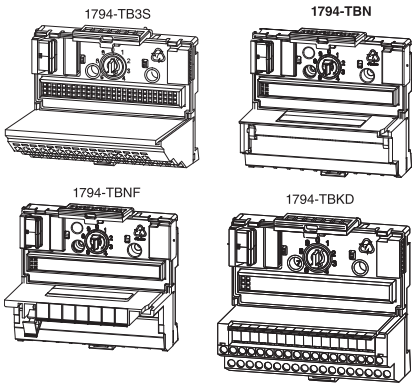
Select a FLEX I/O Terminal Base Unit

Step 3 – Select:

the appropriate terminal base unit for your module and system



Each FLEX I/O module requires a terminal base unit that snaps onto the DIN rail to the right of the I/O adapter. The terminal bases provide terminal connection points for the I/O wiring and plug together to form the backplane. They are available with screw, clamp, or spring terminations.

Common Terminal Base Characteristics

Current Capacity, max	Wire Size	Dimensions (HxWxD)
10	0.34…2.1 mm^2 (22…14 AWG) solid or stranded copper wire rated at 75 °C (167 °F) or greater, 1.2 mm (3/64 in.) insulation max	94 x 94 x 69 mm 3.7 x 3.7 x 2.7 in. **1794-TB37DS and 1794-TB62DS*** (1) 127 x 94 x 69 mm 5.0 x 3.7 x 2.7 in

(1) Measured with expansion module installed.

The following table is a comparison of general specifications for each FLEX I/O terminal base unit. For compatibility with FLEX I/O modules, see Table Digital I/O Module Summary on page 16.

General Specification Comparison

Catalog(1)	Termination Type	Connections	Used in Applications	Current Capacity, max	Wiring Category	Purpose
1794-TB2	Cage clamp	16 I/O; 18 common; 2 +V	Up to 132V AC/156V DC	10	2	A generic 2-wire version of the 1794-TB3.
1794-TB3, 1794-TB3K(2)		16 I/O; 18 common; 18 +V			Module dependent	Primarily intended for use with input modules when using 3-wire input proximity switches – can also be used with output modules.
1794-TB3S, 1794-TB3SK	Spring clamp					A spring clamp version of the 1794-TB3 – provides faster, simpler wire installation.
1794-TB32	Cage clamp	32 I/O; 8 common; 8 +V	Up to 31.2V DC			A 32-point version of the 1794-TB3 to be used with 32-point digital modules and the 1794-IB16D module.
1794-TB32S	Spring clamp					A spring clamp version of the 1794-TB32.
1794-TB3G, 1794-TB3GK(2)	Grounded screw clamp	36 I/O; 2 common; 2 +V; 10 chassis ground				A screw clamp terminal base unit with individual grounding used with certain analog modules.
1794-TB3GS, 1794-TB3GSK(2)	Grounded spring clamp				2	A spring clamp version of the 1794-TB3G.

General Specification Comparison

Catalog[1]	Termination Type	Connections	Used in Applications	Current Capacity, max	Wiring Category	Purpose
1794-TB3T	Cage clamp, temperature	16 I/O; 10 common; 4 +V; 8 chassis ground; 2 sets of CJC for temperature modules	Up to 132V AC/156V DC	10	Module dependent	A cage clamp terminal base to be used with the 1794-IT8 or 1794-IRT8 module (when used in thermocouple mode) – also provides chassis ground connections for the 1794-IR8 and analog modules.
1794-TB3TS, 1794-TB3TSK[2]	Spring clamp, temperature	16 I/O; 10 common; 4 +V; 8 chassis ground; 2 sets of CJC for temperature modules	Up to 132V AC/156V DC	10	2	A spring clamp version of the 1794-TB3T.
1794-TBKD	Cage clamp, knife disconnect	16 I/O; 18 common; 2 +V	—		Module dependent	A cage clamp terminal base with 16 knife disconnects.
1794-TBKDS						A spring clamp version of the 1794-TBKD.
1794-TBN, 1794-TBNK[2]	Screw clamp, NEMA-style	16 I/O; 2 common; 2 +V	264V AC/DC			A NEMA-style screw clamp terminal base for larger gauge wires with a cover for I/O wiring.
1794-TBNF	Screw clamp, fused NEMA-style					Provides eight 5 x 20 mm fused, screw terminals with a cover for I/O wiring – shipped with fuses for the 1794-OA8 module; can be used to fuse the 1794-OM8 and 1794-OW8 modules with a replacement fuse.[3]
1794-TB37DS	D-shell	37 Pin; digital and analog	—		Module dependent	A 37-pin D-shell termination for both digital and analog modules.
1794-TB62DS		62 Point;				A 62-pin D-shell termination for both digital and analog modules.
1794-TB62DSG	Grounded D-shell	62 Point; chassis ground				A grounded version of the 1794-TB62DS – for use with analog modules.
1794-TB62DST	D-shell	16 I/O; 18 common; 2 +V; 2 sets of CJC for temperature modules				A 62-pin D-shell termination to be used with the 1794-IT8 or 1794-IRT8 module (when used in thermocouple mode) – also provides chassis ground connections for analog modules.

