Analog Wiring Systems

Analog Wiring Systems

Digital Wiring Systems with Field-Removable Terminal Blocks

Digital Wiring Systems with Fixed Terminal Blocks

Bulletin 1492 Programmable Controller Wiring Systems

- Increases machine building productivity
- Simplifies design and engineering time
- Reduces wiring time and wiring errors
- Benefits from quality-looking panels

Standards Compliance and Certifications

- Agency Certifications for Modules and Cables
  cULus: Hazardous Locations: Class I Div 2 (all except modules with relays); Groups A, B, D, and D.
  Temperature Code: T3C @ 60 °C.
  UL File No. E10314, Guide No. NRAG
  cULus: Ordinary Locations; Module with relays; UL File No. E11372 Guide No. NRAQ
- Agency Certification Modules
  Factory Mutual (FM): Hazardous Locations; Class I Div 2 (all except modules with relays): Gouprs A, B, C, and D. Temperature Rating: T3C @ 60 °C. FM file J.I.3000590
- CE Certifications
  Compliant for all applicable directives

Table of Contents

Standards Compliance and Certifications, Continued

- UL 508
- UL 1604
- CSA C22.2 No. 14
- CSA C22.2 No. 213
- EN/IEC 61131-2

Bulletin	1746	1756	1762	1764	1769	1794	1771	Bulletin 700H and 700S
Description	SLC 500	ControlLogix	MircoLogix 1200	MicroLogix 1500	CompactLogix	Flex	PLC-5	PowerFlex Drive
Product Selection	Web *	**12-142**	**12-153**	**12-153**	**12-148**	**12-154**	Web *	**12-157**

* Information for this product is available on the Industrial Controls Catalog website: www.ab.com/catalogs

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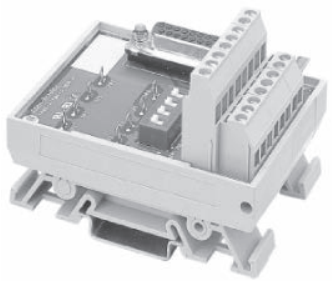
Analog Interface Modules (AIFMs)
General Information



Analog AIFMs are available with either 15- or 25-pin D-Shell connections. This is determined by the number of connections that are required by the I/O module.

Important: The following AIFM Cat. No. breakdown is for explanation purposes only. It is not a product configurator. Not all combinations of fields are valid product cat. nos. Use this breakdown for verification and explanation only.

1492 – AIFM (a) 16F (b) – 5 (c)

a

Modules	
Code	Description
AIFM	Analog Interface Module with Fixed Terminal Block
RAIFM	Analog Interface Module with Removable Terminal Block
TAIFM	Analog Interface Module for SIL2 (Safety Integrity Level 2)

b

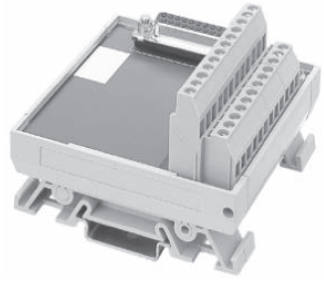
Module Type (all types do not configure a catalog number)	
Code	Description
4	4 channel
C	Combination
CE	Counter Encoder
6	6 channel
8	8 channel
16	16 channel
F	Fused

c

Number of Field Side Wiring Terminals	
Code	Description
3	Three per I/O channel
5	Five per I/O channel

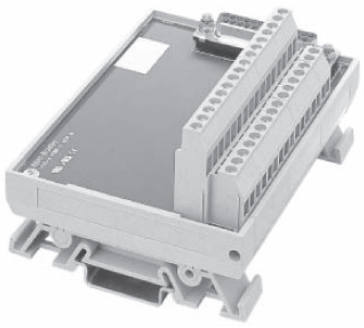
Analog Interface Modules (AIFMs)
Feed-Through

Feed-through IFMs provide the same capability as normal terminal blocks but in a more condensed package. Standard terminal IFMs provide **three field-side** wiring terminals per programmable controller analog input or output point, which includes enough terminals for the device shield and power connections.



