make certain that the hook on the terminal base you are installing is properly hooked into the adjacent terminal base adapter. Failure to lock the hook into the adjacent base/adapter can result in loss of communication on the backplane.
- Do not force the terminal base into the adjacent base/adapter. Forcing the units together can bend or break the hook and allow the units to separate and break communication over the backplane.

Wiring

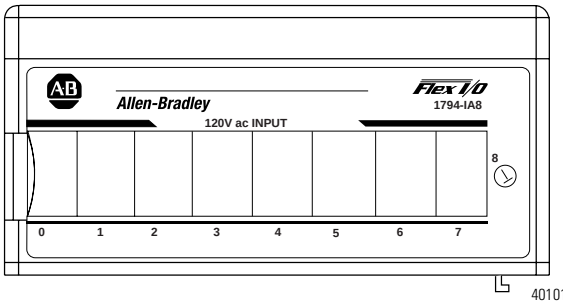
To wire the 1203-FB1 base, connect a SCANport cable from the SCANport device to the desired channel. SCANport cables are available in either male-to-male or male-to-female configurations. You can connect cables of up to 10 meters (33 feet) between a SCANport device and any SCANport peripheral. If you use a port expander, you must subtract the cable length between any device and the expander from the maximum cable length used to connect a peripheral.

Specifications - 1203-FB1	
I/O Capacity	2 SCANport channels
SCANport Voltage Rating	12V dc +10% to 25%
SCANport Current	60mA per channel
Isolation Voltage	1200V ac/dc FLEX to SCANport channel
SCANport Cable	8-pin circular mini-DIN connector
Keyswitch Position	1
General Specifications	
Dimensions (with module installed in base) HxWxD	79mm x 94mm x 66mm (3.1in x 3.7in x 2.7in)
Environmental Conditions	
Operational Temperature	0 to 55°C (32 to 131°F)
Storage Temperature	-40 to 85°C (-40 to 185°F)
Relative Humidity	
Operating	5 to 80% noncondensing
Non-operating	5 to 95% noncondensing
Shock Operating	30g peak acceleration, 11(±1)ms pulse width
Non-operating	50g peak acceleration, 11(±1)ms pulse width
Vibration	Tested 5g @ 10-500Hz per IEC 68-2-6
Publication Installation Instructions	1203-5.7
Agency Certification	As specified by product label

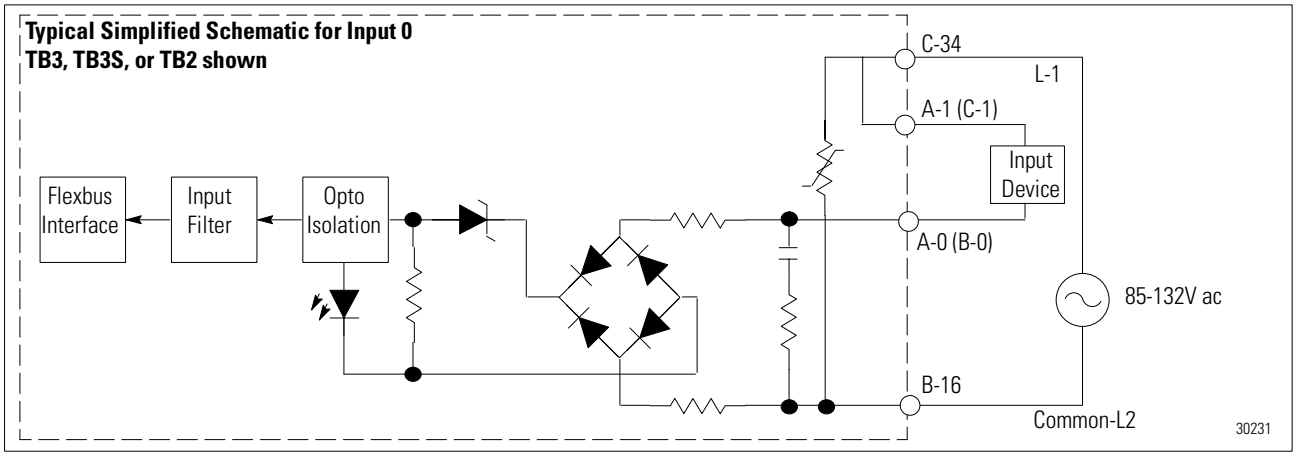
Use the following table to determine which ac module will meet your application needs.

The following table illustrates the recommended terminal base unit(s) for each ac module.

FLEX I/O Product	Catalog Number	Recommended Terminal Base	Compatible Terminal Base(s)
AC			
120V ac Modules	1794-IA8		  
	1794-IA8I		  
	1794-IA16		  Auxiliary terminal strips are required when using the TBN for the IA16
	1794-OA8		   
	1794-OA8I		   
	1794-OA16		   Auxiliary terminal strips are required when using the TBN for the OA16
220V ac Modules	1794-IM8		None
	1794-OM8		

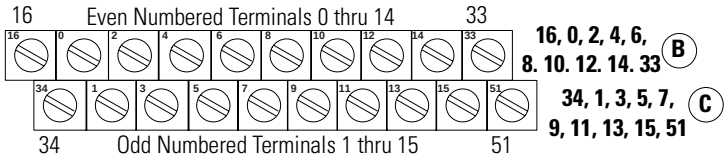


Recommended Terminal Base	Compatible Terminal Base(s)
 TBN	 TB3  TB3S  TB2

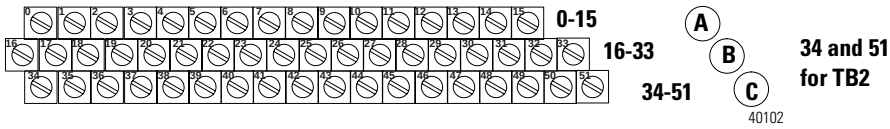


Wiring

1794-TBN



1794-TB3, 1794-TB3S, 1794-TB2



Input Channel	1794-TB3, -TB3S, and -TB2		1794-TBN	
	Input Terminals	120V ac Supply	Input Terminals	120V ac Supply
0	A-0	A-1[1]/C-35	B-0	C-1[2]
1	A-2	A-3[1]/C-37	B-2	C-3[2]
2	A-4	A-5[1]/C-39	B-4	C-5[2]
3	A-6	A-7[1]/C-41	B-6	C-7[2]
4	A-8	A-9[1]/C-43	B-8	C-9[2]
5	A-10	A-11[1]/C-45	B-10	C-11[2]
6	A-12	A-13[1]/C-47	B-12	C-13[2]
7	A-14	A-15[1]/C-49	B-14	C-15[2]

A = input terminals
B = common terminals
C = Power terminals (C-34 thru 51)

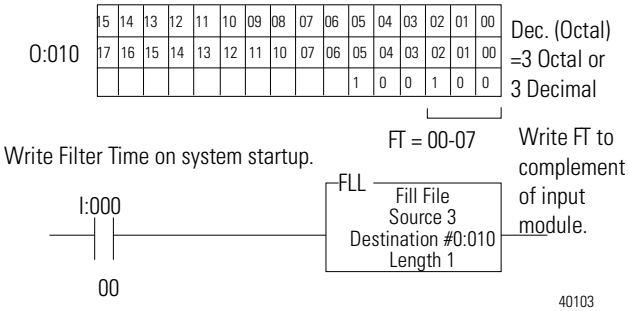
B = even numbered terminals 0 thru 14, ac common terminals 16 and 33
C = Power Terminals C-34 and C-51, and odd numbered terminals 1 thru 15

1 A-1, 3, 5, 7, 9, 11, 13 and 15 on 1794-TB3, -TB3S, and -TB2 are internally connected in the module to 120V ac L1.
2 C-1, 3, 5, 7, 9, 11, 13 and 15 on 1794-TBN are internally connected in the module to 120V ac L1.

Increasing the Input Filter Times

You can increase the input filter time (FT) for channels 00 through 07. Select the input filter time by setting the corresponding bits in the **output** image table (complementary word) for the module.

For example, to increase the off-to-on filter time to 12ms for an ac input module at address rack 1, module group 0, set bits 02, 01, and 00 as shown below.



Input Filter Times (Standard Mode Addressing Only)

Bits			Description	Selected Filter	Maximum Filter Time	
02	01	00	Filter Time for 00-07		Off to On[1]	On to Off[2]
0	0	0	Filter Time 0 (default)	256µs	8.4ms	26.4ms
0	0	1	Filter Time 1	512µs	8.6ms	26.6ms
0	1	0	Filter Time 2	1ms	9ms	27ms
0	1	1	Filter Time 3	2ms	10ms	28ms
1	0	0	Filter Time 4	4ms	12ms	30ms
1	0	1	Filter Time 5	8ms	16ms	34ms
1	1	0	Filter Time 6	16ms	24ms	42ms
1	1	1	Filter Time 7	32ms	40ms	58ms

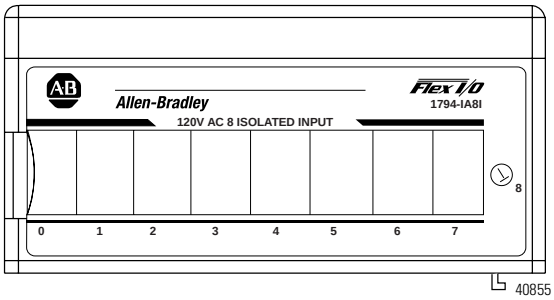
1 Off to on filter is 8ms plus additional filter as specified. Refer to specifications.

2 On to off filter is 26ms plus additional filter as specified. Refer to specifications.

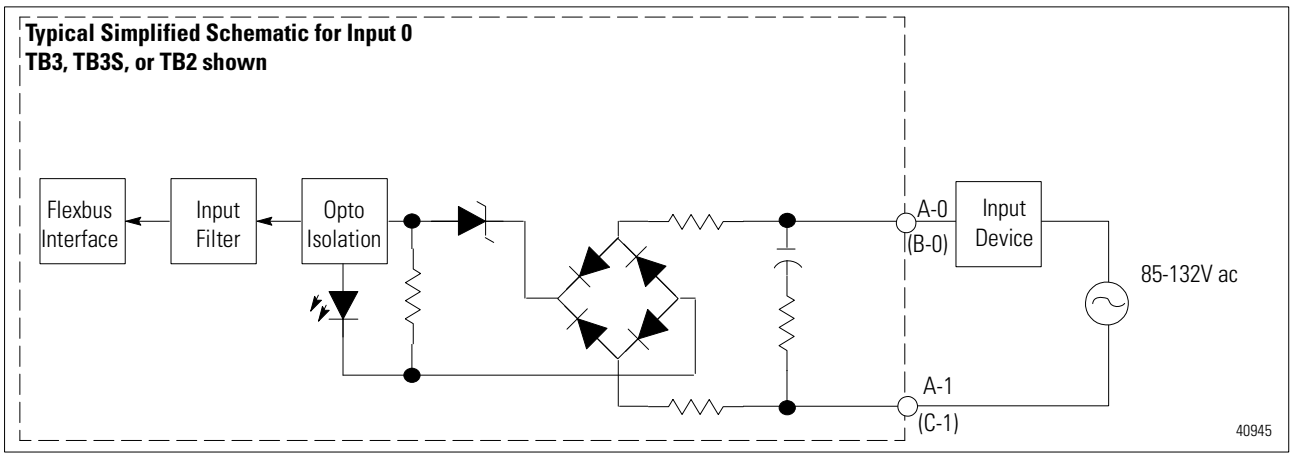
Specifications - 1794-IA8	
Number of Inputs	8 (1 group of 8), non-isolated
Module Location	Cat. No. 1794-TBN, -TB3, -TB3S, or -TB2 Terminal Base Unit
ON-State Voltage	65V ac minimum
ON-State Current[1]	7.1mA minimum
OFF-State Voltage	43V ac maximum
Maximum OFF-State Current	2.9mA
Nominal Input Impedance	10.6K Ω
Nominal Input Current	12mA @ 120V ac, 60Hz
Isolation Voltage Channel to channel Customer power to input channels User to system	 None None 100% tested at 2150V dc for 1s
Maximum Input Filter Time OFF to ON (time from a valid input signal to recognition by module) ON to OFF (time from input dropping below valid level to recognition by module)	 8.4ms, 8.6ms, 9ms, 10ms, 12ms,16ms, 24ms, and 40ms 26.4ms, 26.6ms, 27ms, 28ms, 30ms, 34ms, 42ms, and 58ms Filter time selectable thru output image table Default is 8.4ms off to on/26.4 on to off
Flexbus Current (max)	30mA @ 5V dc
Power Dissipation	Maximum 4.5W @ 132V ac
Thermal Dissipation	Maximum 15.3 BTU/hr @ 132V ac
Indicators (field side indication, customer device driven)	8 yellow status indicators
Keyswitch Position	8
General Specifications	
External ac Power Supply Voltage Voltage Range	 120V ac nominal 85 to 132V ac, 47-63Hz
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Non-operating Vibration	 0 to 55ºC (32 to 131ºF) -40 to 85ºC (-40 to 185ºF) 5 to 95% noncondensing 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm2) stranded maximum 3/64 inch (1.2mm) insulation maximum 1[2]
Publication Installation Instructions	 1794-5.9
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

1 AC inputs compatible with proximity switches with leakage ratings of I_{leak} < 2.5mA and I_{on} maximum = 5mA.

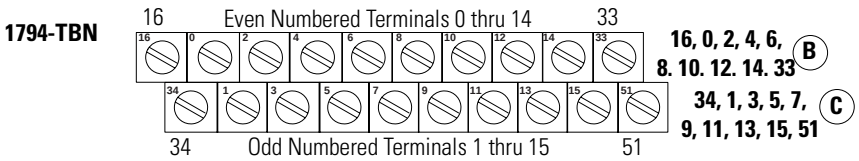
2 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

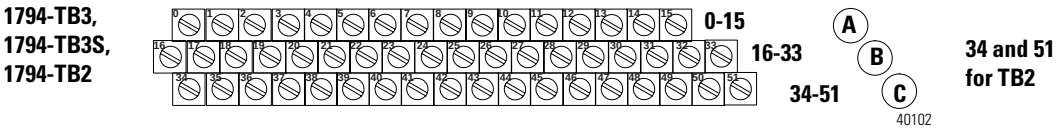


Recommended Terminal Base	Compatible Terminal Base(s)
TBN	TB3, TB3S, TB2



Wiring





Input Channel	1794-TB3, -TB3S, and -TB2		1794-TBN	
	Input Terminals	120V ac Common L2	Input Terminals	120V ac Common L2
0	A-0	A-1	B-0	C-1
1	A-2	A-3	B-2	C-3
2	A-4	A-5	B-4	C-5
3	A-6	A-7	B-6	C-7
4	A-8	A-9	B-8	C-9
5	A-10	A-11	B-10	C-11
6	A-12	A-13	B-12	C-13
7	A-14	A-15	B-14	C-15

A = even numbered input terminals 0 thru 14 for customer input connections; corresponding odd numbered 120V ac common L2 terminals 1 thru 15 for customer connections from isolated power supply

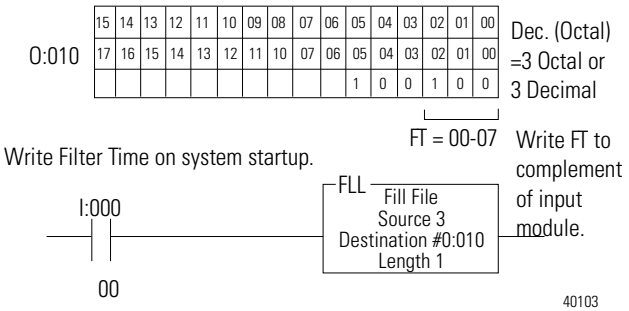
B = even numbered input terminals 0 thru 14 for customer input connections

C = odd numbered terminals 1 thru 15 for 120V ac L2 common connections from isolated power supply

Increasing the Input Filter Times

You can increase the input filter time (FT) for channels 00 through 07. Select the input filter time by setting the corresponding bits in the **output** image table (complementary word) for the module.

For example, to increase the off-to-on filter time to 12ms for an ac input module at address rack 1, module group 0, set bits 02, 01, and 00 as shown below.



Input Filter Times (Standard Mode Addressing Only)

Bits			Description	Selected Filter	Maximum Filter Time	
02	01	00	Filter Time for 00-07		Off to On[1]	On to Off[2]
0	0	0	Filter Time 0 (default)	256µs	8.4ms	26.4ms
0	0	1	Filter Time 1	512µs	8.6ms	26.6ms
0	1	0	Filter Time 2	1ms	9ms	27ms
0	1	1	Filter Time 3	2ms	10ms	28ms
1	0	0	Filter Time 4	4ms	12ms	30ms
1	0	1	Filter Time 5	8ms	16ms	34ms
1	1	0	Filter Time 6	16ms	24ms	42ms
1	1	1	Filter Time 7	32ms	40ms	58ms

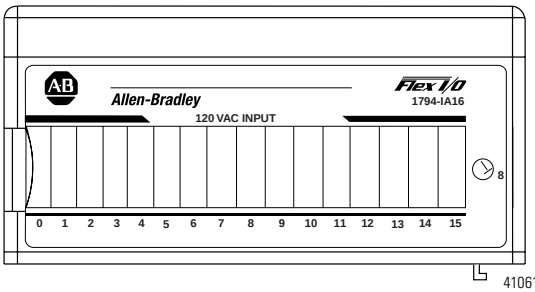
1 Off to on filter is 8ms plus additional filter as specified. Refer to specifications.

2 On to off filter is 26ms plus additional filter as specified. Refer to specifications.

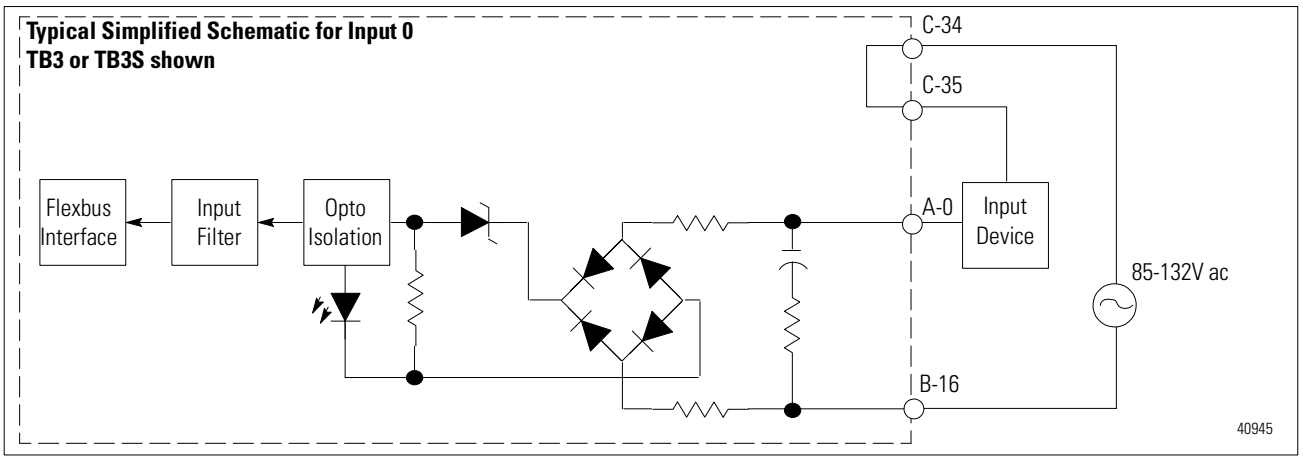
Specifications - 1794-IA8I	
Number of Inputs	8 individually isolated
Module Location	Cat. No. 1794-TBN, -TB3, -TB3S, or -TB2 Terminal Base Unit
ON-State Voltage	65V ac minimum
ON-State Current[1]	7.1mA minimum
OFF-State Voltage	43V ac maximum
Maximum OFF-State Current	2.9mA
Nominal Input Impedance	10.6K Ω
Nominal Input Current	12mA @ 120V ac, 60Hz
Isolation Voltage	100% tested for 1s to 2100V dc between all channels and system; 2100V dc for 1s between individual channels.
Maximum Input Filter Time OFF to ON (time from a valid input signal to recognition by module) ON to OFF (time from input dropping below valid level to recognition by module)	 8.4ms, 8.6ms, 9ms, 10ms, 12ms,16ms, 24ms, and 40ms 26.4ms, 26.6ms, 27ms, 28ms, 30ms, 34ms, 42ms, and 58ms Filter time selectable thru output image table Default is 8.4ms off to on/26.4 on to off
Flexbus Current (max)	30mA @ 5V dc
Power Dissipation	Maximum 4.5W @ 132V ac
Thermal Dissipation	Maximum 15.3 BTU/hr @ 132V ac
Indicators (field side indication, customer device driven)	8 yellow status indicators
Keyswitch Position	8
General Specifications	
External ac Power Supply Voltage Voltage Range	 120V ac nominal 85 to 132V ac, 47-63Hz
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humid7ity Shock Operating Non-operating Vibration	 0 to 55ºC (32 to 131ºF) -40 to 85ºC (-40 to 185ºF) 5 to 95% noncondensing 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm2) stranded maximum 3/64 inch (1.2mm) insulation maximum 1[2]
Publication Installation Instructions	1794-5.55
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

1 AC inputs compatible with proximity switches with leakage ratings of I_{leak} < 2.5mA and I_{on} maximum = 5mA.

2 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

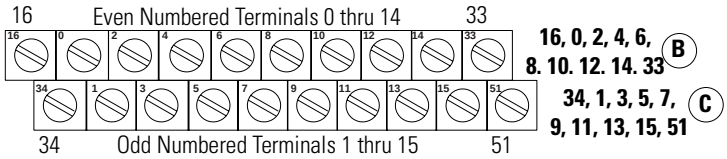


Recommended Terminal Base	Compatible Terminal Base(s)	
 TB3	 TB3S	 TBN Auxiliary terminal strips are required when using the TBN for the IA16

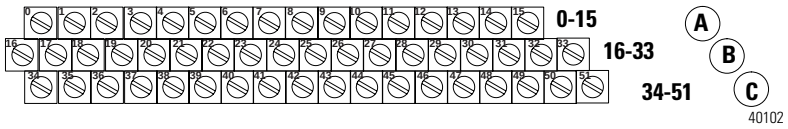


Wiring

1794-TBN



1794-TB3, 1794-TB3S



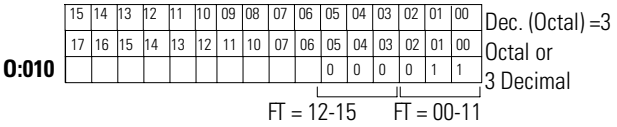
	Input Terminals		120V ac Supply		Input Terminals		120V ac Supply
Channel	TB3, TB3S	TBN	TB3, TB3S	Channel	TB3, TB3S	TBN	TB3, TB3S
0	A-0	B-0	C-35	8	A-8	B-8	C-43
1	A-1	C-1	C-36	9	A-9	C-9	C-44
2	A-2	B-2	C-37	10	A-10	B-10	C-45
3	A-3	C-3	C-38	11	A-11	C-11	C-46
4	A-4	B-4	C-39	12	1-12	B-12	C-47
5	A-5	C-5	C-40	13	A-13	C-13	C-48
6	A-6	B-6	C-41	14	A-14	B-14	C-49
7	A-7	C-7	C-42	15	A-15	C-15	C-50

A = Input terminals.
B = B-16 thru B-33 are internally connected together. Connect 120V ac common L2 to B-16.
C = Power terminals (C34 thru 51) are internally connected together. Connect 120V ac L1 to C-34.

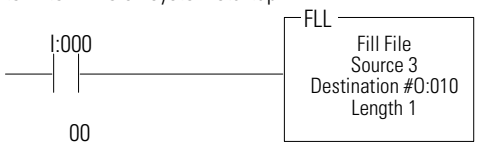
Increasing the Input Filter Time

You can increase the input filter time (FT) for channels 00 through 11 and/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 increase the off-to-on filter time for inputs 0 through 11 to 10ms for an ac input module at address rack 1, module group 0, set bits 02, 01, and 00 as shown below.



Write Filter Time on system startup.



Write FT to complement of input module.

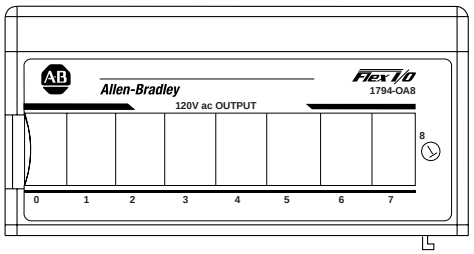
41075

Input Filter Times

Bits			Description	Maximum Filter Time	
02	**01**	**00**	**Filter Time for Inputs 00-11**	**Off to On**	**On to Off**
05	**04**	**03**	**Filter Time for Inputs 12-15**		
0	0	0	Filter Time 0 (default)	7.5ms	26.5ms
0	0	1	Filter Time 1	8ms	27ms
0	1	0	Filter Time 2	9ms	28ms
0	1	1	Filter Time 3	10ms	29ms
1	0	0	Filter Time 4	12ms	31ms
1	0	1	Filter Time 5	16ms	35ms
1	1	0	Filter Time 6	24.5ms	44ms
1	1	1	Filter Time 7	42ms	60.5ms

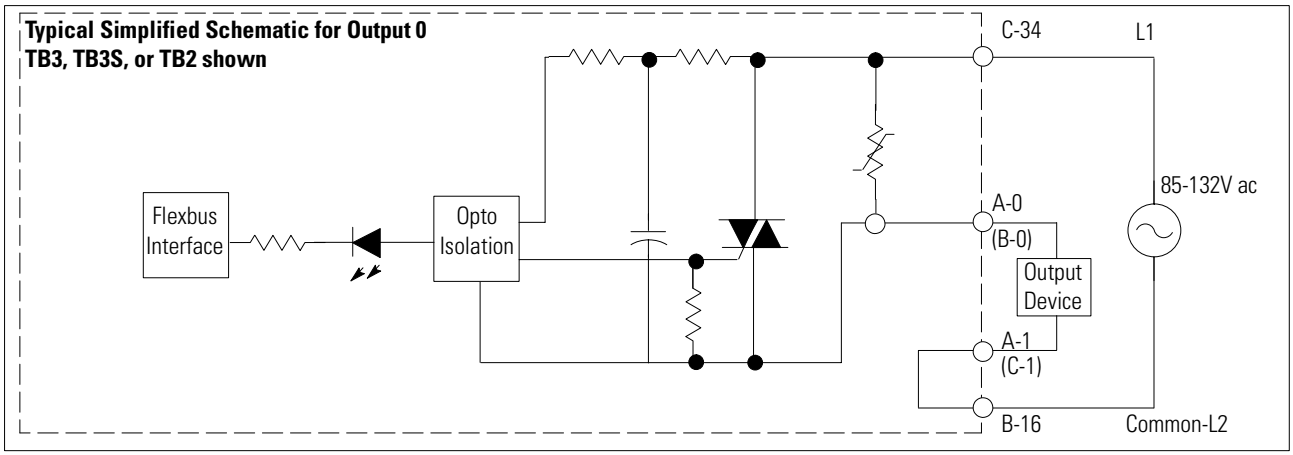
Specifications - 1794-IA16	
Number of Inputs	16 non-isolated
Module Location	Cat. No. 1794-TB3, -TB3S, or -TBN Terminal Base Unit
ON-State Voltage Minimum	74V ac, 47Hz
ON-State Current Minimum Normal Maximum	5.49mA @ 74V ac, 47Hz 12.06mA @ 120V ac, 60Hz 14.81mA @ 132V ac, 63Hz
OFF-State Voltage	20V ac maximum
Maximum OFF-State Current	2.87mA
Nominal Input Impedance	10K Ω
Nominal Input Current	12mA @ 120V ac, 60Hz
Isolation Channel to Channel Customer Power to Input Channels User to System	 None required None 100% tested at 2150V dc for 1s
Maximum Input Filter Time OFF to ON (time from a valid input signal to recognition by block) ON to OFF (time from input dropping below valid level to recognition by block) Filter time selectable thru output image table Default is 7.5ms off to on/26.5 on to off	 7.5ms, 8ms, 9ms, 10ms,12ms, 16ms, 24.5ms, and 42ms 26.5ms, 27ms, 28ms, 29ms, 31ms, 35ms, 44ms, and 60.5ms
Flexbus Current (max)	20mA @ 5V dc
Power Dissipation	Maximum 6.4W @ 132V ac
Thermal Dissipation	Maximum 21.8 BTU/hr @ 132V ac
Indicators (field side indication, customer device driven)	16 yellow status indicators
Keyswitch Position	8
General Specifications	
External ac Power Supply Voltage Voltage Range	 120V ac nominal 74 to 132V ac, 47-63Hz
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) insulation maximum 1[1]
Publication Installation Instructions	 1794-5.60
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

[1] Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."



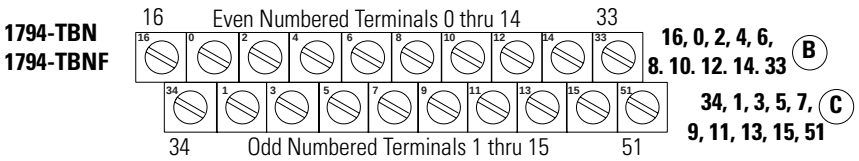
40104

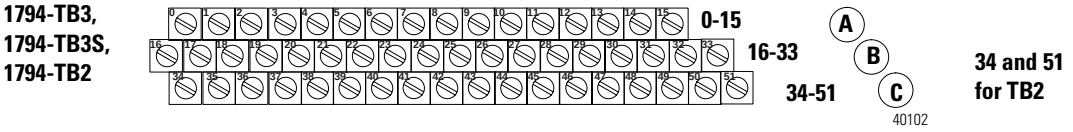
Recommended Terminal Base	Compatible Terminal Base(s)
TBNF	TB3, TB3S, TBN, TB2



40105

Wiring





40102

Output Channel	1794-TB3, -TB3S, and -TB2		1794-TBNF and -TBN	
	Output Terminal	Common Terminal[1]	Output Terminal	Common Terminal[2]
0	A-0	A-1[1]/B-17	B-0	C-1
1	A-2	A-3[1]/B-19	B-2	C-3
2	A-4	A-5[1]/B-21	B-4	C-5
3	A-6	A-7[1]/B-23	B-6	C-7
4	A-8	A-9[1]/B-25	B-8	C-9
5	A-10	A-11[1]/B-27	B-10	C-11
6	A-12	A-13[1]/B-29	B-12	C-13
7	A-14	A-15[1]/B-31	B-14	C-15

A = output terminals
B = common terminals - 120V ac Common L2
C = Power terminals (C-34 thru 51 for TB3 and TB3S) (C-34 and C-51 for TB2)

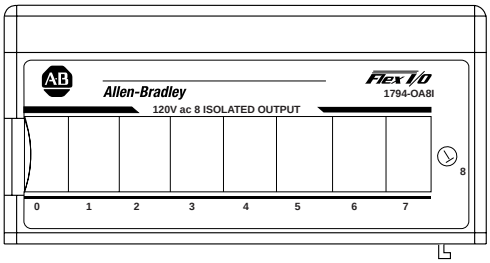
B = even numbered terminals 0 thru 14, ac common L2 terminals 16 and 33
C = Power Terminals C-34 and C-51, and odd numbered common terminals 1 thru 15

1 A-1, 3, 5, 7, 9, 11, 13 and 15 on 1794-TB3, -TB3S, and -TB2 are connected together inside the module to 120V ac common L2.
2 C-1, 3, 5, 7, 9, 11, 13 and 15 on 1794-TBN and -TBNF are internally connected in the module to 120V ac common L2.

Specifications - 1794-OA8	
Number of Outputs	8 (1 group of 8), non-isolated
Module Location	Cat. No. 1794-TBNF, -TB3, -TB3S, -TBN, or -TB2 Terminal Base Unit
Maximum On-State Voltage Drop	1.0V @ 0.5A
ON-State Current	5mA per output minimum 500mA per output maximum @ 55ºC (sufficient to operate an A-B Bulletin 500 NEMA size 3 motor starter); 750mA per output maximum @ 35ºC; 1.0A on 4 nonadjacent outputs, 500mA on the remaining 4 outputs @ 30ºC
OFF-State Leakage	2.25mA maximum
Output Voltage Range	85-132V ac, 47-63Hz
Output Current Rating	4.0A (8 outputs @ 500mA)
Isolation Voltage	1250V ac between user and system No isolation between individual channels; No isolation between customer power and output channels
Output Signal Delay OFF to ON ON to OFF	 1/2 cycle maximum 1/2 cycle maximum
Flexbus Current (max)	80mA
Power Dissipation	4.1W max @ 0.5A 6.3W max @ 0.75A 6.3W max @ 1.0A
Thermal Dissipation	14.0 BTU/hr @ 0.5A 21.1 BTU/hr @ 0.75A 21.4 BTU/hr @ 1.0A
Indicators (field side indication, logic driven)	8 yellow status indicators
Keyswitch Position	8
Surge Current	7A for 45ms, repeatable every 8 seconds
Fusing	Use 1.6A, 250V ac Slow-Blow, Littelfuse pt. no. 23901.6; San-O SD6-1.6A; A-B pt. no. 94171304 (The 1794-TBNF fused terminal base comes with SD6-1.6A fuses installed.)

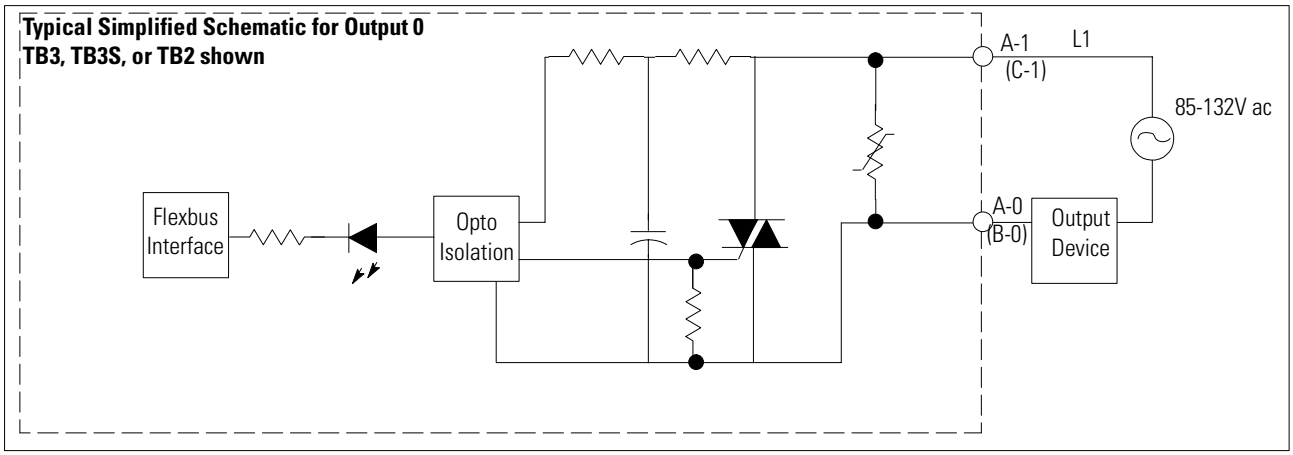
General Specifications	
External ac Power Supply Voltage Input Frequency Voltage Range Surge Current Capability	 120V ac nominal 47-63Hz 85 to 132V ac Maximum 50A for 1/2 cycle at powerup
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Non-operating Vibration	 0 to 55ºC (32 to 131ºF) -40 to 85ºC (-40 to 185ºF) 5 to 95% noncondensing 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) insulation maximum 1[1]
Publication Installation Instructions	 1794-5.10
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."



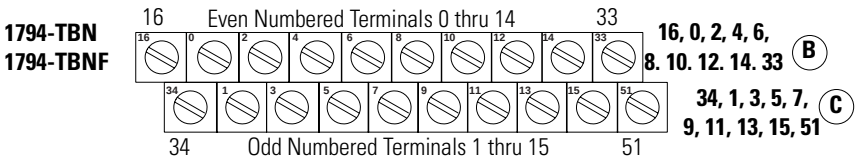
40856

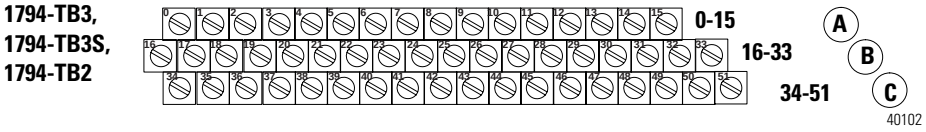
Recommended Terminal Base	Compatible Terminal Base(s)
TBNF	TB3, TB3S, TBN, TB2



40944

Wiring





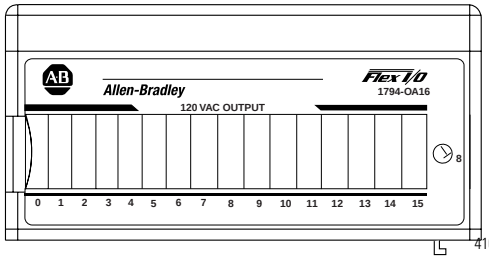
40102

Output Channel	1794-TB3, -TB3S, and -TB2		1794-TBNF and -TBN	
	Output Terminal	120V ac L1 Terminal	Output Terminal	120V ac L1 Terminal
0	A-0	A-1	B-0	C-1
1	A-2	A-3	B-2	C-3
2	A-4	A-5	B-4	C-5
3	A-6	A-7	B-6	C-7
4	A-8	A-9	B-8	C-9
5	A-10	A-11	B-10	C-11
6	A-12	A-13	B-12	C-13
7	A-14	A-15	B-14	C-15
A = even numbered output terminals 0 thru 14 (odd numbered 120V ac L1 terminals 1 thru 15)			B = even numbered output terminals 0 thru 14 C = odd numbered 120V ac L1 terminals 1 thru 15	

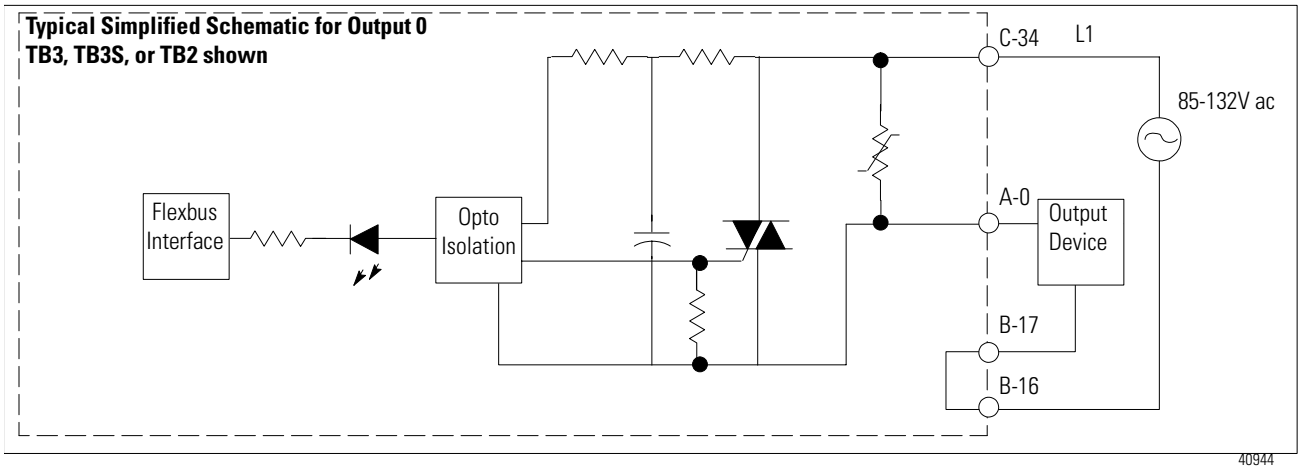
Specifications - 1794-OA8I	
Number of Outputs	8 individually isolated
Module Location	Cat. No. 1794-TBNF, -TB3, -TB3S, -TBN, or -TB2 Terminal Base Unit
Maximum On-State Voltage Drop	1.0V @ 0.5A
ON-State Current	5mA per output minimum 500mA per output maximum @ 55ºC (sufficient to operate an A-B Bulletin 500 NEMA size 3 motor starter); 750mA per output maximum @ 35ºC; 1.0A on 4 nonadjacent outputs, 500mA on the remaining 4 outputs @ 30ºC
OFF-State Leakage	2.25mA maximum
Output Voltage Range	85-132V ac, 47-63Hz
Output Current Rating	4.0A (8 outputs @ 500mA)
Isolation Voltage	100% tested at 2100V dc for 1s between all channels and system 2100V dc for 1s between individual channels
Output Signal Delay OFF to ON ON to OFF	 1/2 cycle maximum 1/2 cycle maximum
Flexbus Current (max)	80mA
Power Dissipation	4.1W maximum @ 0.5A 6.3W maximum @ 0.75A 6.3W maximum @ 1.0A
Thermal Dissipation	14.0 BTU/hr @ 0.5A 21.1 BTU/hr @ 0.75A 21.4 BTU/hr @ 1.0/0.5A
Indicators (field side indication, logic driven)	8 yellow status indicators
Keyswitch Position	8
Surge Current	7A for 45ms, repeatable every 8 seconds
Fusing	Use 1.6A, 250V ac Slow-Blow, Littelfuse pt. no. 23901.6; San-O SD6-1.6A; A-B pt. no. 94171304 (The 1794-TBNF fused terminal base comes with SD6-1.6A fuses installed.)

General Specifications		
External ac Power Supply Voltage Input Frequency Voltage Range Surge Current Capability		 120V ac nominal 47-63Hz 85 to 132V ac Maximum 50A for 1/2 cycle at powerup
Dimensions HxWxD		46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Vibration	 Operating Non-operating	 0 to 55ºC (32 to 131ºF) -40 to 85ºC (-40 to 185ºF) 5 to 95% noncondensing 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors	Wire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) insulation maximum 1[1]
Publication Installation Instructions		 1794-5.56
Agency Certification		Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

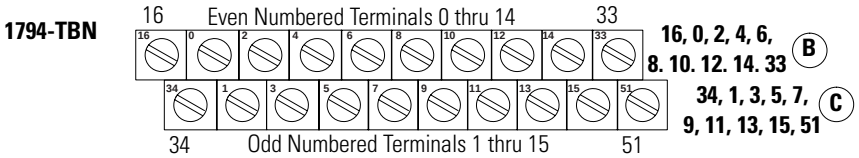
[1] Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1,"Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

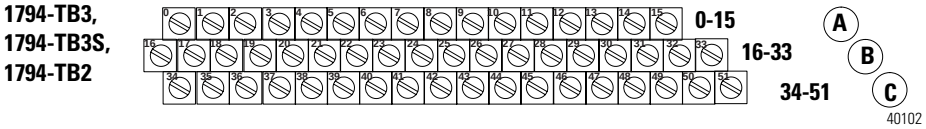


Recommended Terminal Base	Compatible Terminal Base(s)
TB3	TB3S, TBN, TB2 — Auxiliary terminal strips are required when using the TBN



Wiring





	Output Terminals		120V ac Common		Output Terminals		120V ac Common
Channel	TB3, TB3S, TB2	TBN	TB3, TB3S, TB2	Channel	TB3, TB3S, TB2	TBN	TB3, TB3S, TB2
0	A-0	B-0	B-17	8	A-8	B-8	B-25
1	A-1	C-1	B-18	9	A-9	C-9	B-26
2	A-2	B-2	B-19	10	A-10	B-10	B-27
3	A-3	C-3	B-20	11	A-11	C-11	B-28
4	A-4	B-4	B-21	12	1-12	B-12	B-29
5	A-5	C-5	B-22	13	A-13	C-13	B-30
6	A-6	B-6	B-23	14	A-14	B-14	B-31
7	A-7	C-7	B-24	15	A-15	C-15	B-32

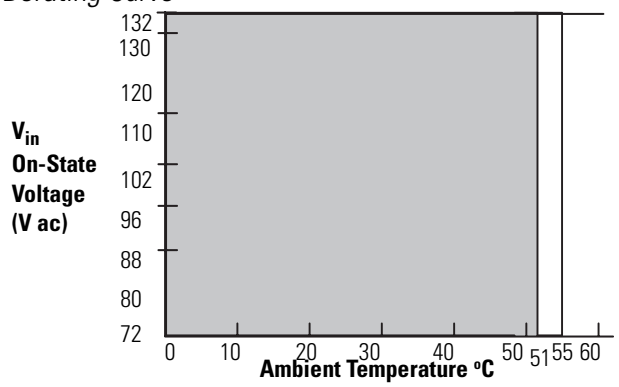
For TB3, TB3S, and TB2:
A = Output terminals.
B = B-17 thru B-32 are internally connected together to 120V ac common L2. Connect 120V ac common L2 to B-16.
C = Power terminals (C-34 and C-51 for TB2; C-34 thru C-51 for TB3 and TB3S) are internally connected together. Connect 120V ac L1 to terminal C-34.
For TBN: Connect 120V ac common L2 to B-16. Connect 120V ac L1 to C-34.
B = Even numbered output terminals 0 thru 14.
C = Odd numbered output terminals 1 thru 15.

Specifications - 1794-OA16	
Number of Outputs	16 non-isolated
Module Location	Cat. No. 1794-TB3, -TB3S, -TBN, or -TB2 Terminal Base Unit
Module Mounting	See derating curve
Maximum On-State Voltage Drop	1.5V @ 0.5A
ON-State Current	50mA per output minimum 500mA per output maximum @ 55°C
OFF-State Leakage	2.25mA maximum
Output Voltage Range	74-132V ac, 47-63Hz
Output Current Rating	4.0A (16 outputs @ 250mA) Attention: If using 0.5A outputs, alternate wiring so that no two 0.5A outputs are next to each other.
Isolation Voltage	100% tested at 2150V ac for 1s between all channels and system No isolation between individual channels; No isolation between customer power and output channels
Output Signal Delay OFF to ON ON to OFF	 1/2 cycle maximum 1/2 cycle maximum
Flexbus Current (max)	80mA
Power Dissipation	4.7W maximum @ 0.5A
Thermal Dissipation	16.1 BTU/hr @ 0.5A
Indicators (field side indication, logic driven)	16 yellow status indicators
Keyswitch Position	8
Surge Current	7A per module, alternate wiring for 40ms, repeatable every 8 seconds
Fusing	Use 2.5A, 150V ac MQ2 normal fuse

General Specifications	
External ac Power Supply Voltage Input Frequency Voltage Range	 120V ac nominal 47-63Hz 74 to 132V ac
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge ($4mm^2$) stranded maximum 3/64 inch (1.2mm) insulation maximum 1[1]
Publication Installation Instructions	 1794-5.61
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

[1] Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

Derating Curve



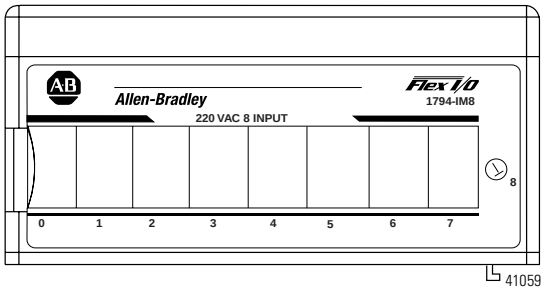
The area within the curve represents the safe operating range for the module under various conditions of user supplied 120V ac supply voltages and ambient temperatu

=Normal mounting safe operating range Included

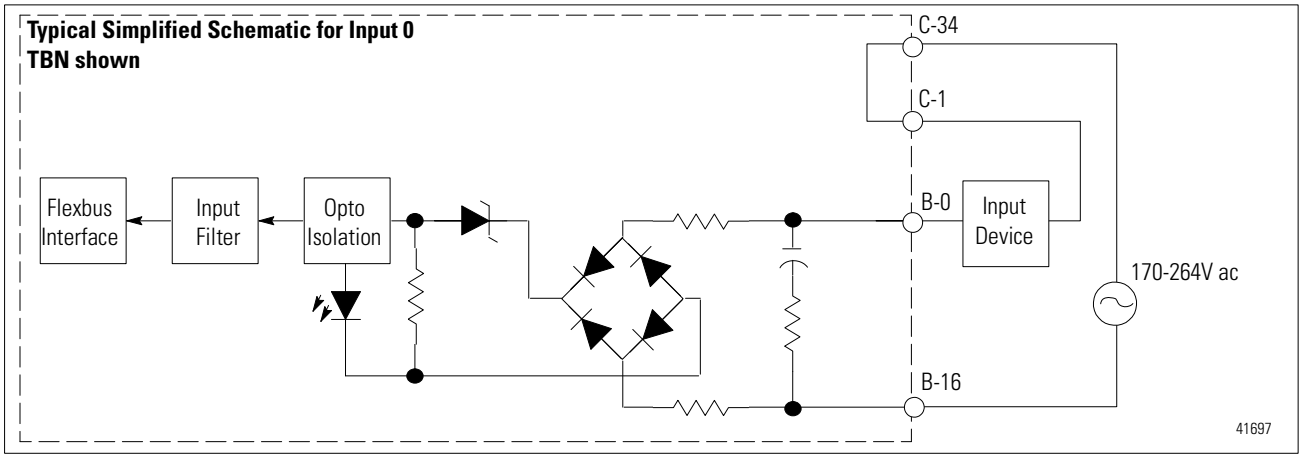
=Other mounting positions (including inverted horizontal, vertical) safe operating range

41274

Mounting	Temperature (maximum)
normal horizontal	55°C
Other mounting positions (including inverted horizontal, vertical)	51°C

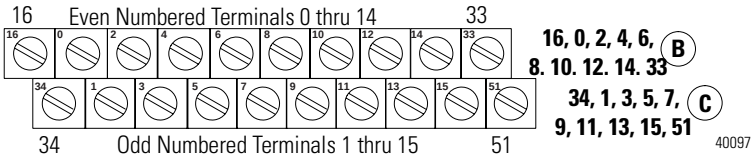


Recommended Terminal Base	Compatible Terminal Base(s)
TBN	None



Wiring

1794-TBN



Input Channel	1794-TBN	
	Input Terminals	220V ac Supply
0	B-0	C-1[1]
1	B-2	C-3[1]
2	B-4	C-5[1]
3	B-6	C-7[1]
4	B-8	C-9[1]
5	B-10	C-11[1]
6	B-12	C-13[1]
7	B-14	C-15[1]

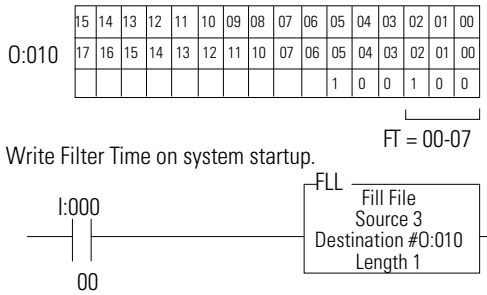
B = even numbered input terminals 0 thru 14, ac common terminals 16 and 33
C = power terminals C-34 and 51, and odd input terminals 1 thru 15

1 C-1, 3, 5, 7, 9, 11, 13, and 15 on the 1794-TBN are internally connected in the module to 220V ac L1.

Increasing the Input Filter Time

You can increase the filter delay time (FT) for channels 00 through 07. Select the input filter time by setting the corresponding bits in the **output** image table (complementary word) for the module.

For example, to increase the off-to-on filter time to 12ms for an ac input module at address rack 1, module group 0, set bits 02, 01, and 00 as shown below.



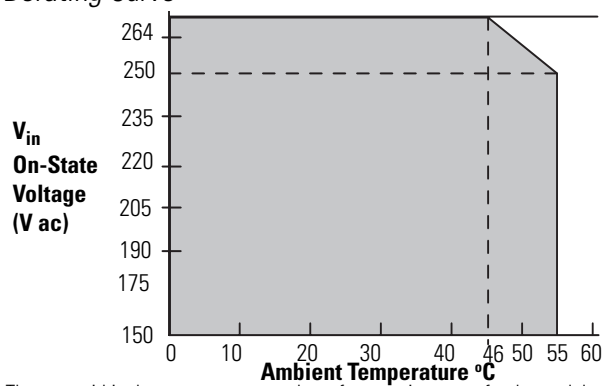
Input Filter Times

Bits			Description	Maximum Filter Time	
02	**01**	**00**	**Filter Time for Inputs 00-07**	**Off to On**	**On to Off**
0	0	0	Filter Time 0 (default)	7.5ms	26.5ms
0	0	1	Filter Time 1	8ms	27ms
0	1	0	Filter Time 2	9ms	28ms
0	1	1	Filter Time 3	10ms	29ms
1	0	0	Filter Time 4	12ms	31ms
1	0	1	Filter Time 5	16ms	35ms
1	1	0	Filter Time 6	24.5ms	44ms
1	1	1	Filter Time 7	42ms	60.5ms

Specifications - 1794-IM8	
Number of Inputs	8 (1 group of 8), non-isolated
Module Location	Cat. No. 1794-TBN Terminal Base Unit
Module Mounting	See derating curve
ON-State Voltage	159V ac minimum
ON-State Current Minimum Normal Maximum	5.27mA @ 159V ac, 47Hz 9.88mA @ 220V ac, 60Hz 13.21mA @ 264V ac, 63Hz
OFF-State Voltage	40V ac maximum
Max OFF-State Current	2.6mA
Nominal Input Impedance	22.3K Ω
Nominal Input Current	10mA @ 220V ac, 60Hz
Isolation Channel to Channel Customer Power to Input Channels User to System	 None required None 100% tested at 2600V dc for 1s
Maximum Input Filter Time OFF to ON (time from a valid input signal to recognition by block) ON to OFF (time from input dropping below valid level to recognition by block)	 7.5ms, 8ms, 9ms, 10ms,12ms, 16ms, 24.5ms, and 42ms 26.5ms, 27ms, 28ms, 29ms, 31ms, 35ms, 44ms, and 60.5ms Filter time selectable thru output image table Default is 7.5ms off to on/26.5 on to off
Flexbus Current (max)	30mA @ 5V dc
Power Dissipation	Maximum 4.7W @ 264V ac
Thermal Dissipation	Maximum 16.2 BTU/hr @ 264V ac
Indicators (field side indication, customer device driven)	8 yellow status indicators
Keyswitch Position	8
General Specifications	
External ac Power Supply Voltage Voltage Range	 220V ac nominal 159 to 264V ac, 47-63Hz (see derating curve)
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm²) stranded maximum 3/64 inch (1.2mm) insulation maximum 1[1]
Publication Installation Instructions	1794-5.57
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

[1] Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

Derating Curve

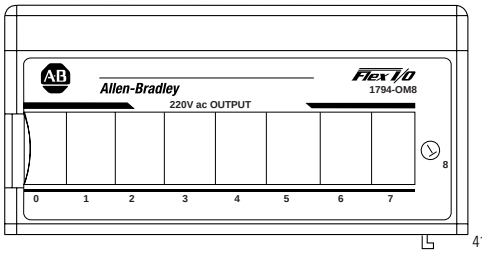


The area within the curve represents the safe operating range for the module under various conditions of user supplied 220V ac supply voltages and ambient temperatures.