(1) Isolation voltage, channel to channel, is determined by the insert module. Use this conductor category information for planning conductor routing. Refer to Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

(2) The letter K in the last position of the catalog number, before the series designation, indicates a conformal coated versions of standard modules and can be used with extended temperature modules (modules ending in -XT).

(3) Contains eight 5 x 20 mm fuses (one for each even-numbered terminal – 0…14 on row B). Shipped with 1.6 A, 250V AC Slow Blow fuse suitable for the 1794-OA8 AC output module. Refer to individual installation instructions for fusing recommendations for other modules. Littlefuse PN23901.6 A-B PN94171304, SAN-O PNSD6-1.6A.

120V AC: Input/Output and Isolated Input/Output, 8 and 16 point

220V AC: Input/Output, 8 point

24V DC: Input/Output/Combination, Sink/Source, Protected, Electronically Fused, Diagnostic, 8, 16, and 32 point

48V DC: Sink Input/Source Output, 16 point

Relay: Sink/Source, 8 point

- Isolated inputs and outputs can be used in applications such as motor control centers where individual control transformers are used.
- Protected outputs (P) have electronic protection which acts to shut the output down in reaction to a short circuit, overload, or over-temperature condition.
  Recovery from shutdown is automatic upon removal of the output fault. No fault status is provided to the processor.
- Electronic Fused (EP) module acts to open the output when a fault occurs. The fuse can be reset by operating a pushbutton, via software, or by cycling the input power. Fault status is provided to the processor.
- Diagnostic (D) modules detect, indicate, and report to the processor the following faults:

  open input or output field devices or wiring

  shorted output field devices

  shorted input or output wiring

  reverse polarity of user supply wiring
- Selectable input filter times from <1 to 60 ms.
- LED for each channel indicating status of:

  corresponding input device

  output signal

Digital I/O Module Summary

Catalog Number	Inputs	Outputs	Terminal Base Unit	Electrical Range	Module Type
AC Modules					
1794-IA8	8	—	1794-TBN, 1794-TB2, 1794-TB3, 1794-TB3S, 1794-TBKD, 1794-TB3K, 1794-TB3SK, 1794-TBNK	120V AC	Nonisolated inputs
1794-IA8I					Isolated inputs
1794-IA16	16		1794-TB3, 1794-TB3S, 1794-TBN(1), 1794-TB3K, 1794-TB3SK, 1794-TBNK		Nonisolated inputs
1794-IM8	8	—	1794-TBN, 1794-TBNK	240V AC	
1794-IM16	16				
1794-OA8	—	8	1794-TBNF, 1794-TB2, 1794-TB3, 1794-TB3S, 1794-TBN, 1794-TBKD, 1794-TBNFK, 1794-TB3K, 1794-TB3SK, 1794-TBNK	120V AC	Nonisolated inputs
1794-OA8I					Isolated outputs
1794-OA16		16	1794-TB3, 1794-TB2, 1794-TB3S,1794-TB3K 1794-TB3SK, 1794-TBN(1), 1794-TBKD, 1794-TBNK	120V AC	Nonisolated outputs
1794-OM8		8	1794-TBNF, 1794-TBN, 1794-TBNFK, 1794-TBNK	240V AC	
1794-OM16		16			

Digital I/O Module Summary

Catalog Number	Inputs	Outputs	Terminal Base Unit	Electrical Range	Module Type
1794-OC16	—	16	1794-TB3, 1794-TB3S, 1794-TB3K, 1794-TB3SK	48V DC	Nonisolated outputs
1794-OG16				5V DC	
1794-OV16				24V DC	
1794-OV16P					Nonisolated, protected outputs
1794-OV32		32	1794-TB32, 1794-TB32S		Nonisolated inputs in groups
Relay Modules					
1794-OW8	—	8	1794-TB2, 1794-TB3, 1794-TB3S, 1794-TBN, 1794-TBNF, 1794-TB3K, 1794-TB3SK, 1794-TBNK, 1794-TBNFK	24V DC	Isolated outputs Electromagnetic relays
1794-OW8XT					Isolated outputs Electromagnetic relays Extended temperatures

(1) Auxiliary terminal strips are required when using the 1794-TBN.