Standard Terminal 4-channel:
Cat. No. 1492-AIFM4-3

Isolated Standard Terminal
6-channel IFM with 25 connections:
Cat. No. 1492-AIFM6S-3, 1492-AIFM8-3

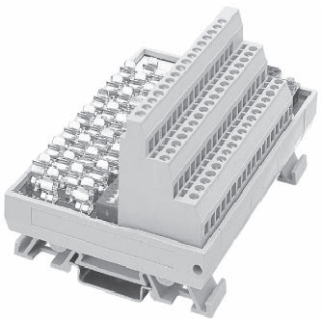


Standard Terminal 8-channel for
3-wire sensor devices:
Cat. No. 1492-AIFM8-3

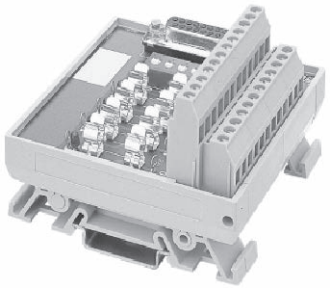
Safety Integrity Level (SIL 2)
Cat. No. 1492-TAIFM16-F-3

Analog Interface Modules (AIFMs)
Fusible

Fusible analog interface input modules provide a convenient method to fuse the input power source on the field side. The field-side power source is distributed through individual on-board 5 x 20 fuse holders. The AIFMs have a 24V DC blown fuse indicators to reduce the troubleshooting time required to locate and replace a blown fuse. Fusible modules have an easy-to-remove transparent plexiglass cover to prevent objects from contacting fuse circuitry under normal operation. Standard fuse holders reside in the IFM, aiding in the removal of a fuse with a fuse puller (fuses are not included). Isolation switch plugs, or "dummy fuses", are also available to isolate an input circuit once power is removed. In addition, once the circuit has been isolated and power restored, the input loop current can be measured in 2-wire transmitter applications. The fusible modules also have three or five terminals per I/O analog input point to create a power bus for device shield and power connections.



Fused 4-channel module with 24V blown fuse indication, test points and 5 terminals per input: Cat. No. 1492-AIFM4I-F-5
8-channel input module with 24V blown fuse indication and 5 terminals per input: Cat. No. 1492-AIFM8-F-5



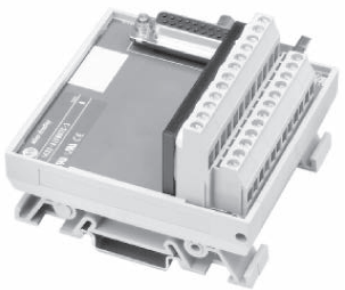
Analog Fused Products
Cat. No. 1492-AIFM4C-F-5, 1492-AIFM4F-F-5, 1492-AIFM8-F-5, 1492-AIFM16-F-3, 1492-AIFM16-F-5

Fused 16-channel module with 24V blown fuse indication, test points and 3 terminals per input: Cat. No. 1492-AIFM16-F-3

16-channel input module with 24V blown fuse indication and 5 terminals per input

Analog Interface Modules (AIFMs)
Thermocouple

The Cat. No.1492-AIFM6TC-3 Thermocouple IFM for the Cat. No. 1756-IT6I or -IT6I2 ControlLogix I/O module provides on-board cold junction compensation to allow thermocouples to be connected remotely while still correcting for temperature at the termination point. The combination thermistor and isothermal bar acquire temperature data at the AIFM for the thermocouple to adjust the input value.