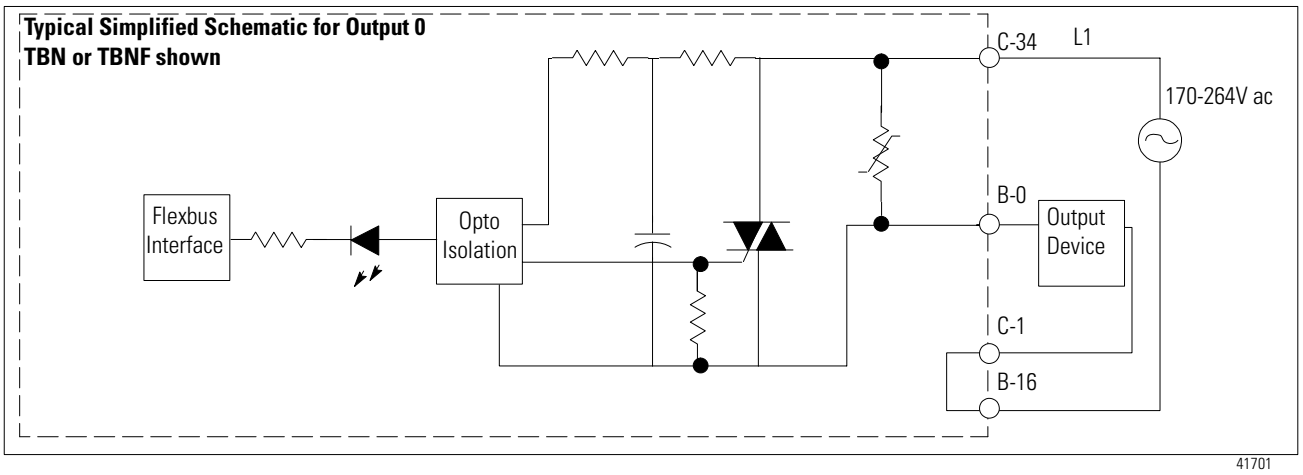
= All mounting positions (including normal horizontal, vertical, inverted horizontal) safe operating range.

41269

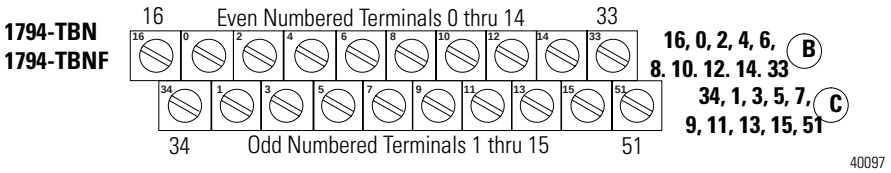
Voltage (maximum)	Temperature (maximum)
264	46°C
250	55°C



Recommended Terminal Base	Compatible Terminal Base(s)
	



Wiring



Output Channel	1794-TBN, -TBNF	
	Output Terminal	Common Terminal[1]
0	B-0	C-1
1	B-2	C-3
2	B-4	C-5
3	B-6	C-7
4	B-8	C-9
5	B-10	C-11
6	B-12	C-13
7	B-14	C-15

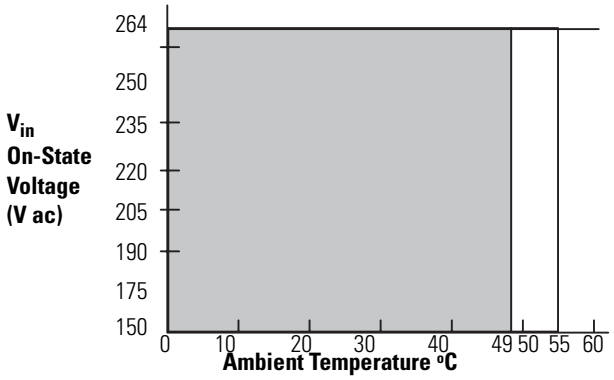
B = even numbered output terminals 0 thru 14, ac common terminals 16 and 33
C = power terminals C-34 and C-51, and odd numbered output common terminals 1 thru 15

1 C-1, 3, 5, 7, 9, 11, 13, and 15 are internally connected in the module to 220V ac common L2.

Specifications - 1794-OM8	
Number of Outputs	8 (1 group of 8), non-isolated
Module Location	Cat. No. 1794-TBN or -TBNF Terminal Base Unit
Module Mounting	Refer to derating curve
Maximum On-State Voltage Drop	1.5V @ 0.5A
ON-State Current	50mA per output minimum 500mA per output maximum @ 55ºC
OFF-State Leakage	2.5mA maximum
Output Voltage Range	159-264V ac, 47-63Hz
Output Current Rating	4.0A (8 outputs @ 500mA)
Isolation Voltage	100% tested at 2600V ac for 1s between user and system No isolation between individual channels No isolation between customer power and output channels
Output Signal Delay OFF to ON ON to OFF	 1/2 cycle maximum 1/2 cycle maximum
Flexbus Current (max)	60mA
Power Dissipation	5W maximum @ 0.5A
Thermal Dissipation	17.1 BTU/hr @ 0.5A
Indicators (field side indication, logic driven)	8 yellow status indicators
Keyswitch Position	8
Surge Current	7A for 40ms, repeatable every 8s
Fusing	Use 0.8A, 250V ac MQ4 normal fuse
General Specifications	
External ac Power Supply Voltage Input Frequency Voltage Range	 220V ac nominal 47-63Hz 159 to 264V ac (see derating curve)
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Non-operating Vibration	 0 to 55ºC (32 to 131ºF) -40 to 85ºC (-40 to 185ºF) 5 to 95% noncondensing 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) insulation maximum 1[1]
Publication Installation Instructions	 1794-5.58
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

[1] Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1,"iIndustrial Automation Wiring and Grounding Guidelines for Noise Immunity."

Derating Curve



The area within the curve represents the safe operating range for the module un various conditions of user supplied 220V ac supply voltages and ambient temper

=Normal mounting safe operating range Included

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

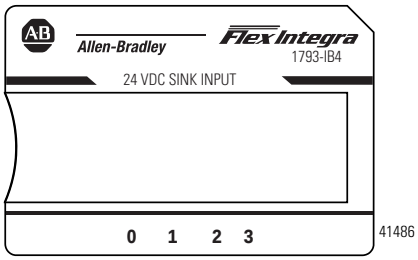
41270

Mounting	Temperature (maximum)
normal horizontal	55ºC
Other mounting positions (including inverted horizontal, vertical)	49ºC

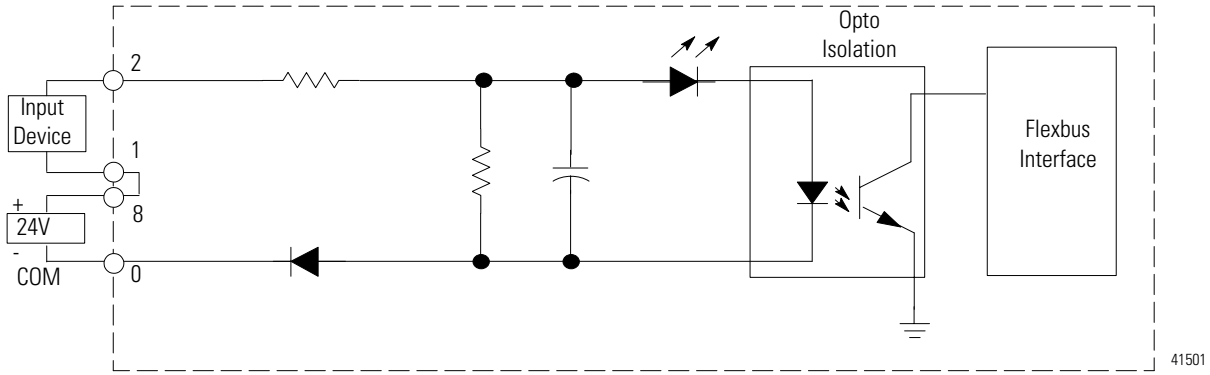
Use the following table to determine which dc module will meet your application needs.

The following table illustrates the recommended terminal base unit(s) for each dc module.

FLEX I/O Product	Catalog Number	Recommended Terminal Base	Compatible Terminal Base(s)
24V dc Modules	1794-IB8		
	1794-IB16		
	1794-IV16		 
	1794-OB8		 
	1794-OB16		 
	1794-OB16P		 
	1794-OV16		
	1794-OV16P		
	1794-OB8EP		  
	1794-IB10XOB6		
48V dc Modules	1794-IC16		
	1794-OC16		 

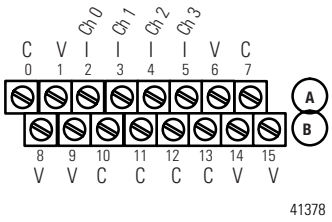


Typical Simplified Schematic for Input 0

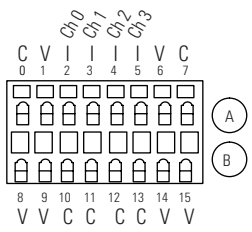


Wiring

1793-IB4



1793-IB4S



Where: C = common, V = +24V dc power, I =input

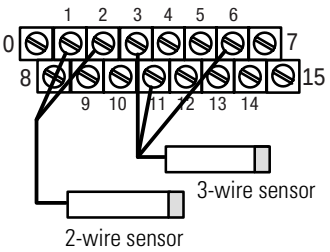
Channel	Input Terminal[1]	Supply Terminal
Input 0	A-2	A-1
Input 1	A-3	A-6
Input 2	A-4	B-9
Input 3	A-5	B-14
+24V dc	Terminals 1, 6, 8, 9, 14, 15 are internally connected together in the module	
Common	Terminals 0, 7, 10 thru 13 are internally connected together in the module	

1 2-wire sensors use input and supply terminals; 3-wire sensors use input, supply and common terminals.

ATTENTION

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

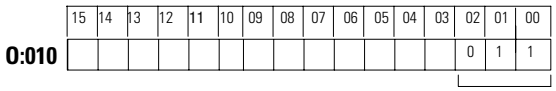
Example of 2-Wire and 3-Wire Sensors



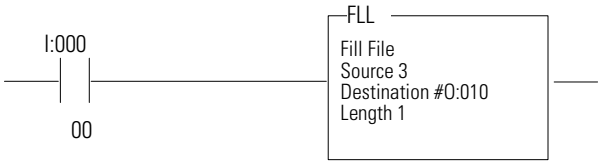
Setting Input Filter Times (Standard Mode Addressing Only)

You can select the input filter time (FT) for channels 00 thru 03. 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 2ms for an input module at address rack 1, module group 0, set bits 02, 01, and 00 as shown below.



Write Filter Time on system startup.



Write Filter Time to complement of input module.

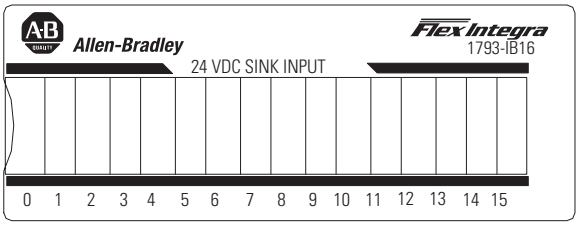
41335

Input Filter Times

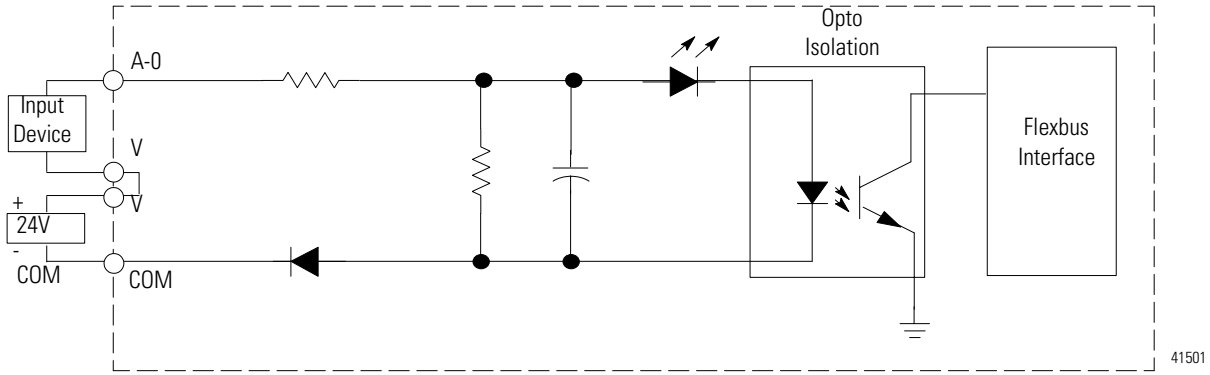
Bits			Description	Selected Filter Time
02	01	00	Filter Time for Inputs 00-07	
0	0	0	Filter Time 0 (default)	256µs
0	0	1	Filter Time 1	512µs
0	1	0	Filter Time 2	1ms
0	1	1	Filter Time 3	2ms
1	0	0	Filter Time 4	4ms
1	0	1	Filter Time 5	8ms
1	1	0	Filter Time 6	16ms
1	1	1	Filter Time 7	32ms

Specifications - 1793-IB4 and -IB4S	
Number of Channels	1 group of 4, nonisolated
Module Location	DIN-rail mounted
Module Type	4 digital input - sinking 1793-IB4 - screw-clamp terminations 1793-IB4S - spring-clamp terminations
ON-State Voltage	10-31.2V dc; 24V dc nominal
ON-State Current	2-12mA; 8mA @ 24V dc
OFF-State Voltage	5.0V dc maximum
OFF-State Current	1.5mA minimum
Channel Impedance	4.6K Ω
Dielectric Withstand Test	Channel to system - 850V dc for 1s Channel to channel - none
Maximum Input Filter Times 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 (see *Setting Input Filter Times*)
Flexbus Current	10mA maximum
Power Dissipation	1.5W @ 31.2V dc
Thermal Dissipation	5.1 BTU/hr @ 31.2V dc
Indicators	4 yellow channel status indicators
General Specifications	
External dc Power Voltage	19.2-31.2V dc (5% ac ripple)
Dimensions HxWxD	69mm x 55mm x 80mm (2.72in x 2.17in x 3.15in)
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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) maximum insulation, 90C minimum temperature rating 2[1]
Terminal Screw Torque	4-7 inch-pounds
Publication Installation Instructions	1793-5.1
Agency Certification	c UL us CE C-Tick

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

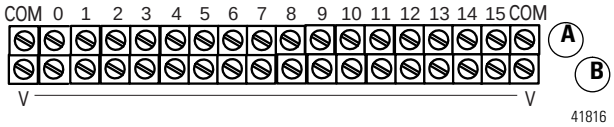


Typical Simplified Schematic for Input 0

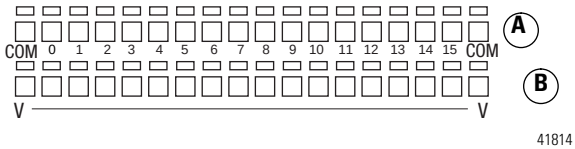


Wiring

1793-IB16



1793-IB16S

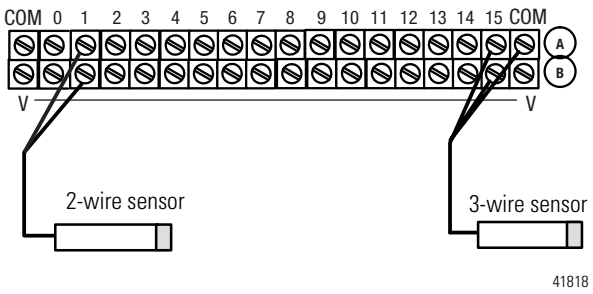


Where: C = common, V = +24V dc power, 0-15 = inputs

ATTENTION

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

Example of 2-Wire and 3-Wire Sensors

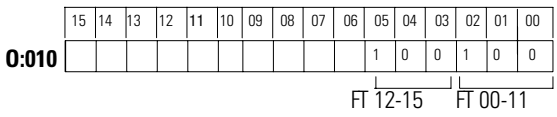


Channel	Input	Power (V)	Channel	Input	Power (V)
0	A-0	connect to corresponding terminal on row B	8	A-8	connect to corresponding terminal on row B
1	A-1		9	A-9	
2	A-2		10	A-10	
3	A-3		11	A-11	
4	A-4		12	A-12	
5	A-5		13	A-13	
6	A-6		14	A-14	
7	A-7		15	A-15	
+24V dc	Power terminals V are internally connected together in the module.				
24V dc common	Common terminals COM are internally connected together in the module.				

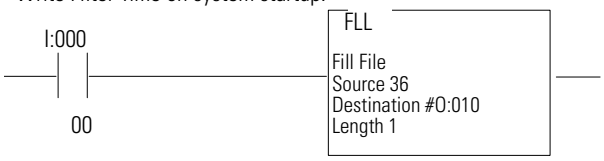
Setting Input Filter Times

You can select the input filter time (FT) for channels 00 thru 11 and channels 12 thru 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 an input module at address rack 1, module group 0, set bits 05, 04, 03, 02, 01, and 00 as shown below.



Write Filter Time on system startup.



Write Filter Time to complement of input module.

41335

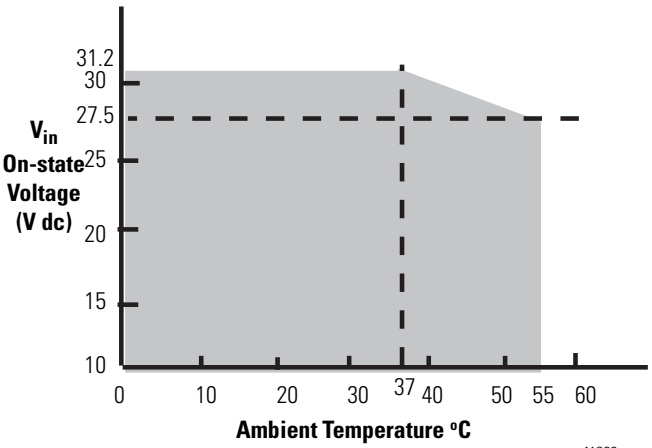
Input Filter Times

Bits			Description	Selected Filter Time
02	01	00	Filter Time for Inputs 00-03	
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

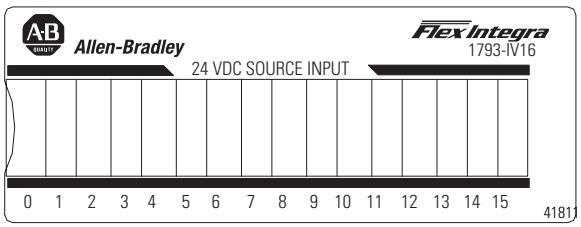
Specifications - 1793-IB16 and -IB16S	
Number of Channels	16 (1 group of 16, nonisolated, sinking)
Module Location	DIN-rail mounted
Module Type	16 digital input - sinking 1793-IB16 - screw-clamp terminations 1793-IB16S - spring-clamp terminations
ON-State Voltage	10V dc minimum 24V dc nominal 31.2V dc maximum
ON-State Current	2mA minimum 8.8mA nominal at 24V dc 12.1mA maximum
OFF-State Voltage	5.0V dc maximum
OFF-State Current	1.5mA minimum
Input Impedance	2.5K Ω
Dielectric Withstand Test	100% tested at 1900V dc for 1s between user and system No isolation between individual channels
Maximum Input Filter Times (Selectable) 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 (see *Setting Input Filter Times*)
Flexbus Current	25mA maximum
Power Dissipation	6.1W @ 31.2V dc
Thermal Dissipation	20.8 BTU/hr @ 31.2V dc
Indicators	16 yellow channel status indicators
General Specifications	
External dc Power Voltage	19.2-31.2V dc (5% ac ripple)
Dimensions HxWxD	69mm x 94mm x 80mm (2.72in x 3.7in x 3.2in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Non-operating Vibration	 0 to 55ºC (32 to 131ºF) -40 to 85ºC (-40 to 185ºF) 5 to 95% noncondensing 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge ($4mm^2$) stranded maximum 3/64 inch (1.2mm) maximum insulation, 90C minimum temperature rating 2[1]
Terminal Screw Torque	4-7 inch-pounds
Publication Installation Instructions	1793-5.8
Agency Certification	c UL us CE C-Tick

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

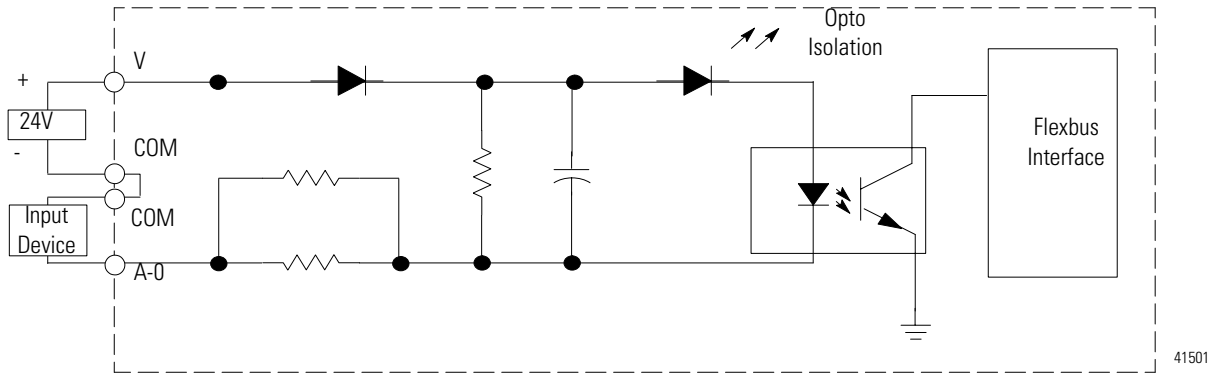
Derating Curve



41820

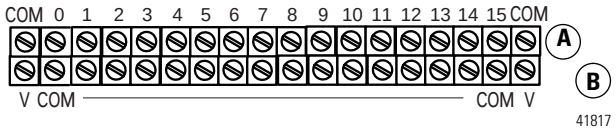


Typical Simplified Schematic for Input 0

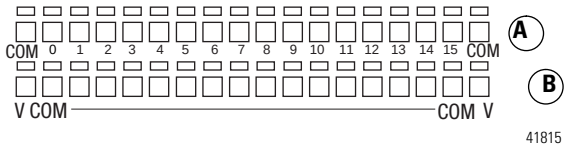


Wiring

1793-IV16



1793-IV16S



Where: C = common, V = +24V dc power, 0-15 = inputs

Channel	Input	Common	Channel	Input	Common
0	A-0	connect to corresponding terminal on row B	8	A-8	connect to corresponding terminal on row B
1	A-1		9	A-9	
2	A-2		10	A-10	
3	A-3		11	A-11	
4	A-4		12	A-12	
5	A-5		13	A-13	
6	A-6		14	A-14	
7	A-7		15	A-15	
+24V dc	Power terminals V are internally connected together in the module.				
24V dc common	Common terminals COM are internally connected together in the module.				

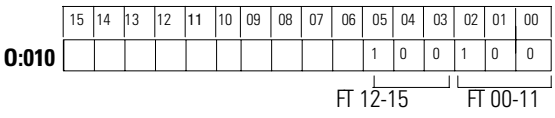
ATTENTION

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

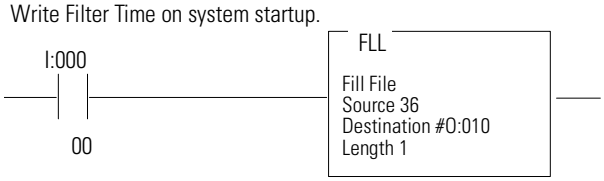
Setting Input Filter Times

You can select the input filter time (FT) for channels 00 thru 11 and channels 12 thru 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 an input module at address rack 1, module group 0, set bits 05, 04, 03, 02, 01, and 00 as shown below.



Write Filter Time on system startup.



Write Filter Time to complement of input module.

41335

Input Filter Times

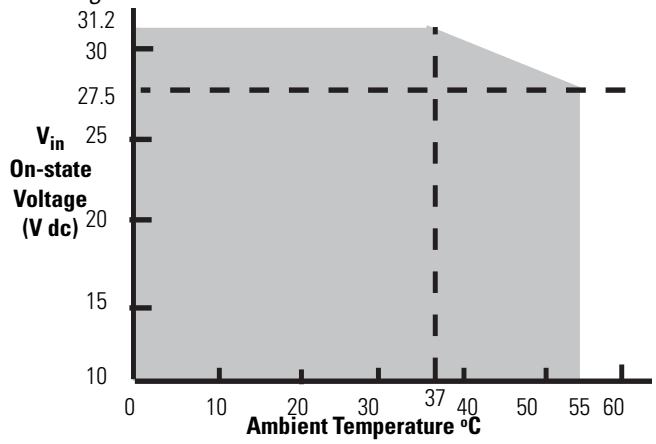
Bits			Description	Selected Filter Time
02	**01**	**00**	**Filter Time for Inputs 00-11**	
05	**04**	**03**	**Filter Time for Inputs 12-15**	
0	0	0	Filter Time 0 (default)	256µs
0	0	1	Filter Time 1	512µs
0	1	0	Filter Time 2	1ms
0	1	1	Filter Time 3	2ms
1	0	0	Filter Time 4	4ms
1	0	1	Filter Time 5	8ms
1	1	0	Filter Time 6	16ms
1	1	1	Filter Time 7	32ms

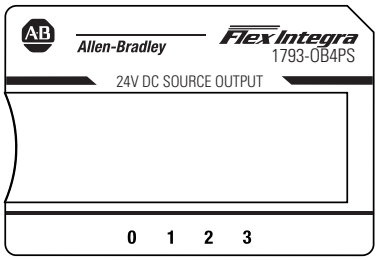
Specifications - 1793-IV16 and -IV16S	
Number of Channels	1 group of 16, nonisolated, sourcing
Module Location	DIN-rail mounted
Module Type	16 digital input - sourcing 1793-IV16 - screw cage terminations 1793-IV16S - spring clamp terminations
ON-State Voltage	10V dc minimum 24V dc nominal 31.2V dc maximum
ON-State Current	2mA minimum 8.8mA nominal @ 24V dc 12.1mA maximum
OFF-State Voltage	5.0V dc maximum
OFF-State Current	1.5mA minimum
Input Impedance	2.5K Ω
Dielectric Withstand Test	100% tested at 1900V dc for 1s between user and system No isolation between individual channels
Maximum Input Filter Times (selectable) 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 (see *Setting Input Filter Times*)
Flexbus Current	25mA maximum
Power Dissipation	6.1W @ 31.2V dc
Thermal Dissipation	20.8 BTU/hr @ 31.2V dc
Indicators	16 yellow channel status indicators

General Specifications	
External dc Power Voltage	19.2-31.2V dc (5% ac ripple)
Dimensions HxWxD	69mm x 55mm x 80mm (2.72in x 2.17in x 3.15in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Non-operating Vibration	 0 to 55ºC (32 to 131ºF) -40 to 85ºC (-40 to 185ºF) 5 to 95% noncondensing 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) maximum insulation, 90C minimum temperature rating 2[1]
Terminal Screw Torque	4-7 inch-pounds
Publication Installation Instructions	1793-5.10
Agency Certification	c UL us CE C-Tick

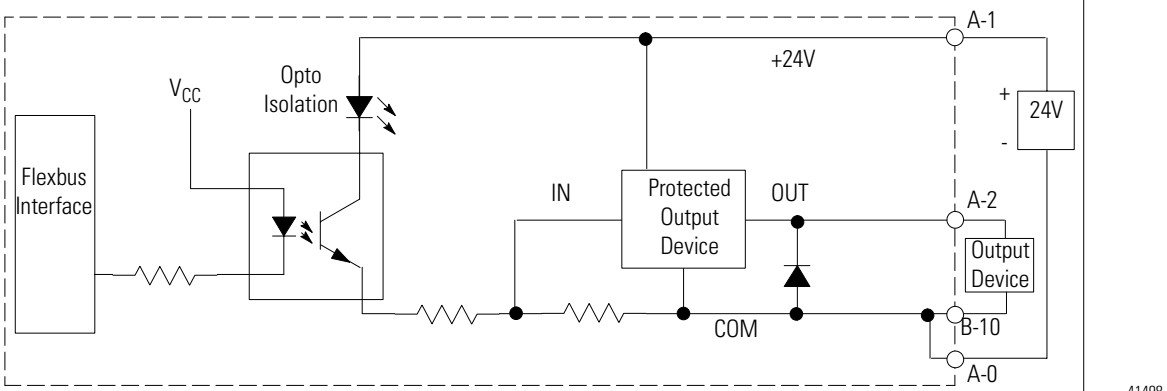
1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

Derating Curve



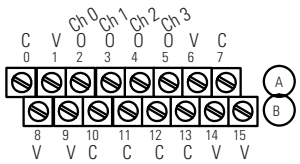


Typical Simplified Schematic for Output 0

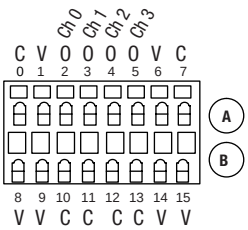


Wiring

1793-OB4



1793-OB4S



Where: C = common, V = +24V dc power, O=output

Output	Output Terminal	Common Terminal
Output 0	A-2	B-10
Output 1	A-3	B-11
Output 2	A-4	B-12
Output 3	A-5	B-13
+24V dc	Terminals 1, 6, 8, 9, 14, 15 are internally connected together in the module	
Common	Terminals 0, 7, 10 thru 13 are internally connected together in the module	

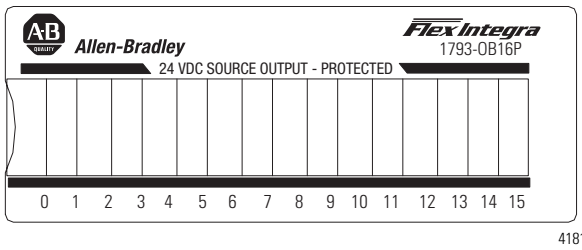
ATTENTION

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

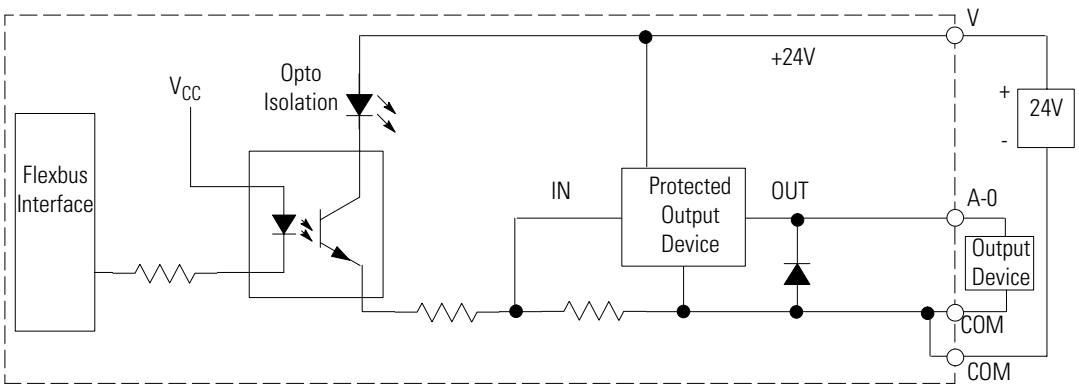
Specifications - 1793-OB4P and -OB4PS	
Number of Channels	1 group of 4, nonisolated
Module Location	DIN-rail mounted
Module Type	4 digital output - sourcing, protected 1793-OB4P - screw-clamp terminations 1793-OB4PS - spring-clamp terminations
ON-State Voltage	10-31.2V dc; 24V dc nominal
ON-State Current	1-500mA per channel
OFF-State Voltage	31.2V dc maximum
OFF-State Current	0.5mA maximum leakage
Channel Impedance	1.0Ω (0.5v maximum drop)
Surge Current	1.5A for 50ms, repeatable every 2s
Dielectric Withstand Test	Channel to system - 850V dc for 1s Channel to channel - none
Maximum Input Delay Times OFF to ON ON to OFF	 0.5ms maximum 1.0ms maximum
Flexbus Current	20mA maximum
Power Dissipation	1.3W @ 31.2V dc
Thermal Dissipation	4.4 BTU/hr @ 31.2V dc
Indicators	4 yellow channel status indicators

General Specifications	
External dc Power Voltage Current	 19.2-31.2V dc (5% ac ripple) 80mA
Dimensions HxWxD	69mm x 55mm x 80mm (2.72in x 2.17in x 3.15in)
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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) maximum insulation, 90C minimum temperature rating 2[1]
Terminal Screw Torque	4-7 inch-pounds
Publication Installation Instructions	 1793-5.2
Agency Certification	

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

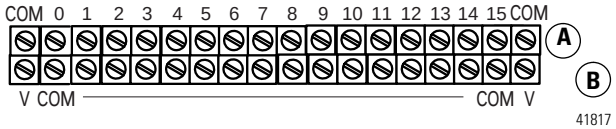


Typical Simplified Schematic for Output 0

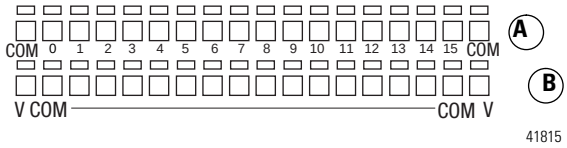


Wiring

1793-OB16



1793-OB16S



Where: C = common, V = +24V dc power, 0-15 = outputs

Channel	Output	Common	Channel	Output	Common
0	A-0	connect to corresponding terminal on row B	8	A-8	connect to corresponding terminal on row B
1	A-1		9	A-9	
2	A-2		10	A-10	
3	A-3		11	A-11	
4	A-4		12	A-12	
5	A-5		13	A-13	
6	A-6		14	A-14	
7	A-7		15	A-15	
+24V dc	Power terminals V are internally connected together in the module.				
24V dc common	Common terminals COM are internally connected together in the module.				

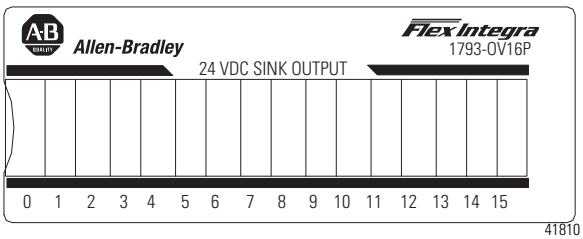
ATTENTION

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

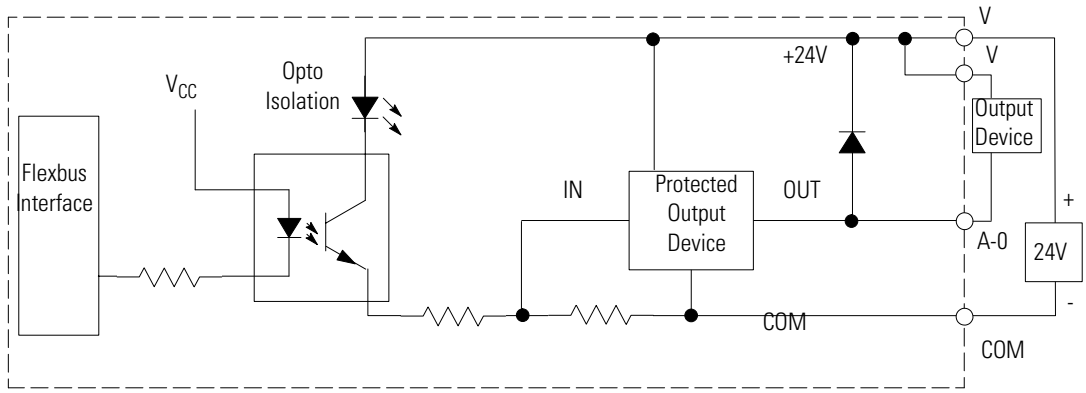
Specifications - 1793-OB16P and -OB16PS	
Number of Channels	16 (1 group of 16, nonisolated)
Module Location	DIN-rail mounted
Module Type	16 digital output - sourcing, protected 1793-OB16P - screw-clamp terminations 1793-OB16PS - spring-clamp terminations
ON-State Voltage	10V dc minimum 24V dc nominal 31.2V dc maximum
ON-State Current	1mA minimum per channel 500mA maximum per channel
OFF-State Voltage Drop	0.5V dc maximum
OFF-State Leakage	0.5mA maximum leakage
Surge Current	1.5A for 50ms, repeatable every 2s
Dielectric Withstand Test	100% tested at 850V dc for 1s between user and system No isolation between individual channels
Maximum Input Delay Times OFF to ON ON to OFF	 0.5ms maximum 1.0ms maximum
Flexbus Current	80mA maximum
Power Dissipation	5W @ 31.2V dc
Thermal Dissipation	17 BTU/hr @ 31.2V dc
Indicators	16 yellow channel status indicators

General Specifications	
External dc Power Voltage Current	 19.2-31.2V dc (5% ac ripple) 80mA
Dimensions HxWxD	69mm x 94mm x 80mm (2.72in x 3.7in x 3.20in)
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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) maximum insulation, 90C minimum temperature rating 2[1]
Terminal Screw Torque	4-7 inch-pounds
Publication Installation Instructions	 1793-5.9
Agency Certification	

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

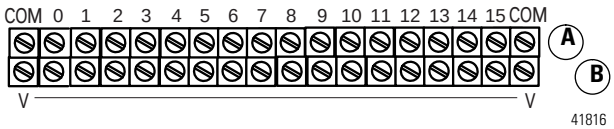


Typical Simplified Schematic for Output 0

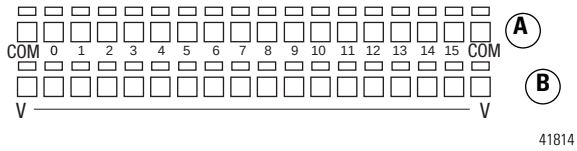


Wiring

1793-OV16P



1793-OV16PS



Where: C = common, V = +24V dc power, 0-15 = outputs

Channel	Output	Power	Channel	Output	Power
0	A-0	Connect to corresponding terminal on row B	8	A-8	Connect to corresponding terminal on row B
1	A-1		9	A-9	
2	A-2		10	A-10	
3	A-3		11	A-11	
4	A-4		12	A-12	
5	A-5		13	A-13	
6	A-6		14	A-14	
7	A-7		15	A-15	
+24V dc	Power terminals V are internally connected together in the module.				
24V dc common	Common terminals COM are internally connected together in the module.				

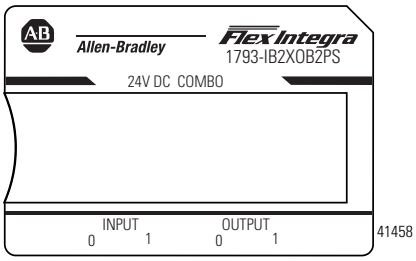
ATTENTION

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

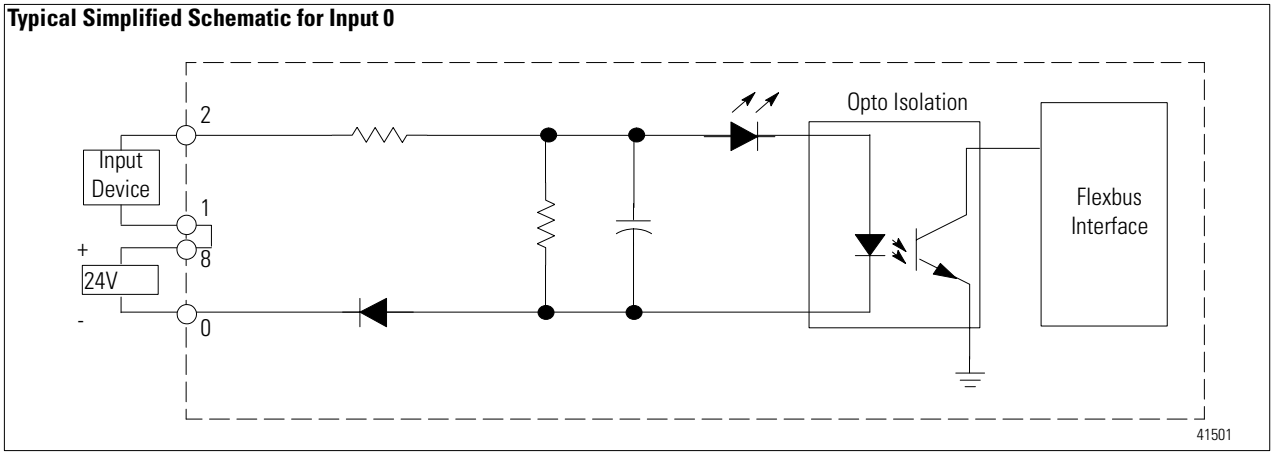
Specifications - 1793-OV16P and -OV16PS	
Number of Channels	1 group of 16, nonisolated, sinking
Module Location	DIN-rail mounted
Module Type	16 digital output - sinking, protected 1793-OV16P - screw-clamp terminations 1793-OV16PS - spring-clamp terminations
ON-State Voltage	10V dc minimum 24V dc nominal 31.2V dc maximum
ON-State Current	1mA minimum per channel 500mA maximum per channel
OFF-State Voltage	31.2V dc maximum
OFF-State Current	0.5mA maximum leakage
Surge Current	2A for 50ms, repeatable every 2s
Dielectric Withstand Test	100% tested at 850V dc for 1s between user and system No isolation between individual channels
Maximum Output Signal Delay Times OFF to ON ON to OFF	 0.5ms maximum 1.0ms maximum
Flexbus Current	80mA maximum
Power Dissipation	4.2W @ 31.2V dc
Thermal Dissipation	14.3 BTU/hr @ 31.2V dc
Indicators	16 yellow channel status indicators
Fusing	Outputs are electronically protected

General Specifications	
External dc Power Voltage Current	 19.2-31.2V dc (5% ac ripple) 80mA
Dimensions HxWxD	69mm x 94mm x 80mm (2.72in x 3.7in x 3.2in)
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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) maximum insulation, 90C minimum temperature rating 2[1]
Terminal Screw Torque	4-7 inch-pounds
Publication Installation Instructions	 1793-5.11
Agency Certification	

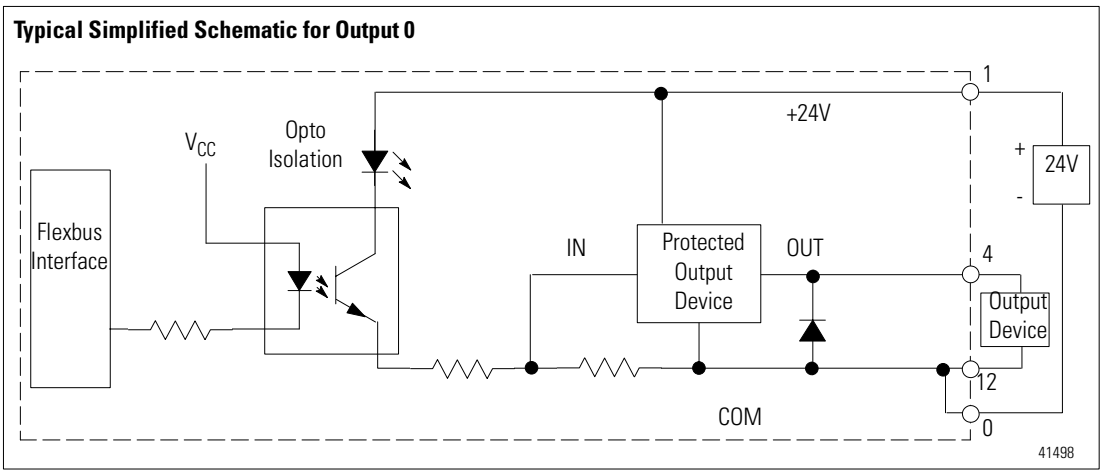
1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."



Typical Simplified Schematic for Input 0

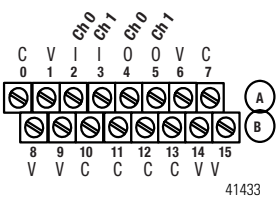


Typical Simplified Schematic for Output 0

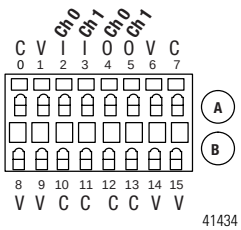


Wiring

1793-IB2XOB2P



1793-IB2XOB2PS



ATTENTION

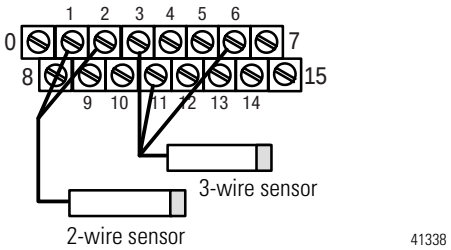
Total current draw through the terminal base unit is limited to 10A. Separate power connections may be necessary.

Where: C = common, V = +24V dc power, I =input, O = output

Input[1]	Input Type	Input Terminal	Supply Terminal
0	Sink Input	2	1
1	Sink Input	3	6
Output	**Output Type**	**Output Terminal**	**Common**
0	Source Output	4	12
1	Source Output	5	13
+24V dc	Terminals 1, 6, 8, 9, 14, 15 are internally connected together in the module.		
24V dc common	Terminals 0, 7, 10 thru 13 are internally connected together in the module		

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

Example of 2-Wire and 3-Wire Sensors

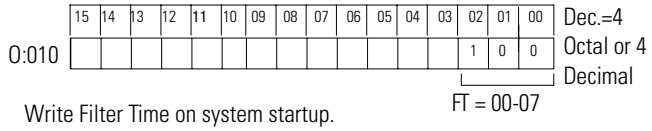


Setting Input Filter Time (Standard Addressing Mode Only)

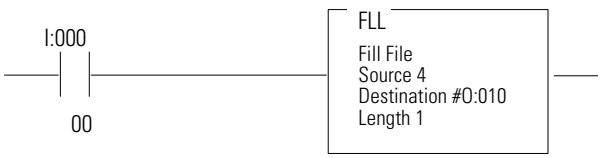
(not available when used with the 1794-ASB adapter)

You can select the input filter time (FT) for channels 00 and 01. 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 4ms for an input module at address rack 1, module group 0, set bits 02, 01, and 00 as shown below.



Write Filter Time on system startup.

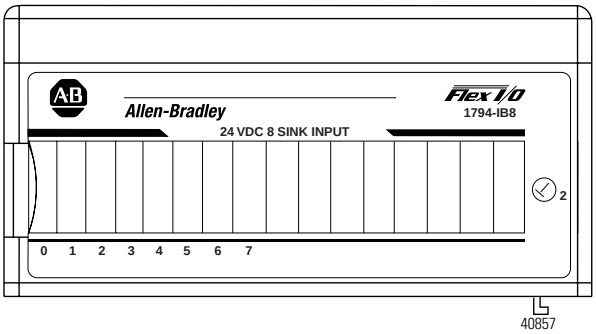


Write Filter Time Constant to complement of input module. 40609

Bits			Description	Selected Filter Time
02	**01**	**00**	**Filter Time for Inputs 00-07**	
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

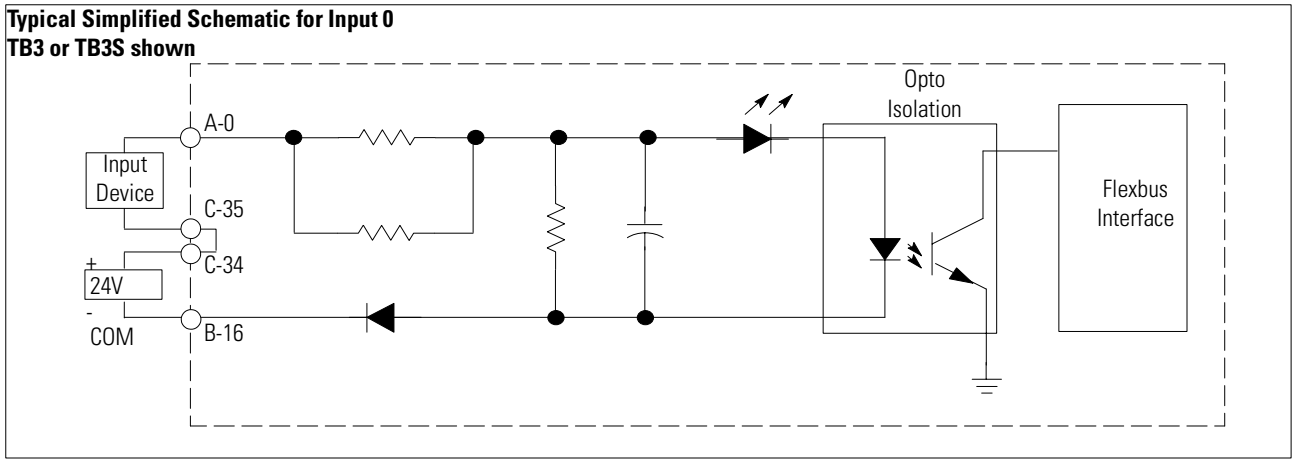
Specifications - 1793-IB2XOB2P and -IB2XOB2PS	
Number of Channels	2 digital input - sinking 2 digital output - sourcing, protected
Module Location	DIN-rail mounted
Module Type	2 input/2 output digital combination with electronic fusing 1793-IB2XOB2P - screw-clamp terminations 1793-IB2XOB2PS - spring-clamp terminations
Input	
ON-State Voltage	10-31.2V dc; 24V dc nominal
ON-State Current	2-12mA; 8mA @ 24V dc
OFF-State Voltage	5.0V dc maximum
OFF-State Current	1.5mA minimum
Channel Impedance	4.6K Ω
Dielectric Withstand Test	Channel to system - 850V dc for 1s Channel to channel - none
Maximum Input Filter Times 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 (see *Setting Input Delay Times*)
Output	
On-State Voltage	10-31.2 V dc; 24V dc nominal
On-State Current	1-500mA per channel
Off-State Voltage	31.2V dc maximum
Off-State Current	0.5mA maximum leakage
Channel Impedance	1.0Ω (0.5V dc maximum drop)
Surge Current	1.5A for 50ms, repeatable every 2s
Dielectric Withstand Test	Channel to system - 850V dc for 1s Channel to channel - none
Maximum Input Delay Times OFF to ON ON to OFF	 0.5ms maximum 1.0ms maximum
General Specifications	
Flexbus Current	20mA maximum
Power Dissipation	1.4W @ 31.2V dc
Thermal Dissipation	4.8 BTU/hr @ 31.2V dc
Indicators	4 yellow channel status indicators
Fusing	Output are electronically fused
External dc Power Voltage Current	 19.2-31.2V dc (5% ac ripple) 40mA maximum
Dimensions HxWxD	69mm x 55mm x 80mm (2.72in x 2.17in x 3.15in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Non-operating Vibration	 0 to 55ºC (32 to 131ºF) -40 to 85ºC (-40 to 185ºF) 5 to 95% noncondensing 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) maximum insulation, 90ºC minimum temperature rating 2[1]
Terminal Screw Torque	4-7 inch-pounds
Publication Installation Instructions	 1793-5.3
Agency Certification	c UL us CE C-Tick

1 Use this conductor category information for planning conductor routing. Refer to pub 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."