Select Input Filter Times for Digital Modules

Input filter times can be set to the following values (EtherNet/IP, ControlNet, and DeviceNet only).

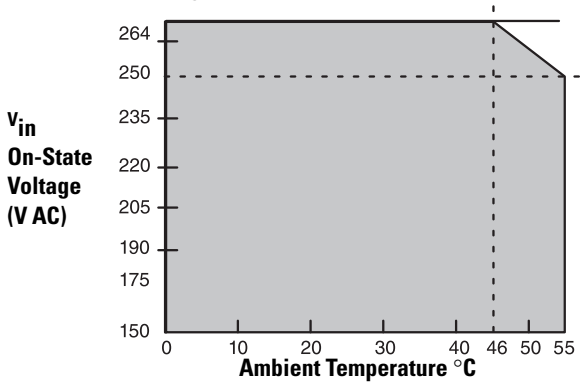
Input Filter Times – AC Modules

Filter Times for Inputs	Maximum Times (ms)			
	OFF to ON		ON to OFF	
	1794-IA8, 1794-IA8I	1794-IA16, 1794-IM8	1794-IA8, 1794-IA8I	1794-IA16, 1794-IM8
Filter time 0 (default)	8.4(1)	7.5	26.4(2)	26.5
1	8.6	8	26.6	27
2	9	9	27	28
3	10	10	28	29
4	12	12	30	31
5	16	16	34	35
6	24	24.5	42	44
7	40	42	58	60.5

(1) OFF to ON filter is 8 ms.

(2) ON to OFF filter is 26 ms.

1794-IM8 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.

FLEX I/O Digital AC Output Modules

Digital AC Output Comparison

Specification	1794-OA8, 1794-OA8I	1794-OA16	1794-OM8	1794-OM16
Voltage, on-state output, nom	120V AC[2]		220V AC	240V AC
Terminal base unit	1794-TBN, 1794-TBNF, 1794-TB2, 1794-TB3, 1794-TB3S, 1794-TBKD, 1794-TBNK, 1794-TBNFK, 1794-TB3K, 1794-TB3SK	1794-TBN[4], 1794-TBNF, 1794-TB2, 1794-TB3S, 1794-TBKD, 1794-TBNK, 1794-TBNFK, 1794-TB3K, 1794-TB3SK	1794-TBN, 1794-TBNF, 1794-TBNK, 1794-TBNFK	
Current, on-state output, min	5 mA per output			
Current, on-state output, max	500 mA pre output @ 55 °C [3] 750 mA per output @ 35 °C 1.0 A on 4 nonadjacent outputs and 500 mA on the remaining 4 outputs @ 30 °C	500 mA per output @ 55 °C[5]	500 mA @ 55 °C[6]	
Current, on-state output, per module	4.0 A (8 outputs @ 500 mA)	4.0 A (16 outputs @ 250 mA)	4.0 A (8 outputs @ 500 mA)[5]	4.0 A (16 outputs @ 250 mA)
Leakage current, off-state output, max	2.25 mA		2.5 mA	
Voltage drop, on-state output, max	1.0V @ 0.5 A	1.5V @ 0.5 A		
Output surge current, max	7 A for 45 ms, repeatable every 8 s	7 A for 40 ms, repeatable every 8 s		
Voltage, on-state output, min[1]	85V AC		159V AC	
Voltage, on-state output, nom	120V AC		240V AC	
Voltage, on-state output, max	132V AC		264V AC	
Power dissipation, max	4.1 W @ 0.5 A 6.3 W @ 0.75 A 6.3 W @ 1.0 A	4.7 W @ 0.5 A	5 W @ 0.5 A	6 W @ 264V AC
Thermal dissipation, max	14.0 BTU/hr @ 0.5 A 21.1 BTU/hr @ 0.75 A 21.4 BTU/hr @ 1.0 A	16.1 BTU/hr @ 0.5 A	17.1 BTU/hr @ 0.5 A	20.47 BTU/hr @ 264V AC

Digital AC Output Comparison

Specification	1794-OA8, 1794-OA8I	1794-OA16	1794-OM8	1794-OM16
Dimensions (HxWxD), approx	46 x 94 x 53 mm (1.8 x 3.7 x 2.1 in.) 94 x 94 x 69 mm (3.7 x 3.7 x 2.7 in.) installed			
Isolation voltage	120V (continuous), I/O to system (and channel to channel for 1794-OA8I) No isolation between individual channels Tested to 2150V DC for 1 s and 1250V AC for 60 s		Tested at 2600V DC for 1 s, I/O to system No isolation between individual channels	250V (continuous), Basic Insulation Type, field side to backplane No isolation between individual channels Type tested at 1250V AC for 60 s

(1) The external AC supply voltage must be capable of a 50 A surge for 1/2 cycle at power-up.