Thermocouple 6-channel module with isothermal bar and 3 terminals per output: Cat. No. 1492-AIFM6-TC-3

Analog Cables
Pre-Wired

Bulletin 1492 pre-wired cables are designed to minimize control wiring in a panel. Pre-wired cables, when used with an analog IFM, replace the point-to-point wiring between Allen-Bradley programmable controller I/O modules and individual terminal blocks. The pre-wired cables have a removable terminal block or wiring arm from the PLC on one end of the cable and a D-Shell connector with a slide-locking mechanism on the other to connect to the IFM. Most pre-wired cables use twisted pairs and all have shield to aid noise immunity of the low-level analog signals. Most cables have a prepared drain wire with a ring lug at the I/O module end of the cable for convenient grounding of the cable shield to the chassis. They are 100% tested for continuity to make a perfect connection every time. The analog pre-wired cables are offered in four standard lengths of 0.5, 1.0, 2.5, and 5.0 m to fit a variety of applications. Other length cables are also available as build-to-order products. Pre-wired analog cables are available for many of the Bulletin 1746 SLC I/O, Bulletin 1756 ControlLogix I/O, Bulletin 1769 Compact I/O for CompactLogix, MicroLogix 1500, 1794 Flex I/O, and Bulletin 1771 PLC-5 I/O modules.

Analog Cables
I/O Ready - Not Available

Analog Cables
IFM Ready - Not Available

Cat. No. Explanation
Analog Cables for Bulletins 1746, 1756/1757, and 1771

1492 – ACABLE 010 A
a b c

a

Analog Interface Cables

Important: Use tables as a product configurator for pre-wired, IFM-ready, and I/O module-ready cables for Bulletins 1746, 1756, and 1771 digital I/O module cables. All combinations of these fields make valid product cat. nos. Refer to selection tables for IFM/XIM compatibility, additional cables, and ordering.

b

Standard or Build-to-Order Length Cable		
Code	Description	
005	0.5 m (1.64 ft)	Standard
010	1.0 m (3.28 ft)	
025	2.5 m (8.20 ft)	
050	5.0 m (16.40 ft)	
001-020	0.1…2.0 m (0.328…6.56 ft) 0.1 m (0.328 ft increments)	Build-to-Order
020-100	2.0…10.0 m (6.56…32.8 ft) 0.5 m (1.64 ft) increments	
100-300	10.0…30.0 m (32.8…98.42 ft) 1.0 m (3.28 ft) increments	

c

A-Cable Type	
Code	Description
A, B, C, D, K, L, P, Q, R	Pre-wired cables for Bulletin 1746 analog and RTD I/O modules.
E, F, G, H, J	Pre-wired cables for Bulletin 1771 analog and RTD I/O modules.
TA, TB, TC, TD, UA, UB, UC, UD, VA, VB, WA, WB, X, Y, Z, ZA, ZB, ZC	Pre-wired cables for Bulletin 1756 analog, RTD, and thermocouple I/O modules.
YT	Pre-wired cable for Bulletin 1756 thermocouple I/O modules.
M	Pre-wired cables for Bulletin 1757 pulse input I/O modules

Cat. No. Explanation
Analog Cables for Bulletin 1746, 1769, 700H/700S and 1794

1492 – ACAB 005 A46
a b c

a

Analog Interface Cables

Important: For explanation purposes only. It is not a product configurator. All combinations of fields are not valid product cat. nos. First, select the desired AIFM using the steps in Ordering Digital and Analog Wiring Systems in publication 1492-TD008_-EN-P. Then, use this breakdown for verification and explanation only.

b

Standard or Build-to-Order Length Cable		
Code	Description	
005	0.5 m (1.64 ft)	Standard
010	1.0 m (3.28 ft)	
025	2.5 m (8.20 ft)	
050	5.0 m (16.40 ft)	
001-020	0.1…2.0 m (0.328…6.56 ft) 0.1 m (0.328 ft increments)	Build-to-Order
020-100	2.0…10.0 m (6.56…32.8 ft) 0.5 m (1.64 ft) increments	
100-300	10.0…30.0 m (32.8…98.42 ft) 1.0 m (3.28 ft) increments	

c

Cable Type	
Code	Description
A46	Analog cable for SLC500
AA69, AB69, BA69, BB69, BC69, BD69, C69,CA69, CB69, CC69, D69, EA69, EB69, EC69, ED69	Analog cable for 1769 I/O
Z7H	Analog cable PowerFlex 700H
X7S, Z7S	Analog cable PowerFlex 700S
Z94	Analog cable for Flex I/O