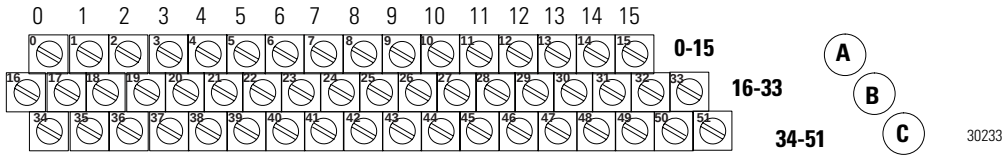
Recommended Terminal Base	Compatible Terminal Base(s)
	

Typical Simplified Schematic for Input 0
TB3 or TB3S shown



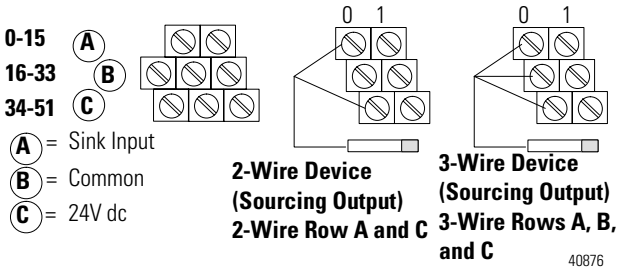
Wiring

1794-TB3
1794-TB3S



Input	1794-TB3 and -TB3S	
	Input Terminal	Voltage Terminal
Input 0	A-0	C-35
Input 1	A-1	C-36
Input 2	A-2	C-37
Input 3	A-3	C-38
Input 4	A-4	C-39
Input 5	A-5	C-40
Input 6	A-6	C-41
Input 7	A-7	C-42
Common	B-16 thru B-33	
+24V dc	C-34 thru C-51	

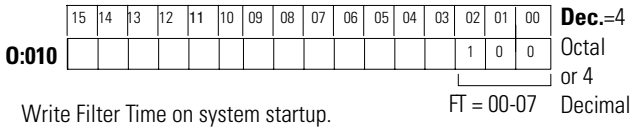
2-Wire and 3-Wire Inputs to the 1794-IB8 Module



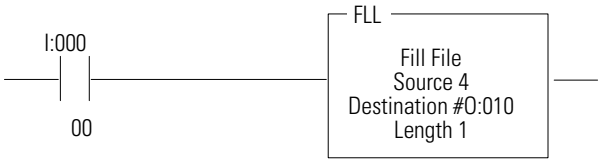
Setting Input Filter Times (Standard Mode Addressing Only)

You can select the input filter time (FT) for channels 00 through 07. 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 constant of 4ms for a dc input module at address rack 1, module group 0, set bits 02, 01, 00 as shown below.



Write Filter Time on system startup.



Write Filter Time Constant to complement of input module.

40609

Input Filter Times

Bits			Description	Selected Filter Time
02	01	00	Filter Time for Inputs 00-07	
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

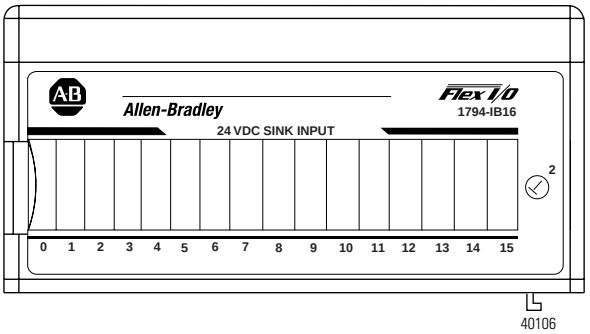
Specifications - 1794-IB8	
Number of Inputs	8 non-isolated, sinking
Module Location	Cat. No. 1794-TB3, -TB3S, or -TBN Terminal Base Unit
ON-State Voltage	10V dc minimum; 24V dc nominal; 31.2V dc maximum
ON-State Current	2.0mA minimum; 8.0mA nominal at 24V dc; 11.0mA maximum
OFF-State Voltage	5.0V dc maximum
OFF-State Current	1.5mA minimum
Input Impedance	4.6K Ω maximum
Isolation Voltage	100% tested at 850V dc for 1s between user and system No isolation between individual channels
Maximum Input Filter Times 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 (see *Setting Input Filter Times*)
Flexbus Current (max)	20mA @ 5V dc
Power Dissipation	Maximum 3.5W @ 31.2V dc
Thermal Dissipation	Maximum 11.9 BTU/hr @ 31.2V dc
Indicators (field side indication, customer device driven)	8 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)
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm²) stranded maximum 3/64 inch (1.2mm) insulation maximum 2[1]
Publication Installation Instructions	 1794-5.30
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

ATTENTION

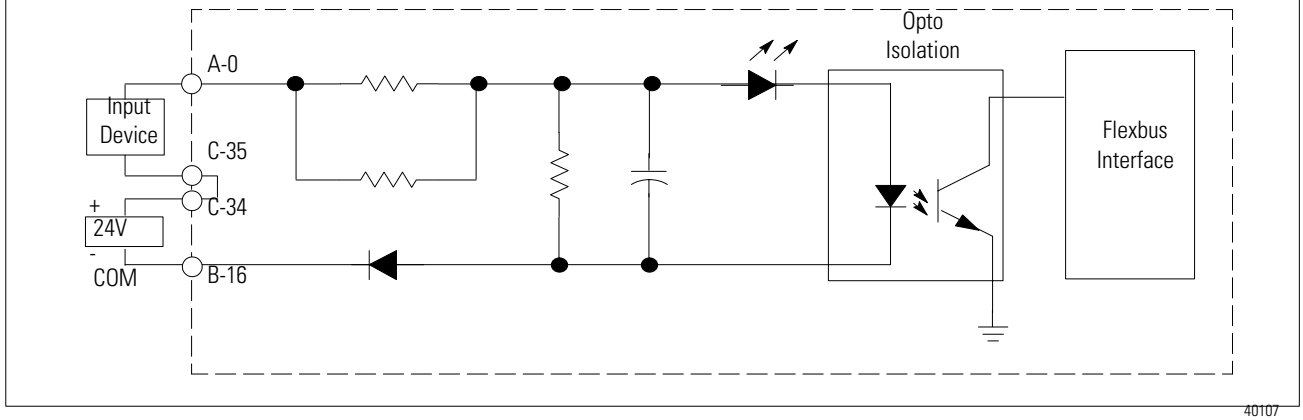
Do not place the 1794-IB8 module next to an output module in 8-point compact addressing with the 1794-ASB2/C or 1794-ASB/D.

If this combination is used, the ASB will fault.



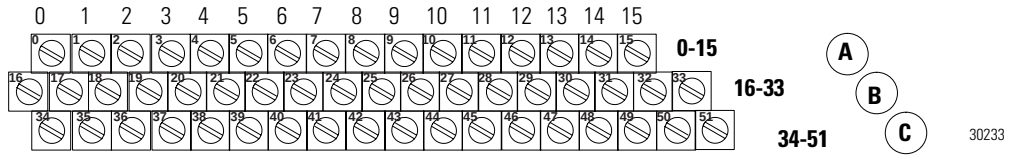
Recommended Terminal Base	Compatible Terminal Base(s)
TB3	TB3S

Typical Simplified Schematic for Input 0
TB3 or TB3S shown



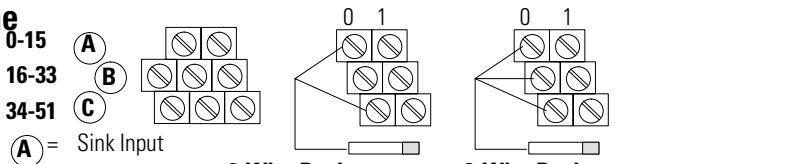
Wiring

1794-TB3
1794-TB3S



1794-TB3 and -TB3S					
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	

2-Wire and 3-Wire Inputs to the 1794-IB16 Module



Setting Input Filter Times

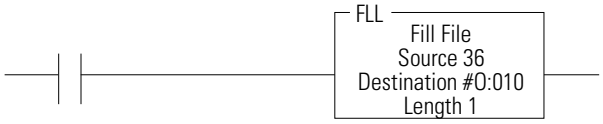
You can select the input filter time for each group of channels (channels 00 through 11, or channels 12 through 15). Select the input filter time by setting the corresponding bits in the **output** image table (complementary word) for the module.

For example, to set a filter time constant 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.

	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	
Dec.	17	16	15	14	13	12	11	10	07	06	05	04	03	02	01	00	=44 Octal
(Octal)																	or 36
O:010											1	0	0	1	0	0	Decimal

FT = 12-15 FT = 00-11

Write Filter Time on system startup.



Write Filter Time Constant to complement of input module. 40154

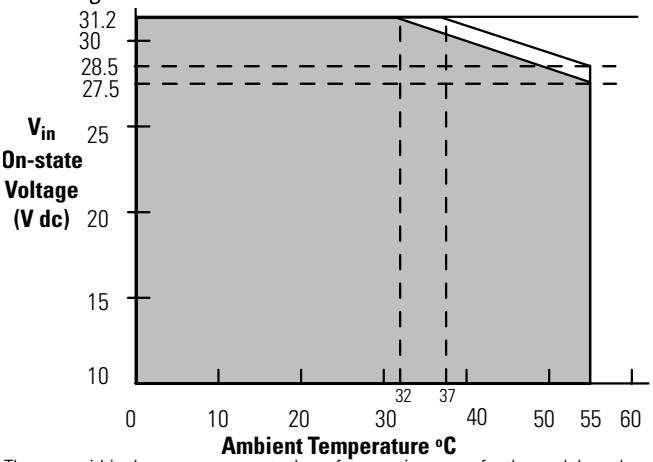
Input Filter Times (Standard Addressing Mode Only)

Bits			Description	Maximum Filter Time
02	**01**	**00**	Filter Times 00-11 (00-13)	
05	**04**	**03**	Filter Times 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

Specifications - 1794-IB16	
Number of Inputs	16 (1 group of 16), non-isolated, sinking
Module Location	Cat. No. 1794-TB3 or -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 Ω maximum
Isolation Voltage	100% tested at 850V dc for 1s between user and system No isolation between individual channels
Max Input Filter Times OFF to ON ON to OFF	 256µs, 512µs, 1ms, 2ms, 4ms, 8ms, 16ms, and 32ms 256µs, 512µs, 1ms, 2ms, 4ms, 8ms, 16ms, and 32ms 256µs default - selectable thru output image table (see *Setting Input Filter Times*)
Flexbus Current (max)	30mA @ 5V dc
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) Refer to derating curve
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm²) stranded maximum 3/64 inch (1.2mm) insulation maximum 2[1]
Publication Installation Instructions	 1794-5.4
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

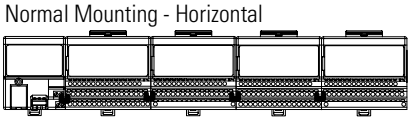
Derating Curve



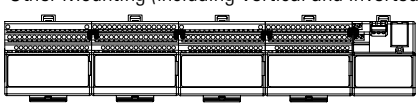
The area within the curve represents the safe operating range for the module under va conditions of user supplied 24V dc supply voltages and ambient temperatures.

= Normal mounting safe operating range, included
= Other mounting positions (including inverted horizontal) safe operating range) 40220

Normal Mounting - Horizontal

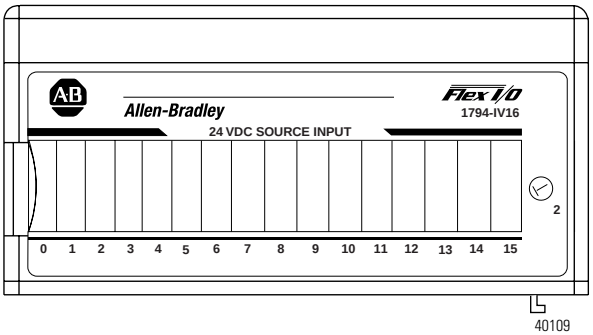


Other Mounting (including Vertical and Inverted Horizontal Mounting)



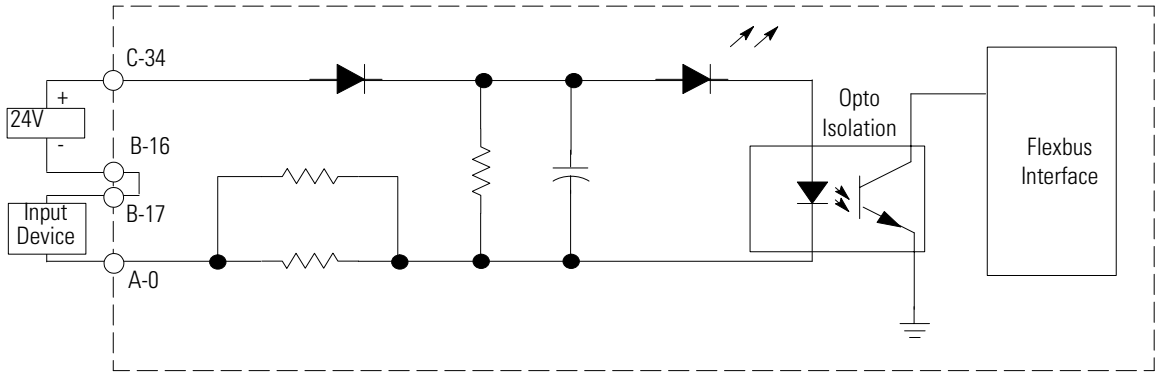
40221

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



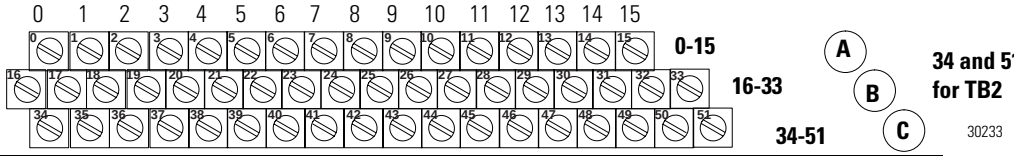
Recommended Terminal Base	Compatible Terminal Base(s)
TB2	TB3, TB3S

Typical Simplified Schematic for Input 0
TB3, TB3S, or TB2 shown



Wiring

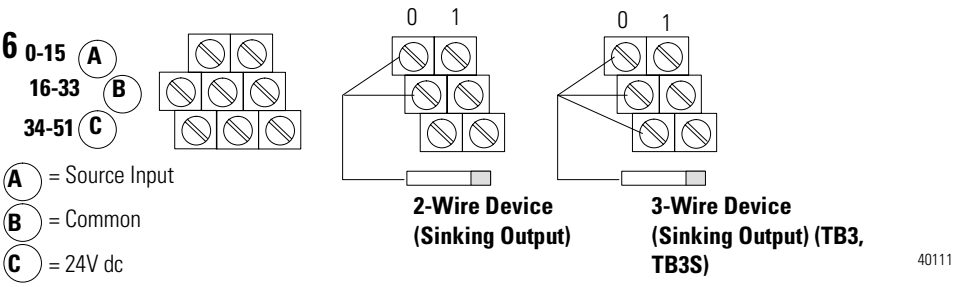
1794-TB3
1794-TB3S
1794-TB2



1794-TB3, -TB3S, and -TB2

Input	Input Terminal	Common Terminal	Input	Input Terminal	Common Terminal
Input 0	A-0	B-17	Input 8	A-8	B-25
Input 1	A-1	B-18	Input 9	A-9	B-26
Input 2	A-2	B-19	Input 10	A-10	B-27
Input 3	A-3	B-20	Input 11	A-11	B-28
Input 4	A-4	B-21	Input 12	A-12	B-29
Input 5	A-5	B-22	Input 13	A-13	B-30
Input 6	A-6	B-23	Input 14	A-14	B-31
Input 7	A-7	B-24	Input 15	A-15	B-32
Common	B-16 thru B-33		24v dc	C-34 thru C-51 (C-34 and C-51 for TB2)	

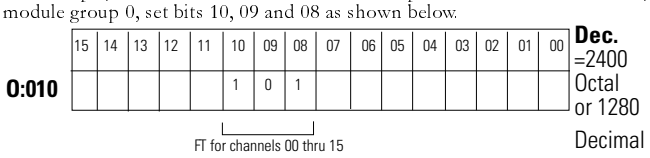
2-wire and 3-wire Inputs to the 1794-IV16 FLEX I/O Module

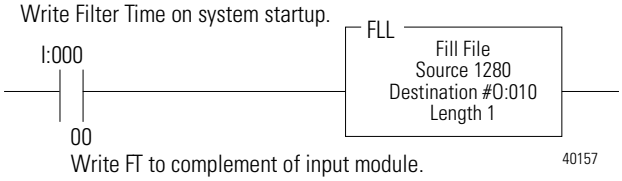


Setting the Input Filter Time

You can select the input filter time (FT) for all channels (channels 00 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 8ms for a dc input module at address rack 1, module group 0, set bits 10, 09 and 08 as shown below.





Input Filter Times (Standard Addressing Mode Only)

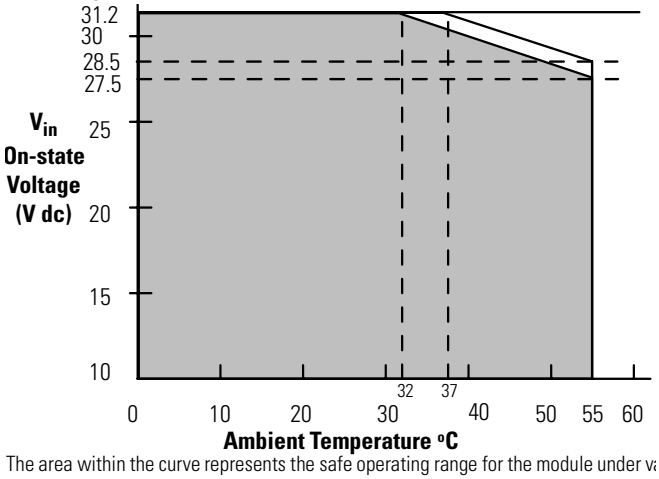
Bits			Description	Selected Filter Time
10	**09**	**08**	**Filter Time for Inputs 00-15(00-17)**	
0	0	0	Filter Time 0 (default)	256µs
0	0	1	Filter Time 1	512µs
0	1	0	Filter Time 2	1ms
0	1	1	Filter Time 3	2ms
1	0	0	Filter Time 4	4ms
1	0	1	Filter Time 5	8ms
1	1	0	Filter Time 6	16ms
1	1	1	Filter Time 7	32ms

Specifications - 1794-IV16	
Number of Inputs	16 (1 group of 16), non-isolated, sourcing
Module Location	Cat. No. 1794-TB2, -TB3, or -TB3S 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	4.7K Ω maximum
Isolation Voltage	100% tested at 2121V dc for 1s between user and system No isolation between individual channels
Input Filter Times OFF to ON ON to OFF	 256µs, 512µs, 1ms, 2ms, 4ms, 8ms, 16ms, and 32ms 256µs, 512µs, 1ms, 2ms, 4ms, 8ms, 16ms, and 32ms 256µs default - selectable thru output image table (see *Setting Input Filter Times*)
Flexbus Current (max)	30mA
Power Dissipation	Maximum 5.7W @ 31.2V dc
Thermal Dissipation	Maximum 19.4 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)
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Non-operating Vibration	 0 to 55ºC (32 to 131ºF) -40 to 85ºC (-40 to 185ºF) 5 to 95% noncondensing 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm²) stranded maximum 3/64 inch (1.2mm) insulation maximum 2[1]
Publication Installation Instructions	 1794-5.28
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

Derating Curve

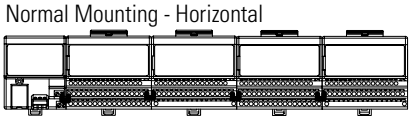


The area within the curve represents the safe operating range for the module under va conditions of user supplied 24V dc supply voltages and ambient temperatures.

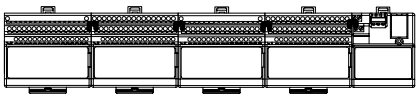
= Normal mounting safe operating range, included
= Other mounting positions (including inverted horizontal) safe operating range)

40220

Normal Mounting - Horizontal

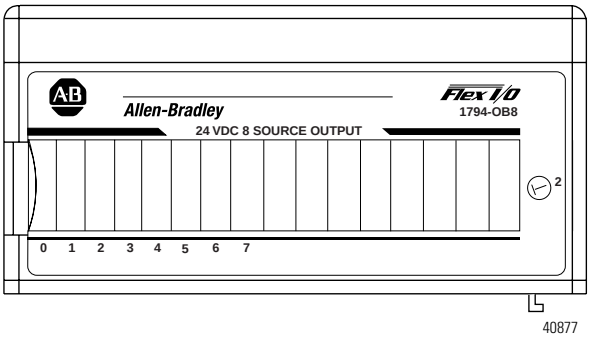


Other Mounting (including Vertical and Inverted Horizontal Mounting)



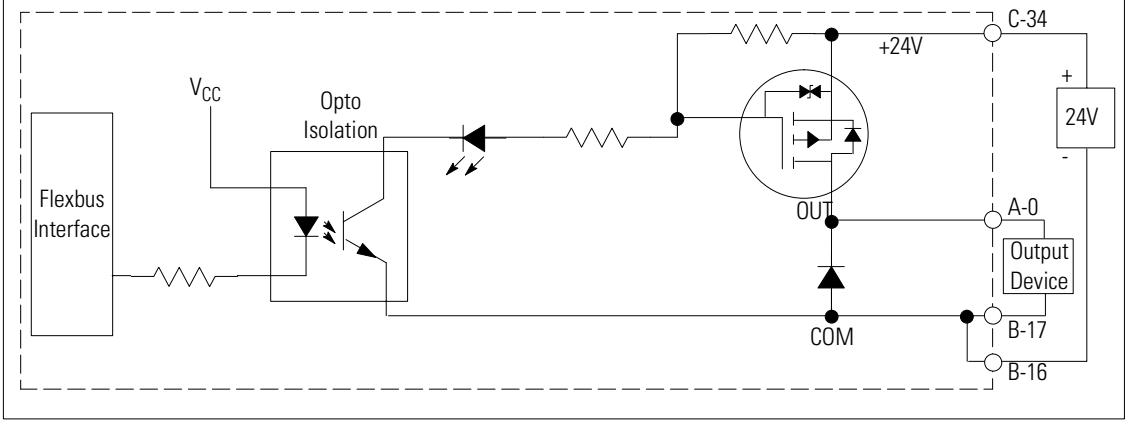
40221

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



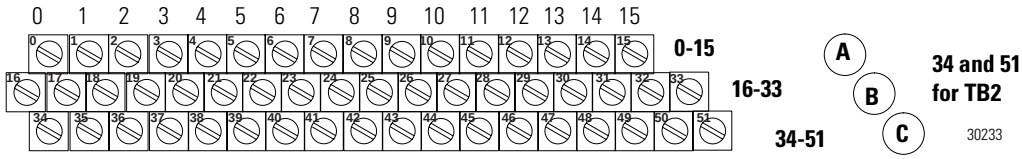
Recommended Terminal Base	Compatible Terminal Base(s)
TB2	TB3 TB3S

Typical Simplified Schematic for Output 0
TB3, TB3S, or TB2 shown



Wiring

1794-TB3
1794-TB3S
1794-TB2

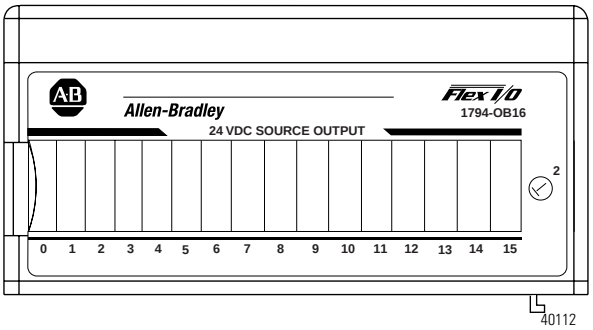


Output	1794-TB3, -TB3S, and -TB2	
	Output Terminal	Common Terminal1
Output 0	A-0	B-17
Output 1	A-1	B-18
Output 2	A-2	B-19
Output 3	A-3	B-20
Output 4	A-4	B-21
Output 5	A-5	B-22
Output 6	A-6	B-23
Output 7	A-7	B-24
+24V dc	C-34 thru C-51 (C-34 and C-51 for TB2)	
Common	B-16 thru B-33	

Specifications - 1794-OB8	
Number of Outputs	8 (1 group of 8) non-isolated, sourcing
Module Location	Cat. No. 1794-TB2, -TB3, or -TB3S Terminal Base Unit
ON-State Voltage Range	10V dc minimum 24V dc nominal; 31.2V dc maximum
ON-State Voltage Drop	0.5V dc maximum
ON-State Current	1.0mA minimum per channel 500mA maximum per channel
OFF-State Voltage	31.2V dc maximum
OFF-State Leakage	0.5mA maximum
Isolation Voltage (min)	100% tested at 850V dc for 1s between user and system No isolation between individual channels
Output Signal Delay OFF to ON ON to OFF	 0.5ms maximum 1.0ms maximum
Flexbus Current (max)	60mA
Power Dissipation	3.3W maximum @ 31.2V
Thermal Dissipation	11.2 BTU/hr @ 31.2V dc
Indicators (field side indication, logic driven)	8 yellow status indicators
Output Current Rating	4A (8 outputs @ 0.5A)
Surge Current	2A for 50ms, repeatable every 2s
Fusing	Module outputs are not fused. Fusing of outputs is recommended. If fusing is desired, you must provide external fusing, use SAN-O MQ4-800mA fuses.
Keyswitch Position	2

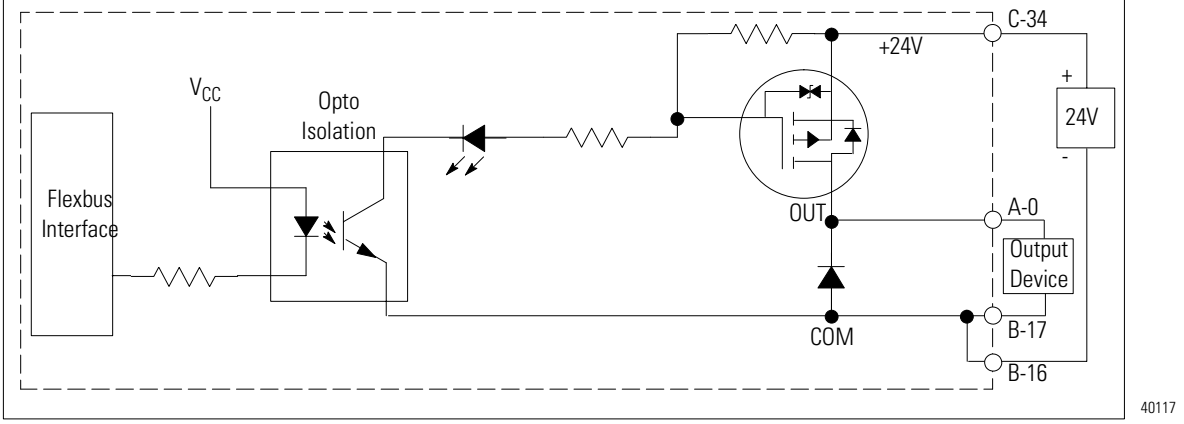
General Specifications	
External dc Power Supply Voltage Voltage Range Supply Current	 24V dc nominal 19.2 to 31.2V dc (includes 5% ac ripple) 25mA @ 24V dc (20 to 35mA)
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7 in x 2.1in)
Environmental Conditions Operational Temperature Storage Temperature Relative 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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) insulation maximum 2[1]
Publication Installation Instructions	 1794-5.31
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

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



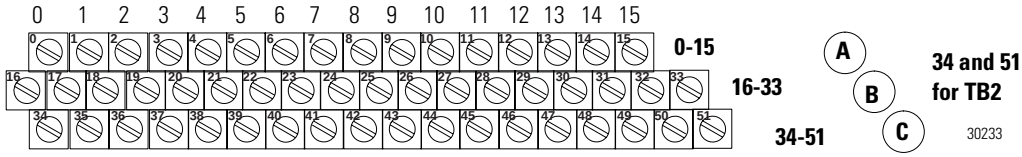
Recommended Terminal Base	Compatible Terminal Base(s)
TB2	TB3 TB3S

Typical Simplified Schematic for Output 0
TB3, TB3S, or TB2 shown



Wiring

1794-TB3
1794-TB3S
1794-TB2



1794-TB3, -TB3S, and -TB2

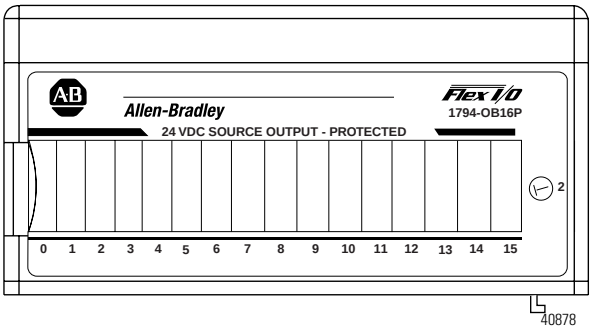
Output	Output Terminal	Common Terminal	Output	Output Terminal	Common Terminal
Output 0	A-0	B-17	Output 8	A-8	B-25
Output 1	A-1	B-18	Output 9	A-9	B-26
Output 2	A-2	B-19	Output 10	A-10	B-27
Output 3	A-3	B-20	Output 11	A-11	B-28
Output 4	A-4	B-21	Output 12	A-12	B-29
Output 5	A-5	B-22	Output 13	A-13	B-30
Output 6	A-6	B-23	Output 14	A-14	B-31
Output 7	A-7	B-24	Output 15	A-15	B-32
Common	B-16 thru B-33		+24v dc	C-34 thru C-51 (C-34 and C-51 for TB2)	

Specifications - 1794-OB16	
Number of Outputs	16 (1 group of 16), non-isolated, sourcing
Module Location	Cat. No. 1794-TB2, -TB3, or -TB3S Terminal Base Unit
ON-State Voltage Range	10V dc minimum 24V dc nominal; 31.2V dc maximum
ON-State Voltage Drop	0.5V dc maximum
ON-State Current	1.0mA minimum per channel 500mA maximum per channel
OFF-State Voltage	31.2V dc maximum
OFF-State Leakage	0.5mA maximum
Isolation Voltage (min)	100% tested at 850V dc for 1s between user and system No isolation between individual channels
Output Signal Delay OFF to ON ON to OFF	 0.5ms maximum 1.0ms maximum
Flexbus Current (max)	80mA
Power Dissipation	5.3W maximum @ 31.2V
Thermal Dissipation	18.1 BTU/hr @ 31.2V dc
Indicators (field side indication, logic driven)	16 yellow status indicators
Output Current Rating	8A (16 outputs @ 0.5A) horizontal or vertical
Surge Current	2A for 50ms, repeatable every 2 seconds
Keyswitch Position	2
Fusing[1]	SAN-O MQ4-800mA

General Specifications	
External dc Power Supply Voltage Voltage Range Supply Current	 24V dc nominal 19.2 to 31.2V dc (includes 5% ac ripple) 49mA @ 24V dc (38mA to 65mA)
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7 in x 2.1in)
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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) insulation maximum 2[2]
Publication Installation Instructions	 1794-5.3
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

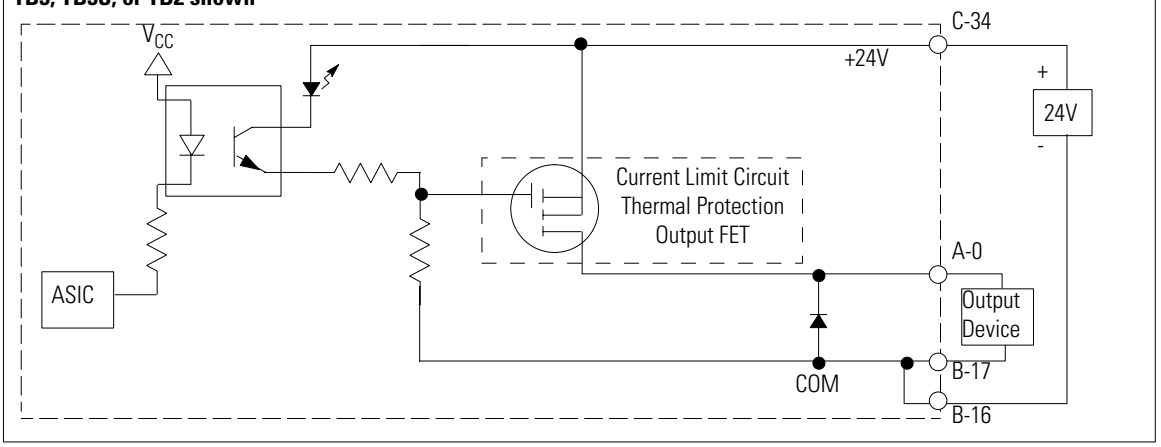
1 Module outputs are not fused. Fusing of outputs is recommended. If external fusing is desired, you must provide external fusing.

2 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."



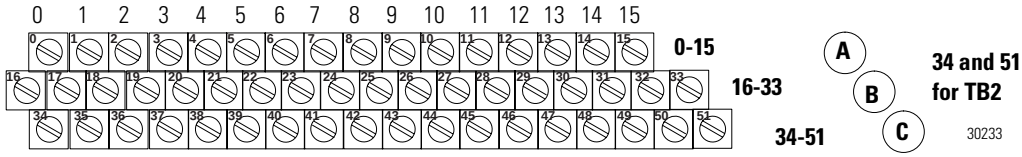
Recommended Terminal Base	Compatible Terminal Base(s)
TB2	TB3 TB3S

Typical Simplified Schematic for Output 0
TB3, TB3S, or TB2 shown



Wiring

1794-TB3
1794-TB3S
1794-TB2



1794-TB3, -TB3S, and -TB2

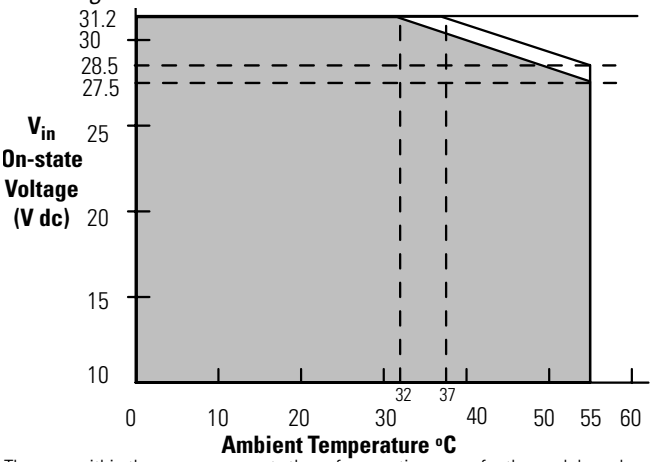
Output	Output Terminal	Common Terminal	Output	Output Terminal	Common Terminal
Output 0	A-0	B-17	Output 8	A-8	B-25
Output 1	A-1	B-18	Output 9	A-9	B-26
Output 2	A-2	B-19	Output 10	A-10	B-27
Output 3	A-3	B-20	Output 11	A-11	B-28
Output 4	A-4	B-21	Output 12	A-12	B-29
Output 5	A-5	B-22	Output 13	A-13	B-30
Output 6	A-6	B-23	Output 14	A-14	B-31
Output 7	A-7	B-24	Output 15	A-15	B-32
Common	B-16 thru B-33		+24v dc	C-34 thru C-51 (C-34 and C-51 for TB2)	

Specifications - 1794-OB16P	
Number of Outputs	16 (1 group of 16), non-isolated, sourcing
Module Location	Cat. No. 1794-TB2, -TB3, or -TB3S Terminal Base Unit
ON-State Voltage Range	10V dc minimum 24V dc nominal; 31.2V dc maximum
ON-State Voltage Drop	0.5V dc maximum
ON-State Current	1.0mA minimum per channel 500mA maximum per channel
OFF-State Voltage	31.2V dc maximum
OFF-State Leakage	0.5mA maximum
Isolation Voltage (min)	100% tested at 2121V dc for 1s between user and system No isolation between individual channels
Output Signal Delay OFF to ON ON to OFF	 0.5ms maximum 1.0ms maximum
Flexbus Current (max)	60mA
Power Dissipation	5.0W maximum @ 31.2V
Thermal Dissipation	17.0 BTU/hr @ 31.2V dc
Indicators (field side indication, logic driven)	16 yellow status indicators
Output Current Rating	8A (16 outputs @ 0.5A)
Surge Current	1.5A for 50ms, repeatable every 2s
Keyswitch Position	2
Fusing	Outputs are electronically protected

General Specifications	
External dc Power Supply Voltage Voltage Range Supply Current	 24V dc nominal 10 to 31.2V dc (includes 5% ac ripple) 60mA @ 24V dc (25mA to 75mA) (Refer to the Derating Curve below)
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7 in x 2.1in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Non-operating Vibration	 0 to 55ºC (32 to 131ºF) -40 to 85ºC (-40 to 185ºF) 5 to 95% noncondensing 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge ($4mm^2$) stranded maximum 3/64 inch (1.2mm) insulation maximum 2[1]
Publication Installation Instructions	 1794-5.45
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

Derating Curve

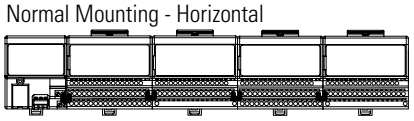


The area within the curve represents the safe operating range for the module under va conditions of user supplied 24V dc supply voltages and ambient temperatures.

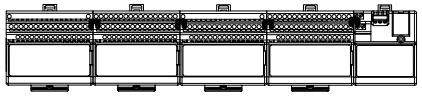
= Normal mounting safe operating range, included
= Other mounting positions (including inverted horizontal) safe operating range)

40220

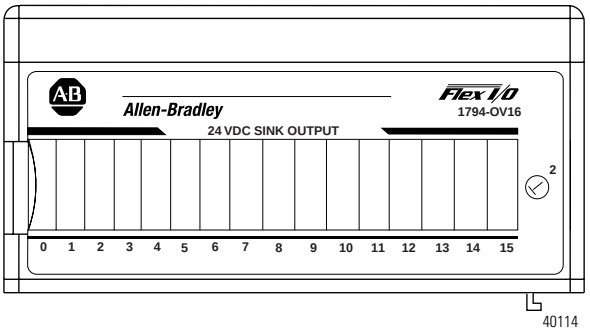
Normal Mounting - Horizontal



Other Mounting (including Vertical and Inverted Horizontal Mounting)

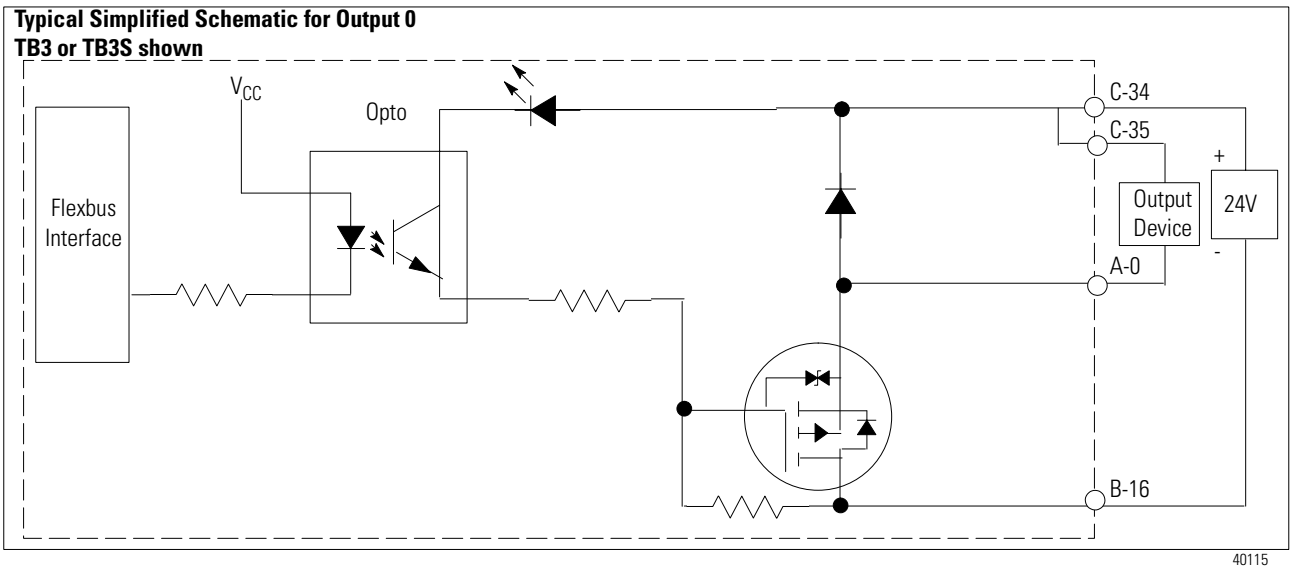


40221



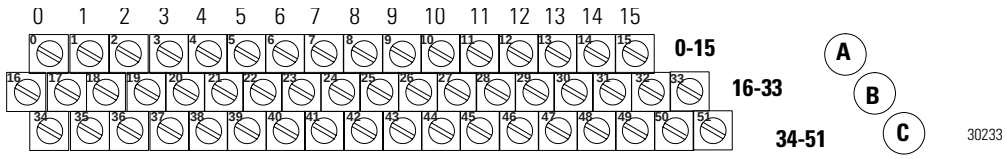
Recommended Terminal Base	Compatible Terminal Base(s)
TB3	TB3S

Typical Simplified Schematic for Output 0
TB3 or TB3S shown



Wiring

1794-TB3
1794-TB3S



1794-TB3 and -TB3S

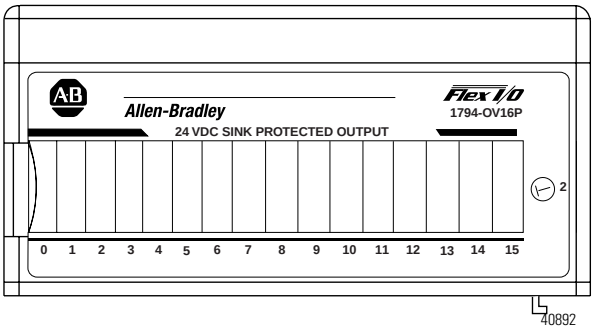
Output	Output Terminal	Power Terminal	Output	Output Terminal	Power Terminal
Output 0	A-0	C-35	Output 8	A-8	C-43
Output 1	A-1	C-36	Output 9	A-9	C-44
Output 2	A-2	C-37	Output 10	A-10	C-45
Output 3	A-3	C-38	Output 11	A-11	C-46
Output 4	A-4	C-39	Output 12	A-12	C-47
Output 5	A-5	C-40	Output 13	A-13	C-48
Output 6	A-6	C-41	Output 14	A-14	C-49
Output 7	A-7	C-42	Output 15	A-15	C-50
Common	B-16 thru B-33		+24v dc	C-34 thru C-51	

Specifications - 1794-OV16	
Number of Outputs	16 (1 group of 16), non-isolated, sinking
Module Location	Cat. No. 1794-TB3 or -TB3S Terminal Base Unit
ON-State Voltage Range	10V dc minimum 24V dc nominal; 31.2V dc maximum
ON-State Voltage Drop	0.2V dc maximum
ON-State Current	1.0mA minimum per channel 500mA maximum per channel
OFF-State Voltage	31.2V dc maximum
OFF-State Leakage	0.5mA maximum
Isolation Voltage (min)	100% tested at 2121V dc for 1s between user and system No isolation between individual channels
Output Signal Delay OFF to ON ON to OFF	 0.5ms maximum 1.0ms maximum
Flexbus Current (max)	80mA
Power Dissipation	4.2W maximum @ 31.2V
Thermal Dissipation	14.3 BTU/hr @ 31.2V dc
Indicators (field side indication, logic driven)	16 yellow status indicators
Output Current Rating	8A (16 outputs @ 0.5A)
Surge Current	2A for 50ms, repeatable every 2 seconds
Keyswitch Position	2
Fusing[1]	SAN-O MQ4-800 800mA fuses

General Specifications	
External dc Power Supply Voltage Voltage Range Supply Current	 24V dc nominal 19.2 to 31.2V dc (includes 5% ac ripple) 49mA @ 24V dc (38mA to 65mA)
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7 in x 2.1in)
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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) insulation maximum 2[2]
Publication Installation Instructions	 1794-5.29
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

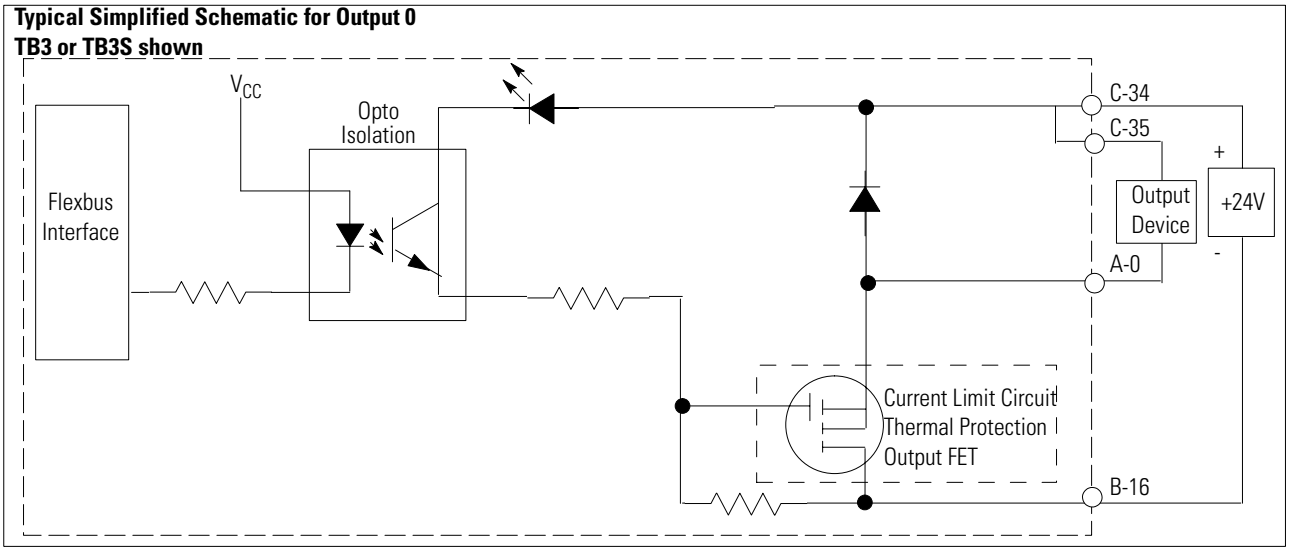
1 Module outputs are not fused. Fusing of outputs is recommended. If external fusing is desired, you must provide external fusing.

2 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."



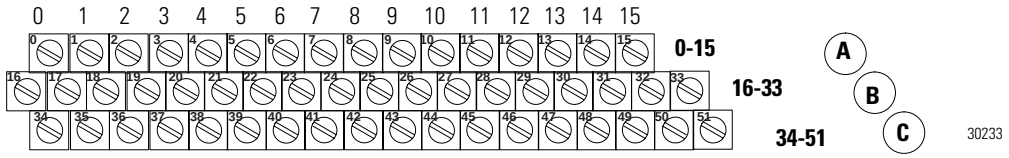
Recommended Terminal Base	Compatible Terminal Base(s)
TB3	TB3S

Typical Simplified Schematic for Output 0
TB3 or TB3S shown



Wiring

1794-TB3
1794-TB3S



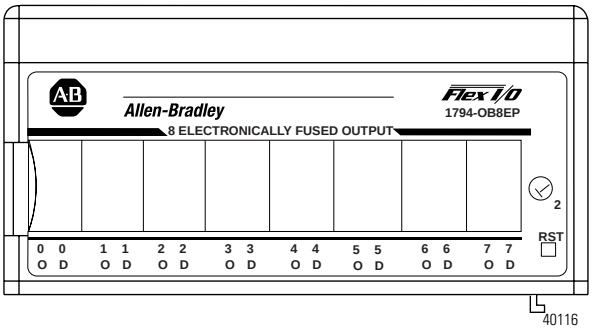
1794-TB3 and -TB3S

Output	Output Terminal	Common Terminal	Output	Output Terminal	Common Terminal
Output 0	A-0	C-35	Output 8	A-8	C-43
Output 1	A-1	C-36	Output 9	A-9	C-44
Output 2	A-2	C-37	Output 10	A-10	C-45
Output 3	A-3	C-38	Output 11	A-11	C-46
Output 4	A-4	C-39	Output 12	A-12	C-47
Output 5	A-5	C-40	Output 13	A-13	C-48
Output 6	A-6	C-41	Output 14	A-14	C-49
Output 7	A-7	C-42	Output 15	A-15	C-50
Common	B-16 thru B-33		+24v dc	C-34 thru C-51	

Specifications - 1794-OV16P	
Number of Outputs	16 (1 group of 16), non-isolated, sinking
Module Location	Cat. No. 1794-TB3 or -TB3S Terminal Base Unit
ON-State Voltage Range	10V dc minimum 24V dc nominal; 31.2V dc maximum
ON-State Voltage Drop	0.2V dc maximum
ON-State Current	1.0mA minimum per channel 500mA maximum per channel
OFF-State Voltage	31.2V dc maximum
OFF-State Leakage	0.5mA maximum
Isolation Voltage (min)	100% tested at 2121V dc for 1s between user and system No isolation between individual channels
Output Signal Delay OFF to ON ON to OFF	 0.5ms maximum 1.0ms maximum
Flexbus Current (max)	80mA
Power Dissipation	4.2W maximum @ 31.2V
Thermal Dissipation	14.3 BTU/hr @ 31.2V dc
Indicators (field side indication, logic driven)	16 yellow status indicators
Output Current Rating	8A (16 outputs @ 0.5A)
Surge Current	2A for 50ms, repeatable every 2s
Keyswitch Position	2
Fusing	Outputs are electronically protected

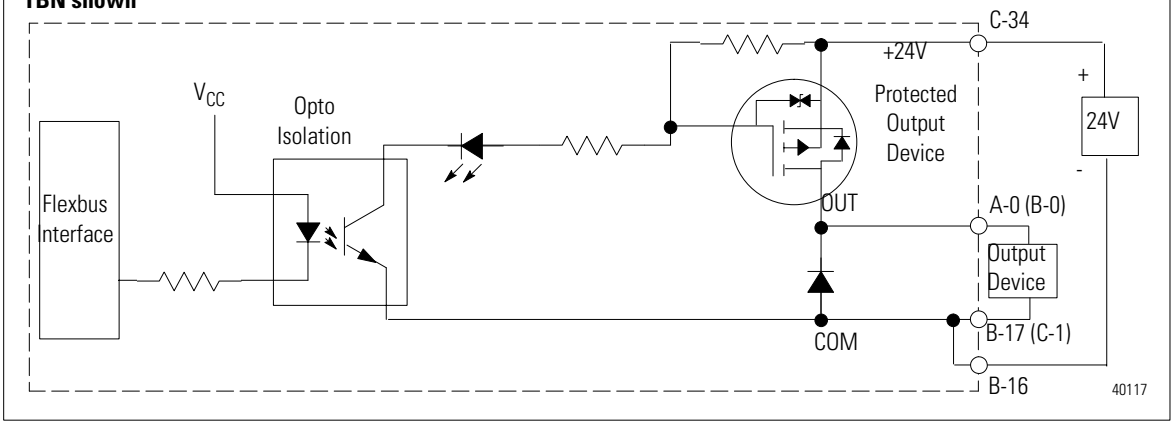
General Specifications	
External dc Power Supply Voltage Voltage Range Supply Current	 24V dc nominal 19.2 to 31.2V dc (includes 5% ac ripple) 49mA @ 24V dc (38mA to 65mA)
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7 in x 2.1in)
Environmental Conditions Operational Temperature Storage Temperature 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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) insulation maximum 2[1]
Publication Installation Instructions	 1794-5.52
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."



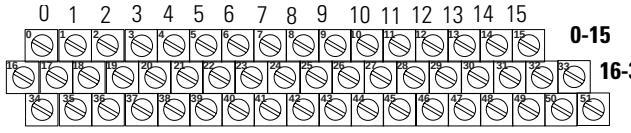
Recommended Terminal Base	Compatible Terminal Base(s)
TB3	TB3S, TBN, TB2

Typical Simplified Schematic for Output 0
TBN shown



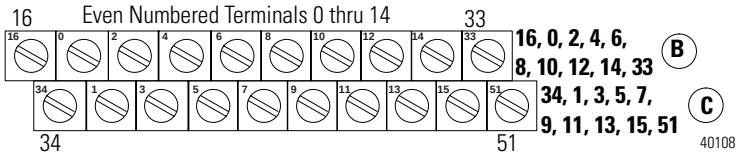
Wiring

1794-TB3
1794-TB3S
1794-TB2



34 and 51 for TB2

1794-TBN



1794-TB3, -TB3S, and -TB2			1794-TBN	
Output	**Output Terminal**	**Common Terminal[1]**	**Output Terminal**	**Common Terminal[2]**
Output 0	A-0	A-1[1]/B-17	B-0	C-1[2]
Output 1	A-2	A-3[1]/B-19	B-2	C-3[2]
Output 2	A-4	A-5[1]/B-21	B-4	C-5[2]
Output 3	A-6	A-7[1]/B-23	B-6	C-7[2]
Output 4	A-8	A-9[1]/B-25	B-8	C-9[2]
Output 5	A-10	A-11[1]/B-27	B-10	C-11[2]
Output 6	A-12	A-13[1]/B-29	B-12	C-13[2]
Output 7	A-14	A-15[1]/B-31	B-14	C-15[2]

A = output terminals
B = common terminals
C = power terminals (C-34 thru 51 for 1794-TB3, -TB3S; 34 and 51 for 1794-TB2)

B = even numbered output terminals 0 thru 14, dc common terminals 16 and 33
C = power terminals C-34 and C-51, and odd numbered output common terminals 1 thru 15

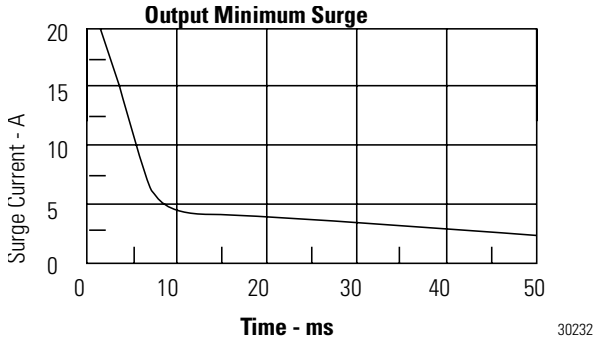
1 A-1, 3, 5, 7, 9, 11, 13, and 15 are connected together inside the module to 24V dc common.
2 C-1, 3, 5, 7, 9, 11, 13, and 15 are connected together inside the module to 24V dc common.