(2) 1794-OA8I – isolated voltage

(3) sufficient to operate an A-B 500 NEMA size 3 motor starter

(4) Auxiliary terminal strips are required when using the 1794-TBN for the 1794-OA16.

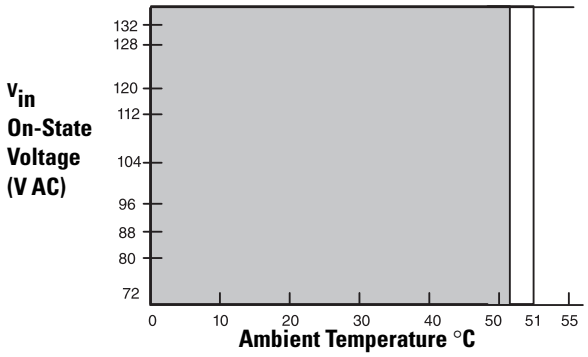
(5) If using 0.5 A outputs, alternate wiring so that no two 0.5 A outputs are adjacent. See the 1794-OA16 Derating Curve for mounting other than the normal horizontal.

(6) See the 1794-OM8 Derating Curve.

IMPORTANT

- The output signal delay, OFF to ON or ON to OFF is 1/2 cycle maximum.
- Modules have a yellow status indicator for each channel. These indicators are driven from the logic-side circuitry.
- Module outputs are not fused. Fusing of individual outputs is required. If applicable, the 1794-TBNF is recommended, otherwise you must provide external fusing. The following fuses are recommended:
  - 1794-OA8, 1794-OA8I – Use 1.6 A, 250V Slow-Blow, Littelfuse (part number 23901.6); San-o SD6-1.6 A (AB part number 94171304). The 1794-TBNF comes with SD6-1.6 A fuses installed.
  - 1794-OA16 – Use 2.5 A, 150V MQ2 normal fuse.
  - 1794-OM8 – Use 0.8 A, 250V MQ4 normal fuse.

1794-OA16 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.

= Normal mounting safe operating range included

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

The 1794-OW8XT module is the extended temperature version of the 1794-OW8 module. The module is conformal coated.

Digital Contact Output Modules

Specification	1794-OW8, 1794-OW8XT
Number of outputs	8
Terminal base unit	1794-TB2, 1794-TB3, 1794-TB3S, 1794-TBN, 1794-TBNF, 1794-TB3K, 1794-TB3SK, 1794-TBNKF
External DC supply voltage range	19.2…31.2V DC (includes 5% AC ripple)
External DC supply current, nom	125 mA
Leakage current, off-state output, max	1 mA @ 240V AC (through a snubber)
Output delay time, OFF to ON, max	10 ms(1)
Output delay time, ON to OFF, max	10 ms(2)
Relay output current rating, resistive	2.0 A @ 5…30V DC 0.22 A @ 125V DC 2.0 A @ 125V AC 2.0 A @ 250V AC
Relay output current rating, inductive	0.98 A steady state @ 5…30V DC, L/R = 7ms 0.5 A steady state @ 48V DC, L/R = 7ms 0.22 A steady state @ 125V DC, L/R = 7ms 2.0 A steady state, 15 A make @ 120V AC, PF = cos θ = 0.35 2.0 A steady state, 7.5A make @ 240V AC, PF = cos θ = 0.35
Contact resistance, initial	30 mΩ
Switching frequency	0.3 Hz (1 operation every 3 s)
Bounce time, mean	1.2 ms
Contact load, min	100 µA @ 100 mV DC
Mechanical life	100,000 operations at rated loads
Fusing	3.0 A. 250V AC slow blow fuse (Littelfuse part number 239003).
Power dissipation, max	5.5 W @ 31.2V DC
Thermal dissipation, max	18.8 BTU/hr @ 31.2V DC
Dimensions (HxWxD), approx	46 x 94 x 53 mm (1.8 x 3.7 x 2.1 in.) 94 x 94 x 69 mm (3.7 x 3.7 x 2.7 in.) installed
Isolation voltage	250V (continuous), Basic Insulation Type, relay to relay, relay to backplane, and relay to power 50V (continuous), Basic Insulation Type, power to backplane Type tested at 1500V AC for 60 s, relay to relay, all combinations. Type tested at 3250V DC for 60 s, relay to backplane and relay to power Type tested at 720V DC for 60 s, power to backplane.

(1) time from valid output on signal to relay energization by module.

(2) time from valid output off signal to relay deenergization by module.