Digital IFM Modules with Field-Removable Terminal Blocks (RTBs)

Select groups of standard, fused and relay digital 1492 wiring system modules (refer to Selection Tables) have field terminal blocks that can be removed (RTB). This RTB feature can provide easier wiring of field devices in a control cabinet where the IFM is located in a hard to reach area, or where hand-access is limited. It can also provide easier and faster replacement of a damaged or defective 1492 wiring system module. The removable plug portion of the RTB assembly has a screw at each end to securely fasten it to the RTB socket, which is mechanically secured to the module circuit board hand housing. Modules are shipped with the RTB socket, but without the removable plug(s). Plugs are available with screw style (e.g., 1492-RTB20N)or push-in style (e.g., 1492- RTB16P) terminals and must be ordered separately(two pieces per cat. no.). Refer to the selection tables for the particular PLC I/O system of interest to determine which modules are offered with field removable terminal blocks.

All of the features available on fixed terminal block products (e.g. labels, agency certification, etc.) are also provided for the removable terminal block 1492 wiring system modules.

Analog AIFM Modules with Field-Removable Terminal Blocks (RTBs)

Select groups of analog 1492 wiring system modules (refer to Selection Tables) have field terminal blocks that can be removed (RTB). This RTB feature can provide easier wiring of field devices in a control cabinet where the IFM is located in a hard to reach area, or where hand-access is limited. It can also provide easier and faster replacement of a damaged or defective 1492 wiring system module. The removable plug portion of the RTB assembly has a screw at each end to securely fasten it to the RTB socket, which is mechanically secured to the module circuit board and housing. Modules hare shipped with the RTB socket, but without the removable plug(s). Plugs are available with screw style (1492-RTBxxN) or push-in style (1492-RTBxxP) terminals and must be ordered separately (Two pieces per cat. no.). Refer to the Selection Tables for the particular PLC I/O system of interest to determine which modules are offered with field Removable Terminals Blocks.

All of the features available on analog fixed terminal block products (e.g. labels, agency certification, etc.) are also provided for the removable terminal block 1492 wiring system modules.

Catalog Number Explanation
RTB Plugs

Important: The following cat. no. breakdown is for explanatory purposes only. It is not a product configurator. Not all combinations of fields are valid cat. nos. Use this breakdown for verification and explanation only.

1492 – RTB (a) 20 (b) – N (c)

a

Removable Terminal Block Plug

b

Number of Poles/Terminal
Code
8
12
14
16
17
20

c

Connector Style	
Code	Description
N	Screw Style
P	Push-in Style

Selecting a Wiring System

Use of Selection Tables

- Locate I/O module required. The top row indicates the I/O module for the I/O platform.
- Locate the interface module required. The second and third column indicates the interface module catalog number.
- Determine if an interface module exists for the I/O module; indicated by “Letter Code” in row (interface catalog number) and the column (I/O module).
- Locate cable. This is the letter indicated by “Letter Code” in the row (interface catalog number) and the column (I/O module). The “Letter Code” represents the suffix of the pre-wired cable.
- Determine cable catalog number. Add 1492-CABLE_ _ _”Letter Code”, example 1492-CABLE_ _ _A.
- Determine length of cable required, standard lengths are 0.5, 1.0, 2.5, and 5.0 m; which represents 005, 010, 025 and 050 for _ _ _ in the cable catalog number. Example 1492-CABLE010A = a 1.0 m cable with “Letter Code” A.