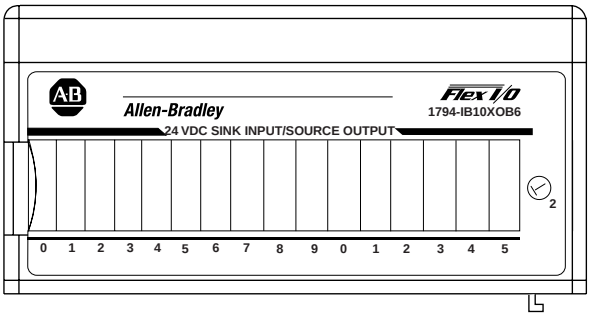
Specifications - 1794-OB8EP	
Number of Outputs	8 (1 group of 8), non-isolated, sourcing
Module Location	Cat. No. 1794-TB3, -TB3S, -TBN, or -TB2 Terminal Base Unit
ON-State Voltage Range	19.2V dc minimum 24V dc nominal; 31.2V dc maximum
ON-State Voltage Drop	0.2V dc maximum
ON-State Current	1.0mA minimum per channel 2.0A maximum per channel
OFF-State Voltage	31.2V dc maximum
OFF-State Leakage	0.5mA maximum
Isolation Voltage (min)	100% tested at 850V dc for 1s between user and system No isolation between individual channels
Output Signal Delay[1] OFF to ON ON to OFF	 0.1ms maximum 0.1ms maximum
Flexbus Current (max)	73mA
Power Dissipation	5.5W maximum @ 31.2V
Thermal Dissipation	18.8 BTU/hr @ 31.2V dc
Indicators (field side indication, logic driven)	8 yellow status indicators; 8 red fault indicators
Output Current Rating	Maximum 2.0A per output 10A maximum per module (e.g. 8 outputs @ 1.25A, 5 outputs @ 2.0A, or similar output/ ampere combinations totaling 10A or less)
Surge Current	4A for 10ms, repeatable every 3 seconds (see chart)
Keyswitch Position	2
Fusing	Outputs are electronically protected.

General Specifications	
External dc Power Supply Voltage Voltage Range Supply Current	 24V dc nominal 19.2 to 31.2V dc (includes 5% ac ripple) 80mA @ 24V dc
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7 in x 2.1in)
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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) insulation maximum 2[2]
Publication Installation Instructions	 1794-5.20
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

1 Off/on delay is time from a valid output "on" signal to output energization. On/off delay is time from a valid output "off" signal to output deenergization.

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

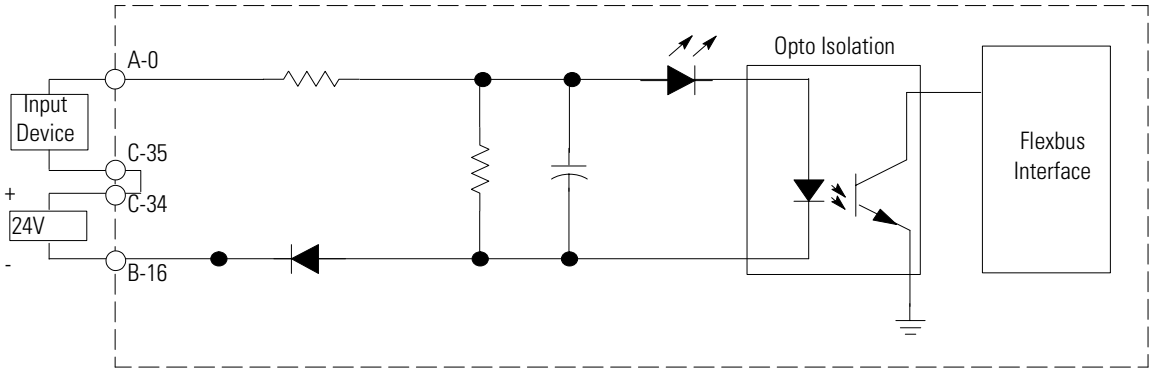




40122

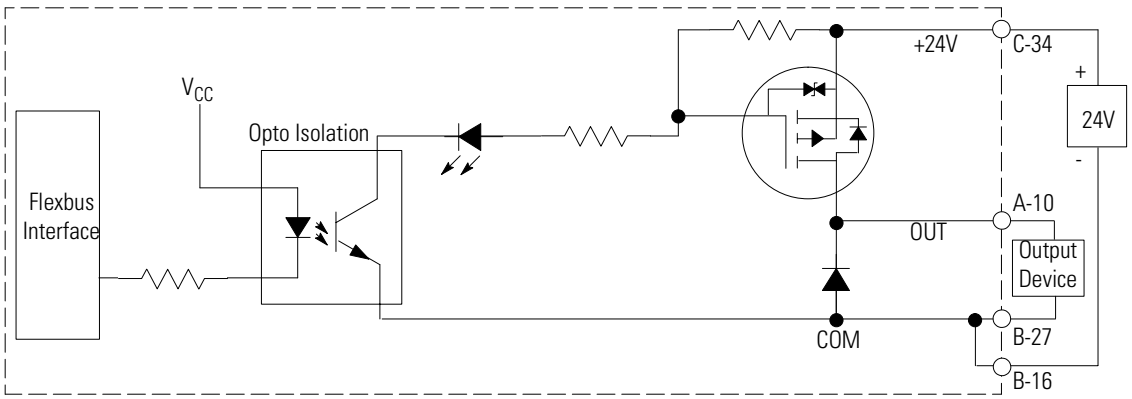
Recommended Terminal Base	Compatible Terminal Base(s)
	

Typical Simplified Schematic for Input 0
TB3 or TB3S shown



40123

Typical Simplified Schematic for Output 0



40124

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

1. Connect the associated input or output power to the corresponding terminal on the **34-51** row **(C)** for each as indicated in the table below. (Power terminals 34 thru 51 are internally connected together.)
2. Connect the +24V dc power to terminal 34 on the **34-51** row **(C)**.
3. 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.
4. Connect the associated input or output return to the corresponding terminal on the **16-33** row **(B)** for each as indicated in the table below. (Returns are internally connected together.)
5. Connect 24V dc return to terminal 16 on the **16-33** row **(B)**.
6. If continuing 24V return to the next terminal base unit, connect a jumper from terminal 33 (return) on this base unit to terminal 16 on the next base unit.
7. Connect the individual input and output wiring to numbered terminals on the **00-15** row **(A)** as indicated in the table below.

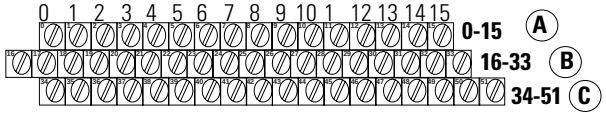
ATTENTION

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

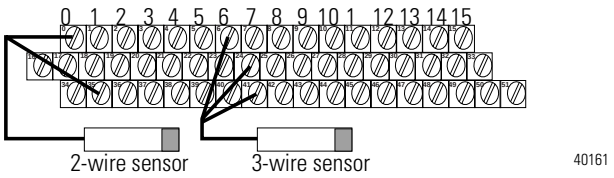
Channel	Signal Type[1]	1794-TB3 and -TB3S		
		Signal	Return[2]	Supply[3]
Input				
0	Sink Input	A-0	B-17	C-35
1	Sink Input	A-1	B-18	C-36
2	Sink Input	A-2	B-19	C-37
3	Sink Input	A-3	B-20	C-38
4	Sink Input	A-4	B-21	C-39
5	Sink Input	A-5	B-22	C-40
6	Sink Input	A-6	B-23	C-41
7	Sink Input	A-7	B-24	C-42
8	Sink Input	A-8	B-25	C-43
9	Sink Input	A-9	B-26	C-44
Output				
0	Source Output	A-10	B-27	
1	Source Output	A-11	B-28	
2	Source Output	A-12	B-29	
3	Source Output	A-13	B-30	
4	Source Output	A-14	B-31	
5	Source Output	A-15	B-32	
	24V dc Return	16 thru 33		
	+24V dc power	34 thru 51		

1 2-wire devices use signal and supply terminals, 3-wire input devices use signal, return, and supply terminals.
2 +24V return internally connected to terminals 16 thru 33.
3 +24V dc power internally connected to terminals 34 thru 51.

1794-TB3, -TB3S



Example of 2-wire and 3-wire sensor



Setting Input Filter Time (Standard Addressing Mode Only)

(not available when used with the 1794-ASB adapter)

You can select the input filter time (FT) for the input channels (channels 00 through 09). 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.

Bits			Description	Filter Time
10	09	08	Filter Time for Inputs 00-09	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

Specifications - 1794-IB10XOB6	
Module Location	Cat. No. 1794-TB3 or -TB3S Terminal Base Unit
Isolation Voltage (min)	1250V ac (rms) isolation 100% tested at 2121V dc for 1s between user and system No isolation between individual channels
Flexbus Current (max)	35mA @ 5V dc
Power Dissipation	6.0W maximum @ 31.2V
Thermal Dissipation	20.3 BTU/hr @ 31.2V dc
Keyswitch Position	2
Fusing[1]	SAN-O MQ4-3A Littelfuse 235 003
Input Specifications	
Number of Inputs	10 (1 group of 10), non-isolated, sinking
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	4.8K Ω maximum
Input Filter Time[2] 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. (Not selectable when used with the 1794-ASB adapter.)
Indicators (field side indication, customer device driven)	10 yellow status indicators
Output Specifications	
Number of Outputs	6 (1 group of 6), non-isolated, sourcing
ON-State Voltage Range	10V dc minimum; 24V dc nominal; 31.2V dc maximum
ON-State Voltage Drop	1V dc @ 2A, 0.5V dc @ 1A maximum
ON-State Current	1.0mA minimum per channel; 2.0A maximum per channel; 10A maximum per module
OFF-State Voltage	31.2V dc maximum
OFF-State Leakage	0.5mA maximum
Output Current Rating	2A per output, 10A per module maximum
Output Signal Delay[3] OFF to ON ON to OFF	 0.5ms maximum 1.0ms maximum
Surge Current	4A for 50ms, repeatable every 2s
Indicators (field side indication, logic driven)	6 yellow status indicators

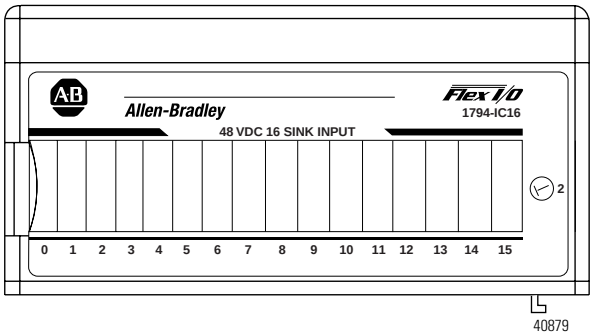
General Specifications	
External dc Power Supply Voltage Voltage Range Output Supply Current	 24V dc nominal 19.2 to 31.2V dc (includes 5% ac ripple) 15mA @ 19.2V dc; 19mA @ 24V dc 24mA @ 30V dc; 25mA @ 31.2V dc
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
Environmental Conditions Operational 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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) insulation maximum 2[4]
Publication Installation Instructions	 1794-5.24
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

1 Module outputs are not fused but fusing of outputs is recommended. If external fusing is required, you must provide external fusing.

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

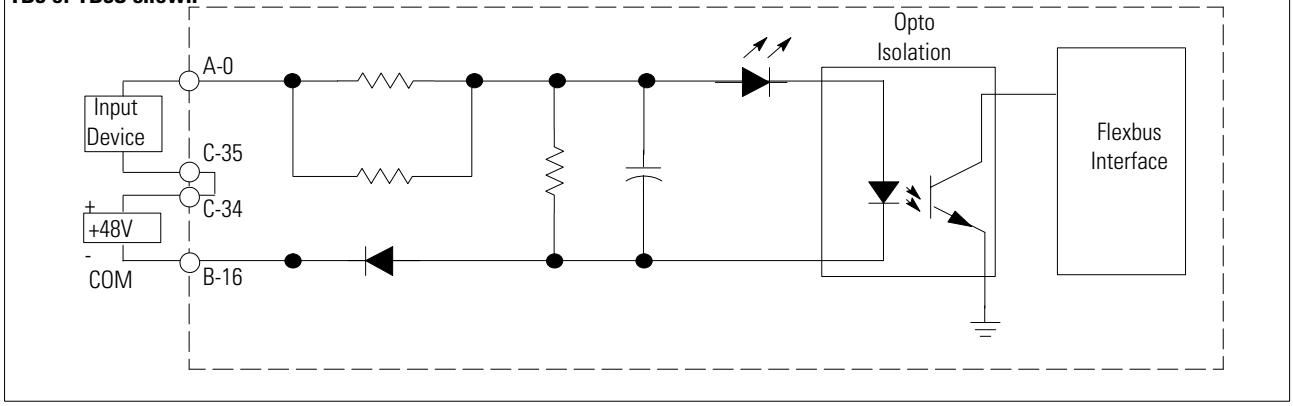
3 Output off-to-on or on-to-off delay is the time from the module issuing an output on or off until the output actually turns on or off.

4 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."



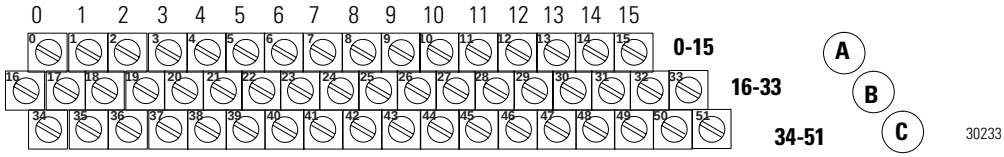
Recommended Terminal Base	Compatible Terminal Base(s)
TB3	TB3S

Typical Simplified Schematic for Input 0
TB3 or TB3S shown



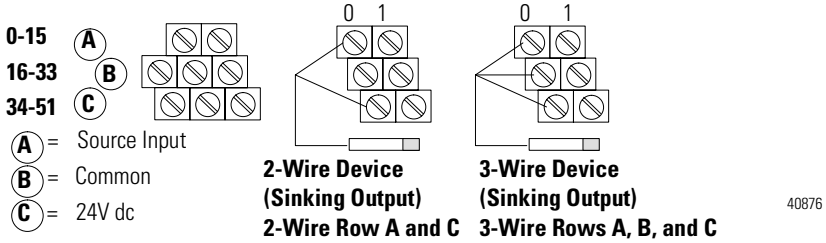
Wiring

1794-TB3
1794-TB3S



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		+48V dc	C-34 thru C-51	

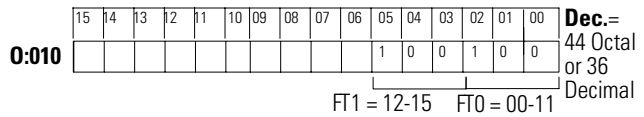
2-Wire and 3-Wire Inputs to the 1794-IC16 Module



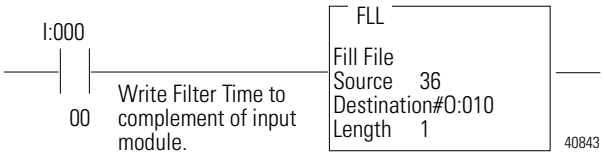
Setting Input Filter Times

This module has a built-in 1ms filter. You can select additional input filter time (FT) for each group of channels (channels 00 through 11, or channels 12 through 15). Select the additional input filter time by setting the corresponding bits in the **output** image table (complementary word) for the module.

For example, to set an additional filter 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. This would result in a total filter time of 5ms.



Write Filter Time on system startup.



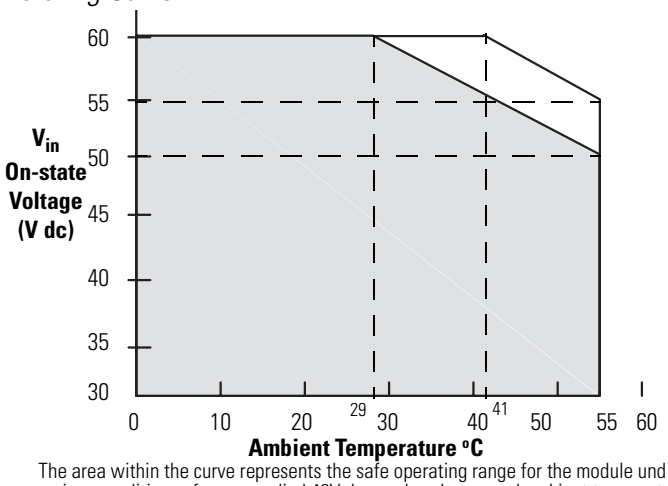
Input Filter Times (Standard Addressing Mode Only)

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

Specifications - 1794-IC16	
Number of Inputs	16 (1 group of 16), non-isolated, sinking
Module Location	Cat. No. 1794-TB3 or -TB3S Terminal Base Unit
Mounting	Refer to derating curve
ON-State Voltage	30V dc minimum; 48V dc nominal; 60V dc maximum
ON-State Current	2.0mA minimum; 5.0mA nominal at 48V dc; 11.0mA maximum
OFF-State Voltage	10.0V dc maximum
OFF-State Current	1.5mA minimum
Input Impedance	11K Ω maximum
Isolation Voltage	100% tested at 1900V dc for 1s between user and system No isolation between individual channels
Maximum Input Filter Times OFF to ON ON to OFF	Minimum 1ms plus selected filter time of: 256µs, 512µs, 1ms, 2ms, 4ms, 8ms, 16ms, 32ms 256µs, 512µs, 1ms, 2ms, 4ms, 8ms, 16ms, 32ms 256µs default - selectable thru output image table (see *Setting Input Filter Times*)
Flexbus Current (max)	25mA
Power Dissipation	Maximum 6.4W @ 60V dc
Thermal Dissipation	Maximum 21.9 BTU/hr @ 60V dc
Indicators (field side indication, customer device driven)	16 yellow status indicators
Keyswitch Position	2
General Specifications	
External dc Power Supply Voltage Voltage Range Input Supply Current	 48V dc nominal 30 to 60V dc (includes 5% ac ripple) 51mA @ 30V 82mA @ 48V 107mA @ 60V
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
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 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) insulation maximum 2[1]
Publication Installation Instructions	 1794-5.53
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

Derating Curve



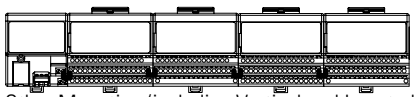
The area within the curve represents the safe operating range for the module und various conditions of user supplied 48V dc supply voltages and ambient temperatu

= Normal mounting safe operating range, included

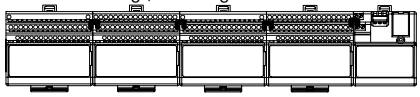
= Other mounting positions (including inverted horizontal) safe operating range)

41119

Normal Mounting - Horizontal

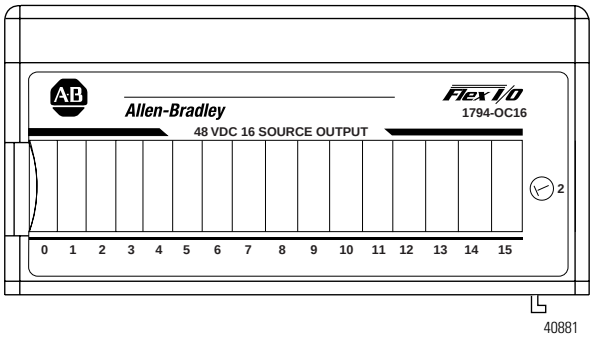


Other Mounting (including Vertical and Inverted Horizontal Mounting)



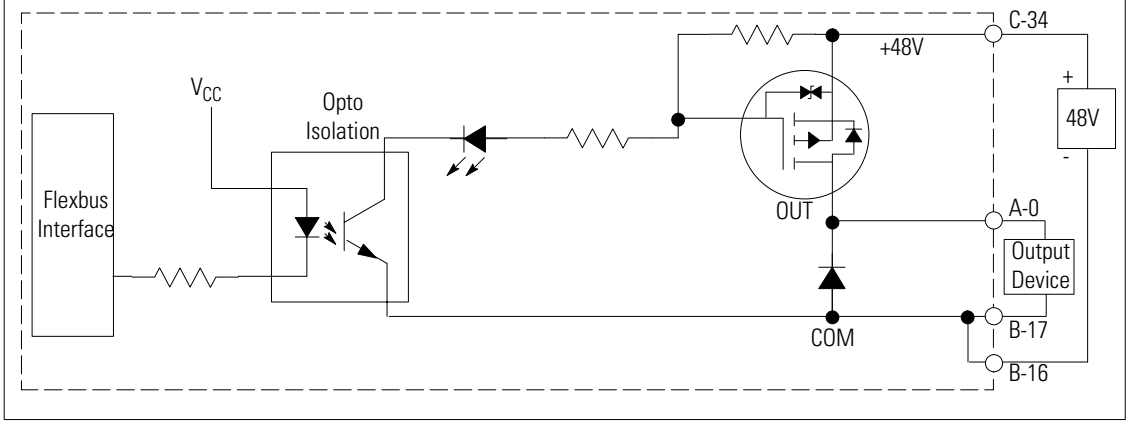
40221

If maximum voltage is 60, the maximum temperature is 41 (normal) 29 (other).
If maximum voltage is 55, the maximum temperature is 55 (normal) 42 (other).
If maximum voltage is 50, the maximum temperature is 55 (normal) 55 (other).



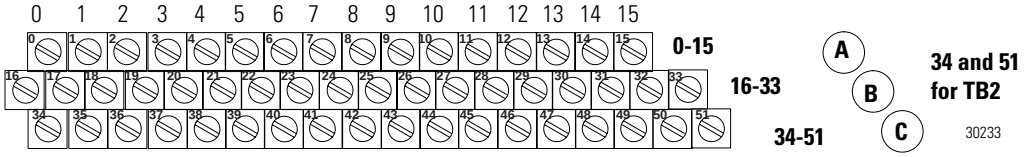
Recommended Terminal Base	Compatible Terminal Base(s)
 TB3	 TB3S  TB2

Typical Simplified Schematic for Output 0
TB3, TB3S, or TB2 shown



Wiring

1794-TB3
1794-TB3S
1794-TB2



Output	Output Terminal	Common Terminal	Output	Output Terminal	Common Terminal
Output 0	A-0	B-17	Output 8	A-8	B-25
Output 1	A-1	B-18	Output 9	A-9	B-26
Output 2	A-2	B-19	Output 10	A-10	B-27
Output 3	A-3	B-20	Output 11	A-11	B-28
Output 4	A-4	B-21	Output 12	A-12	B-29
Output 5	A-5	B-22	Output 13	A-13	B-30
Output 6	A-6	B-23	Output 14	A-14	B-31
Output 7	A-7	B-24	Output 15	A-15	B-32
Common	B-16 thru B-33		+48V dc	C-34 thru C-51 (C-34 and C-51 for TB2)	

Specifications - 1794-OC16	
Number of Outputs	16 (1 group of 16), non-isolated, sourcing
Module Location	Cat. No. 1794-TB3, -TB3S, or -TB2 Terminal Base Unit
ON-State Voltage Range	30V dc minimum 48V dc nominal; 60V dc maximum @ 45ºC 55V dc maximum @ 55ºC
ON-State Voltage Drop	1.0V dc maximum @ 0.5A
ON-State Current	2.0mA minimum per channel 500mA maximum per channel
OFF-State Voltage	60V dc maximum
OFF-State Leakage	1.0mA maximum
Isolation Voltage (min)	100% tested at 1900V dc for 1s between user and system No isolation between individual channels
Output Signal Delay[1] OFF to ON ON to OFF	 0.5ms maximum 1.0ms maximum @ 25ºC 2.0ms maximum @ 55ºC
Flexbus Current (max)	80mA
Power Dissipation	3.7W maximum @ 60V
Thermal Dissipation	12.6 BTU/hr @ 60V dc
Indicators (field side indication, logic driven)	16 yellow status indicators
Output Current Rating	8A (16 outputs @ 0.5A)
Surge Current	4A for 10ms, repeatable every 2s
Keyswitch Position	2
Fusing	2.0A, 150V ac MQ2 normal fuse

General Specifications	
External dc Power Supply Voltage Voltage Range Supply Current	 48V dc nominal 30 to 60V dc (includes 5% ac ripple) 13mA @ 30V dc 21mA @ 48V dc 27mA @ 60V dc
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7 in x 2.1in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Non-operating Vibration	 0 to 55ºC (32 to 131ºF) -40 to 85ºC (-40 to 185ºF) 5 to 95% noncondensing 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) insulation maximum 2[1]
Publication Installation Instructions	 1794-5.54
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

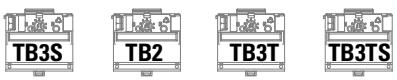
1 Off/On delay is the time from a valid output "on" signal to output energization. On/Off delay is the time from a valid output "off" signal to output deenergization.

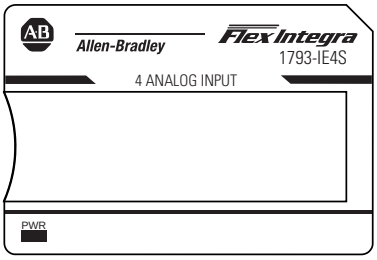
2 You use this conductor category information for planning conductor routing as described in the system level installation manual.

Use the following table to determine which analog module will meet your application needs.

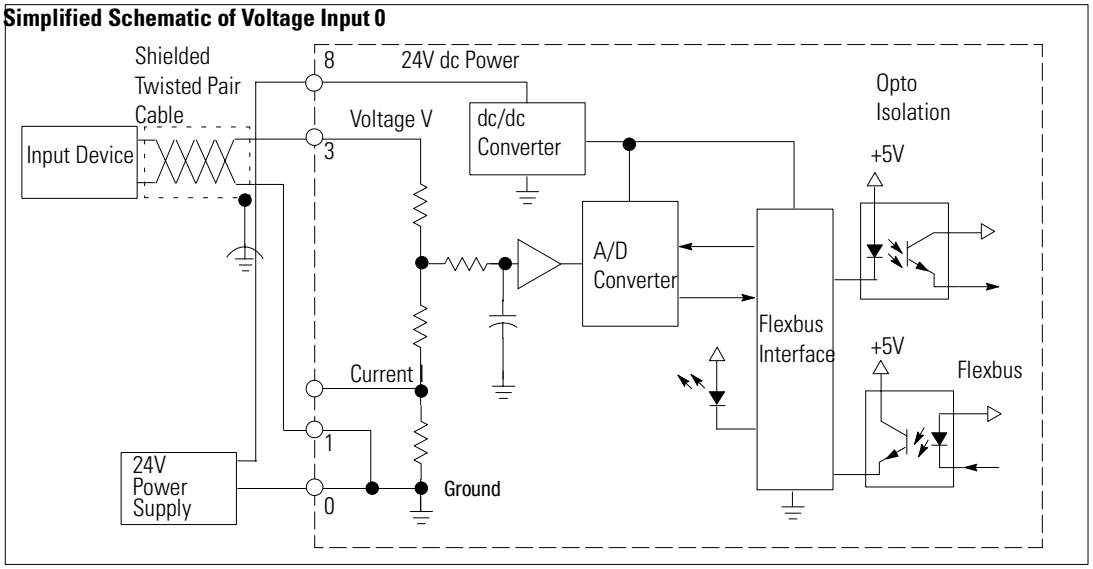
	Analog Module	Purpose	See Page
FLEX Integra	1793-IE4 and -IE4S	24V dc selectable analog 4 input module - 1793-IE4 has screw-clamp terminations while the 1793-IE4S has spring-clamp terminations	**91**
	1793-OE2 and -OE2S	24V dc selectable analog 2 output module - 1793-OE2 has screw-clamp terminations while the 1793-OE2S has spring-clamp terminations	**93**
	1793-IE2XOE1 and -IE2XOE1S	24V dc 4 input/2 output analog combo module - 1793-IE2XOE1 has screw-clamp terminations while the 1793-IE2XOE1S has spring-clamp terminations	**95**
FLEX I/O	1794-IE8/B	24V dc selectable analog 8 input module	**98**
	1794-OE4/B	24V dc selectable analog 4 output module	**100**
	1794-IE4XOE2/B	24V dc 4 input/2 output analog combo module	**103**

The following table illustrates the recommended terminal base unit(s) for each analog module.

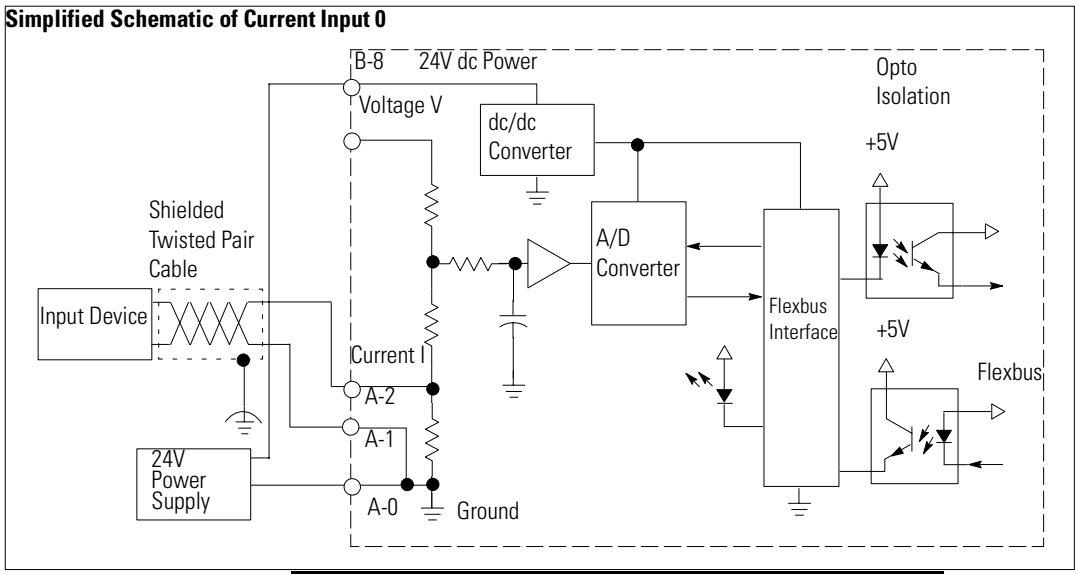
FLEX I/O Product	Catalog Number	Recommended Terminal Base	Compatible Terminal Base(s)
Analog			
24V dc Modules	1794-IE8/B		
	1794-OE4/B		
	1794-IE4XOE2/B		



Simplified Schematic of Voltage Input 0



Simplified Schematic of Current Input 0

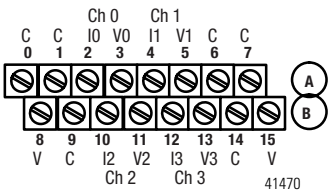


ATTENTION

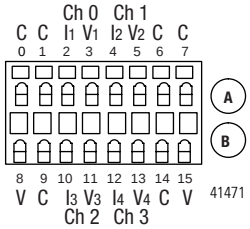
Only connect either a voltage input or a current input per channel, not both.

Wiring

1793-IE4



1793-IE4S



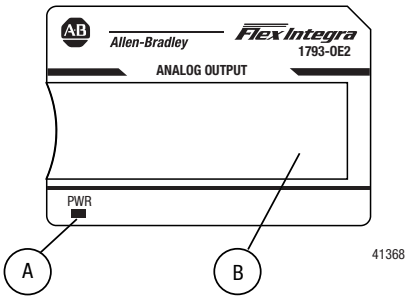
Where: V = 24V dc; C = 24V dc common; In = current in; Vn = voltage in

Channel	Signal Type	Label Markings	Input Terminal	Common Terminal
0	Current	I	A-2	A-1
	Voltage	V	A-3	
1	Current	I	A-4	A-6
	Voltage	V	A-5	
2	Current	I	B-10	B-9
	Voltage	V	B-11	
3	Current	I	B-12	B-14
	Voltage	V	B-13	
24V dc	Terminals 8 and 15 are internally connected together in the module			
24V dc common	Terminals 0, 1, 6, 7, 9 and 14 are internally connected together in the module			

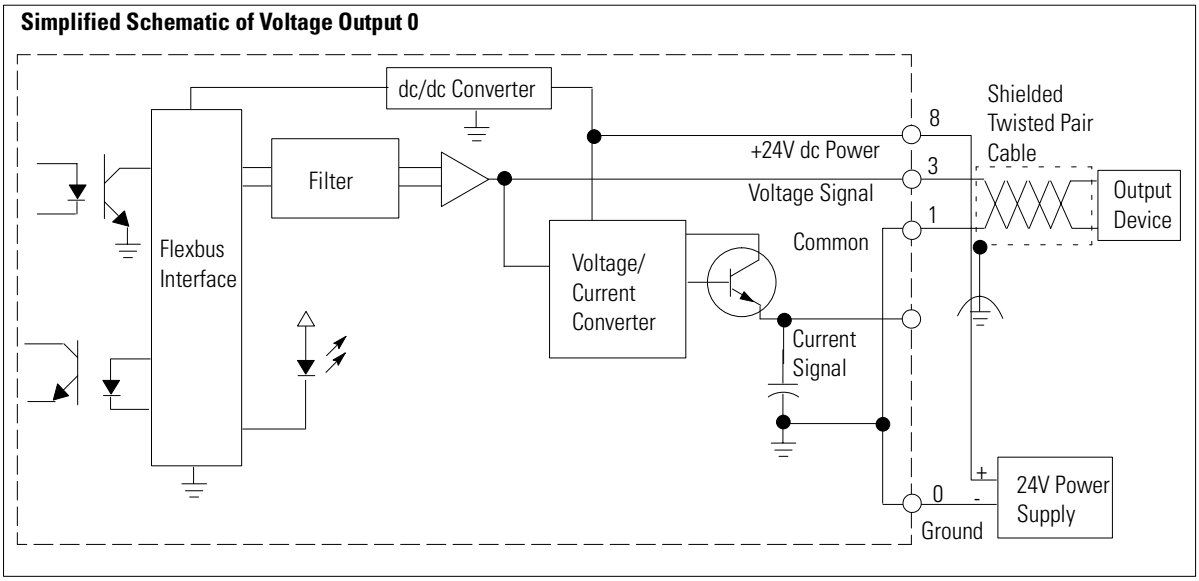
Specifications - 1793-IE4 and -IE4S	
Module Type	4 analog inputs 1793-IE4 - 16 screw-cage terminals 1793-IE4S - 16 spring-clamp terminals
Module Location	DIN rail mounting
Number of Channels	4
Data Format	16-bit 2's complement, left-justified
Conversion Type	Successive approximation
Conversion Rate	256µs all channels
Resolution Voltage Current	12-bits - unipolar; 11-bit plus sign - bipolar 2.56mV/cnt unipolar; 5.13mV/cnt bipolar 5.13µA/cnt
Input Current Terminal	4-20mA (user configurable) 0-20mA (user configurable)
Input Voltage Terminal	±10V (user configurable) 0-10V (user configurable)
Normal Mode Rejection Ratio Voltage Terminal Current Terminal	 -3db @ 17Hz; -20db/decade -10db @ 50Hz; -11.4db @ 60Hz -3db @ 17Hz; -20db/decade -15.3db @ 50Hz; -16.8db @ 60Hz
Step Response to 63% Voltage Terminal Current Terminal	 9.4ms 18.2ms

Specifications - 1793-IE4 and -IE4S (continued)	
Impedance Voltage Terminal Current Terminal	 100K Ω; 200K Ω @ dc 238Ω
Absolute Accuracy Voltage Terminal Current Terminal	 0.20% FS @ 25°C 0.20% FS @ 25°C
Accuracy Drift Voltage Terminal Current Terminal	 0.00428% FS per °C 0.00407% FS per °C
Maximum Overload Voltage Terminal Current Terminal	Single channel, continuous 30V 32mA
Dielectric Withstand Test	Channel to system - 850V dc for 1s Channel to channel - None
Flexbus Current	20mA maximum
Power Dissipation	1.0W @ 31.2V dc
Thermal Dissipation	3.4 BTU/hr @ 31.2V dc
Indicators	1 green power indicators
External dc PowerVoltage Current	19.2-31.2V dc (5% ac ripple) 60mA maximum
Dimensions (HxWxD)	69mm x 55mm x 80mm (2.72in x 2.17in x 3.15in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Nonoperating Vibration	 0 to +55°C (32 to +131°F) -40 to +85°C (-40 to +185°F) 5 to 95% noncondensing Tested to 30g peak acceleration, 11(+1)ms pulse width Tested to 50g peak acceleration, 11(+1)ms pulse width Tested 5g @ 10-500Hz per IEC68-2-6
ConductorsWire Size Category[1]	12 gauge (4mm²) stranded wire 3/64 in (1.2mm) maximum insulation, 90°C min. temperature rating 2
Terminal Screw Torque	4-7 inch-pounds
Publications Installation Instructions	 1793-5.4
Agency Certification	c UL us CE C-Tick

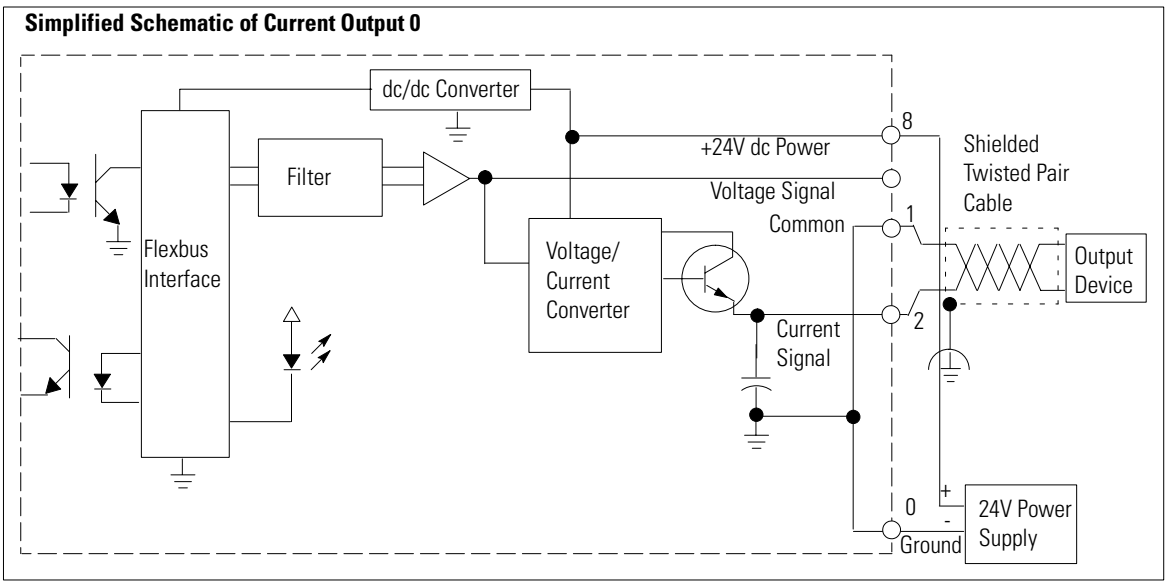
1 Use this category information for planning conductor routing as described in publication 1770-4.1, "Wiring and Grounding Guidelines for Noise Immunity."



Simplified Schematic of Voltage Output 0

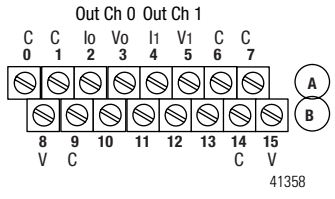


Simplified Schematic of Current Output 0

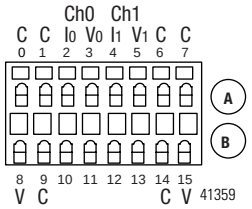


Wiring

1793-OE2



1793-OE2



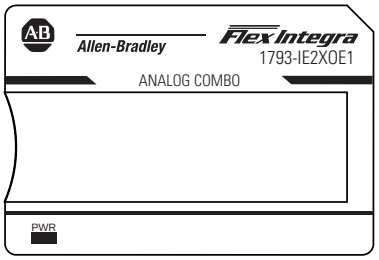
Where: V = 24V dc power; C = common; I = current output; V = voltage output

Channel	Type	Label Markings	Signal	Return
0	Current Signal	I	A-2	
	Current Common	RET		A-1
	Voltage Signal	I	A-3	
	Voltage Common	RET		A-1
1	Current Signal	I	A-4	
	Current Common	RET		A-6
	Voltage Signal	I	A-5	
	Voltage Common	RET		A-6
24V dc	Terminals 8 and 15			
24V dc Common	Terminals 0, 1, 6, 7, 9 and 14.			

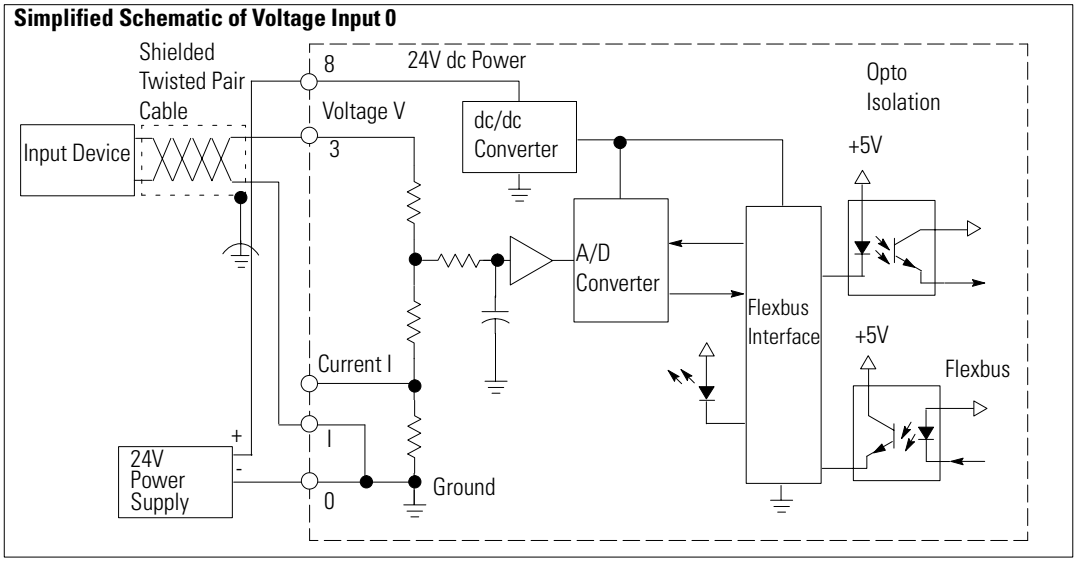
Specifications - 1793-OE2 and -OE2S	
Module Type	2 analog output 1793-OE2 - 16 screw-cage terminals 1793-OE2S - 16 spring-clamp terminals
Module Location	DIN rail mounting
Number of Channels	2 out - nonisolated
Output	
Resolution Voltage Current	12-bits plus sign 2.56mV/cnt 5.13μA/cnt
Data Format	Left justified 16-bit 2's complement
Conversion Type	Pulse width modulation
Conversion Rate	1.024ms all channels
Current Terminal	4-20mA (user configurable) 0-20mA (user configurable)
Voltage Terminal	±10V (user configurable) 0-10V (user configurable) 3mA maximum
Step Response to 63% Voltage Terminal Current Terminal	 24ms 24ms
Impedance Voltage Terminal Current Terminal	 15-750 Ω resistive 15-750 Ω resistive
Absolute Accuracy Voltage Terminal Current Terminal	 0.133% FS @ 25°C 0.425% FS @ 25°C
Accuracy Drift Voltage Terminal Current Terminal	 0.0045% FS per °C 0.0069% FS per °C

Specifications - 1793-OE2 and -OE2S	
Dielectric Withstand Test	Channel to system - 850V dc for 1s Channel to channel - None
General	
Flexbus Current	20mA maximum
Power Dissipation	2.5W @ 31.2V dc
Thermal Dissipation	8.5 BTU/hr @ 31.2V dc
Indicators	1 green power indicators
External dc PowerVoltage Current	19.2-31.2V dc (5% ac ripple) 70mA maximum
Dimensions (HxWxD)	69mm x 55mm x 80mm (2.72in x 2.17in x 3.15in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Nonoperating Vibration	 0 to +55°C (32 to +131°F) -40 to +85°C (-40 to +185°F) 5 to 95% noncondensing Tested to 30g peak acceleration, 11(+1)ms pulse width Tested to 50g peak acceleration, 11(+1)ms pulse width Tested 5g @ 10-500Hz per IEC68-2-6
ConductorsWire Size Category[1]	12 gauge (4mm^2) stranded wire 3/64 in (1.2mm) maximum insulation, 90°C min. temperature rating 2
Terminal Screw Torque	4-7 inch-pounds
Publications Installation Instructions	 1793-5.5
Agency Certification	

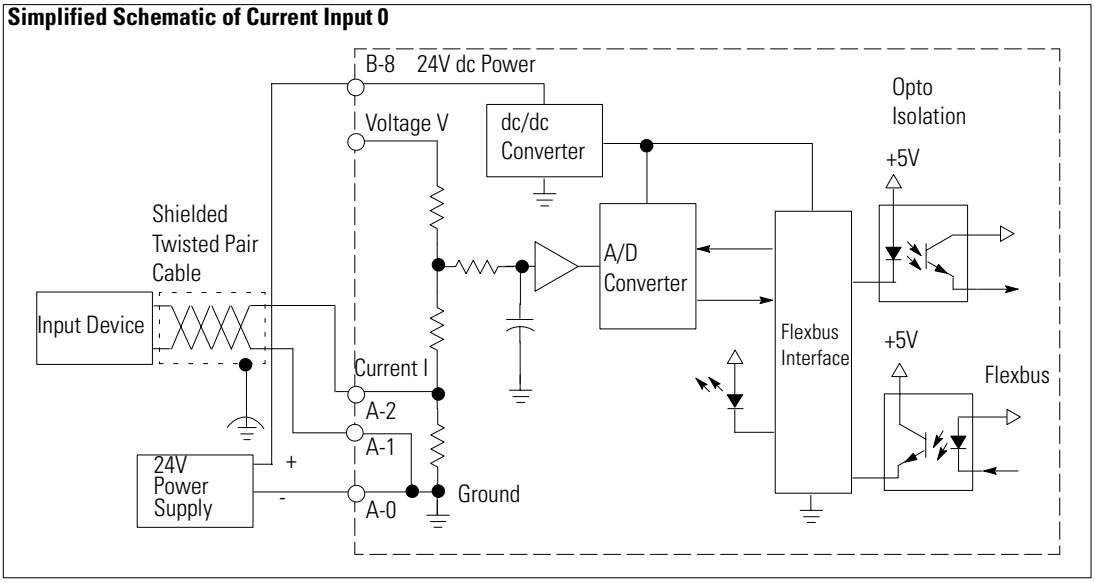
1 Use this category information for planning conductor routing as described in publication 1770-4.1, "Wiring and Grounding Guidelines for Noise Immunity."



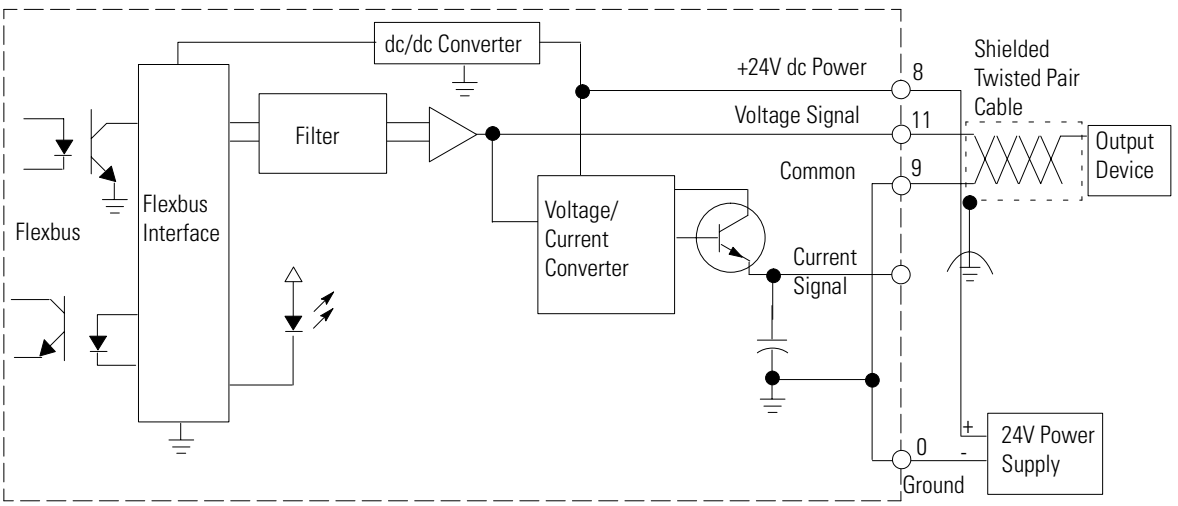
Simplified Schematic of Voltage Input 0



Simplified Schematic of Current Input 0

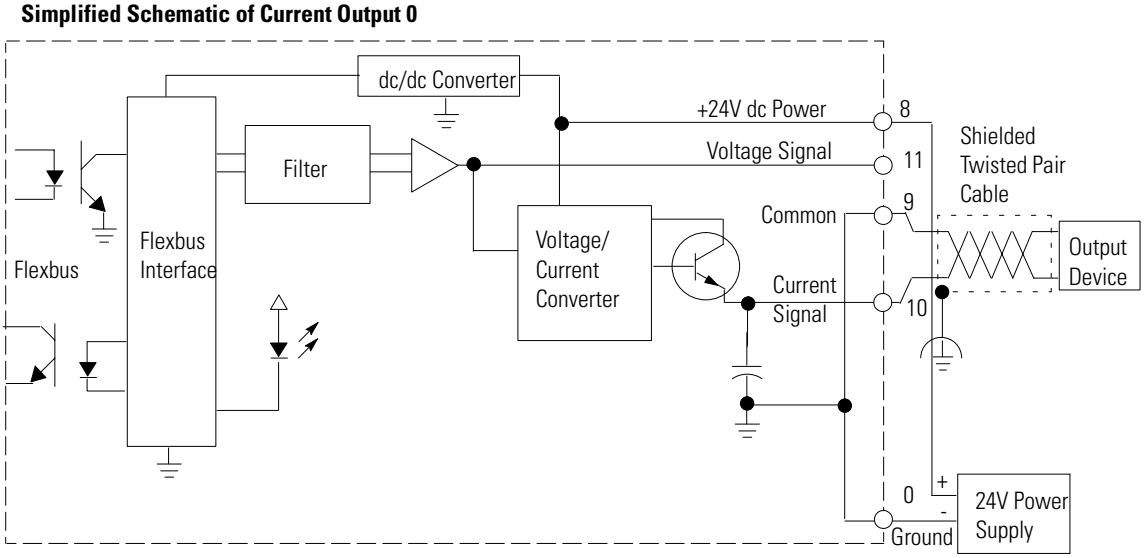


Simplified Schematic of Voltage Output 0



41496

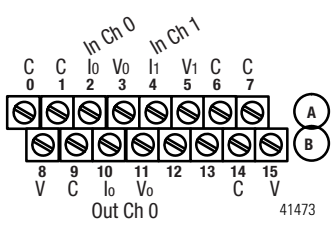
Simplified Schematic of Current Output 0



41497

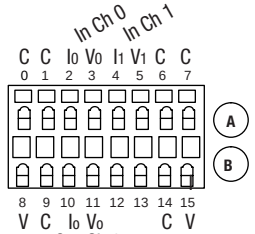
Wiring

1793-IE2XOE1



41473

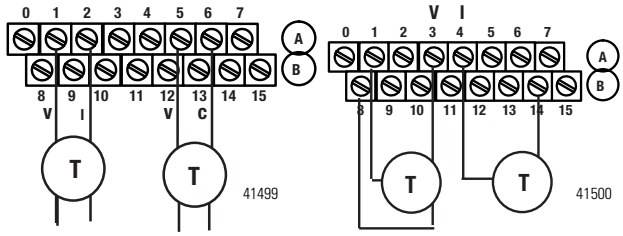
1793-IE2XOE1S



41472

Where: C = common; V = +24V dc power; $I_{0,1}$ = current in; $V_{0,1}$ = voltage in; I_o = current out; V_o = voltage out

Channel	Signal Type	Label Markings	Signal	Return
Input				
0	Current	I	A-2	A-1
	Voltage	V	A-3	
1	Current	I	A-4	A-6
	Voltage	V	A-5	
Output				
0	Current	I	B-10	B-9
	Voltage	V	B-11	
+24V dc	Terminals 8 and 15 are internally connected to +V.			
24V dc common	Terminals 0, 1, 6, 7, 9, 14 are internally connected together in the module.			



ac or dc 4-wire current transmitter (external power)

ac or dc 4-wire voltage transmitter (external power)

3-wire current transmitter (base powered)

2-wire voltage transmitter (base powered)

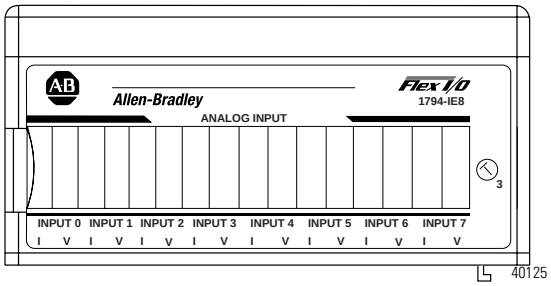
ATTENTION

Use a 100Ω, 25W or greater, resistor when connecting to a low-impedence device, i.e., panel meter. Failure to do so can result in damage to output circuitry.

Specifications - 1793-IE2XOE1 and -IE2XOE1S	
Module Type	2 analog inputs, 1 analog output 1793-IE2XOE1 - 16 screw-cage terminals 1793-IE2XOE1S - 16 spring-clamp terminals
Module Location	DIN rail mounting
Number of Channels	3 - 2 in, 1 out - nonisolated
Input	
Resolution Voltage Current	12-bits - unipolar; 11-bit plus sign - bipolar 2.56mV/cnt unipolar; 5.13mV/cnt bipolar 5.13µA/cnt
Data Type	left justified 16-bit 2's complement
Conversion Type	Successive approximation
Conversion Rate	256µs all channels
Input Current Terminal	4-20mA (user configurable) 0-20mA (user configurable)
Input Voltage Terminal	±10V (user configurable) 0-10V (user configurable)
Normal Mode Rejection Ratio Voltage Terminal Current Terminal	 -3db @ 17Hz; -20db/decade -10db @ 50Hz; -11.4db @ 60Hz -3db @ 17Hz; -20db/decade -15.3db @ 50Hz; -16.8db @ 60Hz
Step Response to 63% Voltage Terminal Current Terminal	 9.4ms 18.2ms
Impedance Voltage Terminal Current Terminal	 9.4ms100K Ω; 200K Ω @ dc 238Ω
Absolute Accuracy Voltage Terminal Current Terminal	 0.20% FS @ 25°C 0.20% FS @ 25°C
Accuracy Drift Voltage Terminal Current Terminal	 0.00428% FS per °C 0.00407% FS per °C
Maximum Overload Voltage Terminal Current Terminal	Single channel, continuous 30V 32mA

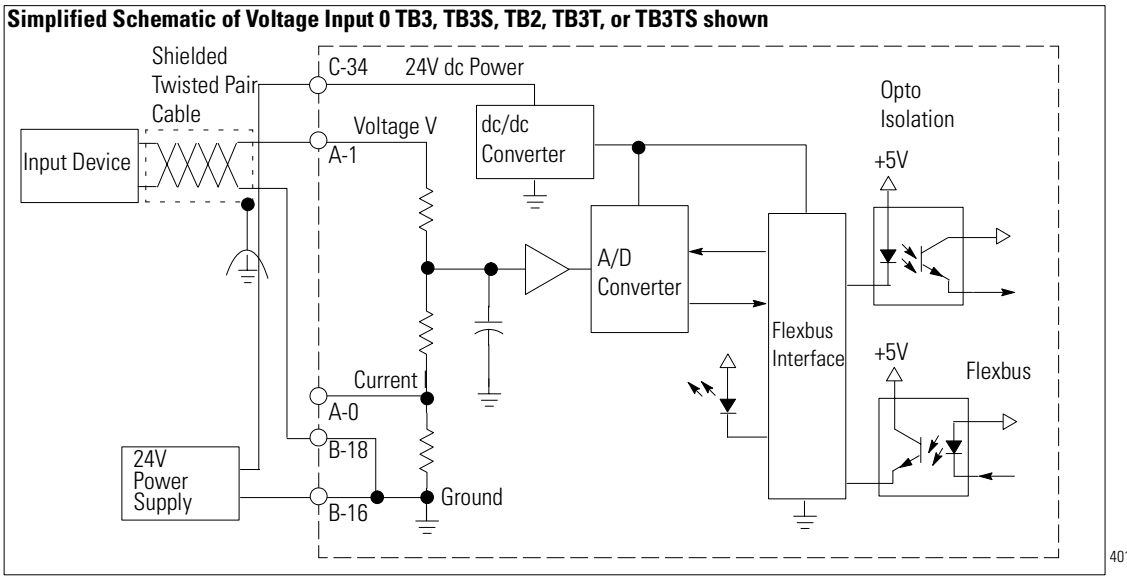
Specifications - 1793-IE2XOE1 and -IE2XOE1S	
Output	
Resolution Voltage Current	12-bits plus sign 2.56mV/cnt 5.13µA/cnt
Data Type	left justified 16-bit 2's complement
Conversion Type	Pulse width modulation
Conversion Rate	1.024ms all channels
Current Terminal	4-20mA (user configurable) 0-20mA (user configurable)
Voltage Terminal	±10V (user configurable) 0-10V (user configurable) 3mA maximum
Step Response to 63% Voltage Terminal Current Terminal	 24ms 24ms
Impedance Voltage Terminal Current Terminal	 15-750 Ω resistive 15-750 Ω resistive
Absolute Accuracy Voltage Terminal Current Terminal	 0.133% FS @ 25°C 0.425% FS @ 25°C
Accuracy Drift Voltage Terminal Current Terminal	 0.0045% FS per °C 0.0069% FS per °C
General Specifications	
Dielectric Withstand Test	Channel to system - 850V dc for 1s Channel to channel - None
Flexbus Current	20mA maximum
Power Dissipation	2.5W @ 31.2V dc
Thermal Dissipation	8.5 BTU/hr @ 31.2V dc
Indicators	1 green power indicators
External dc PowerVoltage Current	19.2-31.2V dc (5% ac ripple) 100mA maximum
Dimensions (HxWxD)	69mm x 55mm x 80mm (2.72in x 2.17in x 3.15in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Nonoperating Vibration	 0 to +55°C (32 to +131°F) -40 to +85°C (-40 to +185°F) 5 to 95% noncondensing Tested to 30g peak acceleration, 11(+1)ms pulse width Tested to 50g peak acceleration, 11(+1)ms pulse width Tested 5g @ 10-500Hz per IEC68-2-6
ConductorsWire Size Category[1]	12 gauge (4mm²) stranded wire 3/64 in (1.2mm) maximum insulation, 90°C min. temperature rating 2
Terminal Screw Torque	4-7 inch-pounds
Publications Installation Instructions	 1793-5.6
Agency Certification	

1 Use this category information for planning conductor routing as described in publication 1770-4.1, "Wiring and Grounding Guidelines for Noise Immunity."

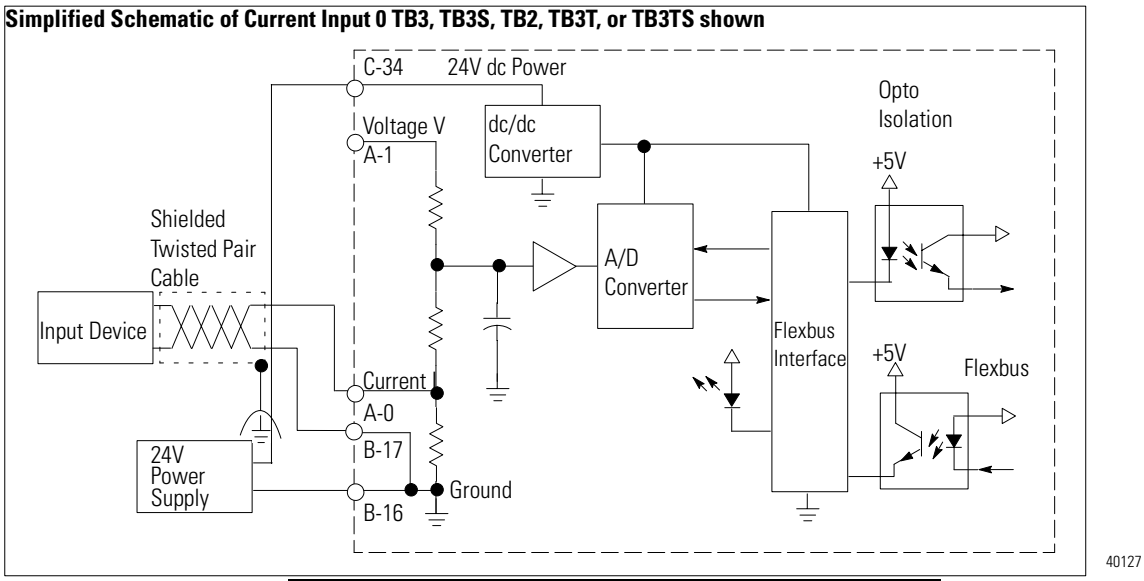


Recommended Terminal Base	Compatible Terminal Base(s)
TB3	TB3S, TB2, TB3T, TB3TS

Simplified Schematic of Voltage Input 0 TB3, TB3S, TB2, TB3T, or TB3TS shown



Simplified Schematic of Current Input 0 TB3, TB3S, TB2, TB3T, or TB3TS shown

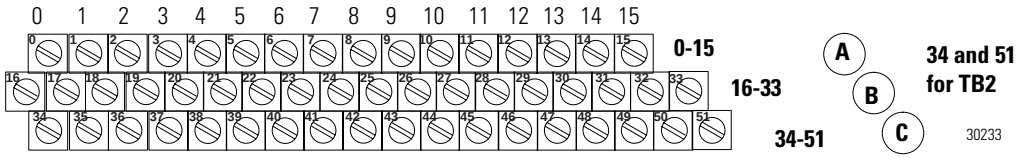


ATTENTION

Only connect either a voltage input or a current input per channel, not both.

Wiring

1794-TB3
1794-TB3S
1794-TB2
1794-TB3T
1794-TB3TS



		TB3, TB3S, TB2, TB3T, TB3TS	TB3, TB3S, TB2	TB3T, TB3TS				TB3, TB3S, TB2, TB3T, TB3TS	TB3, TB3S, TB2	TB3T, TB3TS	
Channel	**Signal Type**	**Input Terminals**	**Common Terminals**		**Shield**	**Channel**	**Signal Type**	**Input Terminals**	**Common Terminals**		**Shield**
0	Current	A-0	B-17	B-17	C-39	4	Current	A-8	B-25	B-25	C-43
	Voltage	A-1	B-18	B-17	C-39		Voltage	A-9	B-26	B-25	C-43
1	Current	A-2	B-19	B-19	C-40	5	Current	A-10	B-27	B-27	C-44
	Voltage	A-3	B-20	B-19	C-40		Voltage	A-11	B-28	B-27	C-44
2	Current	A-4	B-21	B-21	C-41	6	Current	A-12	B-29	B-29	C-45
	Voltage	A-5	B-22	B-21	C-41		Voltage	A-13	B-30	B-39	C-45
3	Current	A-6	B-23	B-23	C-42	7	Current	A-14	B-31	B-31	C-46
	Voltage	A-7	B-24	B-23	C-42		Voltage	A-15	B-32	B-31	C-46

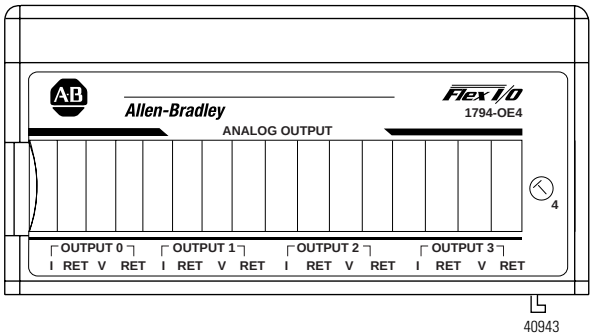
24V dc Common for TB2, TB3, TB3S: B-16 thru B-33
24V dc Common for TB3T and TB3TS: B-16, 17, 19, 21, 23, 25, 27, 29, 31, and 33

+24V dc Power for TB2: C-34 and C-51; +24V dc Power for TB3 and TB3S: C-34 thru C-51
+24V dc Power for TB3T and TB3TS: C-34, 35, 50, and 51

Specifications - 1794-IE8/B	
Number of Inputs	8 single-ended, non-isolated
Module Location	Cat. No. 1794-TB3, -TB3S, -TB2, -TB3T, or -TB3TS Terminal Base Unit
Input Current Terminal	4-20mA (user configurable) 0-20mA (user configurable)
Input Voltage Terminal	±10V (user configurable) 0-10V (user configurable)
Resolution Voltage Current	12 bits - unipolar; 11 bits plus sign - bipolar 2.56mV/cnt unipolar; 5.13mV/cnt bipolar 5.13µA/cnt
Input Impedance Voltage Terminal Current Terminal	 100k Ω 238 Ω
Input Resistance Voltage Terminal Current Terminal	 200k Ω 238 Ω
Isolation Voltage	Tested at 850V dc for 1s between user and system No isolation between individual channels
Flexbus Current	20mA @ 5V dc
Power Dissipation	3W maximum @ 31.2V dc
Thermal Dissipation	Maximum 10.2 BTU/hr @ 31.2V dc
Indicators	1 green power indicator
Keyswitch Position	3
Data Format	Left justified 16-bit 2's complement
Conversion Type	Successive approximation
Conversion Rate	256µs all channels
Normal Mode Rejection Ratio Voltage Terminal Current Terminal	 -3db @ 17Hz; -20db/decade -10.0dB @ 50Hz, -11.4dB @ 60Hz -3db @ 9Hz; -20db/decade -15.3dB @ 50Hz, -16.8dB @ 60Hz
Calibration	None Required
Step Response to 63% Voltage Terminal Current Terminal	 9.4ms 18.2ms

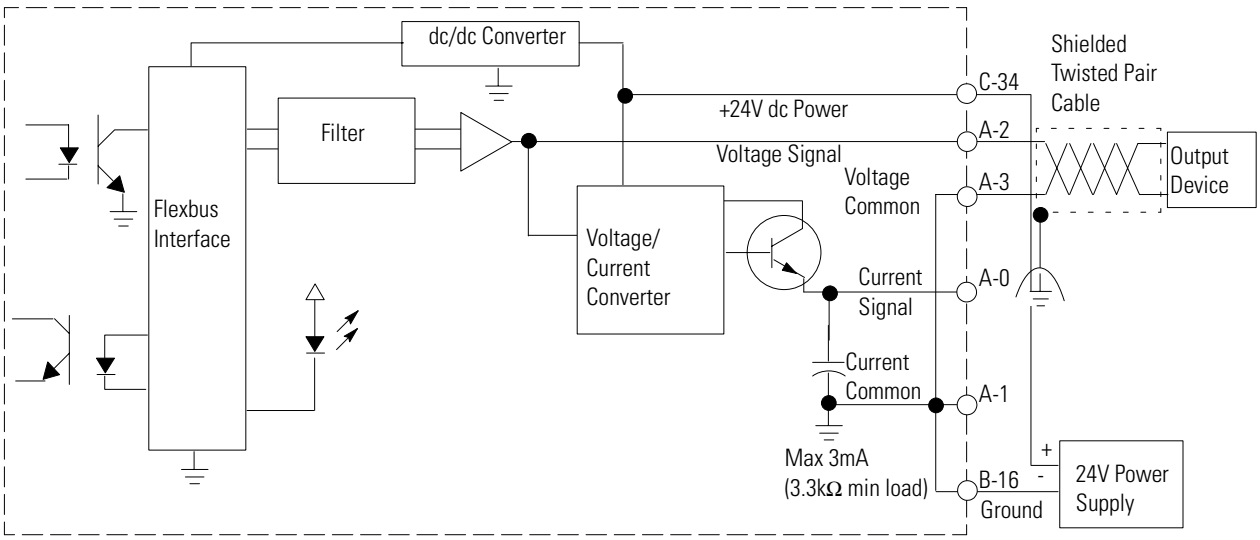
Specifications - 1794-IE8/B (continued)	
Absolute Accuracy[1] Voltage Terminal Current Terminal	 0.20% Full Scale @ 25°C 0.20% Full Scale @ 25°C
Accuracy Drift w/Temp. Voltage Terminal Current Terminal	 0.00428% Full Scale/°C 0.00407% Full Scale/°C
Maximum Overload	30V or 32mA continuous, 1 channel at a time
General Specifications	
External dc Power Supply Voltage Voltage Range Supply Current	 24V dc nominal 19.2 to 31.2V dc (includes 5% ac ripple) 60mA @ 24V dc
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
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 (operating) 5 to 80% noncondensing (non-operating) 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) insulation maximum 2[2]
Publications Installation Instructions User Manual	 1794-5.6 1794-6.5.2
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

1 Includes offset, gain, non-linearity and repeatability error terms.
2 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

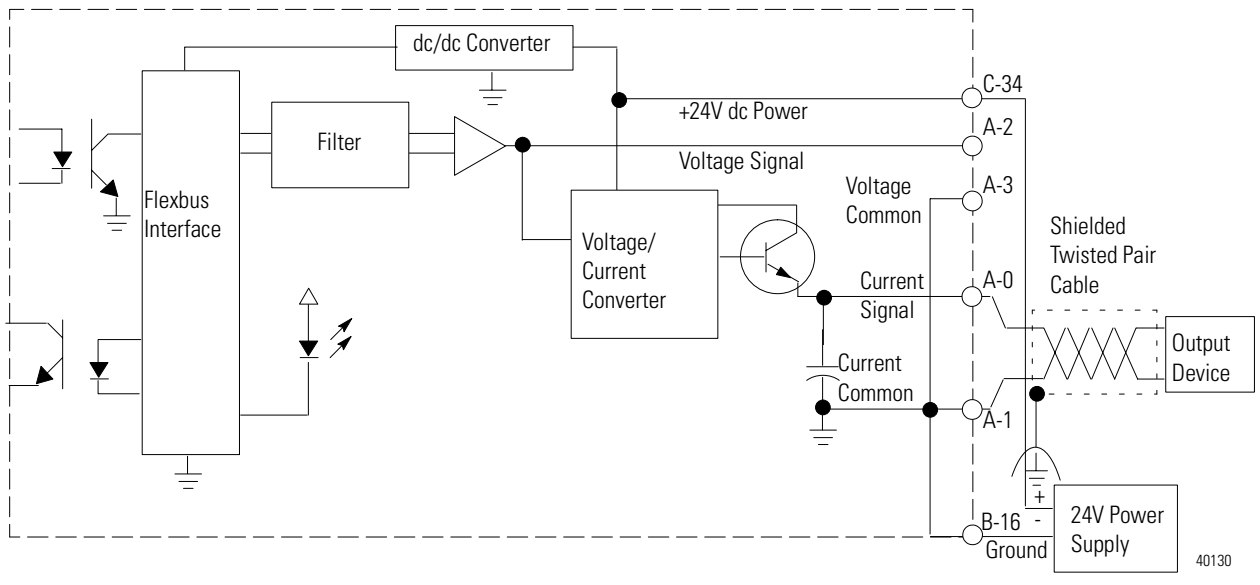


Recommended Terminal Base	Compatible Terminal Base(s)
TB3	TB3S, TB2, TB3T, TB3TS, TBN

Simplified Schematic of Voltage Output 0 TB3, TB3S, TB2, TB3T, or TB3TS shown

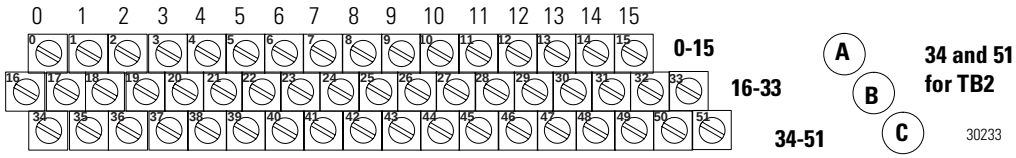


Simplified Schematic of Current Output 0 TB3, TB3S, TB2, TB3T, or TB3TS shown



Wiring

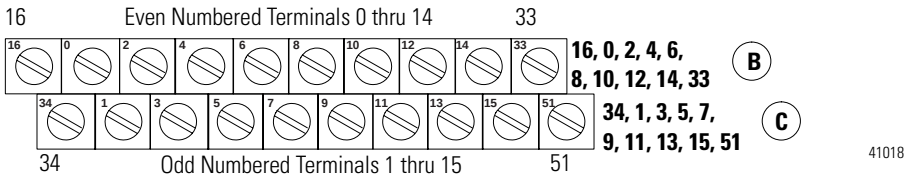
1794-TB3
1794-TB3S
1794-TB2
1794-TB3T
1794-TB3TS



		TB3, TB3S, TB2, TB3T, TB3TS	TB3T, TB3TS			TB3, TB3S, TB2, TB3T, TB3TS	TB3T, TB3TS
Channel	**Signal Type**	**Output Terminals**	**Shield**	**Channel**	**Signal Type**	**Input Terminals**	**Shield**
0	Current Signal	A-0	C-39	2	Current Signal	A-8	C-43
	Current Common	A-1[1]	C-39		Current Common	A-9[1]	C-43
	Voltage Signal	A-2	C-40		Voltage Signal	A-10	C-44
	Voltage Common	A-3[1]	C-40		Voltage Common	A-11[1]	C-44
1	Current Signal	A-4	C-41	3	Current Signal	A-12	C-45
	Current Common	A-5[1]	C-41		Current Common	A-13[1]	C-45
	Voltage Signal	A-6	C-42		Voltage Signal	A-14	C-46
	Voltage Common	A-7[1]	C-42		Voltage Common	A-15[1]	C-46
24V dc Common for TB2, TB3, TB3S: B-16 thru B-33 24V dc Common for TB3T and TB3TS: B-16, 17, 19, 21, 23, 25, 27, 29, 31, and 33				+24V dc Power for TB2: C-34 and C-51 +24V dc Power for TB3 and TB3S: C-34 thru C-51 +24V dc Power for TB3T and TB3TS: C-34, 35, 50, and 51			

1 A-1, 3, 5, 7, 9, 11, 13, and 15 are internally connected in the module to 24V dc common.

1794-TBN



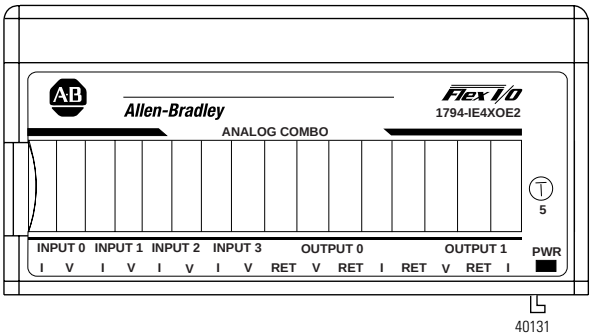
Channel	Type	Output Terminal	Channel	Type	Output Terminal
0	Current Signal	B-0	2	Current Signal	B-8
	Current Common	C-1		Current Common	C-9
	Voltage Signal	B-2		Voltage Signal	B-10
	Voltage Common	C-3		Voltage Common	C-11
1	Current Signal	B-4	3	Current Signal	B-12
	Current Common	C-5		Current Common	C-13
	Voltage Signal	B-6		Voltage Signal	B-14
	Voltage Common	C-7		Voltage Common	C-15
24V dc Common	B-16 and B-33		+24V dc	C34 and C-51	

Specifications - 1794-OE4/B	
Number of Outputs	4 single-ended, non-isolated
Module Location	Cat. No. 1794-TB3, -TB3S, -TB2, -TB3T, -TB3TS, or -TBN Terminal Base Unit
Resolution Voltage Current	12 bits plus sign 2.56mV/cnt 5.13µA/cnt
Data Format	Left justified 16-bit 2's complement
Conversion Type	Pulse Width Modulation
Conversion Rate	1.024ms maximum all channels
Output Current Terminal	0mA output until module is configured 4-20mA user configurable 0-20mA user configurable
Output Voltage Terminal	0V output until module is configured ±10V user configurable 0-10V user configurable
Step Response to 63% of FS	24ms
Current Load on Voltage Output	Maximum 3mA
Resistive Load on mA Output	15 - 750 Ω
Absolute Accuracy[1] Voltage Terminal Current Terminal	 0.133% Full Scale @ 25ºC 0.425% Full Scale @ 25ºC
Accuracy Drift with Temperature Voltage Terminal Current Terminal	 0.0045% Full Scale/ºC 0.0069% Full Scale/ºC
Calibration	None required
Isolation Voltage	Tested at 850V dc for 1s between user and system No isolation between individual channels
Indicators	1 green power indicator
Flexbus Current	20mA @ 5V dc
Power Dissipation	Maximum 4.5W @ 31.2V dc
Thermal Dissipation	Maximum 15.3 BTU/hr @ 31.2V dc
Keyswitch Position	4

General Specifications	
External dc Power Supply Voltage Voltage Range Supply Current	 24V dc nominal 19.2 to 31.2V dc (includes 5% ac ripple) 70mA @ 24V dc (not including outputs)
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Non-operating Vibration	 0 to 55ºC (32 to 131ºF) -40 to 85ºC (-40 to 185ºF) 5 to 95% noncondensing (operating) 5 to 80% noncondensing (non-operating) 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) insulation maximum 2[2]
Publications Installation Instructions User Manual	 1794-5.5 1794-6.5.2
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

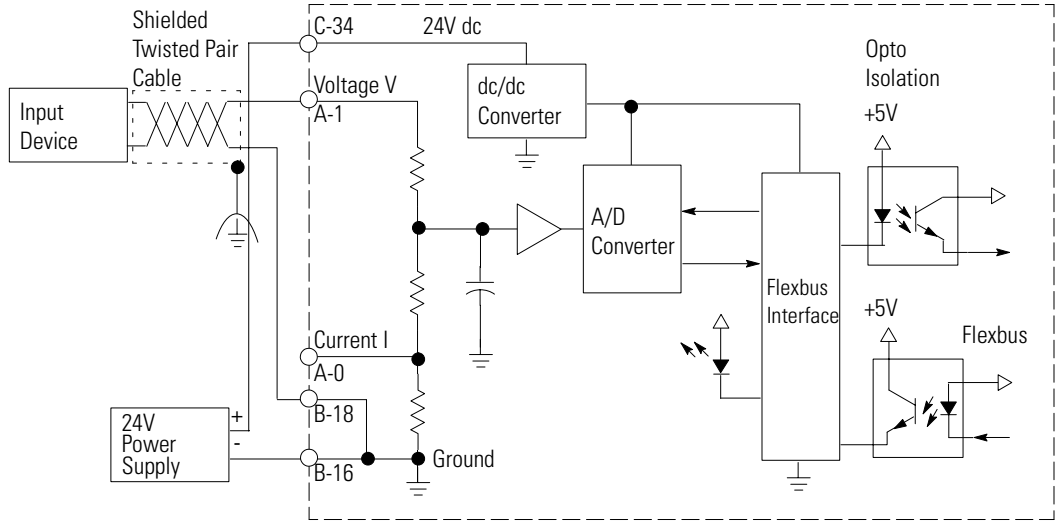
1 Includes offset, gain, non-linearity and repeatability error terms.

2 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

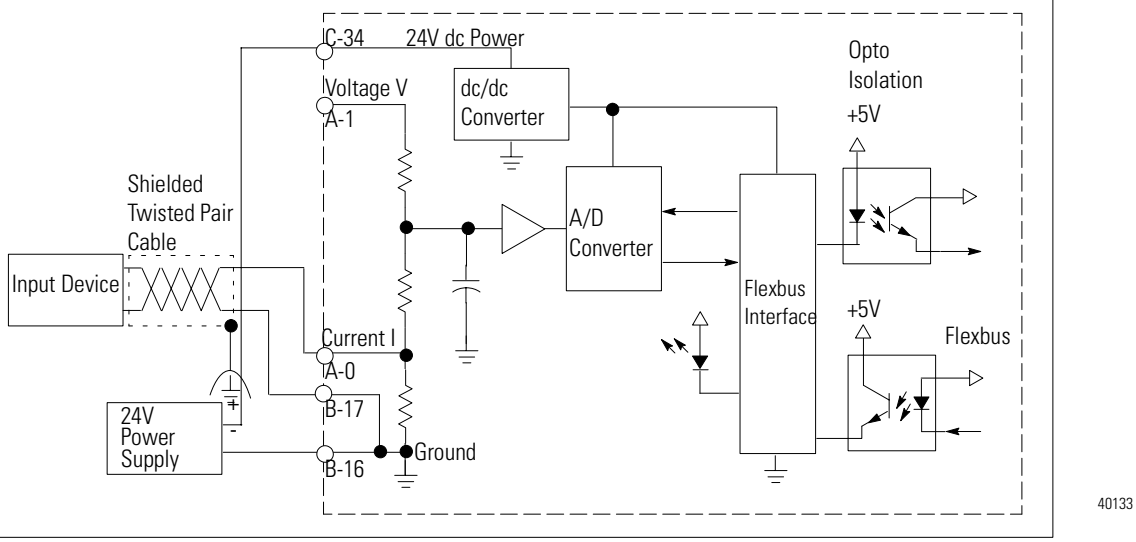


Recommended Terminal Base	Compatible Terminal Base(s)
TB3	TB3S, TB2, TB3T, TB3TS

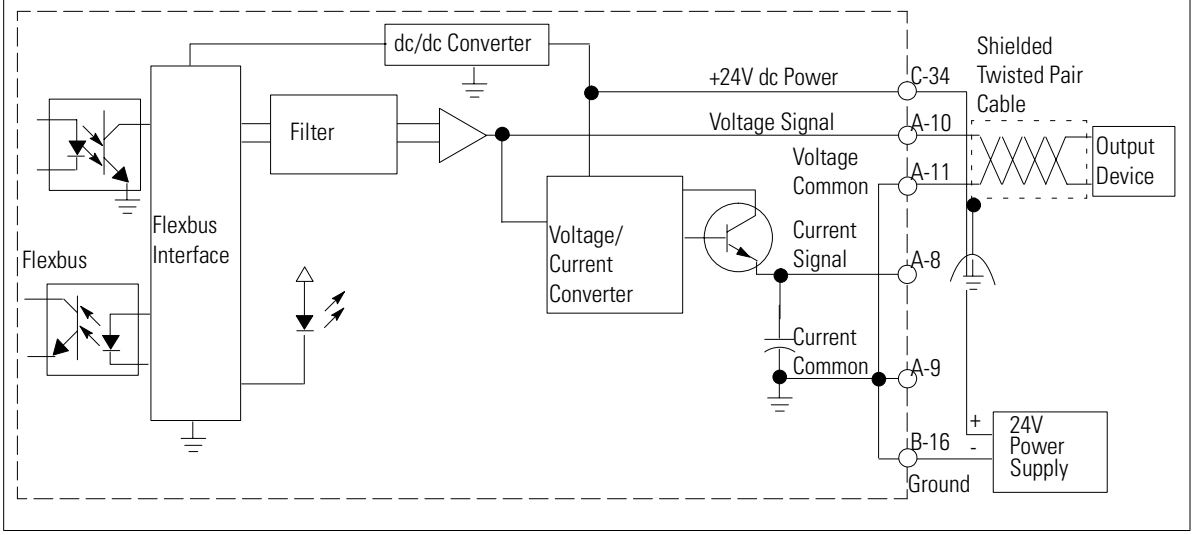
Simplified Schematic of Voltage Input 0 TB3, TB3S, TB2, TB3T, or TB3TS shown



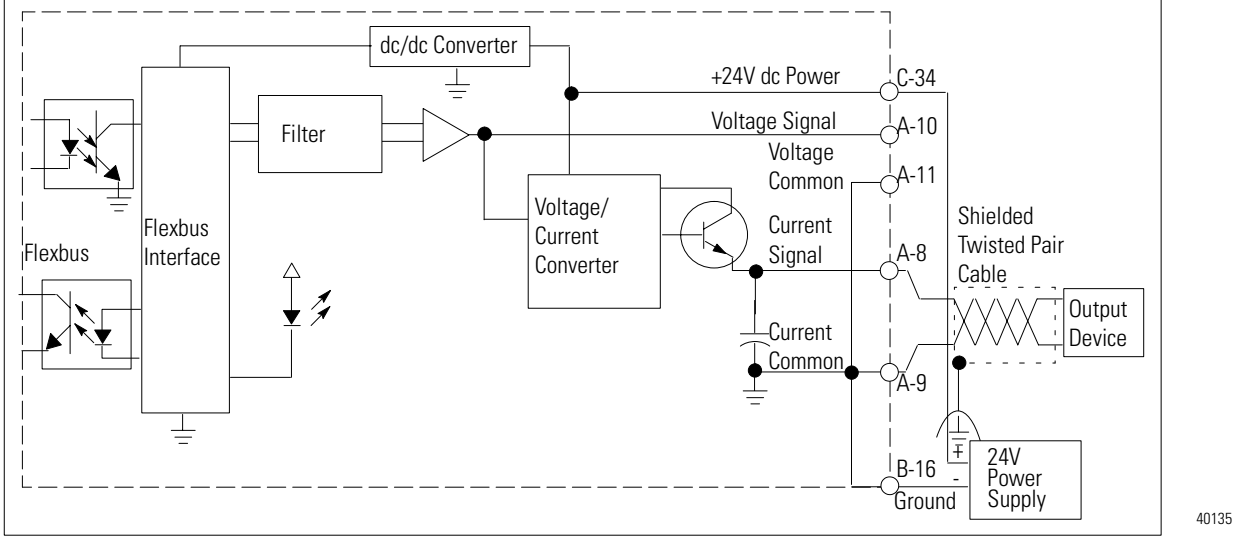
Simplified Schematic of Current Input 0 TB3, TB3S, TB2, TB3T, or TB3TS shown



Simplified Schematic of Voltage Output 0 TB3, TB3S, TB2, TB3T, or TB3TS shown

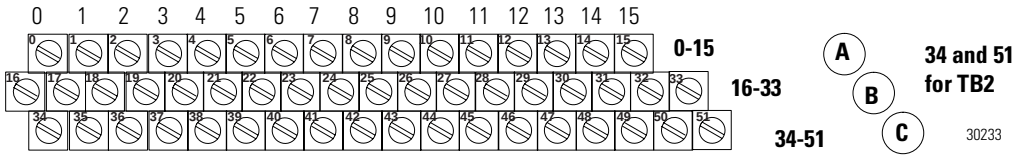


Simplified Schematic of Current Output 0 TB3, TB3S, TB2, TB3T, or TB3TS shown



Wiring

1794-TB3
1794-TB3S
1794-TB2
1794-TB3T
1794-TB3TS



		TB3, TB3S, TB2, TB3T, TB3TS	TB3, TB3S, TB2	TB3T, TB3TS				TB3, TB3S, TB2, TB3T, TB3TS	TB3T, TB3TS
Channel	**Signal Type**	**Input Terminals**	**Common Terminals**		**Shield**	**Channel**	**Signal Type**	**Output Terminals**	**Shield**
In 0	Current	A-0	B-17	B-17	C-39	Out 0	Current Signal	A-8	C-43
	Voltage	A-1	B-18	B-17	C-39		Current Common	A-9[1]	C-43
In 1	Current	A-2	B-19	B-19	C-40		Voltage Signal	A-10	C-44
	Voltage	A-3	B-20	B-19	C-40		Voltage Common	A-11[1]	C-44
In 2	Current	A-4	B-21	B-21	C-41	Out 1	Current Signal	A-12	C-45
	Voltage	A-5	B-22	B-21	C-41		Current Common	A-13[1]	C-45
In 3	Current	A-6	B-23	B-23	C-42		Voltage Signal	A-14	C-46
	Voltage	A-7	B-24	B-23	C-42		Voltage Common	A-15[1]	C-46

24V dc Common for TB2, TB3, TB3S: B-16 thru B-33
24V dc Common for TB3T and TB3TS: B-16, 17, 19, 21, 23, 25, 27, 29, 31, and 33

+24V dc Power for TB2: C-34 and C-51;
+24V dc Power for TB3 and TB3S: C-34 thru C-51
+24V dc Power for TB3T and TB3TS: C-34, 35, 50, and 51

1 A-9, 11, 13, and 15 are internally connected in the module to 24V dc common.

Specifications - 1794-IE4XOE2/B	
Module Location	Cat. No. 1794-TB3, -TB3S, -TB2, -TB3T, -TB3TS Terminal Base Unit
Isolation Voltage	Tested at 850V dc for 1s between user and system No isolation between individual channels
Flexbus Current	20mA
Power Dissipation	4.0W maximum @ 31.2V dc
Thermal Dissipation	Maximum 13.6 BTU/hr @ 31.2V dc
Keyswitch Position	5
Indicators	1 green power indicator
Calibration	None Required
Input Specifications	
Number of Inputs	4 single-ended, non-isolated
Resolution Voltage Current	12 bits - unipolar; 11 bits plus sign - bipolar 2.56mV/cnt unipolar; 5.13mV/cnt bipolar 5.13µA/cnt
Data Format	Left justified 16-bit 2's complement
Conversion Type	Successive approximation
Conversion Rate	256µs all channels
Input Current Terminal	4-20mA (user configurable) 0-20mA (user configurable)
Input Voltage Terminal	±10V (user configurable) 0-10V (user configurable)
Step Response to 63% Voltage Terminal Current Terminal	 9.4ms 18.2ms
Absolute Accuracy[2] Voltage Terminal Current Terminal	 0.20% Full Scale @ 25ºC 0.20% Full Scale @ 25ºC
Accuracy Drift with Temperature Voltage Terminal Current Terminal	 0.00428% Full Scale/ºC 0.00407% Full Scale/ºC
Normal Mode Rejection Ratio Voltage Terminal Current Terminal	 -3db @ 17Hz; -20db/decade -10.0dB @ 50Hz, -11.4dB @ 60Hz -3db @ 9Hz; -20db/decade -15.3dB @ 50Hz, -16.8dB @ 60Hz
Input Impedance Voltage Voltage Terminal Current Terminal	 100k Ω 238 Ω
Input Resistance Voltage Voltage Terminal Current Terminal	 200k Ω 238 Ω
Maximum Overload	30V continuous or 32mA continuous, one channel at a time
Output Specifications	
Number of Outputs	2 single-ended, non-isolated
Resolution Voltage Current	12 bits plus sign 2.56mV/cnt 5.13µA/cnt
Data Format	Left justified 16-bit 2's complement
Conversion Type	Pulse Width Modulation

Output Specifications (continued)	
Conversion Rate	1.024ms maximum all channels
Output Current Terminal	0mA output until module is configured 4-20mA user configurable 0-20mA user configurable
Output Voltage Terminal	0V output until module is configured ±10V user configurable 0-10V user configurable
Step Response to 63% of FS	24ms
Absolute Accuracy[1] Voltage Terminal Current Terminal	 0.133% Full Scale @ 25ºC 0.425% Full Scale @ 25ºC
Accuracy Drift with Temperature Voltage Terminal Current Terminal	 0.0045% Full Scale/ºC 0.0069% Full Scale/ºC
Current Load on Voltage Output	3mA maximum
Resistive Load on mA Output	15 - 750 Ω
General Specifications	
External dc Power Supply Voltage Voltage Range Supply Current	 24V dc nominal 19.2 to 31.2V dc (includes 5% ac ripple) 70mA @ 24V dc
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Non-operating Vibration	 0 to 55ºC (32 to 131ºF) -40 to 85ºC (-40 to 185ºF) 5 to 95% noncondensing (operating) 5 to 80% noncondensing (nonoperating) 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) insulation maximum 2[1]
Publications Installation Instructions User Manual	 1794-5.5 1794-6.5.2
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

2 Includes offset, gain, non-linearity and repeatability error terms.

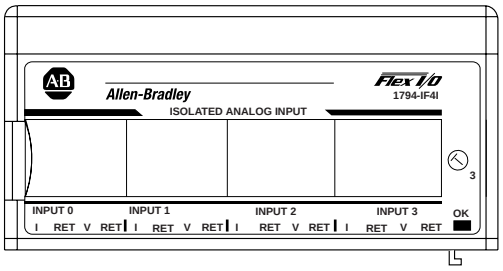
Use the following table to determine which isolated analog module will meet your application needs.

Analog Module	Purpose	See Page
1794-IF4I	24V dc isolated analog 4 input module	**108**
1794-OF4I	24V dc isolated analog 4 output module	**111**
1794-IF2XOF2I	24V dc 2 input/2 output isolated analog combo module	**114**

The following table illustrates the recommended terminal base unit(s) for each analog module.

FLEX I/O Product	Catalog Number	Recommended Terminal Base	Compatible Terminal Base(s)
Analog			
24V dc Modules	1794-IF4I		
	1794-OF4I		
	1794-IF2XOF2I	 *	

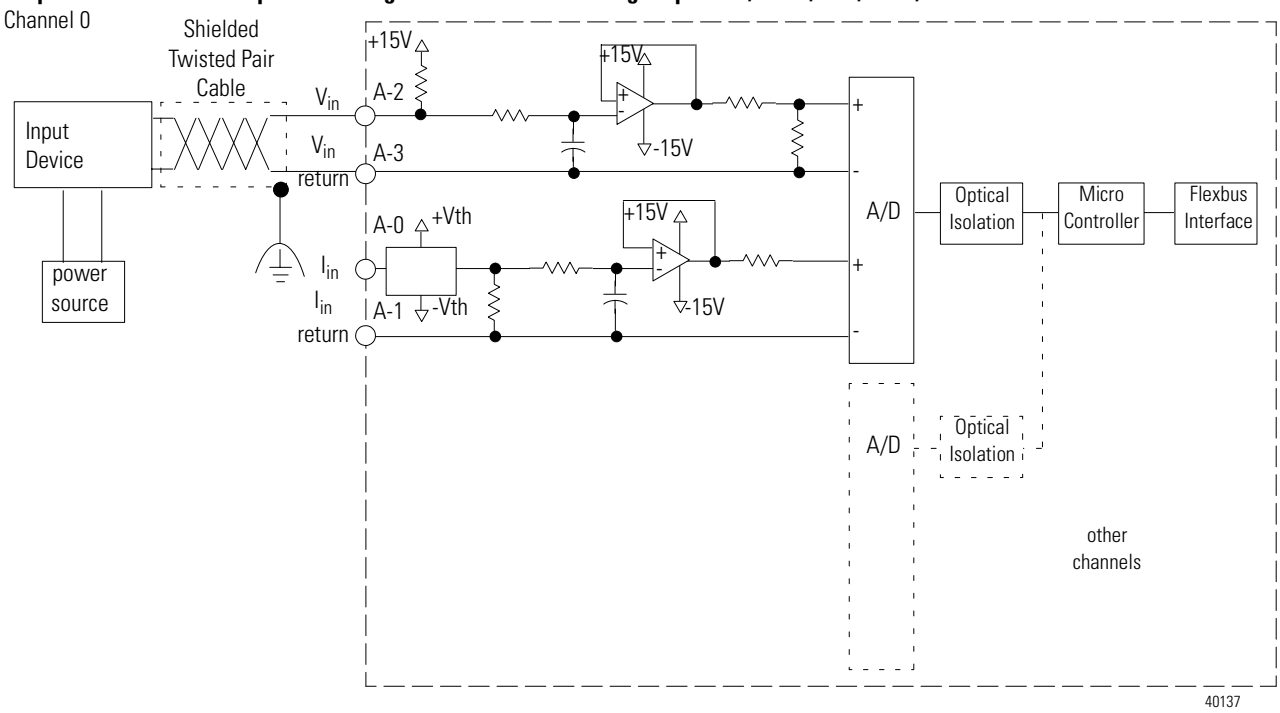
* The TB3T provides convenient ground terminations but fewer dc common terminations.



40136

Recommended Terminal Base	Compatible Terminal Base(s)
TB3	TB3S, TB2, TB3T, TB3TS, TBN

Simplified Schematic of Input 0 Showing Connections for a Voltage Input TB3, TB3S, TB2, TB3T, TB3TS shown

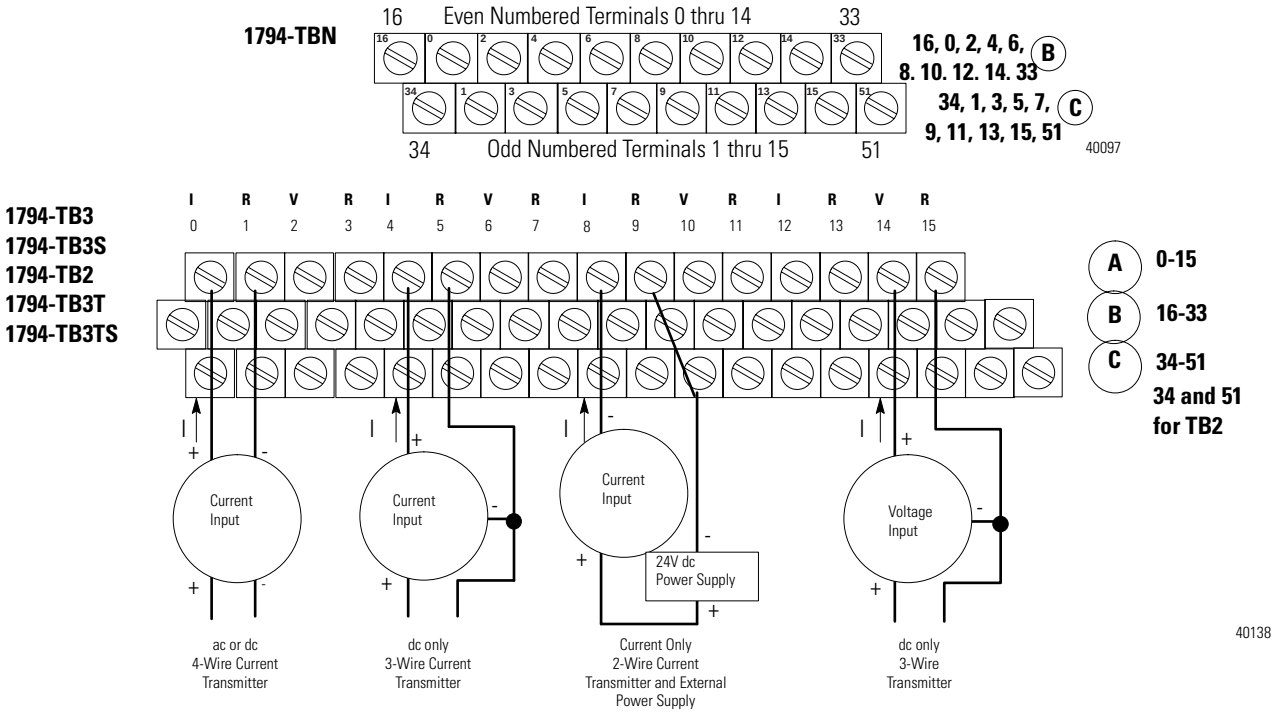


40137

ATTENTION

Only connect either a voltage input or a current input per channel, not both.