Analog AIFMs and Cables for Bulletin 1756 ControlLogix Standard and Combination Modules

Voltage [V]	Term. per I/O	Description	Fixed Terminal Block	Removable Terminal Block	RTB Plugs ❖	Bulletin 1756 Analog I/O Module														
						1756-IF8 (Sgl-End Voltage)	1756-IF8 (Sgl-End Current)	1756-IF8 (Diff Voltage)	1756-IF8 (Diff Current)	1756-IF16 (Sgl-End Voltage)	1756-IF16 (Sgl-End Current)	1756-IF16 (Diff Voltage)	1756-IF16 (Diff Current)	1756-OF4 (Voltage)	1756-OF4 (Current)	1756-OF8 (Voltage)	1756-OF8 (Current)	1756-IF4FXOF2F (Cur In & Out)	1756-IF4FXOF2F (Volt In & Out)	1756-IF4FXOF2F (Current In & Voltage Out)
			Cat. No.	Cat. No.	Cat. No.	Analog Cable Cat. No. Suffix ✦														
Feed-through																				
24	3	4-ch input, output or 2-in/2-out	**1492-AIFM4-3**	1492-RAIFM4-3	1492-RTB8✪									VA	VB					
	3...4	6-ch isolated	**1492-AIFM6S-3**	**1492-RAIFM6S-3**	1492-RTB12✪													ZA	ZB	ZC
	3	8-ch differential, 16-ch single-ended	**1492-AIFM8-3**	**1492-RAIFM8-3**	1492-RTB16✪	TA	TB	TC	TD	UA	UB	UC	UD			WA	WB			
Fusible Analog																				
24	5	8-ch blown fuse LED	**1492-AIFM8-F-5**	—	—	TA	TB	TC	TD			UC	UD					ZA	ZB	ZC
	3	16-ch blown fuse LED	**1492-AIFM16-F-3**	—	—					UA	UB	UC	UD							
	5	16-ch input blown fuse LED	**1492-AIFM16-F-5**	—	—					UA	UB	UC	UD							
Safety Integrity Level §																				
24	3	Blown fuse LED	1492-TAIFM16-F-3	—	—					UA										

See footnotes on the following page.

Analog AIFMs and Cables for Bulletin 1756 ControlLogix Isolated, RTD, Thermocouple and Specialty Modules

Voltage [V]	Term. per I/O	Description	Fixed Terminal Block	Removable Terminal Block	RTB Plugs ❖	Bulletin 1756 Analog I/O Module✶																
						1756-IF6I (Current)	1756-IF6I (Voltage)	1756-IF6CIS	1756-OF6CI	1756-OF6VI	1756-IR6I	1756-IT6I	1756-IT6I2	1756-IF8H (Voltage with HART)	1756-IF8H (Current with HART)	1756-IF16H (Single-ended with HART)	1756-IF16H (Differential with HART)	1756-OF8H (Voltage with HART)	1756-OF8H (Current with HART)	1756-HSC (12...24V DC)	1756-HSC (5V DC)	1756-PIM
			Cat. No.	Cat. No.	Cat. No.	Analog Cable Cat. No. Suffix✦																
Feed-through																						
24	3..4	6-ch isolated	**1492-AIFM6S-3**	**1492-RAIFM6S-3**	1492-RTB12✪	X	Y	Z	Y	Y	Z											
	3	8-ch differential, 16-ch single-ended	**1492-AIFM8-3**	**1492-RAIFM8-3**	1492-RTB16✪									UC	UD			WA	WB			
Thermocouple																						
24	3	6-ch	**1492-AIFM6TC-3**	—	—							Y	YT									
High-Speed Counter/Encoder																						
24	1	2-ch, counter input 4 outputs	**1492-AIFMCE4**	—	—															XA	XB	
Fusible High-Speed Counter/Encoder																						
24	1	2-ch, fused counter input, fused outputs	**1492-AIFMCE4-F**	—	—															XA	XB	
Fusible Analog																						
24	5	8-ch w/ blown fuse LED	**1492-AIFM8-F-5**	—	—									UC	UD							
	3	16-ch w/ blown fuse LED	**1492-AIFM16-F-3**	—	—											UB	❄					
	1	8 input/ 2 output ch	1492-AIFMPI	—	—																	M

✦ To order a Pre-wired Cable, add the **Suffix No.** from the table above to the end of the **Cat. No.** below.