Wiring

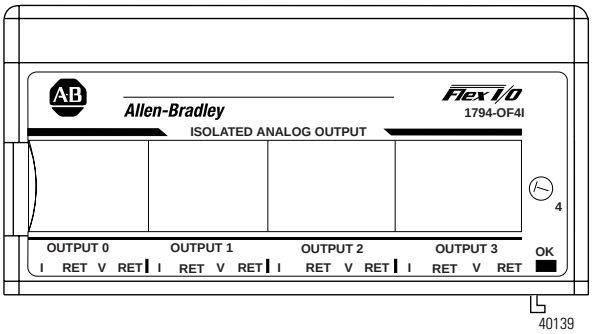


1794-TB3, -TB3S, -TB2, -TB3T, and -TB3TS					1794-TBN
Channel	**Signal Type**	**Label Markings**	**Terminal**	**Shield (TB3T/TB3TS)**	**Terminal**
0	Current Input	I0	A-0	C-39	B-0
	Current Return	I0 Ret	A-1		C-1
	Voltage Input	V0	A-2	C-40	B-2
	Voltage Return	V0 Ret	A-3		C-3
1	Current Input	I1	A-4	C-41	B-4
	Current Return	I1 Ret	A-5		C-5
	Voltage Input	V1	A-6	C-42	B-6
	Voltage Return	V1 Ret	A-7		C-7
2	Current Input	I2	A-8	C-43	B-8
	Current Return	I2 Ret	A-9		C-9
	Voltage Input	V2	A-10	C-44	B-10
	Voltage Return	V2 Ret	A-11		C-11
3	Current Input	I3	A-12	C-45	B-12
	Current Return	I3 Ret	A-13		C-13
	Voltage Input	V3	A-14	C-46	B-14
	Voltage Return	V3 Ret	A-15		C-15
24V dc Common	TB2, TB3, TB3S: Terminals 16 thru 33 are internally connected in the terminal base unit TB3T, TB3TS: Terminals 16, 17, 19, 21, 23, 25, 27, 29, 31, and 33 are internally connected in the terminal base unit TBN: Terminals 16 and 33 are internally connected in the terminal base unit				
+24V dc Power	TB2 and TBN: Terminals 34 and 51 are internally connected in the terminal base unit TB3, TB3S: Terminals 34 thru 51 are internally connected in the terminal base unit TB3T, TB3TS: Terminals 34, 35, 50, and 51 are internally connected in the terminal base unit				
Chassis Gnd	TB3T, TB3TS: Terminals 39 thru 46 are internally connected to chassis gnd				

Specifications - 1794-IF4I	
Number of Inputs	4 isolated
Module Location	Cat. No. 1794-TB3, -TB3S, -TB2, -TB3T, -TB3TS, and -TBN Terminal Base Units
Input Current Terminal	4-20mA (user configurable) 0-20mA (user configurable) ±20mA (user configurable)
Input Voltage Terminal	±10V (user configurable) 0-10V (user configurable) ±5V (user configurable) 0-5V (user configurable)
Resolution Voltage Current	16 bits - unipolar; 15 bits plus sign - bipolar 0.156mV/cnt unipolar; 0.313mV/cnt bipolar 0.320µA/cnt unipolar; 0.640 µA/cnt bipolar
Input Resistance Voltage Terminal Current Terminal	 >10 megohm <100Ω[1]
Isolation Voltage	120V ac continuous (when used with -TB3, -TB3S, -TB2, -TB3T, and -TB3TS) 250V ac continuous (when used with -TBN) Module is factory tested to 2550V dc for 1s between: channel to channel channel to user power channel to system user power to system
Flexbus Current	50mA
Power Dissipation	2.0W maximum @ 31.2V dc
Thermal Dissipation	Maximum 6.9 BTU/hr @ 31.2V dc
Indicators	1 green power/status indicator
Keyswitch Position	3
Data Format	2's complement 2's complement percent binary offset binary
Conversion Type	Sigma Delta
Update Rate	2.5/5.0/7.5ms all channels
Normal Mode Rejection Ratio Voltage or Current Terminal	 -3dB @ 12Hz (300Hz conversion rate) -80.0dB @ 50Hz (300Hz conversion rate) -3dB @ 6Hz (150Hz conversion rate) -80.0dB @ 60Hz (150Hz conversion rate)
Common Mode Rejection Ratio	-120dB @ 50/60Hz
Calibration	Factory calibrated
Step Response to 63% Voltage or Current Terminal	 1200Hz conversion rate = 0.6ms 600Hz conversion rate = 6.7ms 300Hz conversion rate = 13.4ms 150Hz conversion rate = 26.7ms
Absolute Accuracy[2] Voltage Terminal Current Terminal	 0.1% Full Scale @ 25ºC 0.1% Full Scale @ 25ºC
Accuracy Drift w/Temp. Voltage Terminal Current Terminal	 0.0028% Full Scale/ºC 0.0038% Full Scale/ºC
Maximum Overload	30V continuous or 32mA continuous, one channel at a time

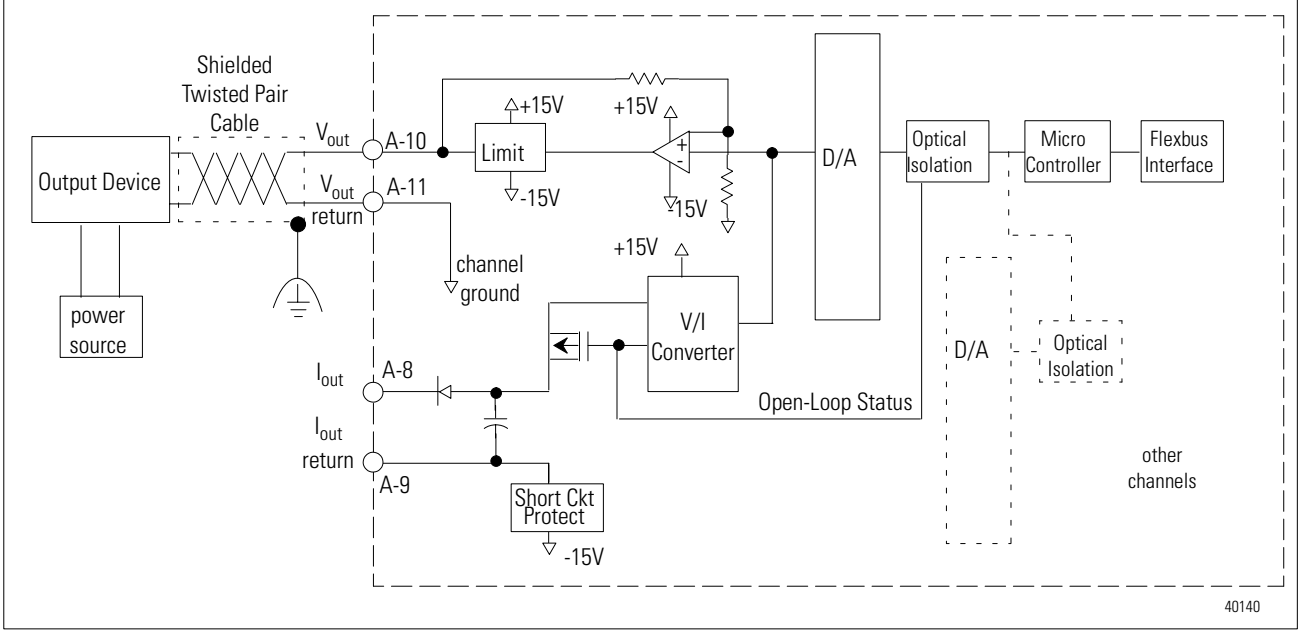
General Specifications	
External dc Power Supply Voltage Voltage Range Supply Current	 24V dc nominal 19.2 to 31.2V dc (includes 5% ac ripple) 80mA @ 24V dc
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Non-operating Vibration	 0 to 55ºC (32 to 131ºF) -40 to 85ºC (-40 to 185ºF) 5 to 95% noncondensing (operating) 5 to 80% noncondensing (non-operating) 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
ConductorsWire Size Category	12 gauge (4mm²) stranded maximum 3/64 inch (1.2mm) insulation maximum 2[3]
Publications Installation Instructions User Manual	 1794-5.38 1794-6.5.8
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

1 If 24V dc is removed from the module, input resistance = 10kΩ.
2 Includes offset, gain, non-linearity and repeatability error terms.
3 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

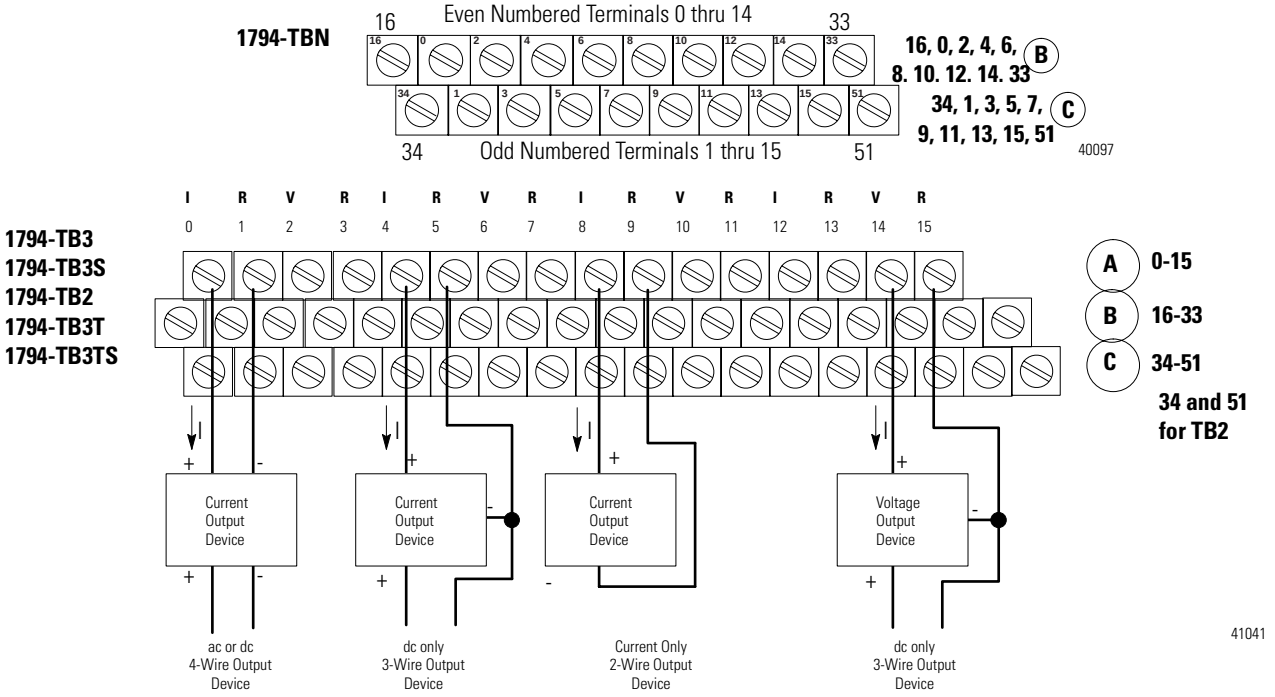


Recommended Terminal Base	Compatible Terminal Base(s)
TB3	TB3S, TB2, TB3T, TB3TS, TBN

Simplified Schematic of Output 2 Showing Connections for a Voltage Output TB3, TB3S, TB2, TB3T, TB3TS shown



Wiring



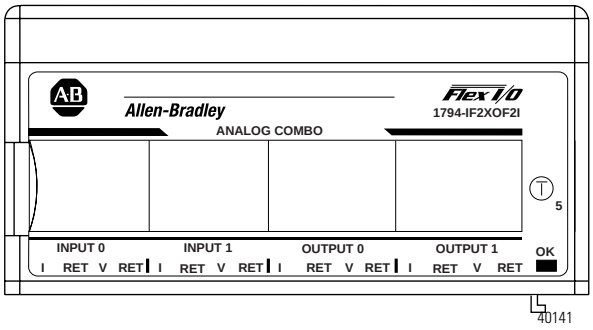
1794-TB3, -TB3S, -TB2, -TB3T, and -TB3TS					1794-TBN
Channel	**Signal Type**	**Label Markings**	**Terminal**	**Shield (TB3T/TB3TS)**	**Terminal**
0	Current Output	I0	A-0	C-39	B-0
	Current Return	I0 Ret	A-1		C-1
	Voltage Output	V0	A-2	C-40	B-2
	Voltage Return	V0 Ret	A-3		C-3
1	Current Output	I1	A-4	C-41	B-4
	Current Return	I1 Ret	A-5		C-5
	Voltage Output	V1	A-6	C-42	B-6
	Voltage Return	V1 Ret	A-7		C-7
2	Current Output	I2	A-8	C-43	B-8
	Current Return	I2 Ret	A-9		C-9
	Voltage Output	V2	A-10	C-44	B-10
	Voltage Return	V2 Ret	A-11		C-11
3	Current Output	I3	A-12	C-45	B-12
	Current Return	I3 Ret	A-13		C-13
	Voltage Output	V3	A-14	C-46	B-14
	Voltage Return	V3 Ret	A-15		C-15
24V dc Common	TB2, TB3, TB3S: Terminals 16 thru 33 are internally connected in the terminal base unit TB3T, TB3TS: Terminals 16, 17, 19, 21, 23, 25, 27, 29, 31, and 33 are internally connected in the terminal base unit TBN: Terminals 16 and 33 are internally connected in the terminal base unit				
+24V dc Power	TB2 and TBN: Terminals 34 and 51 are internally connected in the terminal base unit TB3, TB3S: Terminals 34 thru 51 are internally connected in the terminal base unit TB3T, TB3TS: Terminals 34, 35, 50, and 51 are internally connected in the terminal base unit				
Chassis Gnd	TB3T, TB3TS: Terminals 39 thru 46 are internally connected to chassis gnd				

Specifications - 1794-OF4I	
Number of Outputs	4 isolated
Module Location	Cat. No. 1794-TB3, -TB3S, -TB2, -TB3T, -TB3TS, and -TBN Terminal Base Units
Output Current Terminal	0mA output until module is configured 4-20mA (user configurable) 0-20mA (user configurable)
Output Voltage Terminal	0V output until module is configured ±10V (user configurable) 0-10V (user configurable) ±5V (user configurable) 0-5V (user configurable)
Resolution Voltage Current	15 bits plus sign 0.320mV/cnt 0.656µA/cnt
Isolation Voltage	120V ac continuous (when used with -TB3, -TB3S, -TB2, -TB3T and -TB3TS) 250V ac continuous (when used with -TBN) Module is factory tested to 2550V dc for 1s between: channel to channel channel to user power channel to system user power to system
Flexbus Current	50mA
Power Dissipation	4.7W maximum @ 31.2V dc
Thermal Dissipation	Maximum 16 BTU/hr @ 31.2V dc
Indicators	1 green power/status indicator
Keyswitch Position	4
Data Format	2's complement, 2's complement% binary offset binary
Conversion Type	Digital to analog converter
Update Rate	2.5/5.0ms
Calibration	Factory calibrated
Step Response to 63% of FS	<25µs
Absolute Accuracy[1] Voltage Terminal Current Terminal	 0.1% Full Scale @ 25ºC 0.1% Full Scale @ 25ºC
Accuracy Drift w/Temp. Voltage Terminal Current Terminal	 0.0012% Full Scale/ºC 0.0025% Full Scale/ºC
Current Load on Voltage Output	3mA maximum
Resistive Load on mA Output	0-750Ω

General Specifications	
External dc Power Supply Voltage Voltage Range Supply Current	 24V dc nominal 19.2 to 31.2V dc (includes 5% ac ripple) 210mA @ 24V dc
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Non-operating Vibration	 0 to 55ºC (32 to 131ºF) -40 to 85ºC (-40 to 185ºF) 5 to 95% noncondensing (operating) 5 to 80% noncondensing (non-operating) 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
ConductorsWire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) insulation maximum 2[2]
Publications Installation Instructions User Manual	 1794-5.37 1794-6.5.8
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

1 Includes offset, gain, non-linearity and repeatability error terms.

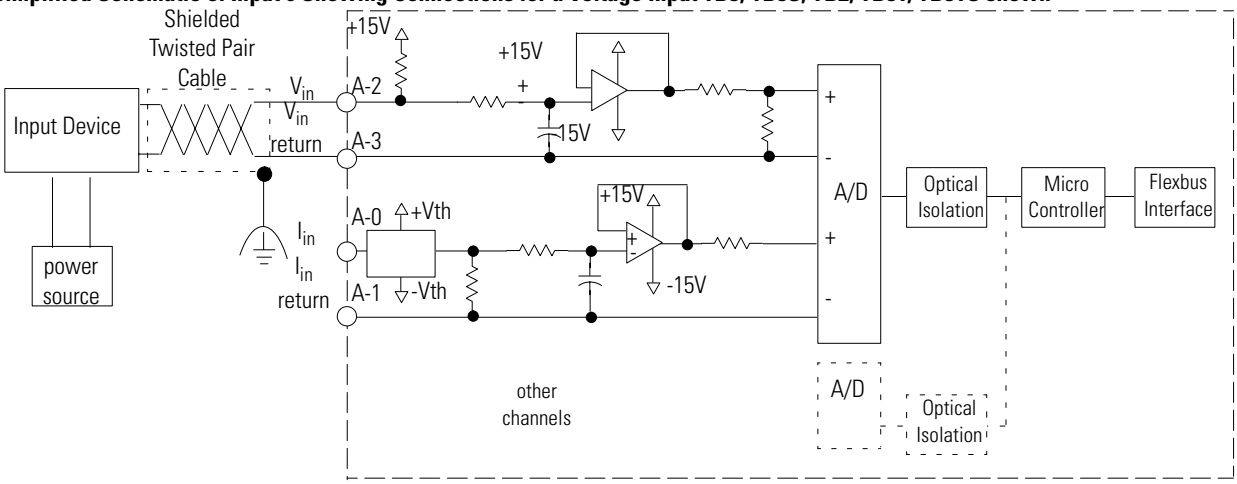
2 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."



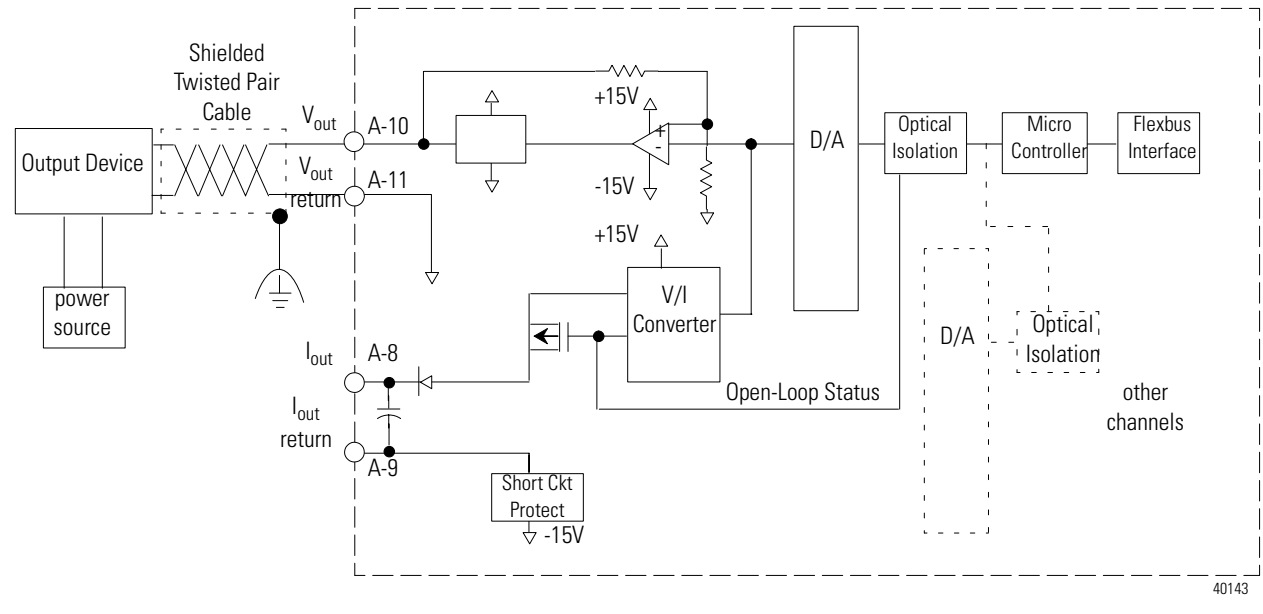
Recommended Terminal Base	Compatible Terminal Base(s)
TB3 *	TB3S, TB2, TB3T, TB3TS, TBN

* The TB3T provides convenient ground terminations but fewer dc common terminations.

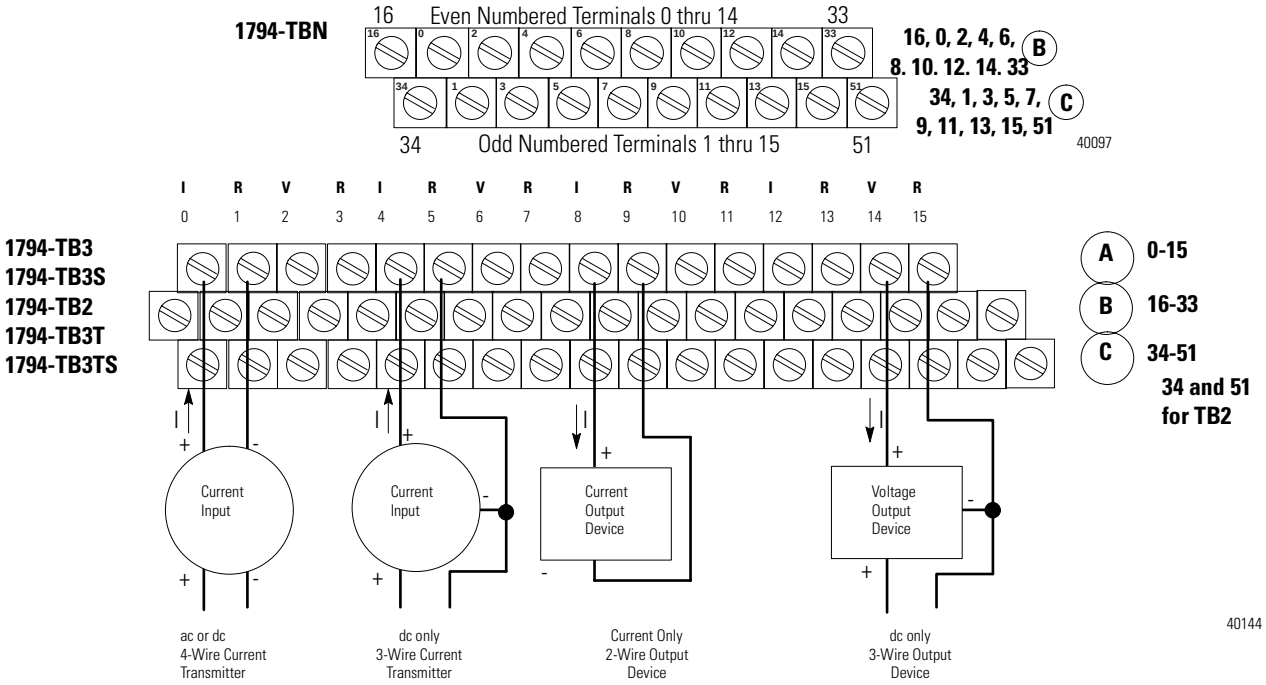
Simplified Schematic of Input 0 Showing Connections for a Voltage Input TB3, TB3S, TB2, TB3T, TB3TS shown



Simplified Schematic of Output 0 Showing Connections for a Voltage Output TB3, TB3S, TB2, TB3T, TB3TS shown



Wiring



1794-TB3, -TB3S, -TB2, -TB3T, and -TB3TS					1794-TBN
Channel	**Signal Type**	**Label Markings**	**Terminal**	**Shield (TB3T/TB3TS)**	**Terminal**
0	Current Input	I0	A-0	C-39	B-0
	Current Return	I0 Ret	A-1		C-1
	Voltage Input	V0	A-2	C-40	B-2
	Voltage Return	V0 Ret	A-3		C-3
1	Current Input	I1	A-4	C-41	B-4
	Current Return	I1 Ret	A-5		C-5
	Voltage Input	V1	A-6	C-42	B-6
	Voltage Return	V1 Ret	A-7		C-7
2	Current Output	I0	A-8	C-43	B-8
	Current Return	I0 Ret	A-9		C-9
	Voltage Output	V0	A-10	C-44	B-10
	Voltage Return	V0 Ret	A-11		C-11
3	Current I Output	I1	A-12	C-45	B-12
	Current Return	I1 Ret	A-13		C-13
	Voltage Output	V0	A-14	C-46	B-14
	Voltage Return	V1 Ret	A-15		C-15
24V dc Common	TB2, TB3, TB3S: Terminals 16 thru 33 are internally connected in the terminal base unit TB3T, TB3TS: Terminals 16, 17, 19, 21, 23, 25, 27, 29, 31, and 33 are internally connected in the terminal base unit TBN: Terminals 16 and 33 are internally connected in the terminal base unit				
+24V dc Power	TB2 and TBN: Terminals 34 and 51 are internally connected in the terminal base unit TB3, TB3S: Terminals 34 thru 51 are internally connected in the terminal base unit TB3T, TB3TS: Terminals 34, 35, 50, and 51 are internally connected in the terminal base unit				
Chassis Gnd	TB3T, TB3TS: Terminals 39 thru 46 are internally connected to chassis gnd				

ATTENTION

Only connect either a voltage input or a current input per channel, not both.

Specifications - 1794-IF2XOF2I	
Module Location	Cat. No. 1794-TB3, -TB3S, -TB2, -TB3T, -TB3TS, and -TBN Terminal Base Unit
Isolation Voltage	120V ac continuous (when used with -TB3, -TB3S, -TB2, -TB3T, and -TB3TS) 250V ac continuous (when used with -TBN) Module is factory tested to 2550V dc for 1s between:channel to channel channel to user power channel to system user power to system
Flexbus Current	50mA
Power Dissipation	3.3W maximum @ 31.2V dc
Thermal Dissipation	Maximum 11 BTU/hr @ 31.2V dc
Keyswitch Position	5
Indicators	1 green power/status indicator
Calibration	Factory calibration
Input Specifications	
Number of Inputs	2 isolated
Resolution Voltage Current	16 bits - unipolar; 15 bits plus sign - bipolar 0.156mV/cnt unipolar; 0.313mV/cnt bipolar 0.320µA/cnt unipolar: 0-640µA/cnt bipolar
Data Format	2's complement 2's complement percent binary offset binary
Conversion Type	Sigma delta
Update Rate	2.5/5.0/7.5ms all channels
Input Current Terminal	4-20mA (user configurable) 0-20mA (user configurable) ±20mA (user configurable)
Input Voltage Terminal	±10V (user configurable) 0-10V (user configurable) ±5V (user configurable) 0-5V (user configurable)
Step Response to 63% Voltage or Current Terminal	 1200Hz convert rate = 0.6ms 600Hz convert rate = 6.7ms 300Hz convert rate = 13.4ms 150Hz convert rate = 26.7ms
Absolute Accuracy[1] Voltage Terminal Current Terminal	 0.1% Full Scale @ 25ºC 0.1% Full Scale @ 25ºC
Accuracy Drift w/Temp. Voltage Terminal Current Terminal	 0.0028% Full Scale/ºC 0.0038% Full Scale/ºC
Normal Mode Rejection Ratio Voltage Terminal Current Terminal	 -3dB @ 12Hz (300Hz conversion rate) -80.0dB @ 50Hz (300Hz conversion rate) -3dB @ 6Hz (150Hz conversion rate) -80.0dB @ 60Hz (150Hz conversion rate)
Input Resistance Voltage Terminal Current Terminal	 >10megΩ <100 Ω[2]
Maximum Overload	30V continuous or 32mA continuous, one channel at a time

Output Specifications	
Number of Outputs	2 isolated
Resolution Voltage Current	15 bits plus sign 0.320mV/cnt 0.656µA/cnt
Data Format	2's complement, 2's complement% binary offset binary
Conversion Type	Digital to analog converter
Update Rate	2.5/5.0ms
Output Current Terminal	0mA output until module is configured 4-20mA (user configurable) 0-20mA (user configurable)
Output Voltage Terminal	0V output until module is configured ±10V (user configurable) 0-10V (user configurable) ±5V (user configurable) 0-5V (user configurable)
Step Response to 63% of FS	<25µs
Absolute Accuracy[3] Voltage Terminal Current Terminal	 0.1% Full Scale @ 25ºC 0.1% Full Scale @ 25ºC
Accuracy Drift w/Temp. Voltage Terminal Current Terminal	 0.0012% Full Scale/ºC 0.0025% Full Scale/ºC
Current Load on Voltage Output	3mA maximum
Resistive Load on mA Output	0 - 750 Ω
General Specifications	
External dc Power Supply Voltage Voltage Range Supply Current	 24V dc nominal 19.2 to 31.2V dc (includes 5% ac ripple) 150mA @ 24V dc
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Non-operating Vibration	 0 to 55ºC (32 to 131ºF) -40 to 85ºC (-40 to 185ºF) 5 to 95% noncondensing (operating) 5 to 80% noncondensing (nonoperating) 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) insulation maximum 2[3]
Publications Installation Instructions User Manual	 1794-5.39 1794-6.5.8
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

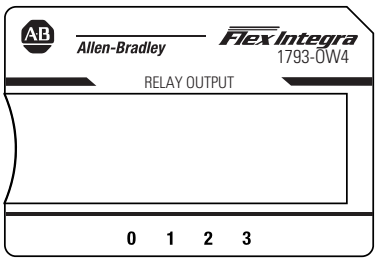
1 Includes offset, gain, non-linearity and repeatability error terms.
2 If 24V dc is removed from the module, input resistance = 10kΩ.
3 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

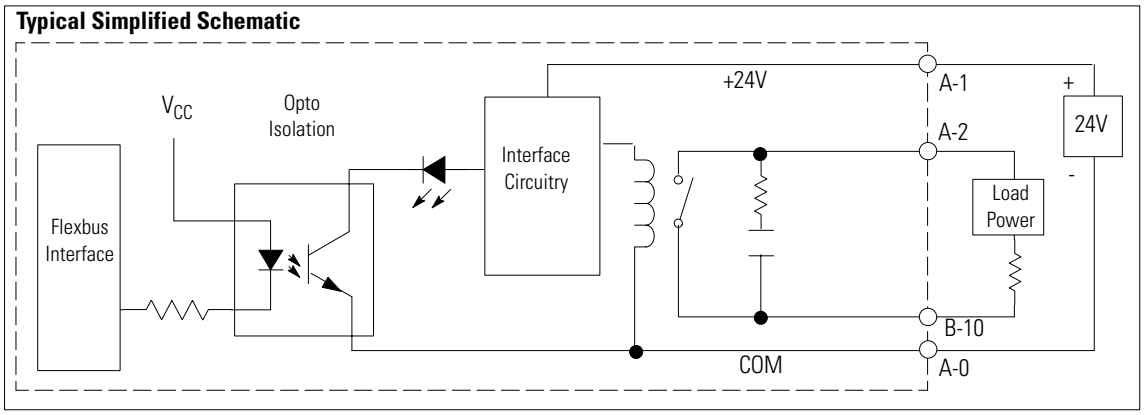
The following table describes the relay module.

	Relay Module	Purpose	See Page
FLEX Integra	*1793-OW4 and -OW4S*	24V dc, 48V dc, 120V ac, and 240V ac 4 relay sink/source output module - the 1793-OW4 has screw-clamp terminations while 1793-OW4S has spring-clamp terminations	**118**
FLEX I/O	*1794-OW8*	24V dc, 48V dc, 120V ac, and 240V ac 8 relay sink/source output module	**120**

The following table illustrates the recommended terminal base unit(s) for the relay module.

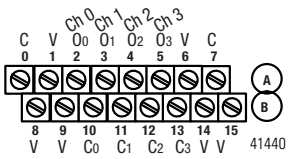
FLEX I/O Product	Catalog Number	Recommended Terminal Base	Compatible Terminal Base(s)
Relay			
Relay Module	1794-OW8		   



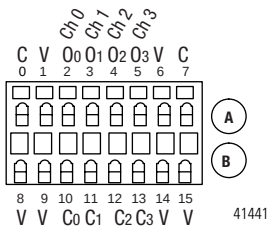


Wiring

1793-OW4



1793-OW4S



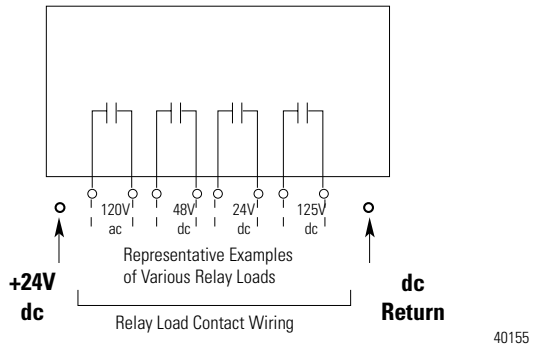
Where: C = common; V = +24V dc power; O = relay load; Cn = relay common

Output Channel	Output Terminal	Common
0	A-2	B-10
1	A-3	B-11
2	A-4	B-12
3	A-5	B-13
+24V dc	Terminals 1, 6, 8, 9, 14 and 15 are internally connected together in the module	
24V dc common	Terminals 0 and 7 are internally connected together in the module.	

ATTENTION

Do not attempt to increase load current or wattage capability beyond the maximum rating by connecting 2 or more outputs in parallel. The slightest variation in relay switching time may cause one relay to momentarily switch the total load current.

Simplified Schematic of Relay Module



Load power can be obtained from a variety of sources, and can range from +5V dc to 240V ac. Make certain that only 24V dc is applied to the module power terminals on the module terminal base.

ATTENTION

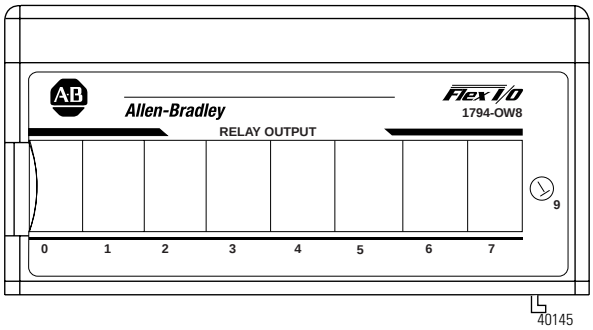
Apply only +24V dc power to the power terminals on the terminal base unit. Make certain that all relay wiring is properly connected before applying any power to the module.

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

Specifications - 1793-OW4 and -OW4S		
Module Type	Form A relay output 1793-OW4 - screw-cage terminations 1793-OW4S - spring-clamp terminations	
Mounting Location	DIN rail mounting	
Number of Channels	1 group of 4	
Output Range (at rated power)	**Resistive** 5-30V dc @ 2.0A 48V dc @ 0.5A 125V dc @ 0.25A 125V ac @ 2.0A 240V dc @ 2.0A	**Inductive** 5-30V dc @ 2.0A; L/R = 7ms 48V dc @ 0.5A; L/R = 7ms 125V dc @ 0.25A; L/R = 7ms 125V ac @ 2.0A; 15A make; PF = cos θ = 0.4 240V ac @ 2.0A; 15A make; PF = cos θ = 0.4
Maximum Power Ratings (steady state)	**Resistive** 60W @ 30V dc 24W @ 48V dc 31W @ 125V dc 250W @ 125V ac 480W @ 240V ac	**Inductive** 60VA @ 30V dc 24VA @ 48V dc 31VA @ 125V dc 250VA @ 125V ac 480VA @ 240V ac
Minimum Contact Load	100µA @ 100mV dc	
Off-state Leakage Current	1mA @ 240V ac (through a snubber)	
Initial Contact Resistance	30mΩ	
Expected Contact Life	100,000 operations minimum at rated loads	
Switching Frequency	0.3Hz maximum at rated load	
Operate/Release Time	10ms maximum	
Bounce Time	1.2ms (mean)	
Delay Times Off to On On to Off	8ms maximum (from valid output ON signal to relay coil activation) 26ms (from valid output OFF signal to relay coil deactivation)	
Isolation Voltage Between any 2 contacts Customer load to logic Customer load to 24V dc Customer 24V dc to logic	 2550V dc for 1s 2550V dc for 1s 2550V dc for 1s 850V dc for 1s	

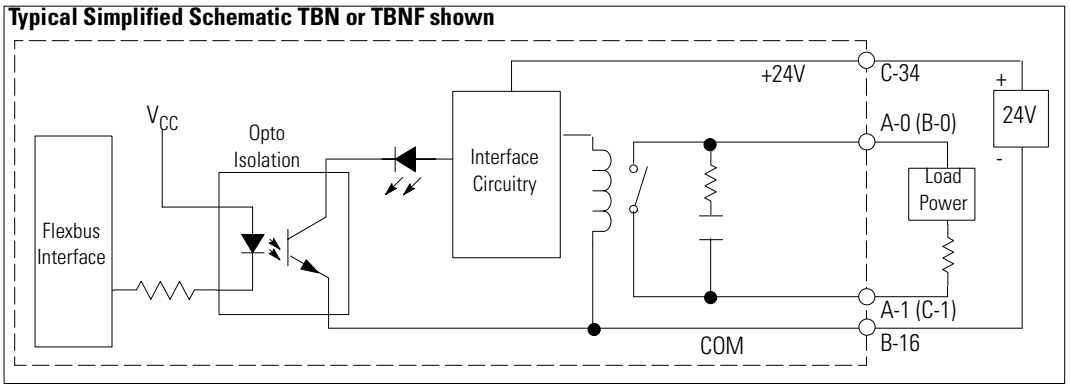
Specifications - 1793-OW4 and -OW4S	
Fuse Recommendations	3.0A, 250V ac slow blow fuse (Littelfuse part number 239003)
Flexbus Current	70mA maximum
Power Dissipation	5.0W @ 31.2V dc
Thermal Dissipation	17.1 BTU/hr @ 31.2V dc
Indicators	4 yellow channel status indicators
General Specifications	
External dc Power Voltage Current	 19.2-31.2V dc (5% ac ripple) 125mA maximum
Dimensions (HxWxD)	69mm x 55mm x 80mm (2.72in x 2.17in x 3.15in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Nonoperating Vibration	 0 to +55°C (32 to +131°F) -40 to +85°C (-40 to +185°F) 5 to 95% noncondensing Tested to 12g peak acceleration, 11(+1)ms pulse width Tested to 50g peak acceleration, 11(+1)ms pulse width Tested 2g @ 10-500Hz per IEC68-2-6
ConductorsWire Size Category[1]	12 gauge (4mm^2) stranded wire 3/64 in (1.2mm) maximum insulation 2
Terminal Screw Torque	4-7 inch-pounds
Publications Installation Instructions	 1793-5.7
Agency Certification	

1 Use this category information for planning conductor routing as described in publication 1770-4.1, "Wiring and Grounding Guidelines for Noise Immunity."

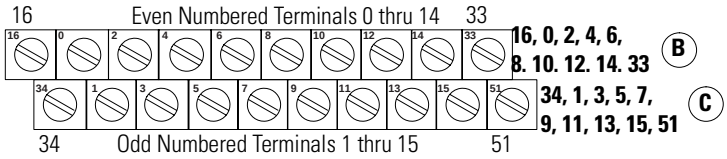


Recommended Terminal Base	Compatible Terminal Base(s)
TBNF	TB2, TB3, TB3S, TBN

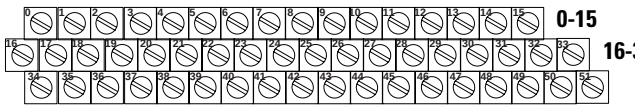
Typical Simplified Schematic TBN or TBNF shown



1794-TBN
1794-TBNF



1794-TB3
1794-TB3S
1794-TB2



Output Channel	1794-TB3, -TB3S, -TB2 Output Terminal	Output Channel	1794-TB3, -TB3S, -TB2 Output Terminal	Output Channel	1794-TBN, -TBNF Output Terminal	Output Channel	1794-TBN, -TBNF Output Terminal
0	A-0	4	A-8	0	B-0	4	B-8
	A-1		A-9		C-1		C-9
1	A-2	5	A-10	1	B-2	5	B-10
	A-3		A-11		C-3		C-11
2	A-4	6	A-12	2	B-4	6	B-12
	A-5		A-13		C-5		C-13
3	A-6	7	A-14	3	B-6	7	B-14
	A-7		A-15		C-7		C-15

A = output terminals
B = dc return terminals
C = power terminals (C-34 thru 51 for TB3, TB3S) (C-34 and C-51 for TB2)

B = even numbered output terminals 0-14, 24V dc return terminals B-16 and B-33
C = odd numbered output terminals 1-15; 24V dc power terminals C-34 and C-51

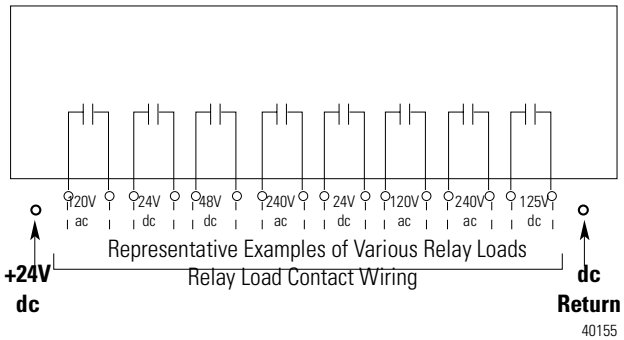
ATTENTION

Do not attempt to increase load current or wattage capability beyond the maximum rating by connecting 2 or more outputs in parallel. The slightest variation in relay switching time may cause one relay to momentarily switch the total load current.

Apply only +24V dc power to the power terminals on the terminal base unit. Make certain that all relay wiring is properly connected before applying any power to the module.

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

Simplified Schematic of Relay Module



Load power can be obtained from a variety of sources, and can range from +5V dc to 240V ac. Make certain that only 24V dc is applied to the module power terminals on the module terminal base

Specifications - 1794-OW8	
Outputs per Module	8 Form A isolated (normally open) electromechanical relays
Module Location	Cat. No. 1794-TBNF, -TB3, -TB3S, -TB2 or -TBN Terminal Base Unit
Off-State Leakage Current (max at 240V ac)	1mA thru snubber circuit
Output Voltage Range (load dependent)	5-30V dc @ 2.0A resistive 48V dc @ 0.5A resistive 125V dc @ 0.25A resistive 125V ac @ 2.0A resistive 240V ac @ 2.0A resistive
Output Current Rating (at rated power)	Resistive 2A @ 5-30V dc 0.5A @ 48V dc 0.25A @ 125V dc 2A @ 125V ac 2A @ 240V ac Inductive 2.0A steady state @ 5-30V dc, L/R = 7ms 0.5A steady state @ 48V dc, L/R = 7ms 0.25A steady state @ 125V dc, L/R = 7ms 2.0A steady state, 15A make @ 125V ac, PF = cos θ = 0.4 2.0A steady state, 15A make @ 240V ac, PF = cos θ = 0.4
Power Rating (steady state)	250W max. for 125V ac resistive output 480W max. for 240V ac resistive output 60W max. for 30V dc resistive output 24W max. for 48V dc resistive output 31W max. for 125V dc resistive output 250VA max. for 125V ac inductive output 480VA max. for 240V ac inductive output 60VA max. for 30V dc inductive output 24VA max. for 48V dc inductive output 31VA max. for 125V dc inductive output
Isolation Voltage Between any 2 sets of contacts Customer load to logic Customer load to 24V dc supply Customer 24V dc supply to logic	 2550V dc for 1s 2550V dc for 1s 2550V dc for 1s 850V dc for 1s
Output Signal Delay OFF to ON ON to OFF	8ms maximum (time from valid output on signal to relay energization by module) 26ms maximum (time from valid output off signal to relay deenergization by module)
Flexbus Current (max)	69mA @ 5V dc
Power Dissipation	Maximum 5.5W
Thermal Dissipation	Maximum 18.8 BTU/hr
Indicators (field side indication, logic driven)	8 yellow status indicators
Keyswitch position	9
Initial Contact Resistance	30mΩ
Switching Frequency	1 operation/3s (0.3Hz at rated load) max
Operate/Release Time	Maximum 10ms
Bounce Time	1.2ms (mean)
Minimum Contact Load	100µA at 100mV dc
Expected Life of Electrical Contacts	Minimum 100,000 operations @ rated loads
Fusing[1]	Use a 1794-TBNF with a 3.0A Littelfuse 239003
Max Inrush Current	15A
General Specifications	
External dc Power Supply Voltage Voltage Range Supply Current	 24V dc nominal 19.2 to 31.2V dc (includes 5% ac ripple) 125mA maximum
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
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 12g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 2g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) insulation maximum 1[2]
Publication Installation Instructions	 1794-5.19
Agency Certification	Meets URLR150 and C300; Meets IEC 1131 AC-15 Utilization Category Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

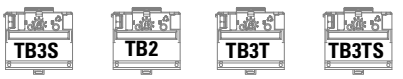
1 Module outputs are not fused. If external fusing is desired, you must provide external fusing.

2 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

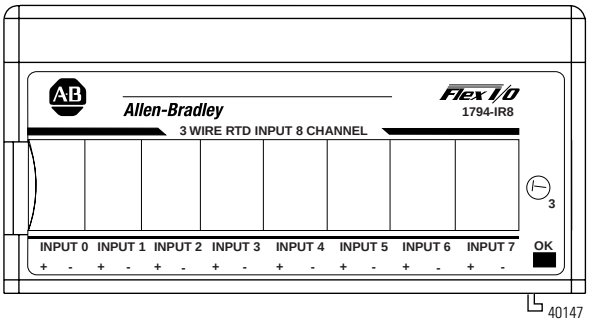
Use the following table to determine which specialty module will meet your application needs.

Specialty Module	Purpose	See Page
1794-IR8	24V dc 8 input RTD module	**123**
1794-IRT8	24V dc thermocouple/RTD module	**126**
1794-IT8	24V dc 8 input thermocouple/mV module	**129**
1203-FM1	SCANport module	**132**

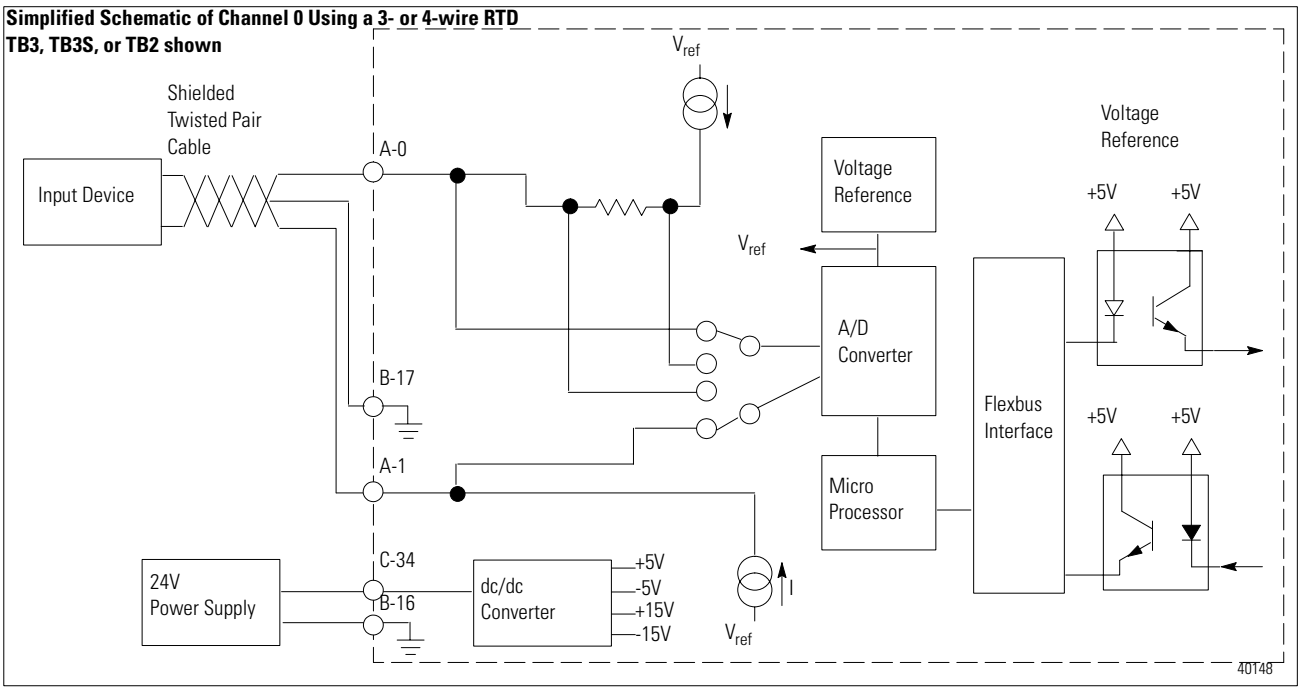
The following table illustrates the recommended terminal base unit(s) for each specialty module.

FLEX I/O Product	Catalog Number	Recommended Terminal Base	Compatible Terminal Base(s)
Specialty			
RTD Input Module	1794-IR8		
Thermocouple/RTD Input Module	1794-IRT8		
Thermocouple/mV Input Module	1794-IT8	 *	 You can use a TB2, TB3, or TB3S for mV inputs only.
SCANport Module	1203-FM1		None

* You can use a -TB3, -TB3S, or -TB2 for mV inputs only.



Recommended Terminal Base	Compatible Terminal Base(s)
TB3	TB3S, TB2, TB3T, TB3TS



Wiring

1. Connect the individual high and low signal wiring to numbered terminals on the **0-15** row **(A)** on the terminal base unit as indicated in the table below.
2. Connect 24V dc common to terminal 16 on row **(B)**.
3. Connect individual channel signal returns to the associated terminal on row **(B)** as shown in the table below.

ATTENTION

Use the following Belden cables for connecting the RTD to the terminal base unit.

RTD Type	Length of Run/Humidity Level	Belden Cable Number
2-wire	Not applicable	9501
3-wire	Less than 100ft (30.5m) with normal humidity	9533
	Over 100ft (30.5m) or high humidity[1]	83503

1 Greater than 55% for more than 8 hours

4. Connect individual channel shield returns to the associated terminal on row **(B)** for 1794-TB3 or row **(C)** for the 1794-TB3T as shown in the table below.
5. Connect +24V dc to terminal 34 on the **34-51** row **(C)**.

ATTENTION

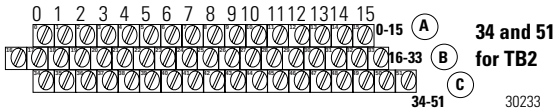
To reduce susceptibility to noise, power analog modules and digital modules from separate power supplies. Do not exceed a length of 33ft (10m) for dc power cabling.

Do not daisy chain power or ground from the RTD terminal base unit **to any ac or dc digital module terminal base units.**

6. If daisy-chaining 24V dc common, connect jumper from terminal 33 to terminal 16 on the next terminal base unit.
7. If daisy-chaining +24V dc, connect jumper from terminal 51 to terminal 34 on the next terminal base unit.
8. Connect the shield to functional earth ground as near as possible to the module.

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

1794-TB3, -TB3S, -TB2, -TB3T, or -TB3TS



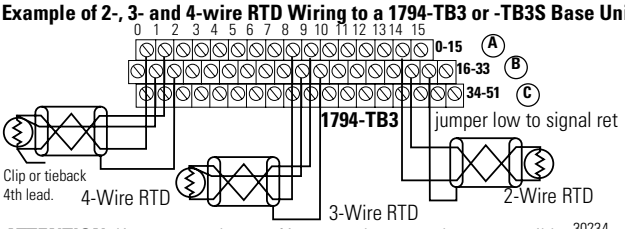
RTD Channel	1794-TB3, -TB3S, -TB2 Terminal Base Unit			
	High Signal Terminal	Low Signal Terminal	Signal Return[1]	Shield Return
0	A-0	A-1	B-17	B-18
1	A-2	A-3	B-19	B-20
2	A-4	A-5	B-21	B-22
3	A-6	A-7	B-23	B-24
4	A-8	A-9	B-25	B-26
5	A-10	A-11	B-27	B-28
6	A-12	A-13	B-29	B-30
7	A-14	A-15	B-31	B-32
24V dc Common	16 thru 33			
+24V dc power	34 thru 51 (34 and 51 for TB2)			

1 When using a 2-wire RTD, jumper the signal return to the low signal terminal.

RTD Channel	1794-TB3T or -TB3TS Terminal Base Unit			
	High Signal Terminal	Low Signal Terminal	Signal Return	Shield Return[1]
0	A-0	A-1	B-17	C-39
1	A-2	A-3	B-19	C-40
2	A-4	A-5	B-21	C-41
3	A-6	A-7	B-23	C-42
4	A-8	A-9	B-25	C-43
5	A-10	A-11	B-27	C-44
6	A-12	A-13	B-29	C-45
7	A-14	A-15	B-31	C-46
24V dc Common	16, 17, 19, 21, 23, 25, 27, 29, 31 and 33			
+24V dc power	34, 35, 50, and 51			

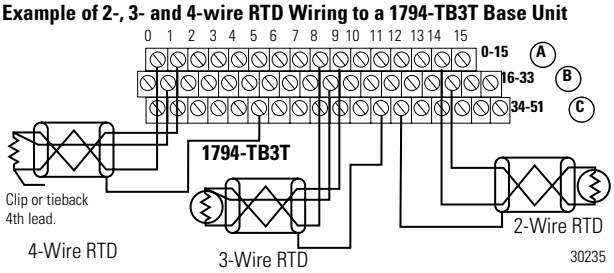
1 Terminals 39 to 46 are chassis ground.

Example of 2-, 3- and 4-wire RTD Wiring to a 1794-TB3 or -TB3S Base Unit



ATTENTION: Keep exposed area of inner conductor as short as possible. For pure resistance measurements, tie each side of resistor to "high" and "low" terminals. Then jumper the "low" (odd numbered) terminal to signal return (com).

Example of 2-, 3- and 4-wire RTD Wiring to a 1794-TB3T Base Unit



ATTENTION: Keep exposed area of inner conductor as short as possible. Temp and resistance data is returned with an implied decimal point. For example a temp data of 1779 is 177.9°. Resistance data of 2034 is 203.4Ω.

Data Type

Word	Description			
Write word 0	Module Data Type			
	Bit	01	00	
		0	0	°C (default) or resistance (in Ω)
		0	1	°F
		1	0	Bipolar counts scaled between -32768 and +32767
		1	1	Unipolar counts scaled between 0 and 65535

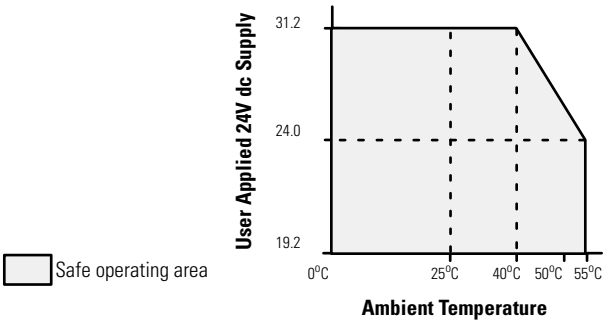
RTD Type

Word	Description					
Write word 1	RTD Type - Range					
	Bit	03	02	01	00	Channel 0
		0	0	0	0	Resistance (default)
		0	0	0	1	No sensor connected - do not scan
		0	0	1	0	100W Pt ∝ = 0.00385 Euro (-200 to +870°C)
		0	0	1	1	100W Pt ∝ = 0.003916 U.S. (-200 to +630°C)
		0	1	0	0	200W Pt ∝ = 0.00385 Euro (-200 to +630°C)
		0	1	0	1	500W Pt ∝ = 0.00385 Euro (-200 to +630°C)
		0	1	1	0	Reserved
		0	1	1	1	10Ω Copper (-200 to +260°C)
		1	0	0	0	120Ω Nickel (-60 to +250°C)
		1	0	0	1	100Ω Nickel (-60 to +250°C)
		1	0	1	0	200Ω Nickel (-60 to +250°C)
		1	0	1	1	500Ω Nickel (-60 to +250°C)
		1	1	0	0	Reserved
	Bit	07	06	05	04	Channel 1 - see bits 00-03, word 1
		11	10	09	08	Channel 2 - see bits 00-03, word 1
		15	14	13	12	Channel 3 - see bits 00-03, word 1
Write Word 2	Bit	03	02	01	00	Channel 4 - see bits 00-03, word 1
		07	06	05	04	Channel 5 - see bits 00-03, word 1
		11	10	09	08	Channel 6 - see bits 00-03, word 1
		15	14	13	12	Channel 7 - see bits 00-03, word 1

Specifications - 1794-IR8	
Number of Inputs	8 Channels
Module Location	Cat. No. 1794-TB3, -TB3S, -TB2, -TB3T, or -TB3TS Terminal Base Unit
Signal Input Range	1 to 433 Ω
Sensors Supported	Resistance: 100 Ω Pt μ = 0.00385 Euro (-200 to +870°C) 100 Ω Pt μ = 0.003916 U.S. (-200 to +630°C) 200 Ω Pt μ = 0.00385 Euro (-200 to +630°C) 500 Ω Pt μ = 0.00385 Euro (-200 to +630°C) 100 Ω Nickel μ = 0.00618 (-60 to +250°C) 120 Ω Nickel μ = 0.00672 (-60 to +250°C) 200 Ω Nickel μ = 0.00618 (-60 to +250°C) 500 Ω Nickel μ = 0.00618 (-60 to +250°C) 10 Ω Copper ∝ = 0.00427 (-200 to +260°C)
Resolution	16 bits across 435 Ω
Data Format	Left justified 16-bit 2's complement or offset binary
Normal Mode Noise Rejection	60db @ 60Hz for A/D filter cutoff @ 15Hz
Accuracy without Calibration (low humidity)	Normal mode: 0.05% Full Scale (maximum) Enhanced Mode: 0.01% Full Scale (typical)
Common Mode Rejection	-120db @ 60Hz; -100db @ 50Hz with A/D filter cutoff @ 10Hz
Common Mode Voltage	0V between channels (common return)
System Throughput Normal mode: Enhanced mode:	 Programmable from 28ms/channel to 325ms/channel 325ms (1 channel scanned) 2.6s (8 channels scanned) Programmable from 56ms/channel to 650ms/channel 650ms (1 channel scanned) 2.925s (8 channels scanned)
Settling Time to 100% of Final Value	Available at system throughput rate
Open RTD Detection	Out of range reading (upscale)
Open Wire Detection Time	Available at system throughput rate
Overvoltage Capability	35V dc, 25V ac continuous @ 25°C 250V peak transient
Channel Bandwidth	dc to 2.62Hz (-3db)
RFI Immunity	Error of less than 1% of range at 10V/M 27 to 1000MHz
Input Offset Drift with Temperature	1.5 mΩ/°C maximum

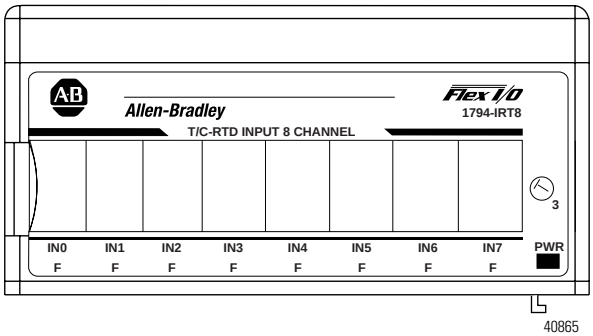
Specifications - 1794-IR8 (continued)	
Gain Drift with Temperature	Normal mode: 20 ppm/°C maximum Enhanced mode: 10 ppm/°C maximum
RTD Excitation Current	718.39μA
Indicators	1 red/green status indicator
Flexbus Current	20mA
Power Dissipation	3W maximum @ 31.2V dc
Thermal Dissipation	Maximum 10.2 BTU/hr @ 31.2V dc
Keyswitch Position	3
Cable Requirements	2-wire Belden 9501 3 -wire, less than 100ft (30.5m) with normal humidity- Belden 9533 3 -wire, greater than 100ft (30.5m) or high humidity (>55% for >8 hrs)- Belden 83503
General Specifications	
External dc Power Supply Voltage Voltage Range Supply Current	 24V dc nominal 19.2 to 31.2V dc (includes 5% ac ripple) 19.2V dc for ambient temperatures < 55°C 24V dc for ambient temperatures < 55°C 31.2V dc for ambient temperatures < 40°C See derating curve. 140mA @ 24V dc
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Non-operating Vibration	 0 to 55°C (32 to 131°F) See derating curve. -40 to 85°C (-40 to 185°F) 5 to 95% noncondensing (operating) 5 to 80% noncondensing (non-operating) 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Publications Installation Instructions User Manual	 1794-5.22 1794-6.5.4
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

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.

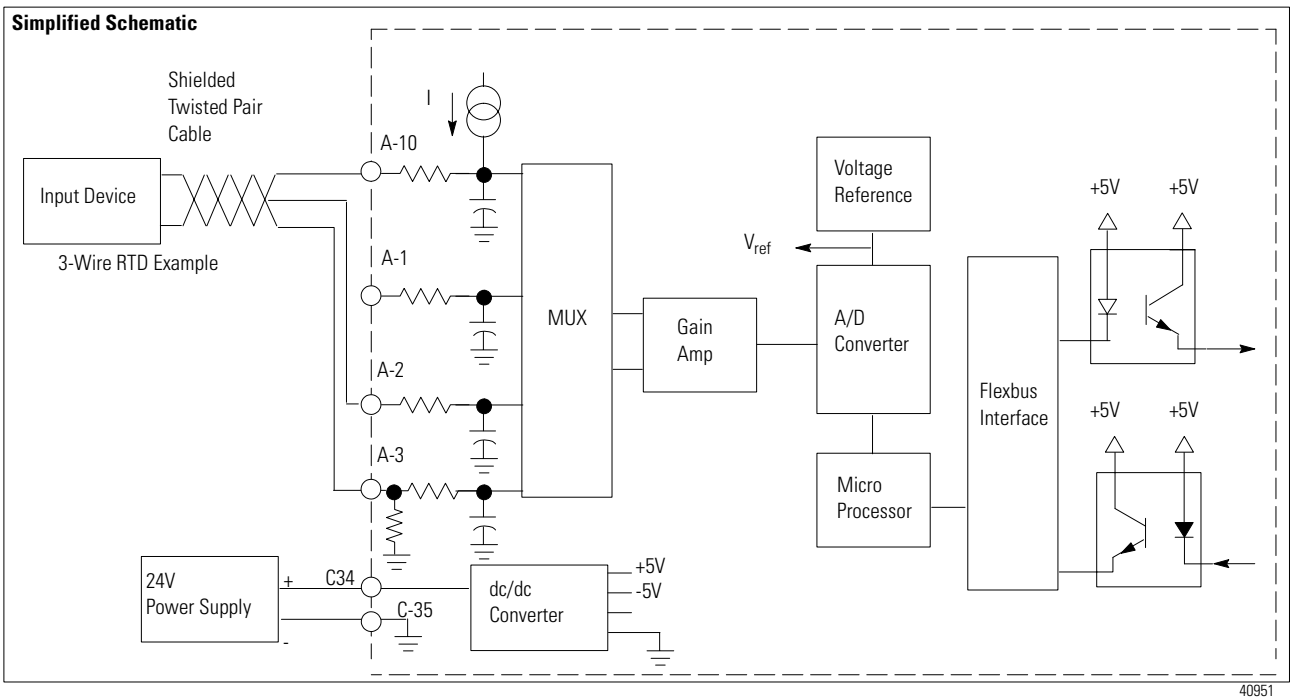
40156



40865

Recommended Terminal Base	Compatible Terminal Base(s)
TB3G	TB3GS

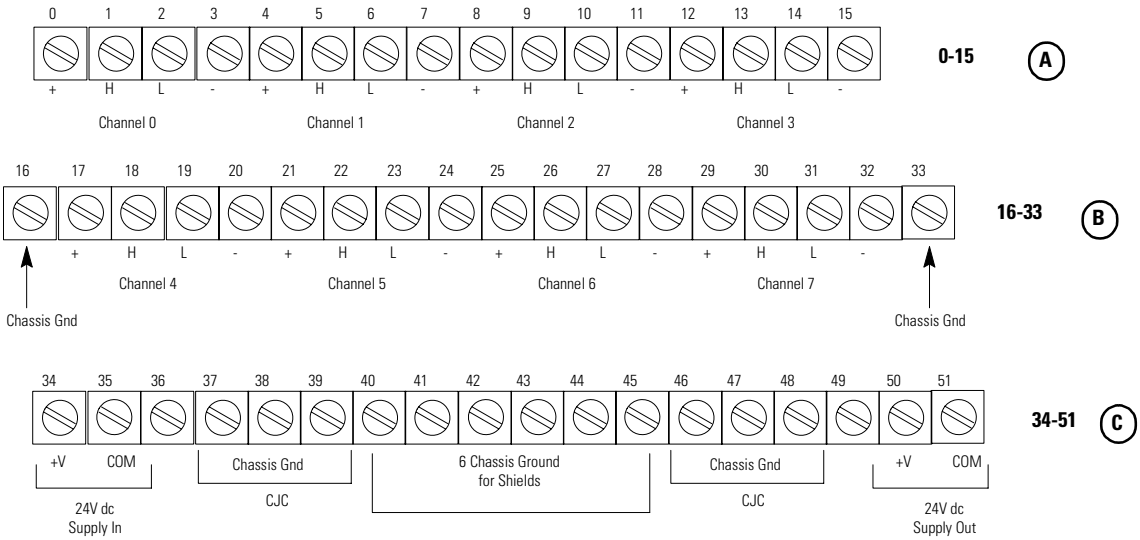
Simplified Schematic



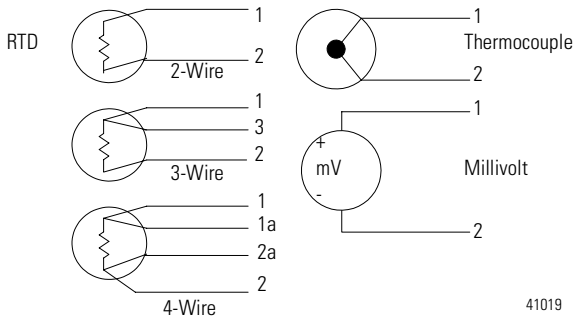
40951

Wiring.

Connections for 1794-TB3G shown



40620



Type of Input	Connect the following				
	H	L	+	-	Shield[1]
RTD - 2-wire			1	2	
RTD - 3-wire		3	1	2	
RTD - 4-wire	1a	2a	1	2	
Thermocouple		1		2	
Millivolt		1		2	

1 Terminals 37, 38, and 39 and 46, 47, and 48 are for cold junction compensation (with 38 and 47 chassis GND).

RTD or Thermocouple Channel	1794-TB3G and -TB3GS Terminal Base Units			
	High Signal Terminal (H)	Low Signal Terminal (L)	RTD Source Current (+)	Signal Return[1](-)
0	A-1	A-2	A-0	A-3
1	A-5	A-6	A-4	A-7
2	A-9	A-10	A-8	A-11
3	A-13	A-14	A-12	A-15
4	B-18	B-19	B-17	B-20
5	B-22	B-23	B-21	B-24
6	B-26	B-27	B-25	B-28
7	B-30	B-31	B-29	B-32
+24V dc Power	34 and 50			
24V dc Common	35 and 51			

1 Terminals 37, 38, and 39 and 46, 47, and 48 are for cold junction compensation (with 38 and 47 chassis GND).

2 Terminals 16, 33, and 40 thru 45 are chassis ground.

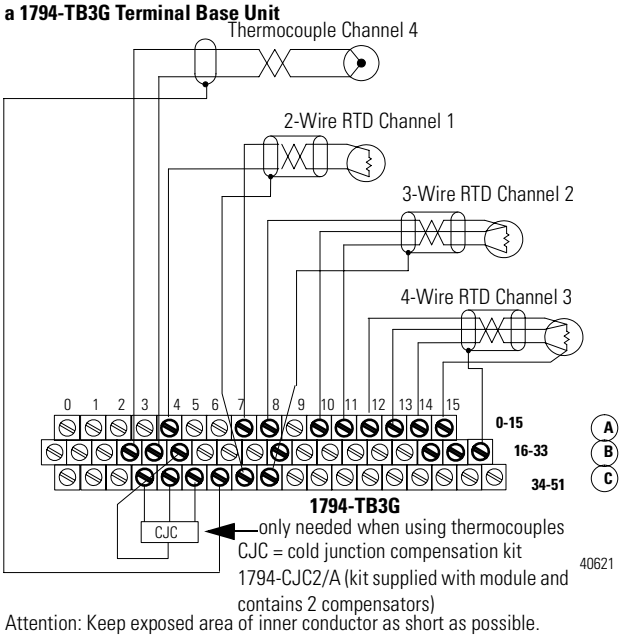
ATTENTION

To reduce susceptibility to noise, power analog modules and digital modules from separate power supplies. Do not exceed a length of 10m (33ft) for dc power cabling.

Do not daisy chain power or ground from this terminal base unit **to any ac or dc digital module terminal base units**.

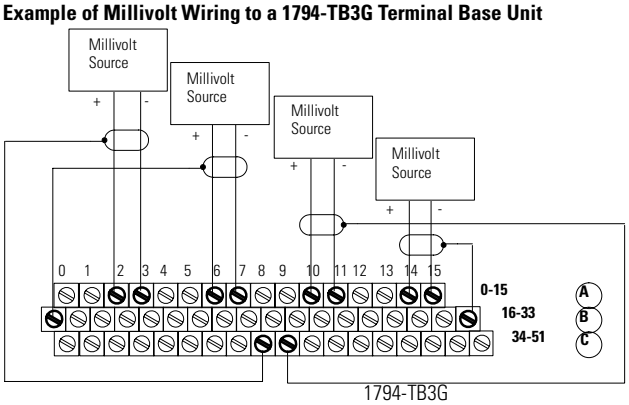
Total current draw through the terminal base unit is limited to 10A. Separate power connections to the terminal base unit may be necessary.

Example of 2-, 3-, and 4-wire RTD and Thermocouple Wiring to a 1794-TB3G Terminal Base Unit



Attention: Keep exposed area of inner conductor as short as possible.
Note: Module cannot be configured as shown. This is just an example of different input connections.
This is a non-isolated module. You may need to take extra precautions like tying the 24V dc common to the earth ground.

Example of Millivolt Wiring to a 1794-TB3G Terminal Base Unit



ATTENTION: Keep exposed area of inner conductor as short as possible.

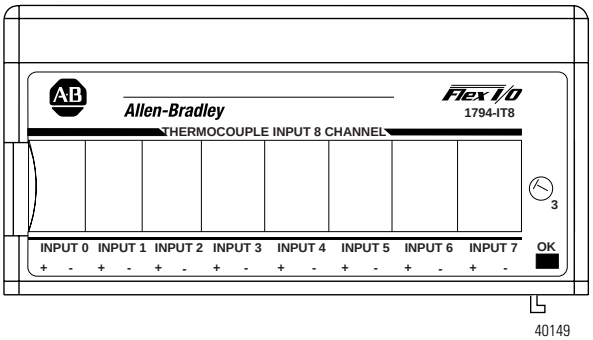
Data Type

Bit	11	10	09	08	Data type for channels 0-7
	0	0	0	0	°C or resistance (in Ω)
	0	0	0	1	°F
	0	0	1	0	°K
	0	0	1	1	-32767 to +32767
	0	1	0	0	0 to 65535
0101 through 1111 not used					
Module defaults to -4000 to 10000 in millivolt mode, and 0 to 5000 in ohms mode. **Note:** For millivolts there are two implied decimals. For degrees and ohms there is one implied decimal.					

Specifications - 1794-IRT8	
Number of Inputs	8 Channels (2 groups of 4)
Module Location	Cat. No. 1794-TB3G, -TB3GS Terminal Base Unit
Nominal Input Ranges	-40 to +100mV dc for thermocouples 0 to 325mV dc for RTDs 0 to 500 Ω for resistance range
Supported RTD Types	Resistance: 100 Ω Pt ∝ = 0.00385 Euro (-200 to +870ºC) 100 Ω Pt ∝ = 0.003916 U.S. (-200 to +630ºC) 200 Ω Pt ∝ = 0.00385 Euro (-200 to +400ºC) 200 Ω Pt ∝ = 0.003916 U.S. (-200 to +400ºC) 100 Ω Nickel ∝ = 0.00618 (-60 to +250ºC) 120 Ω Nickel ∝ = 0.00672 (-80 to +320ºC) 200 Ω Nickel ∝ = 0.00618 (-60 to +200ºC) 10 Ω Copper ∝ = 0.00427 (-200 to +260ºC)
Supported Thermocouple Types	Type B: 300 to 1800ºC (572 to 3272ºF) Type E: -270 to 1000ºC (-454 to 1832ºF) Type J: -210 to 1200ºC (-346 to 2192ºF) Type K: -270 to 1372ºC (-454 to 2502ºF) Type TXK/XK (L):-200 to 800ºC (-328 to 1472ºF) Type N: -270 to 1300ºC (-454 to 2372ºF) Type R: -50 to 1768ºC (-58 to 3214ºF) Type S: -50 to 1768ºC (-58 to 3214ºF) Type T: -270 to 400ºC (-454 to 752ºF)
Resolution	14 bits
Data Format	ºC (implied decimal point XXX.X) ºF (implied decimal point XXX.X) ºK (implied decimal point XXX.X) -32767 to +32767 0-65535 0-5000 (Ω mode) (implied decimal point XXX.X) -4000 to +10000 (millivolt mode) (implied decimal point XXX.XX)
Accuracy vs. Filter Cutoff	0.05% of full range in millivolt mode with filtering selected Hardware only = 0.10% of full range in millivolt mode
Common Mode Rejection	-80db @ 5V peak-to-peak 50-60Hz
Common Mode Input Range	±4V minimum
Isolation Voltage	1500V ac (rms) or 2550V dc for 1.0s between customer and system
System Throughput - add 0.5ms if filtering is selected	For maximum throughput short circuit all unused channels. 5.4ms - millivolt 7.05ms -Ω- 2-wire RTD 9.1ms -Ω- 3-wire RTD 9.2ms -Ω- 4-wire RTD 7.3ms - 2-wire RTD (ºF) 9.4ms - 4-wire RTD (ºF) 7.7ms - 2-wire RTD (ºC), (ºK) 9.8ms - 4-wire RTD (ºC), (ºK) 9.35ms - 3-wire RTD (ºF) 9.75ms - 3-wire RTD (ºC), (ºK) 6.65ms - Thermocouples (ºF) 7.0ms - Thermocouples (ºC), (ºK)
Open Circuit Detection	Defaults to maximum value

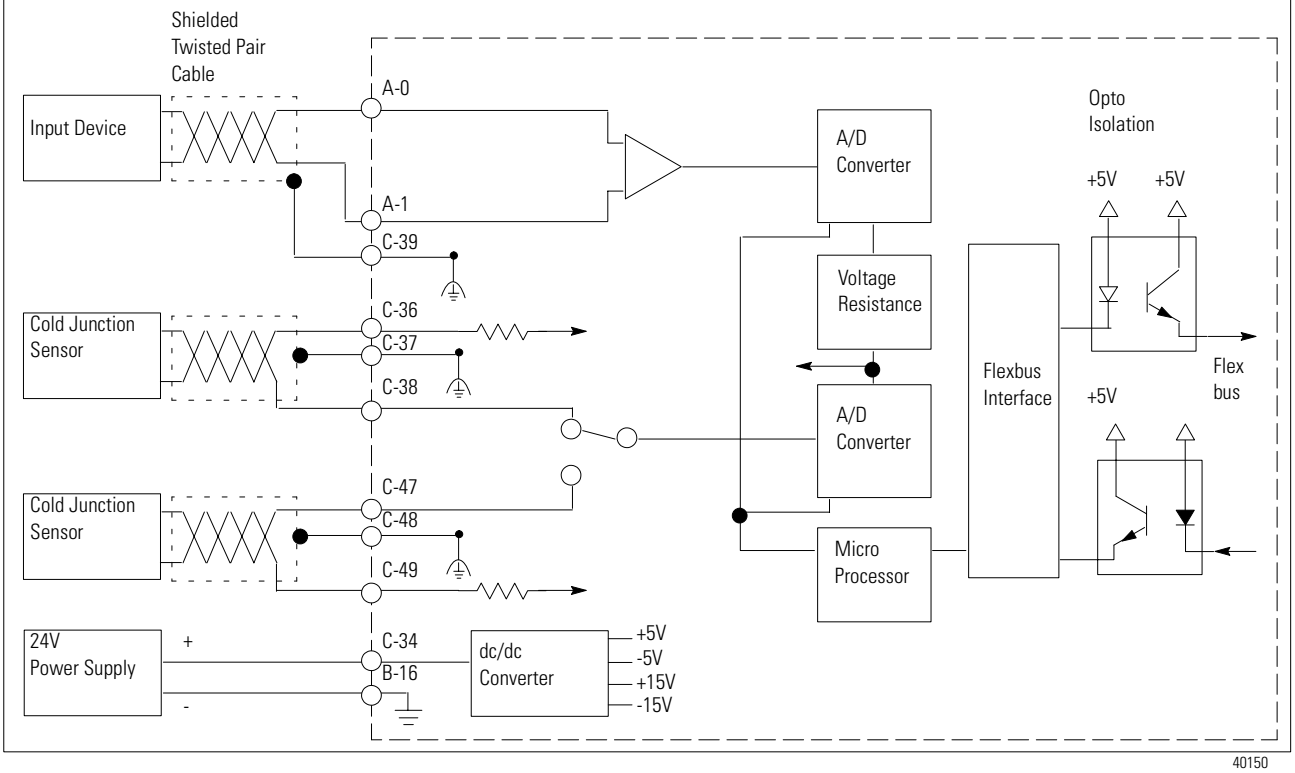
Specifications - 1794-IRT8 (continued)	
Excitation Current	630µA
Open Input Detection Time	0 to 3.8s for revision D or earlier Immediate detection (maximum 1 scan) for revision E or later
Overvoltage Capability	7V dc continuous @ 25ºC
RFI Immunity	Error of less than 1% of range at 10V/M 27 to 1000MHz
Overall Drift with Temperature	150ppm/ºC of span (maximum)
Cold Junction Compensation Range	0 to 70ºC
Cold Junction Compensator	A-B Cold Junction Compensator Kit, 1794-CJC2 (kit supplied with the module and contains 2 compensators)
Indicators	1 green power status indicator
Flexbus Current	40mA
Power Dissipation	3W maximum @ 31.2V dc
Thermal Dissipation	Maximum 10.2 BTU/hr @ 31.2V dc
Keyswitch Position	3
General Specifications	
External dc Power Supply Voltage Voltage Range Supply Current	 24V dc nominal 19.2 to 31.2V dc (includes 5% ac ripple) 85mA @ 24V dc
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Non-operating Vibration	 0 to 55ºC (32 to 131ºF) -40 to 85ºC (-40 to 185ºF) 5 to 95% noncondensing (operating) 5 to 80% noncondensing (non-operating) 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Thermocouple mV Category	 Use appropriate shielded thermocouple wire[1] Belden 8761 2[2]
Publications Installation Instructions User Manual	 1794-5.50 1794-6.5.12
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

1 Refer to thermocouple manufacturer for proper thermocouple extension.
2 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Wiring and Grounding Guidelines for Noise Immunity."



Recommended Terminal Base	Compatible Terminal Base(s)
TB3T	TB3, TB3S, TB2, TB3TS — You can use a TB2, TB3, or TB3S for mV inputs only.

Simplified Schematic Channel 0 TB3T or TB3TS shown



Wiring

1. Connect the individual high and low signal wiring to numbered terminals on the **0-15** row **(A)** on the terminal base unit as indicated in the table below.
2. Connect 24V dc common to terminal 16 on row **(B)**.
3. Connect individual channel shield returns to the associated terminal on row **(B)** for 1794-TB3 or row **(C)** for the 1794-TB3T as shown in the table below.
4. Connect +24V dc to terminal 34 on the **34-51** row **(C)**.

ATTENTION

To reduce susceptibility to noise, power analog modules and digital modules from separate power supplies. Do not exceed a length of 10m (33ft) for dc power cabling.

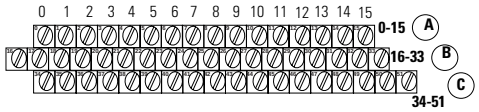
Do not daisy chain power or ground from the RTD terminal base unit to any ac or dc digital module terminal base units.

5. If daisy-chaining 24V dc common, connect jumper from terminal 33 to terminal 16 on the next terminal base unit.
6. If daisy-chaining +24V dc, connect jumper from terminal 51 to terminal 34 on the next terminal base unit.
7. Connect the shield to functional earth ground as near as possible to the module.

ATTENTION

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

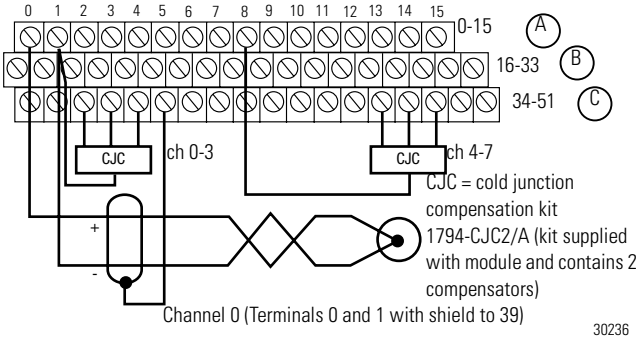
1794-TB3, -TB3S, -TB2, -TB3T, or -TB3TS



mV Mode Channel	1794-TB3, -TB3S, -TB2 Terminal Base Unit			
	High Signal Term. (+)	Low Signal Term. (-)	Shield Return	Not Used
0	A-0	A-1	B-17	B-18
1	A-2	A-3	B-19	B-20
2	A-4	A-5	B-21	B-22
3	A-6	A-7	B-23	B-24
4	A-8	A-9	B-25	B-26
5	A-10	A-11	B-27	B-28
6	A-12	A-13	B-29	B-30
7	A-14	A-15	B-31	B-32
24V dc Common	16 thru 33			
+24V dc power	34 thru 51 (34 and 51 for TB2)			

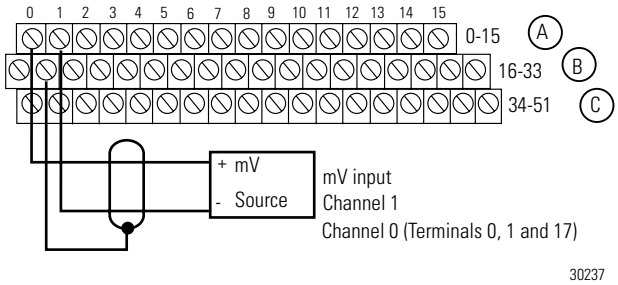
Thermo-couple Channel	1794-TB3T, -TB3TS Terminal Base Unit			
	High Signal Term. (+)	Low Signal Term. (-)	Not Used	Shield Return
0	A-0	A-1	B-17	B-39
1	A-2	A-3	B-19	B-40
2	A-4	A-5	B-21	B-41
3	A-6	A-7	B-23	B-42
4	A-8	A-9	B-25	B-43
5	A-10	A-11	B-27	B-44
6	A-12	A-13	B-29	B-45
7	A-14	A-15	B-31	B-46
24V dc Common	16, 17, 19, 21, 23, 25, 27, 29, 31 and 33			
+24V dc power	34, 35, 50 and 51			

Example of Thermocouple Wiring to 1794-TB3T Base Unit



This is a non-isolated module. You may need to take extra precautions when using grounded thermocouples, like tying the 24V dc common to the earth ground.

Example of mV Input Wiring to 1794-TB3 or -TB3S Base Unit



Data Type

Word	Description			
Write Word 0	Module Data Type			
	Bit	01	00	Definition
		0	0	°C (default)[1]
		0	1	°F
		1	0	Bipolar counts scaled between -32768 and +32767 (default)
		1	1	Unipolar counts scaled between 0 and 65535

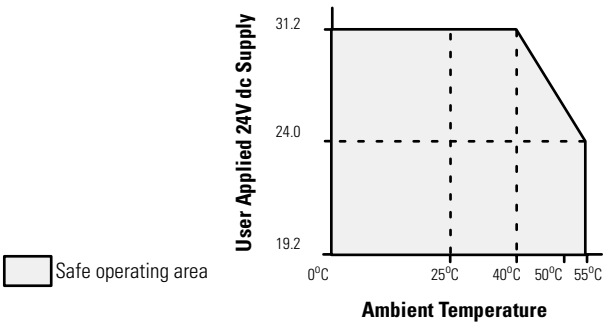
1 For millivolts there are two implied decimals. For degrees and ohms there is one implied decimal.

Specifications - 1794-IT8	
Number of Inputs	8 Channels
Module Location	Cat. No. 1794-TB3T, -TB3, -TB3S, -TB2, or -TB3TS Terminal Base Unit[1]
Nominal Input Voltage Ranges	±76.5mV
Supported Thermocouple Types	Type B: 300 to 1800°C (572 to 3272°F) Type C: 0 to 2315°C (32 to 4199°F) Type E: -270 to 1000°C (-454 to 1832°F) Type J: -210 to 1200°C (-346 to 2192°F) Type K: -270 to 1372°C (-454 to 2502°F) Type N: -270 to 1300°C (-454 to 2372°F) Type R: -50 to 1768°C (-58 to 3214°F) Type S: -50 to 1768°C (-58 to 3214°F) Type T: -270 to 400°C (-454 to 752°F) Type TXK/XK (L): -200 to 800°C (-328 to 1472°F)
Resolution	16 bits (2.384 µV typical)
Accuracy with filter @ 24°C (±0.5°C)	0.025% Full Scale Range maximum
Accuracy without filter @ 24°C (±0.5°C)	0.05% Full Scale Range maximum
Data Format	16-bit 2's complement or offset binary (unipolar)
Normal Mode Noise Rejection	-60db @ 60Hz
Common Mode Rejection	-115db @ 60Hz; -100db @ 50Hz
Common Mode Input Range	+10V maximum
Channel to Channel Isolation	±10V
System Throughput	325ms (1 channel scanned), programmable to 28ms 2.6s (8 channels scanned), programmable to 224ms
Settling Time to 100% of final value	Available at system throughput rate
Open Circuit Detection	Out of range reading (upscale)
Open Thermocouple Detection Time	Available at system throughput rate
Overvoltage Capability	35V dc, 25V ac continuous @ 25°C 250V peak transient
Channel Bandwidth	0 to 2.62Hz (-3db)
RFI Immunity	Error of less than 1% of range at 10V/M 27 to 1000MHz
Input Offset Drift With Temperature	±6 µV/°C maximum
Gain Drift With Temperature	10ppm/°C maximum
Overall Drift With Temperature	50ppm/°C of span (maximum)
Cold Junction Compensation Range	0 to 70°C
Cold Junction Compensator	Kit Cat. No. 1794-CJC2 (contains 2 CJCs)
Indicators	1 red/green power/status indicator
Flexbus Current	20mA
Power Dissipation	3W maximum @ 31.2V dc
Thermal Dissipation	Maximum 10.2 BTU/hr @ 31.2V dc
Keyswitch Position	3

General Specifications	
External dc Power Supply Voltage Voltage Range Supply Current	 24V dc nominal 19.2 to 31.2V dc (includes 5% ac ripple) 19.2V dc for ambient temperatures < 55°C 24V dc for ambient temperatures < 55°C 31.2V dc for ambient temperatures < 40°C See derating curve. 150mA @ 24V dc
Dimensions HxWxD	1.8mm x 3.7mm x 2.1mm (46in x 94in x 53in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Non-operating Vibration	 0 to 55°C (32 to 131°F) See derating curve. -40 to 85°C (-40 to 185°F) 5 to 95% noncondensing (operating) 5 to 80% noncondensing (nonoperating) 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
Publications Installation Instructions User Manual	 1794-5.21 1794-6.5.7
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

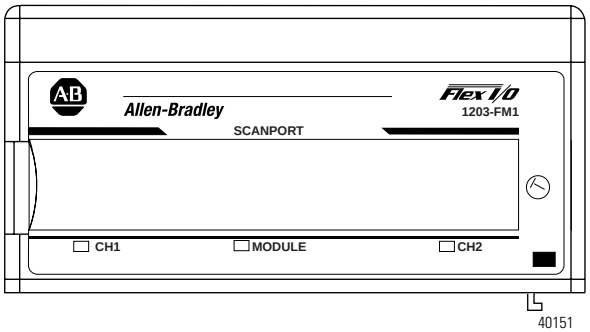
1 Use a 1794-TB3, -TB3S, or -TB2 terminal base unit for mV inputs only. You must use a 1794-TB3T and -TB3TS terminal base unit when using thermocouple inputs.

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.

40156



Recommended Terminal Base	Compatible Terminal Base(s)
	None

ATTENTION

The 1203-FM1 may require up to twice the adapter power supply current of standard FLEX I/O modules. When installing FLEX I/O modules, you can use a maximum of four 1203-FM1 modules with any FLEX I/O adapter. As a general rule, each 1203-FM1 requires the power capacity of two of the standard FLEX I/O modules, so you cannot install as many standard modules as you normally would when using the 1203-FM1. Refer to the following chart to determine the number of 1203 and standard modules that may be installed together in your system.

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.

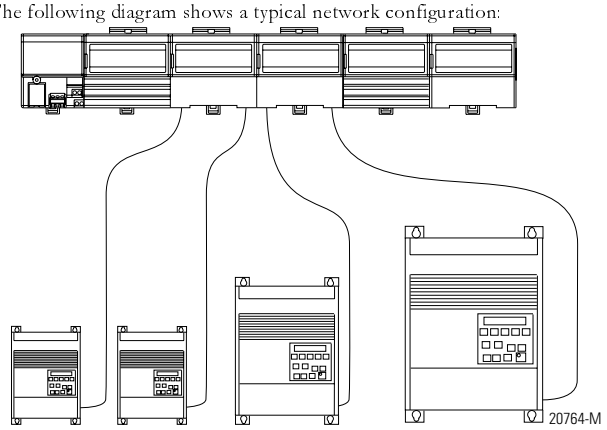
If you are using this number of standard (1794) modules:	Then, the maximum number of 1203 modules that you can use is:	The number of SCANport connections provided is:
7 or 8	0	0
5 or 6	1	2
3 or 4	2	4
1 or 2	3	6
0	4	8

Wiring

To wire the 1203 base used by this module, connect a SCANport cable from the SCANport device to the desired channel. SCANport cables are available in either male-to-male or male-to-female configurations. You can connect cables of up to 10 meters (33 feet) between a SCANport device and any SCANport peripheral.

If you use a port expander, you must subtract the cable length between any device and the expander from the maximum cable length used to connect a peripheral.

The following diagram shows a typical network configuration:



Specifications - 1203-FM1	
Input Voltage Rating	5V supplied from flexbus
Indicators	3 bi-color
Module Location	Cat. No. 1203-FB1 Terminal Base Unit
Flexbus Current	160mA maximum
Power Consumption	0.8W
Keyswitch Position	1
General Specifications	
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Vibration	 0 to 55°C (32 to 131°F) -40 to 85°C (-40 to 185°F) Operating 5 to 95% noncondensing Non-operating 5 to 80% noncondensing) Operating 30g peak acceleration, 11(±1)ms pulse width Non-operating 50g peak acceleration, 11(±1)ms pulse width Tested 5 g @ 10-500Hz per IEC 68-2-6
Dimensions HxWxD	1.8mm x 3.7mm x 2.1mm (46in x 94in x 53in)

Use the following table to determine which counter module will meet your application needs.

Counter Module	Purpose	See Page
1794-IJ2	24V dc 2 input frequency module	**135**
1794-VHSC	24V dc 2 channel very high speed counter module (use with 1794-ACN15 or -ACNR15 only)	**139**
1794-ID2	24V dc 2 input pulse counter module	**142**
1794-IP4	12/24V dc 4 input pulse counter module	**145**

The following table illustrates the recommended terminal base unit(s) for each counter module.

FLEX I/O Product	Catalog Number	Recommended Terminal Base	Compatible Terminal Base(s)
Counter			
Frequency Input Module	1794-IJ2		
Very High Speed Counter Module (use with 1794-ACN15 or -ACNR15 only)	1794-VHSC		 For use with 1794-ACN(R)15 only.
2- Channel Pulse Counter Input Module	1794-ID2		   Auxiliary terminal strips are required when using the TBN or TBNF for the ID2
4-Channel Pulse Counter Input Module	1794-IP4		   Auxiliary terminal strips are required when using the TBN or TBNF for the IP4

Ask these three questions when deciding on which counter module would best fit your application:

1. What is the application?
2. What is the desired counter mode?
3. What field devices, signal levels, and signal type are being connected to the counter module?

Catalog Number	Network Compatibility
1794-IJ2	ControlNet, DeviceNet, RIO, and referenced partners
1794-VHSC	1794-ACN15 or -ACNR15
1794-ID2	ControlNet, DeviceNet, RIO, and referenced partners
1794-IP4	ControlNet, DeviceNet, RIO, and referenced partners

1794-IJ2

Description: Essentially a tachometer with the capability of reporting frequency, acceleration, and direction. Outputs are activated by alarms. Input devices range from magnetic pickup to flowmeters, to incremental encoders to proximity detectors.

This intelligent I/O module is designed to perform high-speed frequency algorithms. The module provides 2 frequency inputs, 2 gate inputs, and 2 outputs. The frequency inputs are capable of accepting frequencies up to 32KHz. The module accepts and returns binary data.

The 1794-IJ2 measures frequency over a user-specified time interval. A frequency calculation can start before the time interval has elapsed, if a user-specified number of frequency input pulses have occurred.

The module's primary target is high-speed, accurate frequency measurement. As such, a high-speed internal clock is synchronized with the frequency input to count over a user-selected sampling time or a user-defined number of frequency input pulses. All power for input devices (24V dc) is supplied by the I/O module.

Applications: Any application requiring rotational control including turbine generators, motors, drives, gears, shafts, etc.

Signal Types: Input = 50mV, 500mV, 3V, 6V, 24V sine or square wave up to 32KHz Output = Two 24V dc digital source outputs current-limited to 1A

Network Compatibility: All networks supported by FLEX I/O

1794-VHSC

Description: A counter module with two incremental quadrature encoder interfaces, each with three inputs (A, B, and Z). Each input module as ± inputs for connection to pulse transmitters with complementary or non-complementary signals.

The counter can count one or two pulse trains for up/down counting and detection of a selectable number of edges (X1, X2, X4). Each of the two counters has an upper limit of 1MHz, a 24-bit counter register, a preset register, and a latch register.

Power to the module is supplied from an external power supply. Outputs can be configured for overlapping, multiple windows, and/or pulse with modulation.

Applications: Typical applications include packaging, material handling, flow monitoring, cut-to-length, motor speed control and monitoring.

Signal Types: Input = 5V, 15V, or 24V dc square wave limited to 1MHz Output = Four 5V or 12-24V dc digital source outputs, on-state current maximum 1A, maximum current per output pair is.5A

Network Compatibility: Use with 1794-ACN(R)15 ControlNet only.

1794-ID2

Description: A counter module with 2 incremental quadrature encoder interfaces, each with four inputs (A, B, Z, and G).

Each input module has ± inputs for connection to pulse transmitters with complementary or non-complementary signals.

The counter can count one or two pulse trains for up/down counting and detection of a selectable number of edges (X1, X2, X4). Each of the two counters has an upper limit of 100KHz, a 16-bit counter register, a preset register, and a latch register.

Power to the module is supplied from an external power supply.

Applications: Typical applications include quantity counting, positioning, and speed calculations.

Signal Types: Input = 12V to 24V square wave limited to 100KHz Output = None

Network Compatibility: All networks supported by FLEX I/O

1794-IP4

Description: A counter module with 4 pulse transmitter interfaces (12-24V dc), each with two signal inputs (N and D).

Each input module has ± inputs for connection to pulse transmitters.

Each interface may be configured for: a) period of time measurement using one 16-bit counter and accumulating pulse counting using the other 16-bit counter or b) period time measurement using a 32-bit counter.

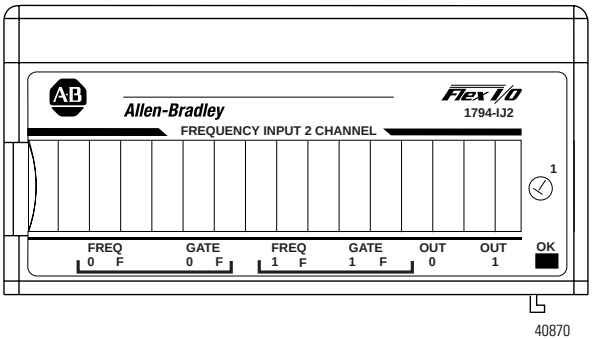
The number of periods to be measured is selectable (1, 2, 4, 8, 16, 32, 64, and 128) via the gate control.

Power to the module is supplied from an external power supply.

Applications: Typical applications include counting pulses from flow meters and density meters. Quantity counting and speed calculations are examples of other applications.

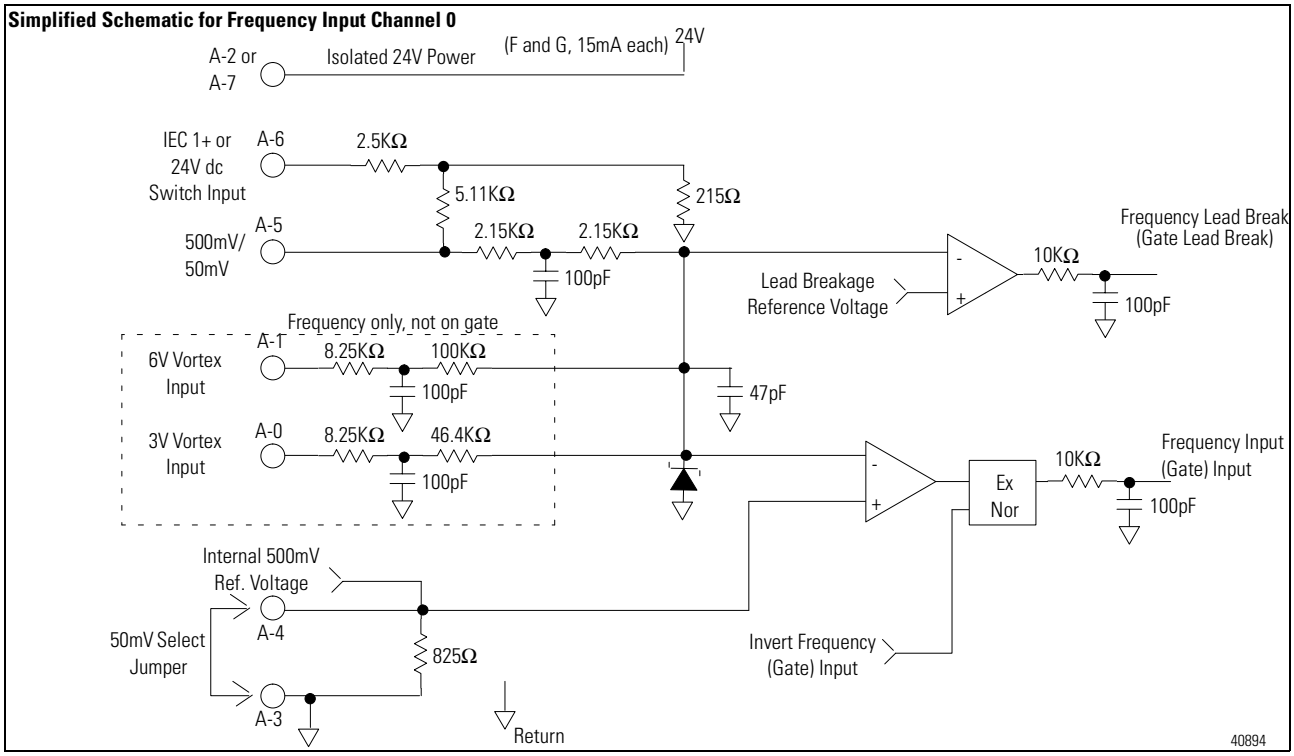
Signal Types: Input = 12V to 24V square wave limited to 100KHz Output = None

Network Compatibility: All networks supported by FLEX I/O

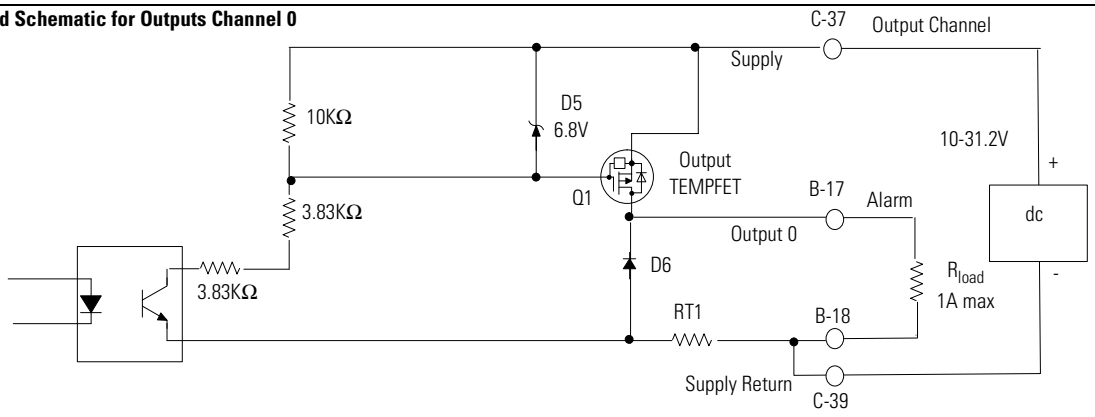


Recommended Terminal Base	Compatible Terminal Base(s)
	

Simplified Schematic for Frequency Input Channel 0



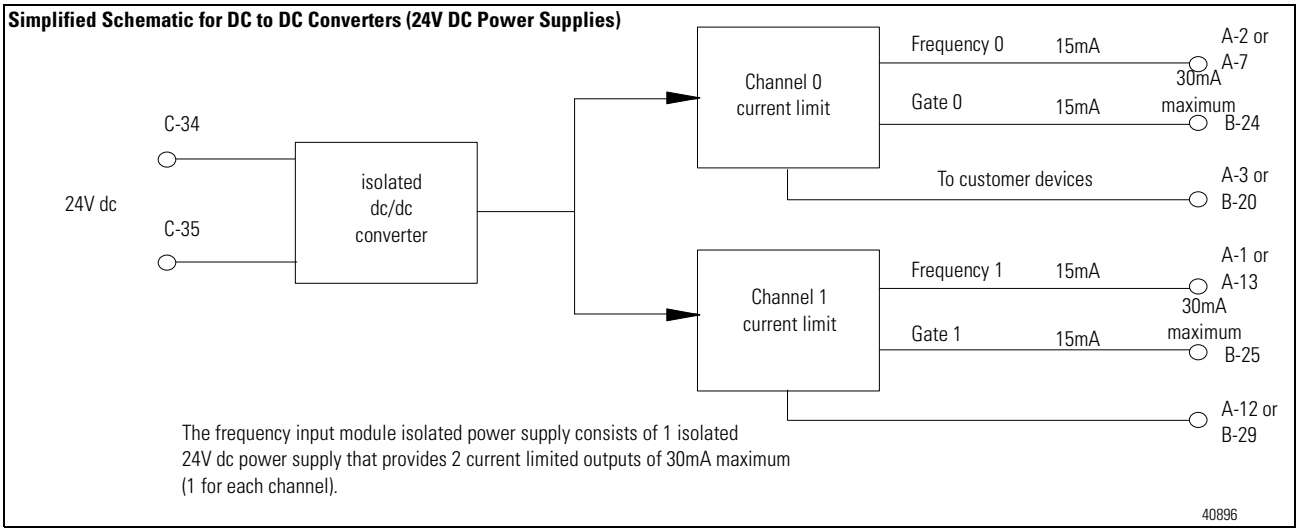
Simplified Schematic for Outputs Channel 0



Customer supplied power, ranging from +10V to +31.2V dc, is connected internally to the power output transistor. When an output is turned on, current flows into the source out of the drain, through the load connected to the ground of the customer supply (customer return). Diode D6 protects the power output transistors from damage due to inductive loads. Output Q1 is a thermally protected FET and will turn off @ 3A (approximately). After an output goes into thermal shutdown, you must fix the cause of the shutdown and toggle the outputs ON and OFF to reenergize the output. RT1 protects D6 and Q1 if power supply polarity is reversed.

40895

Simplified Schematic for DC to DC Converters (24V DC Power Supplies)

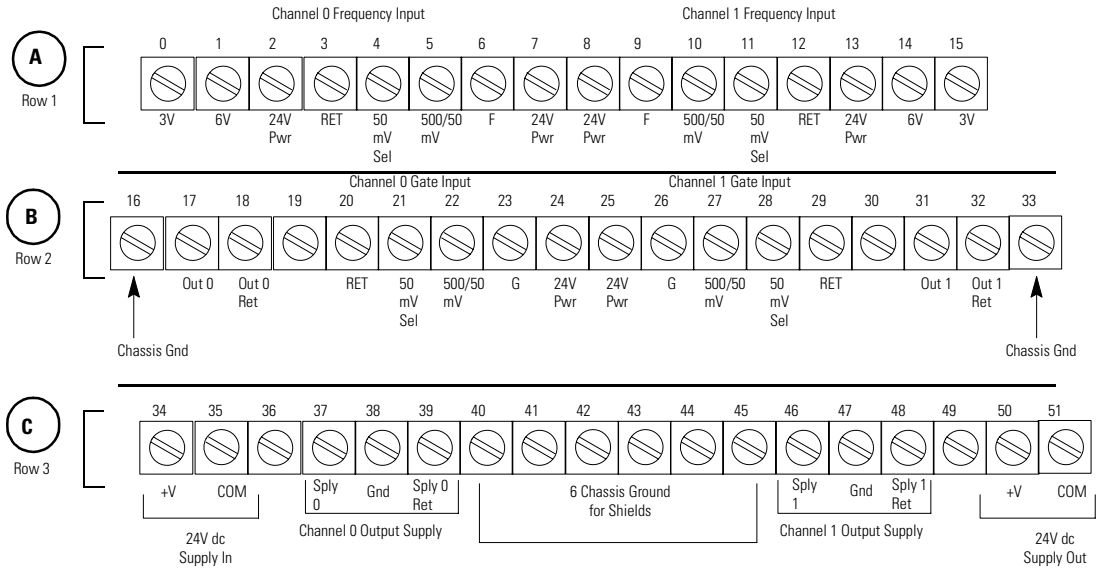


The frequency input module isolated power supply consists of 1 isolated 24V dc power supply that provides 2 current limited outputs of 30mA maximum (1 for each channel).

40896

Wiring

Connections for 1794-TB3G shown



All 24V dc pwr and ret terminals are sourced power provided for the sensors. Do not connect external power to these terminals.

Provides power for up to four 24V dc devices at 15mA each, for a total of 60mA. Channel 0 power and Channe 1 power have current limiters, each rated at 30mA max.

40625

ATTENTION

To reduce susceptibility to noise, power analog modules and digital modules from separate power supplies. Do not exceed a length of 10m (33ft) for dc power cabling.

Do not daisy chain power or ground from the RTD terminal base unit to any ac or dc digital module terminal base units.

ATTENTION

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

	Channel 0 Terminals[5]			Channel 1 Terminals[5]			
Type of Inputs	**Power**	**Input**	**RET[6]**	**Power**	**Input**	**RET[6]**	**GND[5]**
Frequency							
24V dc IEC1+ Proximity[1],[2]	A-7	A-6	A-3	A-8	A-9	A-12	
24V dc Contact Switch[3]	A-7	A-6	A-3	A-8	A-9	A-12	
500mV ac Magnetic Pickup	A-7	A-5	A-3	A-8	A-10	A-12	
50mV ac Magnetic Pickup[4]	A-7	A-5	A-3	A-8	A-10	A-12	
6V ac Vortex	A-2	A-1	A-3	A-13	A-14	A-12	
3V ac Vortex	A-2	A-0	A-3	A-13	A-15	A-12	

1 As defined by standard IEC 1131-2.

2 RET not used on 2-wire devices.

3 Add external resistor from 24V to F or G for wire-off detection (0.4mA).

4 Add a jumper between 50mV and RET (Frequency - channel 0=4 to 3; channel 1=11 to 12). (Gate - channel 0=21 to 20; channel 1=28 to 29).

5 Connect cable shields to GND terminals.

6 All 4 RET terminals (ch 0 and 1, Freq, Gate) are internally connected together.

	Channel 0 Terminals[5]			Channel 1 Terminals[5]			
Type of Inputs	**Power**	**Input**	**RET[6]**	**Power**	**Input**	**RET[6]**	**GND[5]**
Gate							
24V dc IEC1+ Proximity[1],[2]	B-24	B-23	B-20	B-25	B-26	B-29	
24V dc Contact Switch[3]	B-24	B-23	B-20	B-25	B-26	B-29	
500mV ac Magnetic Pickup	B-24	B-22	B-20	B-25	B-27	B-29	
50mV ac Magnetic Pickup[4]	B-24	B-22	B-20	B-25	B-27	B-29	

1 As defined by standard IEC 1131-2.

2 RET not used on 2-wire devices.

3 Add external resistor from 24V to F or G for wire-off detection (0.4mA).

4 Add a jumper between 50mV and RET (Frequency - channel 0=4 to 3; channel 1=11 to 12). (Gate - channel 0=21 to 20; channel 1=28 to 29).

5 Connect cable shields to GND terminals.

6 All 4 RET terminals (ch 0 and 1, Freq, Gate) are internally connected together.

	Channel 0 Terminals[1]				Channel 1 Terminals[1]			
Output Alarm Connections	**Sply +**	**Sply RET**	**Out +**	**Out RET**	**Sply +**	**Sply RET**	**Out +**	**Out RET**
Supply Connection	C-37	C-39			C-46	C-48		
Output Connection			B-17	B-18			B-31	B-32

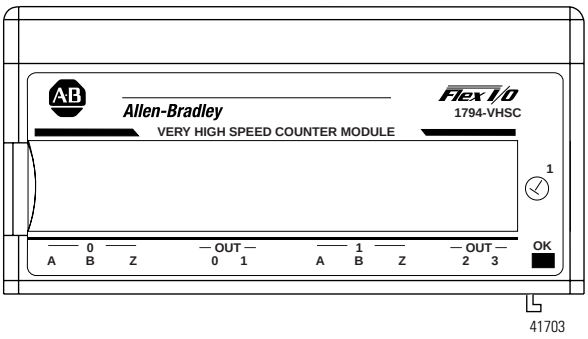
1 Connect cable shields to GND connections.

Specifications - 1794-IJ2	
Module Location	Cat. No. 1794-TB3G or -TB3GS Terminal Base Unit
Isolation Voltage	1250 Vrms/V ac between user input (F & G) and system, user output (0 & 1) and system, and user power and system 100% tested at 2121V dc for 1s 500 Vrms/V ac between 4 user inputs and 2 user outputs, user output 0 and output 1 100% tested at 850V dc for 1s
Processing Time	≤4ms
Flexbus Current	30mA @ 5V dc
Power Dissipation	4.6W maximum @ 31.2V dc
Thermal Dissipation	Maximum 15.6 BTU/hr @ 31.2V dc
Indicators (Field-Side Driven, Logic-Side Indication)	1 green/red power/status indicator Input: 4 yellow status indicators (0, 1) - logic side 4 red wire-off indicators (F) - logic side Output: 2 yellow status indicators (0, 1) - logic side
Keyswitch Position	1
Input Specifications	
Number of Input Channels	2
Number of Inputs per Channel	2 - Frequency and Gate (gate used to establish direction)
Input Frequency (max)	1-32Kz w/sine wave; 1-32KHz w/square wave input
Frequency Value (max)	32,767 or 3,276.7 (dependent on range)
Input Pulse Width (min)	20µs
Resolution/Accuracy	Refer to resolution/accuracy table
On-State Voltage (min)	10V (24V IEC+1 proximity, encoder input or switch inputs)
On-State Voltage (nominal) (selected by terminal base connections)	50mV ac, 28V ac peak - Extended Magnetic Pickup 500mV ac, 28V ac peak - Magnetic Pickup ≤3V - vortex flowmeter low range ≥6V - vortex flowmeter high range 24V dc IEC1+ proximity or encoder input 24V dc contact switch input
On-State Voltage (max)	Limited to isolated 24V dc power supply
On-State Current Minimum Nominal Maximum	 2.0mA 9.0mA 10.0mA
Off-State Voltage (max)	5.0V dc on 24V dc IEC1+ Terminal
Off-State Current (min)	1.5mA into 24V dc IEC1+ Terminal
Wire-Off Detection	0.4mA for proximity, encoder, or contact switch with 50kΩ shunt resistor

Input Specifications (continued)	
Frequency Input Impedance	>5KΩ for 50mV extended magnetic pickup >5KΩ for 500mV magnetic pickup >10KΩ for 3V vortex flowmeter >10KΩ for 6V vortex flowmeter >2.5KΩ for 24V dc IEC1+ proximity or encoder input >2.5KΩ for 24V dc contact switch input
Gate Input Impedance	>5KΩ for 50mV extended magnetic pickup >5KΩ for 500mV magnetic pickup >2.5KΩ for 24V dc IEC1+ proximity or encoder input >2.5KΩ for 24V dc contact switch input
Output Specifications (meets IEC 1A 24V dc output specification)	
Number of Outputs	2 isolated
Output Voltage Source	Customer supplied
Output Voltage Minimum Nominal Maximum	 10V dc 24V dc 31.2V dc
Off-State Voltage (maximum)	31.2V dc
On-State Current Minimum Maximum	 1.0mA per output minimum 1.0A per channel sourced out of module **Current Limited:** All outputs can be on simultaneously without derating
Surge Current	2A for 50ms, repeatable every 2s
Off-State Leakage (max)	<300µA @ 31.2V dc
On-State Voltage Drop (max)	0.9V dc @ 1A
Output Control	Outputs individually assignable to: Frequency,% full scale, or acceleration alarm
Output Switching Time	Triggered by frequency alarm or acceleration alarm Turn On: <0.5ms Turn Off: <1ms

General Specifications	
External dc Power Supply Voltage Voltage Range Supply Current	(Input for +5V logic and 24V dc/dc converters) 24V dc nominal 19.2 to 31.2V dc (includes 5% ac ripple) 220mA @ 19.2V dc; 180mA @ 24V dc; 140mA @ 31.2V dc
Isolated dc Power Supply Voltage Voltage Range Supply Current Peak ac Ripple	(Output to sensors and encoders) 24V dc nominal 21.6 to 26.4V dc 0-60mA maximum @ 24V dc (4 devices @ 15mA = 60mA) 100mV maximum
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
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 (operating) 5 to 80% noncondensing (non-operating) 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Input Conductors Wire Category Length (maximum)	 Belden 8761 2[1] 304.8m (1000ft)
Output Conductors Wire Category	 Belden 8761 2[1]
Publications Installation Instructions User Manual	 1794-5.49 1794-6.5.11
Agency Certification	Class I Division 2 certified Groups A, B, C, D certified Class I Zone 2 Group IIC certified

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Wiring and Grounding Guidelines for Noise Immunity."