0.5M Cable = 1492-ACABLE005_
1.0M Cable = 1492-ACABLE010_
2.5M Cable = 1492-ACABLE025_
5.0M Cable = 1492-ACABLE050_

Custom Length Cable = 1492-CABLEXXX_. See Catalog Number Explanation on page 12-137 for available Custom Length Codes to replace XXX in Cat. No.

❖ Order plugs separately (two plugs per catalog number). Plugs are available in screw style and push in style terminal types. To order, replace the ✪ in the catalog number with the code for the desired terminal style. The code for screw style is **N** and the code for push in style is **P**.

✶ Some analog I/O modules can be operated in up to four modes (current/voltage, single-ended/differential) based on connections. In all cases, each channel is factory-configured for the same mode. However, you can field configure any channel for another mode. You may need to alter the terminal block wiring to match the application. Refer to the *PLC I/O Module Installation Manual*.

❄ Requires two Cat. No. 1492-AIFM16-F-3, one cable, Cat. No. 14952-AC005005UF, is required.

§ This 1492 module is for use in SIL2 safety systems only. It does not satisfy the requirements for general I/O fault tolerance. To use this module in a SIL2 application, specially developed application software for the ControlLogix processor must be used. To obtain the latest revision of this application software contact Technical Support at 1-440-646-3434.

Analog AIFMs and Cables for Bulletin 1769 CompactLogix I/O Standard and Combination Modules

Voltage [V]	Term. per I/O	Description	Fixed Terminal Block Cat. No.	Removable Terminal Block Cat. No.	RTB Plugs ❖ Cat. No.	Bulletin 1769 CompactLogix I/O Module: 1769-IF4 (Sgl-End Voltage)	1769-IF4 (Sgl-End Current)	1769-IF4 (Diff Voltage)	1769-IF4 (Diff- Current)	1769-IF8 (Sgl-End Voltage)	1769-IF8 (Sgl-End Current)	1769-IF8 (Diff - Voltage)	1769-IF4 (Diff - Current)	1769-OF2 (Voltage)	1769-OF8C (Current)	1769-OF8V (Voltage)	1769-OF4 (Current)	1769-OF4 (Voltage)
						Analog Cable Cat. No. Suffix ✦												
Feed-through																		
24	3	4-ch, 2 in or 2 out	**1492-AIFM4-3**	1492-RAIFM4-3	1492-RTB8✪	BA69	BB69	BC69	BD69					AA69			AC69	AD69
24	3	8-ch differential, 16-ch single ended	**1492-AIFM8-3**	**1492-RAIFM8-3**	1492-RTB16✪					EA69	EB69	EC69	ED69		D69	D69		
Fusible Analog																		
24	5	4-ch blown fuse LED, rest points	**1492-AIFM4I-F-5**	—	—	BA69	BB69	BC69	BD69									
24	5	8-ch blown fuse LED	**1492-AIFM8-F-5**	—	—					EA69	EB69	EC69	ED69					