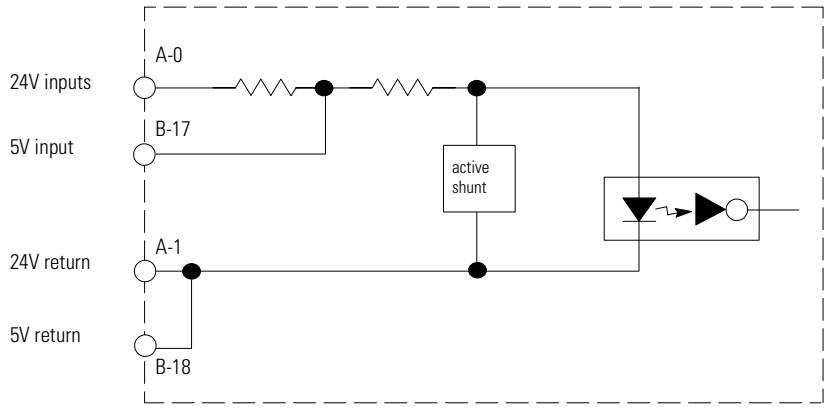


Recommended Terminal Base	Compatible Terminal Base(s)
	

ATTENTION

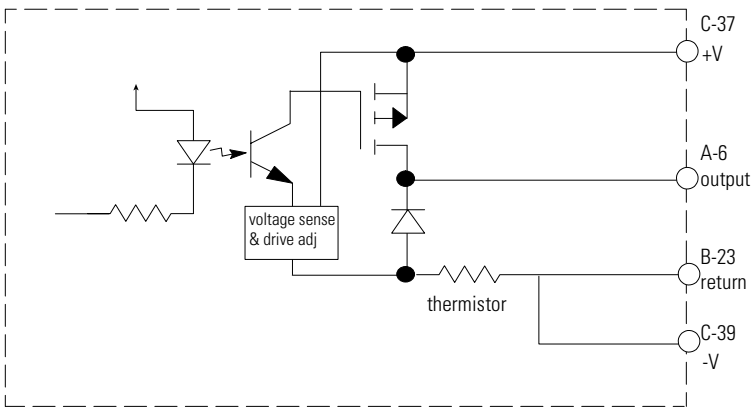
This module must be used with 1794-ACN15 or -ACNR15 series B or later ControlNet adapters in ControlNet systems.

Simplified Schematic for Input A of Channel 0



42181

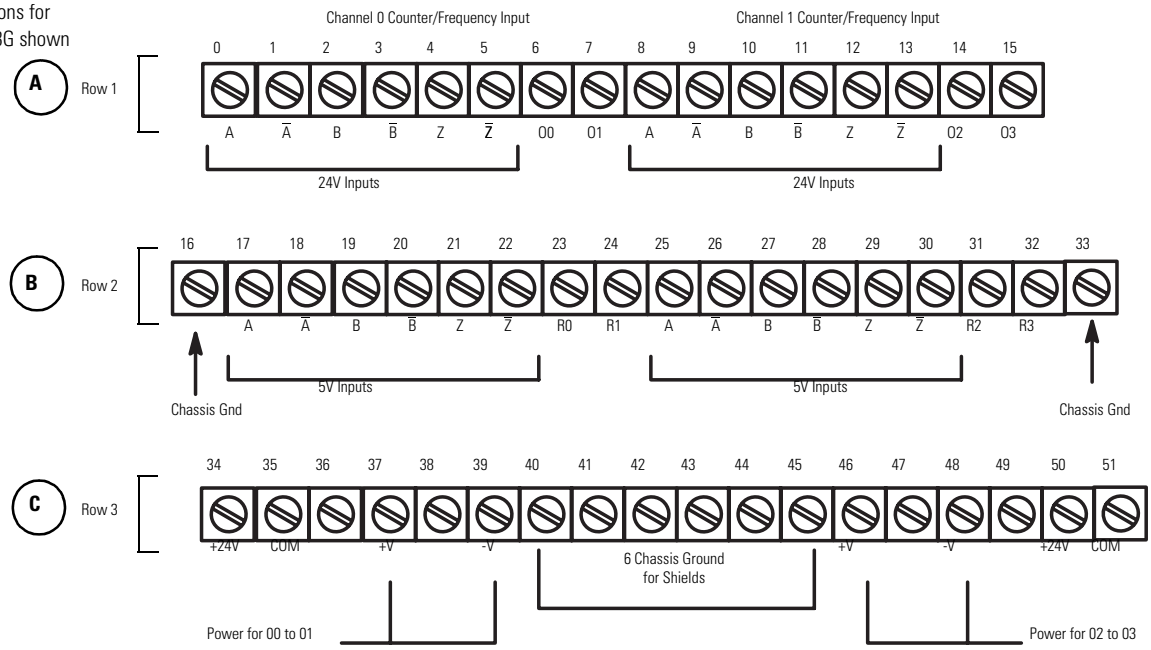
Simplified Schematic for Output 0



42182

Wiring

Connections for
1794-TB3G shown



Where: A, $\overline{A}$ = incremental encoder input A (+5 or +24V dc)
B, $\overline{B}$ = incremental encoder input B (+5 or +24V dc)
Z, $\overline{Z}$ = incremental encoder input Z (+5 or +24V dc)
O = sourcing outputs
R = returns for sourcing outputs
+V = +5 or +24V dc isolated power externally supplied for outputs (1A max)
-V = negative isolated power connection (1A max)
+24V dc = 24V dc terminal base power for module
COM = return for +24V dc terminal base power for module
Chassis Gnd = chassis ground for input or output cable shields

41704

ATTENTION

To reduce susceptibility to noise, power analog modules and digital modules from separate power supplies. Do not exceed a length of 10m (33ft) for module dc power cabling.

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

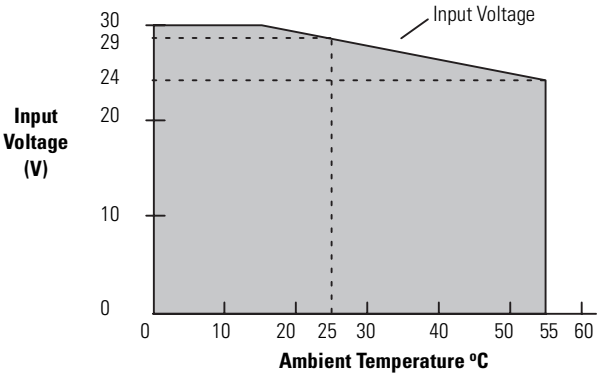
Incremental Encoder Inputs	Channel 0		Channel 1	
	+24V Inputs	+5V Inputs	+24V Inputs	+5V Inputs
Input A	A-0	B-17	A-8	B-25
Input $\overline{A}$	A-1	B-18	A-9	B-26
Input B	A-2	B-19	A-10	B-27
Input $\overline{B}$	A-3	B-20	A-11	B-28
Input Z	A-4	B-21	A-12	B-29
Input $\overline{Z}$	A-5	B-22	A-13	B-30

Outputs	Sourcing Out	Return	Outputs	Sourcing Out	Return
00	A-6	B-23	02	A-14	B-31
01	A-7	B-24	03	A-15	B-32
+24V		Terminals B-34 and C-50			
24V COM		Terminals B-35 and C-51			
+5V or +24V output power		Terminals B-37 and C-46			
-V output power		Terminals B-39 and C-48			
Chassis Ground		Terminals B-16, B-33 and C-40 thru C-45			

Specifications - 1794-VHSC	
Input Specifications	
Module Location	Cat. No. 1794-TB3G or -TB3GS Terminal Base Unit
Number of Inputs per Counter	2 groups of A/$\overline{A}$, B/$\overline{B}$, and Z/$\overline{Z}$ pairs with 5V dc or 15-24V dc terminations
Input Voltage	5V dc or 15-24V dc (determined on terminal base terminations)
Input Current (Typical)	5V dc terminations: 19.1mA @ 5V dc 25.7mA @ 6V dc 15-24V dc terminations: 6.1mA @ 15V dc 10.2mA @ 24V dc
Input Off-State Voltage	5V dc terminations: ≤1.25V dc 15-24V dc terminations: ≤1.8V dc
Input Off-State Current	≤0.250mA
Input On-State Voltage	5V dc terminations: ≥2.6V dc 15-24V dc terminations: ≥12.5V dc
Input On-State Current	≥5mA
On-State Voltage (max)	5V dc terminations: ±6V 15-24V dc terminations: Refer to derating curve
Input Frequency (max)	1.0MHz counter and encoder X1 (no filters) 500kHz encoder X2 (no filters) 250kHz encoder X4 (no filters)
Input Filter Selections	5: Off, 10µs, 100µs, 1.0ms, 10.0ms per A/B/Z group
Output Specifications	
Number of Outputs	2 isolated groups of 2 (0.5A max @ 5V dc; 1.0A max @ 12-24V dc)
Output Control	Outputs can be tied to 8 compare windows
Output Supply Voltage Range	5-7V dc; 10-31V dc
Off-State Leakage Current	≤0.3mA
On-State Voltage Drop	5V operation - 0.5A 12-24V operation - 1.0A
On-State Current Maximum	5V operation - 0.5A 12-24V operation - 1.0A
Maximum Current per Output Pair	5V operation - 0.9A 12-24V operation - 4.0A
Short Circuit Current	5V operation - 0.9V dc @ 0.5A 12-24V operation - 0.9V dc @ 1.0A Outputs are short circuit protected and turned off until power is cycled.
Delay Time Off to On On to Off	 25µs (load dependent) 150µs (load dependent)
Isolation Voltage	100% tested @ 850V dc for 1s between six isolated areas, including: flexbus module 24V dc power A0/B0/Z0 inputs A1/B1/Z1 inputs O0/O1 and output power supply 1 O2/O3 and output power supply 2
Flexbus Current	75mA @ 5V dc (with terminal base power off)
Power Dissipation	5W maximum @ 31.2V dc
Thermal Dissipation	Maximum 17.1 BTU/hr @ 31.2V dc
Indicators	1 green/red power/status indicator 6 yellow input status indicators - logic side 4 yellow output status - logic side
Keyswitch Position	1

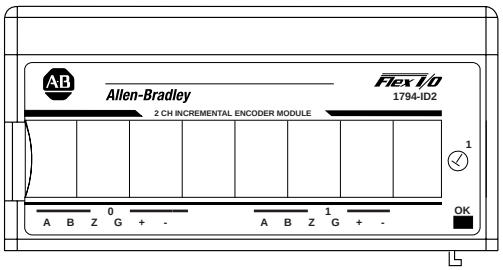
General Specifications	
Module Location	Cat. No. 1794-TB3G or -TB3GS terminal base unit
Dimensions (HxWxD)	45.7mm x 94.0mm x 53.3mm (1.8in x 3.7in x 2.1in)
External dc Power[1] Supply Voltage Voltage Range Supply Current	 24V dc nominal 19.2 to 31.2V dc (includes 5% ac ripple) 100mA @ 24V dc
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Nonoperating Vibration	 0 to 55°C (32 to 131°F) -40 to 85°C (-40 to 185°F) 5 to 95% noncondensing (operating) 5 to 80% noncondensing (non-operating) 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
ConductorsWire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) insulation maximum 2[2]
Publications Installation Instructions User Manual	 1794-5.67 1794-6.5.10
Agency Certification	CE

1 Does not represent power required to supply the inputs or outputs.
2 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Wiring and Grounding Guidelines for Noise Immunity."



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. This includes all possible mounting positions, including inverted horizontal.

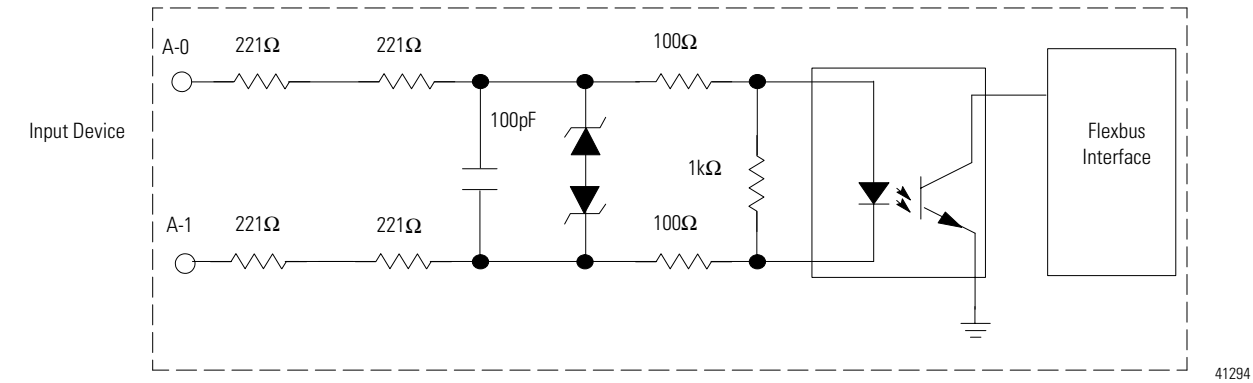
41702



41293

Recommended Terminal Base	Compatible Terminal Base(s)			
TB3	TB3S	TBN	TBNF	Auxiliary terminal strips are required when using the TBN or TBNF for the ID2

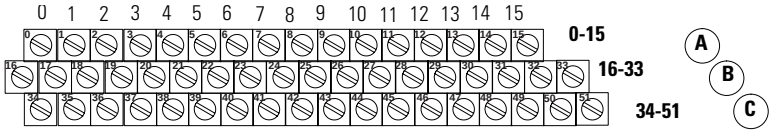
Typical Simplified Schematic for Input A of Channel 0 TB3 or TB3S shown



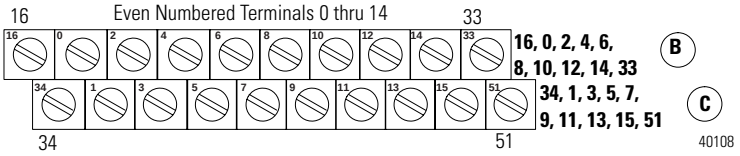
41294

Wiring

1794-TB3
1794-TB3S



1794-TBNF
1794-TBN



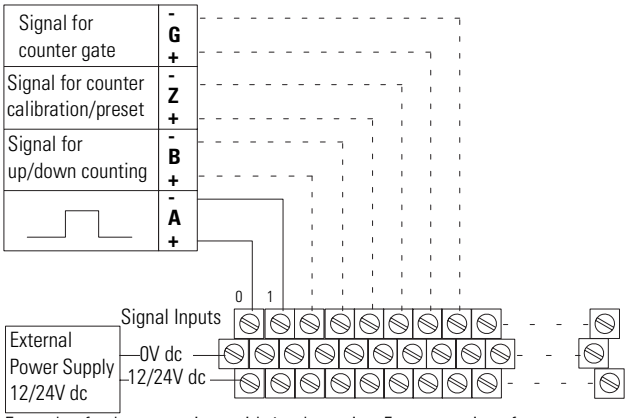
40108

	Terminal Base Units 1794-TB3 and -TB3S			Terminal Base Units 1794-TBN and -TBNF[1]	
	Signal	**0V dc**	**12/24V dc**	**Signal**	**Input**
Pulse Counter Channel 0					
A+	A-0	B-17	C-35	B-0	
A-	A-1	B-18	C-36	C-1	
B+	A-2	B-19	C-37	B-2	
B-	A-3	B-20	C-38	C-3	
Z+	A-4	B-21	C-39	B-4	
Z-	A-5	B-22	C-40	C-5	
G+	A-6	B-23	C-41	B-6	
G-	A-7	B-24	C-42	C-7	
Pulse Counter Channel 1					
A+	A-8	B-25	C-43	B-8	
A-	A-9	B-26	C-44	C-9	
B+	A-10	B-27	C-45	B-10	
B-	A-11	B-28	C-46	C-11	
Z+	A-12	B-29	C-47	B-12	
Z-	A-13	B-30	C-48	C-13	
G+	A-14	B-31	C-49	B-14	
G-	A-15	B-32	C-50	C-15	
0V dc	Terminals 16 and 33				
12/24V dc	Terminals 34 and 51				

1 Auxiliary terminal blocks are required when using these terminal base units.

Example of Incremental Encoder Wiring

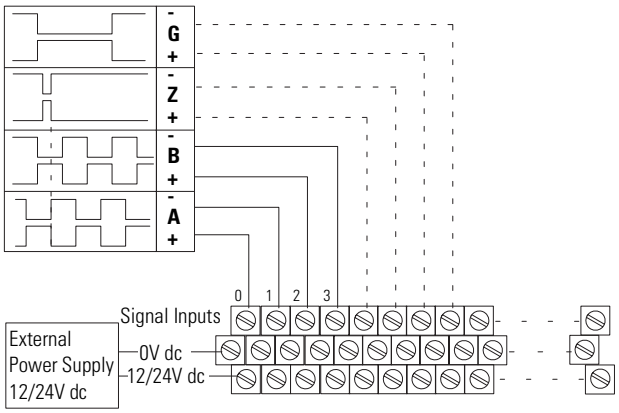
Pulse Counter Channel 0 (with 1 pulse train)



Example of pulse transmitter with 1 pulse trains. For connection of channel 2, refer to the wiring diagram.
Note: Dotted lines indicate signals not always used.

41295

Pulse Counter Channel 0 (with 2 pulse trains)



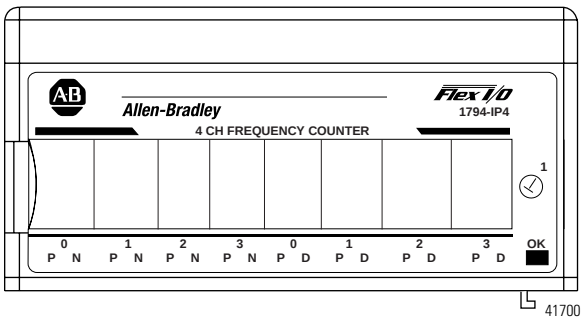
Example of pulse transmitter with 2 pulse trains, with or without reference and/or gate function. For connection of channel 2, refer to the wiring diagram.
Note: Dotted lines indicate signals not always used.

41296

Specifications - 1794-ID2	
Input Specifications	
Number of Counters	2
Number of Inputs per Counter	4 inputs (A, B, Z, G)
Input Pulse Width (Minimum)	Each signal condition must be stable for at least 2µs to be recognized
Counting Frequency	100KHz maximum
Input Range Input ON Input OFF	 Maximum 26.4V dc (24V dc ±10%) Minimum 6V dc Maximum 3V dc Minimum -26.4V dc
Input Current (Typical)	3mA @ 6V dc 9mA @ 12V dc 15mA @ 24V dc

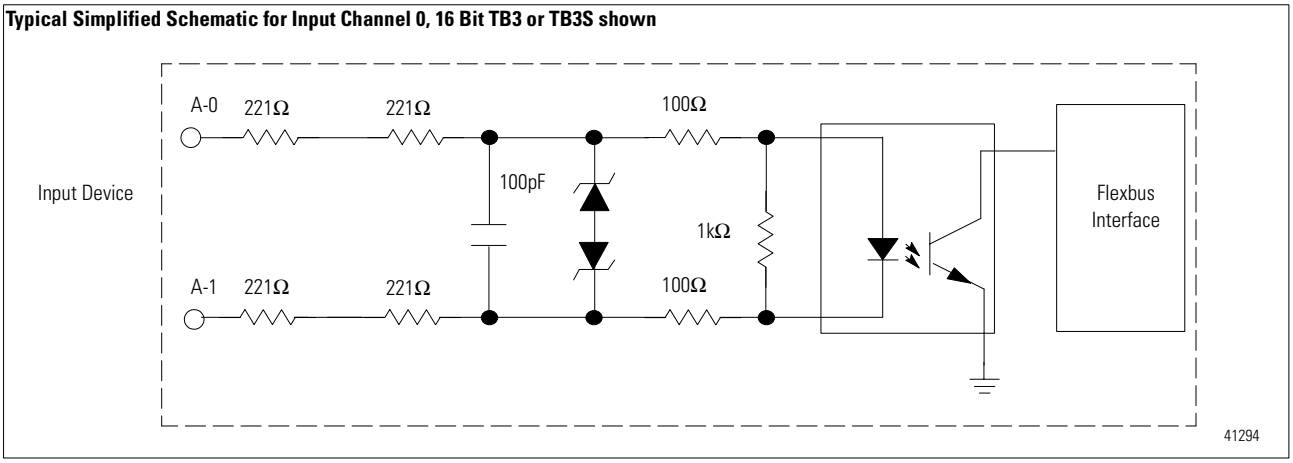
General Specifications	
Module Location	Cat. No. 1794-TB3, -TB3S, -TBN, and -TBNF Terminal Base Units
Isolation Voltage	500V dc
Flexbus Current	5mA @ 5V dc
Power Supply	12-24V dc (±10%)
Current Consumption from External Power Supply	150mA @ 12V dc 75mA @ 24V dc
Power Dissipation	5W maximum @ 26.4V dc
Thermal Dissipation	Maximum 17.1 BTU/hr @ 26.4V dc
Indicators (field side driven, logic side indication)	1 green/red power/status indicator Input: 12 yellow status indicators - logic side
Keyswitch Position	1
Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Nonoperating Vibration	 0 to 55°C (32 to 131°F) Note: Do not connect maximum input voltage simultaneously to all inputs if the module ambient temperature is expected to exceed 40°C (104°F). -40 to 85°C (-40 to 185°F) 5 to 90% noncondensing (operating) 5 to 80% noncondensing (non-operating) 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Input Conductors Wire Category Length (Maximum)	 Belden 8761 2[1] 1000ft (304.8m)
Publications Installation Instructions User Manual	 1794-5.63 1794-6.5.15
Agency Certification	

1 Use this conductor category information for planning conductor routing. Refer to publication 1770, 4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."



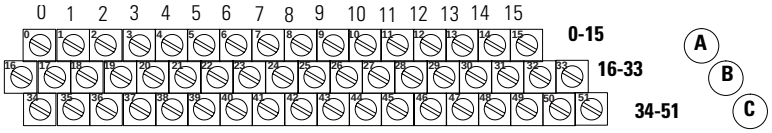
Recommended Terminal Base	Compatible Terminal Base(s)			
TB3	TB3S	TBN	TBNF	Auxiliary terminal strips are required when using the TBN or TBNF for the IP4

Typical Simplified Schematic for Input Channel 0, 16 Bit TB3 or TB3S shown

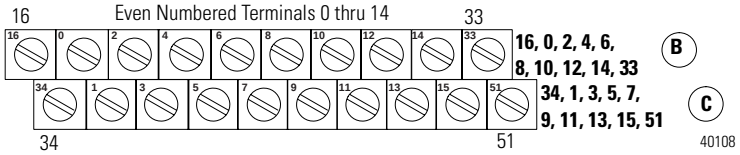


Wiring

1794-TB3
1794-TB3S



1794-TBNF
1794-TBN

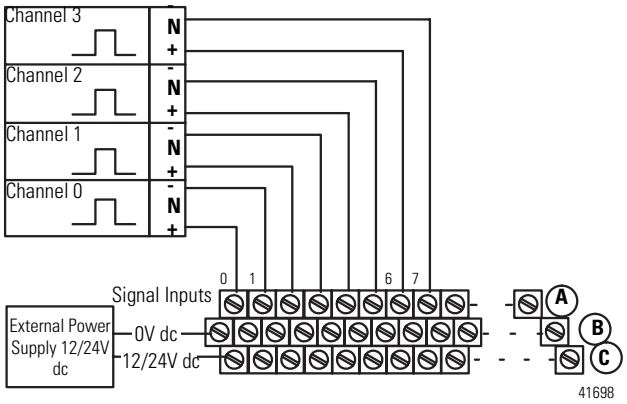


Channel		Terminal Base Units 1794-TB3 and -TB3S			Terminal Base Units 1794-TBN and -TBNF[1]	
		Signal	0V dc	12/24V dc	Signal	Input
16-Bit Period Time Measurement						
0	N+	A-0	B-17	C-35	B-0	
	N-	A-1	B-18	C-36	C-1	
1	N+	A-2	B-19	C-37	B-2	
	N-	A-3	B-20	C-38	C-3	
2	N+	A-4	B-21	C-39	B-4	
	N-	A-5	B-22	C-40	C-5	
3	N+	A-6	B-23	C-41	B-6	
	N-	A-7	B-24	C-42	C-7	
32-Bit Period Time Measurement						
0	D+	A-8	B-25	C-43	B-8	
	D-	A-9	B-26	C-44	C-9	
1	D+	A-10	B-27	C-45	B-10	
	D-	A-11	B-28	C-46	C-11	
2	D+	A-12	B-29	C-47	B-12	
	D-	A-13	B-30	C-48	C-13	
3	D+	A-14	B-31	C-49	B-14	
	D-	A-15	B-32	C-50	C-15	
	0V dc	Terminals 16 thru 33			Terminals 16 and 33	
	12/24V dc	Terminals 34 thru 51			Terminals 34 and 51	

1 Auxiliary terminal blocks are required when using these terminal base units.

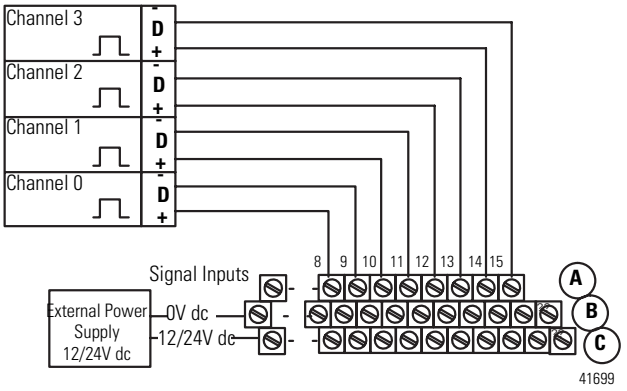
Example Wiring (4 Channels)

Pulse Counter



Example Wiring (4 Channels)

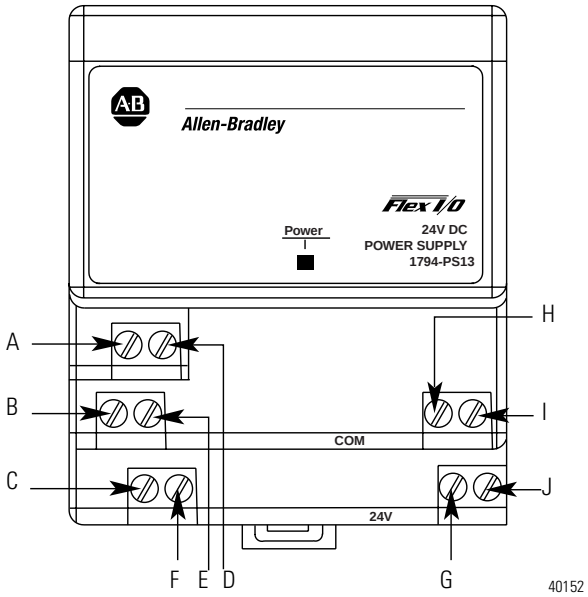
32-Bit Period Time Measurement



Specifications - 1794-IP4	
Number of Inputs	4 frequency counter interfaces - 2 inputs each
Counting Frequency	100KHz maximum. Each signal condition must be stable for at least 2μs to be recognized.
Input Range Input ON Input OFF	 Maximum 26.4V dc (24V dc +10%) Minimum 6V dc Maximum 3V dc Minimum - 26.4V dc
Input Current (Typical)	3mA @ 6V dc 9mA @ 12V dc 15mA @ 24V dc
Module Location	Cat. No. 1794-TB3, -TB3S, -TBN, and -TBNF Terminal Base Units
Flexbus Current	5mA @ 5V dc
Power Supply (External)	12-24V dc (±10%)
Current Consumption from External Power Supply	150mA @ 12V dc 75mA @ 24V dc
Power Dissipation	5W maximum @ 26.4V dc
Thermal Dissipation	Maximum 17.1 BTU/hr @ 26.4V dc
Indicators (field side driven, logic side indication)	1 green/red power/status indicator 8 yellow status indicators - logic side
Keyswitch Position	1
Data Format	Period read in 1μs counts with 1MHz internal clock selected; 0.1μs counts when 10MHz internal clock selected
Overflow	Maximum period is 65ms when 1MHz internal clock selected; Maximum period = 6.5ms when 10MHz internal clock selected

Dimensions HxWxD	46mm x 94mm x 53mm (1.8in x 3.7in x 2.1in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Nonoperating Vibration	 0 to 55°C (32 to 131°F) Note: Do not connect maximum input voltage simultaneously to all inputs if the module ambient temperature is expected to exceed 40°C (104°F). -40 to 85°C (-40 to 185°F) 5 to 90% noncondensing (operating) 5 to 80% noncondensing (non-operating) 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Input Conductors Wire Category Length (Maximum)	 Belden 8761 2[1] 1000ft (304.8m)
Publications Installation Instructions User Manual	 1794-5.64 1794-6.5.16
Agency Certification	

1 Use this conductor category information for planning conductor routing. Refer to publication 1770, 4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."



Wiring

ATTENTION

The 1794-PS13 power supply provides sufficient 24V dc power to operate up to 4 adapter modules. Do not attempt to operate an entire FLEX I/O system with this power supply.

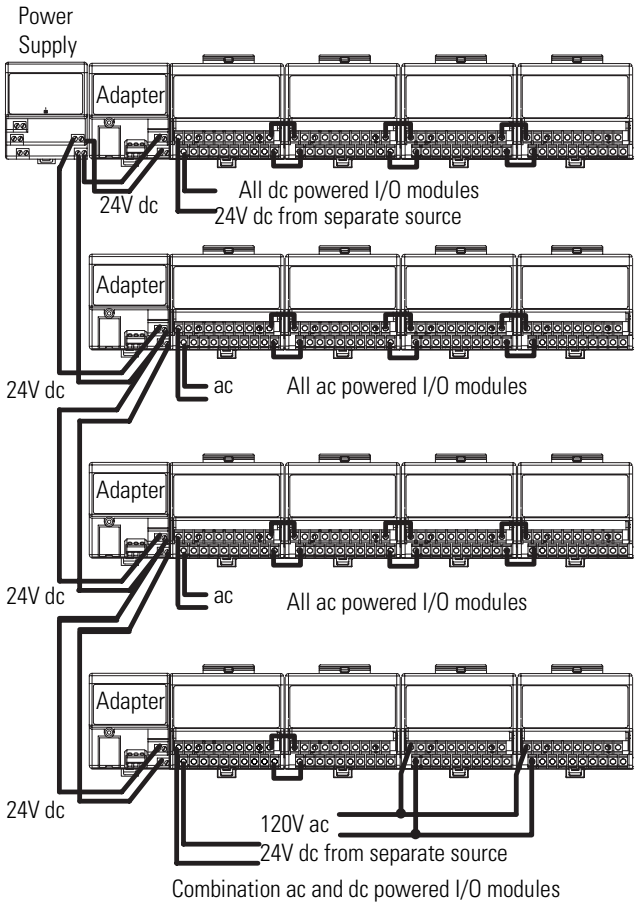
Terminals A, B, and C are 120/230V supply terminals. Terminals D, E, and F are available to daisychain this 120/230V power to other 1794-PS13 power supplies. If supplying 120V ac to the power supply, you can also power the ac modules in the adjacent system.

1. Connect the 120/230V ac power to the left side terminals on the connectors on the left side of the module as follows:

Connect		To
ac Ground	GND	A
120/230V ac common	L2/N	B
120/230V ac power	L1	C

2. Connect terminal **G** (+24V dc) to the +24V dc terminal on the first adapter.
3. Connect terminal **H** (+24V dc common) to the +24V dc common terminal on the first adapter.
4. Repeat steps 3 and 4 using terminals **I** and **J** for the second adapter.
5. Connections **D, E** and **F** are used to pass 120/230V ac power to adjacent 1794-PS13 power supplies.

Example of Using a 1794-PS13 Power Supply to Power Four Adapter Modules



Specifications - 1794-PS13	
This power supply complies with the CE low-voltage directive.	
Input Specifications	
Nominal Supply Voltage	120V ac, 47-63Hz, 0.6A maximum 230V ac, 47-63Hz, 0.42A maximum
Voltage Range	85-265V ac
Inrush Current	40A typical, 1 ac cycle @ Vin 265V ac, 55ºC
Interruption	Output voltage will stay within specification when input drops out for 1/2 cycle @ 47Hz, 85V ac with maximum load
Output Specifications	
Nominal Output Voltage	+24V dc
Voltage Range	20.4-27.6V dc (includes noise & 5% ac ripple)
Output Current	1.3A maximum
Minimum Load	0mA
Output Surge	Sufficient to drive 4 adapters (surge of 23A for 2ms each)
Overvoltage Protection	Output internally limited to 35V dc. Cycle power to reenergize.
Isolation Voltage	2500V dc for 1 second

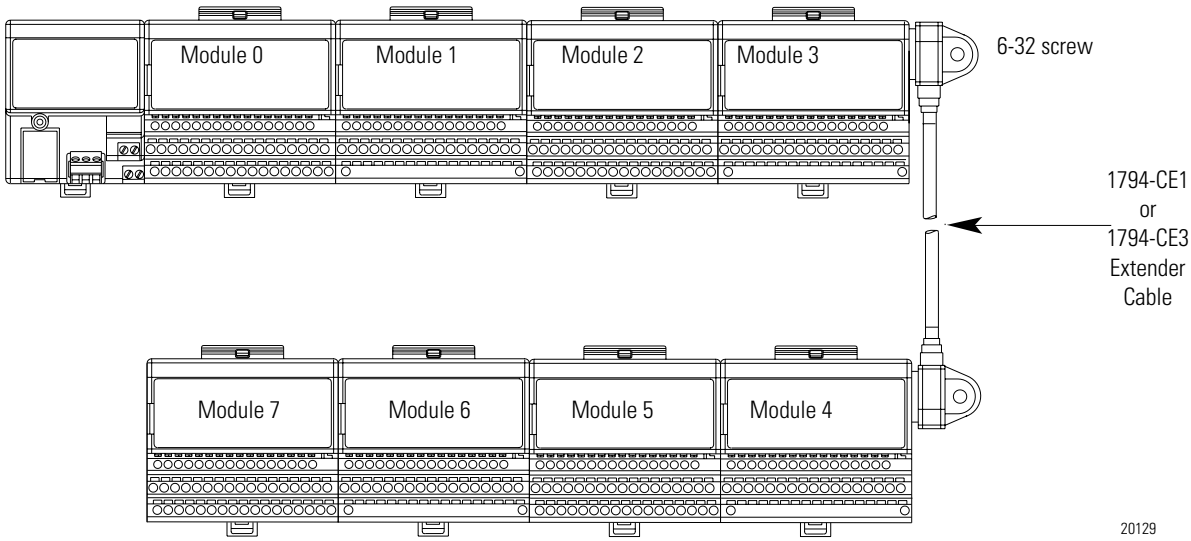
General Specifications	
Mounting	Horizontal or vertical on a DIN rail, wall or panel
Terminal Screw Torque	5-7 lb-in
Dimensions HxWxD	87mm x 68mm x 69mm (3.4in x 2.7in x 2.7in)
Environmental Conditions Operational Temperature Storage Temperature Relative Humidity Shock Operating Non-operating Vibration	 0 to 55ºC (32 to 131ºF) -40 to 85ºC (-40 to 185ºF) 5 to 95% noncondensing 30g peak acceleration, 11(±1)ms pulse width 50g peak acceleration, 11(±1)ms pulse width Tested 5g @ 10-500Hz per IEC 68-2-6
Conductors Wire Size Category	12 gauge (4mm^2) stranded maximum 3/64 inch (1.2mm) insulation maximum 1[1]
Publication Installation Instructions	 1794-5.69
Agency Certification	

1 Use this conductor category information for planning conductor routing. Refer to publication 1770-4.1, "Industrial Automation Wiring and Grounding Guidelines for Noise Immunity."

Optional Accessories

Extender Cable (1794-CE1 and -CE3)

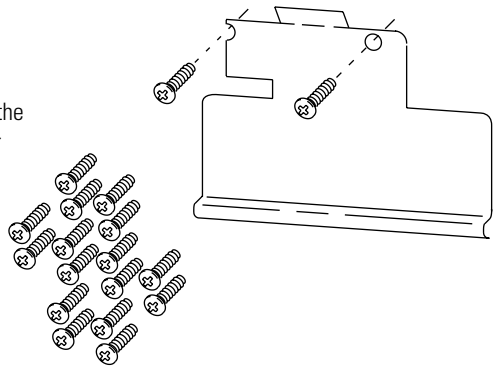
Use the optional 1794-CE1 (0.3m, 1ft) or 1794-CE3 (0.9m, 3ft) extender cable (one per system) to arrange your system in two rows or split your system into horizontal and vertical orientation. The cable can be used between any module or adapter.



Mounting Kit (1794-NM1)

Use the optional 1794-NM1 mounting kit to mount your FLEX I/O system on a panel or wall without a DIN rail.

1794-NM1
Mounting Kit with
18 screws (2 screws for the adapter and 2 screws for each module)



Cold Junction Compensator Kit (1794-CJC2)

The cold junction compensator kit, containing two compensators, is included with the 1794-IRT8 and -IT8 modules. You can order additional compensators using the above catalog number.

Label Kit (1794-LBL)

Use the label kit to tailor the label on your FLEX I/O terminal base unit to meet your needs. The label kit includes a diecut drawing and label sheet with five labels.

ID CAT. NO.	OCTAL MODULE LABEL	
PLC5	00 01 02 03 04 05 06 07 10 11 12 13 14 15 16 17	UPPER
PLC5	20 21 22 23 24 25 26 27 30 31 32 33 34 35 36 37 40 41	MIDDLE
PLC5	42 43 44 45 46 47 50 51 52 53 54 55 56 57 60 61 62 63	LOWER
PLC5	00 01 02 03 04 05 06 07 10 11 12 13 14 15 16 17	UPPER
PLC5	20 21 22 23 24 25 26 27 30 31 32 33 34 35 36 37 40 41	MIDDLE
PLC5	42 43 44 45 46 47 50 51 52 53 54 55 56 57 60 61 62 63	LOWER
PLC5	00 01 02 03 04 05 06 07 10 11 12 13 14 15 16 17	UPPER
PLC5	20 21 22 23 24 25 26 27 30 31 32 33 34 35 36 37 40 41	MIDDLE
PLC5	42 43 44 45 46 47 50 51 52 53 54 55 56 57 60 61 62 63	LOWER
PLC5	00 01 02 03 04 05 06 07 10 11 12 13 14 15 16 17	UPPER
PLC5	20 21 22 23 24 25 26 27 30 31 32 33 34 35 36 37 40 41	MIDDLE
PLC5	42 43 44 45 46 47 50 51 52 53 54 55 56 57 60 61 62 63	LOWER
	DECIMAL MODULE LABEL	
SLC	16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33	MIDDLE
SLC	34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51	LOWER
SLC	16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33	MIDDLE
SLC	34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51	LOWER
SLC	16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33	MIDDLE
SLC	34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51	LOWER
SLC	16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33	MIDDLE
SLC	34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51	LOWER
	MODULE NUMBERING OR RACK ADDRESSING	

ADDRESS 00	ADDRESS 01	ADDRESS 02	ADDRESS 03
ADDRESS 04	ADDRESS 05	ADDRESS 06	ADDRESS 07

40188

RSWire Software

RSWire™ software is an application that runs on top of AutoCAD® software to produce schematics with simultaneous manufacturing and support documentation. Use this software to help you integrate project schematics and panel layouts.

ABECAD Software

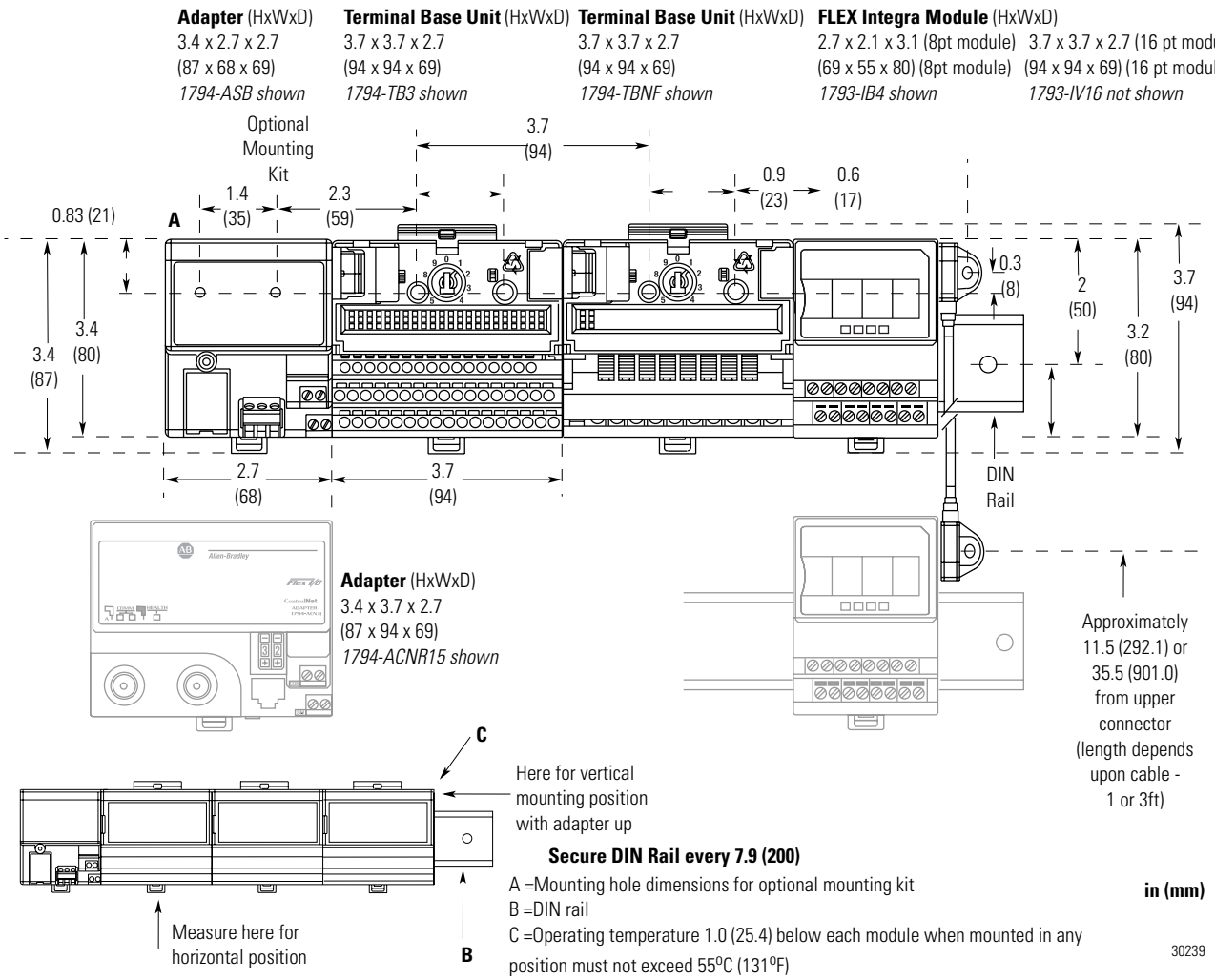
ABECAD™ software is a library of AutoCAD drawings of Allen-Bradley products. It includes many product drawings and an easy to use selection utility. You can download ABECAD software from www.ab.com or install it from the RAISE cd-rom. To obtain the RAISE cd-rom, request publication 6219-NP from your local salesperson or distributor.

	Catalog Number	Description	Related Publications	
General Information	Various I/O	I/O Systems Overview	System Overview	CIG-2.1
	1794 Series	FLEX I/O Family	Product Profile	1794-1.17
	1794 Series	FLEX I/O Family	Brochure	1794-1.16
	1793 Series	FLEX Integra Family	Product Profile	1793-1.1
Adapters	1794-ADN	24V dc DeviceNet Adapter	Installation Instructions User Manual	1794-5.14 1794-6.5.5
	1794-ADN2	24V dc DeviceNet Adapter	Installation Instructions User Manual	1794-5.65 1794-6.5.17
	1794-ACN15	24V dc ControlNet Adapter	Installation Instructions	1794-5.47
	1794-ACNR15	24V dc ControlNet Redundant Media Adapter	Installation Instructions	1794-5.48
	1794-ASB2/C	24V dc Remote I/O Adapter (up to 2 modules)	Installation Instructions User Manual	1794-5.44 1794-6.5.13
	1794-ASB/D	24V dc Remote I/O Adapter (up to 8 modules)	Installation Instructions User Manual	1794-5.46 1794-6.5.9
Bases	1794-TB3	3-Wire Screw Clamp Terminal Base Unit	Installation Instructions	1794-5.2
	1794-TB3S	3-Wire Spring Clamp Terminal Base Unit	Installation Instructions	1794-5.42
	1794-TB3T	Temperature Terminal Base Unit	Installation Instructions	1794-5.41
	1794-TB3TS	Spring Clamp Temperature Terminal Base Unit	Installation Instructions	1794-5.43
	1794-TB3G	Screw Clamp Grounded Terminal Base Unit	Installation Instructions	1794-5.51
	1794-TB3GS	Spring Clamp Grounded Terminal Base Unit	Installation Instructions	1794-5.59
	1794-TBN	Terminal Base Unit	Installation Instructions	1794-5.16
	1794-TBNF	Fused Terminal Base Unit	Installation Instructions	1794-5.17
	1203-FB1	SCANport Terminal Base Unit	Installation Instructions	1203-5.7
AC	1794-IA8	120V ac 8 Input Module	Installation Instructions	1794-5.9
	1794-IA8I	120V ac 8 Isolated Input Module	Installation Instructions	1794-5.55
	1794-IA16	120V ac 16 Input Module	Installation Instructions	1794-5.60
	1794-IM8	220V ac 8 Input Module	Installation Instructions	1794-5.57
	1794-OA8	120V ac 8 Output Module	Installation Instructions	1794-5.10
	1794-OA8I	120V 8 Isolated Output Module	Installation Instructions	1794-5.56
	1794-OA16	120V ac 16 Output Module	Installation Instructions	1794-5.61
	1794-OM8	220V ac 8 Output Module	Installation Instructions	1794-5.58
DC	1793-IB4(S)	24V dc 4 Sink Input Module	Installation Instructions	1793-5.1
	1793-IB16(S)	16 Sink Input Module	Installation Instructions	1793-5.8
	1793-IV16(S)	16 Source Input Module	Installation Instructions	1793-5.10
	1793-OB4P(S)	24V dc 4 Source Output (Protected) Module	Installation Instructions	1793-5.2
	1793-OB16P(S)	16 Source (Protected) Output Module	Installation Instructions	1793-5.9
	1793-OV16P(S)	16 Sink (Protected) Output Module	Installation Instructions	1793-5.11
	1793-IB2XOB2P(S)	24V dc 2 Input/2 Protected Output Combo Module	Installation Instructions	1793-5.3
	1794-IB8	24V dc 8 Sink Input Module	Installation Instructions	1794-5.30
	1794-IB16	24V dc 16 Sink Input Module	Installation Instructions	1794-5.4
	1794-IV16	24V dc 16 Source Input Module	Installation Instructions	1794-5.28
	1794-OB8	24V dc 8 Source Output Module	Installation Instructions	1794-5.31
	1794-OB16	24V dc 16 Source Output Module	Installation Instructions	1794-5.3
	1794-OB16P	24V dc 16 Source Output (Protected) Module	Installation Instructions	1794-5.45
	1794-OV16	24V dc 16 Sink Output Module	Installation Instructions	1794-5.29

	Catalog Number	Description	Related Publications	
DC	1794-OV16P	24V dc Sink Output (Protected) Module	Installation Instructions	1794-5.52
	1794-OB8EP	24V dc Electronically Fused 8 Output Module	Installation Instructions	1794-5.20
	1794-IB10XOB6	24V dc 10 Input/6 2A Output Combo Module	Installation Instructions	1794-5.24
	1794-IC16	48V dc 16 Sink Input Module	Installation Instructions	1794-5.53
	1794-OC16	48V dc 16 Source Output Module	Installation Instructions	1794-5.54
Analog	1793-IE4(S)	24V dc 4 Input Analog Module	Installation Instructions	1793-5.4
	1793-OE2(S)	24V dc 2 Output Analog Module	Installation Instructions	1793-5.5
	1793-IE2XOE1(S)	24V dc2 Input/1 Output Analog Combo Module	Installation Instructions	1793-5.6
	1794-IE8/B	24V dc Selectable Analog 8 Input Module	Installation Instructions User Manual	1794-5.6 1794-6.5.2
	1794-OE4/B	24V dc Selectable Analog 4 Output Module	Installation Instructions User Manual	1794-5.5 1794-6.5.2
	1794-IE4XOE2/B	24V dc 4 Input/2 Output Analog Combo Module	Installation Instructions User Manual	1794-5.15 1794-6.5.2
Isolated Analog	1794-IF4I	24V dc Source Isolated Analog 4 Input Module	Installation Instructions	1794-5.38
	1794-OF4I	24V dc Source Isolated Analog 4 Output Module	Installation Instructions	1794-5.37
	1794-IF2XOF2I	24V dc 2 Input/2 Output Isolated Analog Module	Installation Instructions User Manual	1794-5.39 1794-6.5.8
Relay	1793-OW4(S)	4 Relay Sink/Source Output Module	Installation Instructions	1793-5.7
	1794-OW8	24V dc 8 Relay Sink/Source Output Module	Installation Instructions	1794-5.19
Specialty	1794-IR8	24V dc RTD Input Module	Installation Instructions User Manual	1794-5.22 1794-6.5.4
	1794-IRT8	24V dc Thermocouple/RTD Input Module	Installation Instructions User Manual	1794-5.50 1794-6.5.12
	1794-IT8	24V dc Thermocouple/mV Input Module	Installation Instructions User Manual	1794-5.21 1794-6.5.7
	1203-FM1	24V dc SCANport Module	Installation Instructions	1203-5.8
Counters	1794-IJ2	24V dc 2 Input Frequency Module	Installation Instructions User Manual	1794-5.49 1794-6.5.11
	1794-VHSC	24V dc 2 Channels Very High Speed Counter Module	Installation Instructions User Manual	1794-5.67 1794-6.5.10
	1794-ID2	24V dc 2 Input Pulse Counter Module	Installation Instructions User Manual	1794-5.63 1794-6.5.15
	1794-IP4	12/24V dc 4 Input Pulse Counter Module	Installation Instructions User Manual	1794-5.64 1794-6.5.16
Power Supply	1794-PS13	Power Supply Module (1.3A)	Installation Instructions	1794-5.69
Accessories	1794-CE1	Extender Cable, 0.3m (1ft)	Installation Instructions	1794-5.12
	1794-CE3	Extender Cable, 0.9m (3ft)	Installation Instructions	1794-5.12
	1794-NM1	Mounting Kit	Installation Instructions	1794-5.13

Contact your local A-B distributor for information on ordering any of the above publications.

For electronic copies of these publications, go to:
http://www.theautomationbookstore.com



ATTENTION

When properly installed, FLEX I/O and FLEX Integra are 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.

If installing FLEX I/O on non-recommended DIN rail materials, use the mounting holes provided in each terminal base or a 1794-NM1 mounting kit with approved mounting bracket. Use mounting screws with star washers to provide the FLEX I/O platform with a chassis ground connection that is not likely to be affected by shock, vibration, or oxidation over time. Mount FLEX Integra only on zinc-plated, yellow-chromated steel DIN rail.

At Allen-Bradley, customer service means experienced representatives at Customer Support Centers in key cities throughout the world for sales, service, and support. Our value-added services include:

Technical Support

- SupportPlus programs
- Telephone support and 24-hour emergency hotline
- Software and documentation updates
- Technical subscription services

Engineering and Field Services

- Application engineering assistance
- Integration and start-up assistance
- Field service
- Maintenance support

Technical Training

- Lecture and lab courses
- Self-paced computer and video-based training
- Job aids and workstations
- Training needs analysis

Repair and Exchange Services

- Your only “authorized” source
- Current revisions and enhancements
- Worldwide exchange inventory
- Local support

Reach us now at www.rockwellautomation.com

Wherever you need us, Rockwell Automation brings together leading brands in industrial automation including Allen-Bradley controls, Reliance Electric power transmission products, Dodge mechanical power transmission components, and Rockwell Software. Rockwell Automation's unique, flexible approach to helping customers achieve a competitive advantage is supported by thousands of authorized partners, distributors and system integrators around the world.

Americas Headquarters, 1201 South Second Street, Milwaukee, WI 53204, USA, Tel: (1) 414 382-2000, Fax: (1) 414 382-4444
European Headquarters SA/NV, avenue Herrmann Debroux, 46, 1160 Brussels, Belgium, Tel: (32) 2 663 06 00, Fax: (32) 2 663 06 40
Asia Pacific Headquarters, 27/F Citicorp Centre, 18 Whitfield Road, Causeway Bay, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

Rockwell Automation

Publication 1794-2.1 - January 2000
Supersedes Publication 1794-2.1 - February 1999