Analog AIFMs and Cables for Bulletin 1769 CompactLogix I/O Specialty Modules

Voltage [V]	Term. per I/O	Description	Fixed Temrinal Block Cat. No.	Removable Terminal Block Cat. No.	RTB Plugs ❖ Cat. No.	Bulletin 1769 CompactLogix I/O Module: 1769-HSC	1769-IF4I (Current)	1769-IF4I (Voltage)	1769-IF16C (Current)	1769-IF16V (Voltage)	1769-IT6	1769-IR6	1769-OF4CI (Current)	1769-OF4VI (Voltage)	1769-IF4XOF2 or- IF4FXOF2F (Current in & out)	1769-IF4XOF2 or - IF4FXOF2F (Voltage in & out)	1769-IF4XOF2 or - IF4FXOF2F (Current in & Voltage out)
						Analog Cable Cat. No. Suffix ✦											
Feed-through																	
24	3	8-ch differential, 16-ch single ended	**1492-AIFM8-3**	**1492-RAIFM8-3**	1492-RTB16✪				EE69	EE69							
24	4	6-ch isolated	**1492-AIFM6S-3**	**1492-RAIFM6S-3**	1492-RTB12✪										CA69	CB69	CC69
Thermocouple																	
24	3	Thermocouple	**1492-AIFM6TC-3**	—	—						E69	E69					
RTD																	
24	4	6-ch isolated	**1492-AIFM6S-3**	**1492-RAIFM6S-3**	1492-RTB12✪							C69					
High-Speed Counter/Encoder																	
24	4	2-channel input counter	**1492-AIFMCE4**	—	—	HA69											
Fused High-Speed Counter/Encoder																	
24	4	2-ch fused couter input/ 4 fused output	**1492-AIFMCE4-F**	—	—	HA69											
Fusible Analog																	
24	5	4-ch blown fuse LED, rest points	**1492-AIFM4I-F-5**	—	—		BE69	BF69					AE69	AE69			
24	5	8-ch blown fuse LED	**1492-AIFM8-F-5**												CA69	CB69	CC69
24	3	16-ch input blown fuse LED	**1492-AIFM16-F-3**	—	—				EE69	EE69							

✦ To order a Pre-wired Cable, add the **Suffix No.** from the table above to the end of the **Cat. No.** below.

0.5M Cable = 1492-ACAB005_
1.0M Cable = 1492-ACAB010_
2.5M Cable = 1492-ACAB025_
5.0M Cable = 1492-ACAB050_

Custom Length Cable = 1492-ACABXXX_. See Catalog Number Explanation on page 12-140 for available Custom Length Codes to replace XXX in Cat. No.

❖ Order plugs separately (two plugs per catalog number). Plugs are available in screw style and push in style terminal types. To order, replace the ✪ in the catalog number with the code for the desired terminal style. The code for screw style is **N** and the code for push in style is **P**.

Analog AIFMs for Bulletin 1794 Flex I/O

Voltage [V]	Term. per I/O	Description	Fixed Terminal Block	Removable Terminal Block	RTB Plugs ❖	Bulletin 1794 Flex I/O Module					
						1794-IE4X0E2	1794-IE8	1794-IF2X0F2I	1794-IF4I	1794-OE4	1794-OF4I
			Cat. No.	Cat. No.	Cat. No.	Analog Cable Cat. No. Suffix✦					
			Feed-through								
24	3	8-ch differential, 16-ch single-ended	**1492-AIFM8-3**	**1492-RAIFM8-3**	1492-RTB16✪	Z94	Z94	Z94	Z94	Z94	Z94
			Fusible								
24	5	8-ch, Blown fuse LED	**1492-AIFM8-F-5**	—	—	Z94	Z94	Z94	Z94		

✦ To order a Pre-wired Cable, add the **Suffix No.** from the table above to the end of the **Cat. No.** below.

0.5M Cable = 1492-ACAB005_
1.0M Cable = 1492-ACAB010_
2.5M Cable = 1492-ACAB025_
5.0M Cable = 1492-ACAB050_

Custom Length Cable = 1492-ACABXXX_. See Catalog Number Explanation on page 12-140 for available Custom Length Codes to replace XXX in Cat. No.

❖ Order plugs separately (two plugs per catalog number). Plugs are available in screw style and push in style terminal types. To order, replace the ✪ in the catalog number with the code for the desired terminal style. The code for screw style is **N** and the code for push in style is **P**.