Analog Wiring Systems

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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

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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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Benefits

Reduced Wiring Time

Wiring is completed in a fraction of the time when wiring systems are used, as compared with the traditional method of wiring each point to the I/O swing arm and field-side terminal blocks. Pre-wired cables are factory-wired to the I/O wiring arm on one end and a connector for the Interface Module (IFM) on the other. IFMs enhance the capability of the I/O systems with added terminations, field-side LED status indicators, isolation circuits, overcurrent protection, and higher amperage outputs. Both standard and specific build-to-order length cables are available, providing the correct length for any panel in a neat, space-efficient wiring solution.

Reduced Wiring Errors

Wiring system cables are pre-tested to ensure 100% accurate connections and eliminate the need for point-to-point checking of wiring. No more crossed wires and loose connections between the I/O module and the terminal block. Even one error in wiring 128 I/O points in a point-to-point system may require a complete check of the wiring. Wiring errors can take several minutes to track down and correct before the panel is ready for startup. When IFMs and cables are snapped in place, they fit every time — no need to find the wrong or loose connection, resulting in a much higher rate of success at system startup.

Faster Troubleshooting and Easier Maintenance

Normal terminal blocks can't offer the benefits of IFMs, such as LED indication on each I/O point. Wiring systems improve system startup and ease troubleshooting and maintenance. Diagnostic capabilities in the form of fuses, blown fuse indication, and field-side ON-State LEDs — in a reduced space — allow maintenance personnel to quickly locate faults, reduce downtime, and improve overall productivity.

Increased Volume and Productivity

Cable interconnections for a wiring system can be up to 30 times faster to install than traditional point-to-point wiring, enabling OEMs and panel builders using wiring systems to build panels faster and produce more machines.

Reduced Wire Preparation and Routing

Pre-wired cables eliminate the time and costs associated with stripping and cutting wires. Routing wires is much easier with wiring systems, since engineers only have to worry about routing one pre-wired cable versus the 20 or 40 wires needed in the traditional wiring method.

Labeling and Marking

Pre-printed, I/O-specific adhesive label strips for quick marking of IFM terminals save labor compared with point-to-point wiring that requires labor-intensive wire markers. Pre-wired cables require no wire labels. Pre-printed I/O-specific labels ensure neat, easy-to-read identification of wires and I/O points for all users.

The marking of traditional terminal blocks has even caused some OEMs to move toward a high-tech approach of plotting markers, requiring additional equipment in the form of a plotter system and a PC to run the plotter software.

Simplified Design

Design engineers can simplify their panel drawings by calling out an IFM and pre-wired cable instead of having to detail every single wire and terminal block on their drawings. Simplified panel drawings aid not only the installer, but also the end customer who receives the panel.

Increased DIN Rail Density

An increasing trend in the industry is to pack more products into the same DIN Rail space. Wiring systems support this trend, as they require less DIN Rail space than traditional terminal blocks. For example, if an OEM were to use a 40-point IFM in place of 40 terminal blocks, DIN Rail space can be reduced by more than 50%. All IFMs have terminals for connecting the I/O field wiring. In addition, extra terminal, sensor, fusible, and relay IFMs contain common terminals that are used as power busses for sensor and actuators. No additional terminal blocks are needed to provide power to the sensors/actuators — saving valuable panel/DIN Rail space.

To further reduce panel space, narrow IFMs (e.g., Cat. No. 1492-IFM20FN) have been designed. They require 45% less space than the standard length IFMs, making them well-suited for tightly packed enclosures. The high density narrow IFMs have two rows of 10 field-wiring terminals with an overall length of 60 mm (2.36 in.).

Quality-Looking Panels

The pre-wired cables and IFMs organize the wiring in your panel and provide a consistent look. Pre-printed adhesive labels for the terminals neatly identify field-wiring connections, which correspond to the I/O module address. A large marking area is also available for identifying I/O information on the IFM.

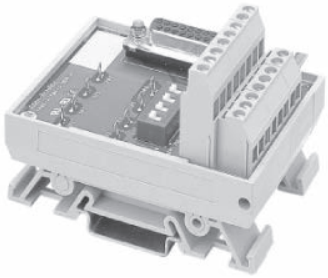
Fewer Parts, Less Inventory, and Lower Carrying Cost

A wiring system involves an IFM and the cable, versus the block, barrier, jumper, markers, wires, and swing arms associated with traditional hardwired systems. Therefore, it requires fewer components and, in turn, less inventory and lower carrying costs.

Design Flexibility

To develop a cost-effective system, the hardware components must meet the needs of the design engineer. Rockwell Automation provides the broadest range of digital and analog systems in the industry. Allen-Bradley wiring systems deliver a lower life cycle cost.

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

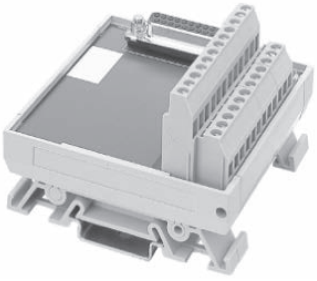
Module Type (all types do not configure a catalog number)	
Code	Description
4	4 channel
C	Combination
CE	Counter Encoder
6	6 channel
8	8 channel
16	16 channel
F	Fused

c

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

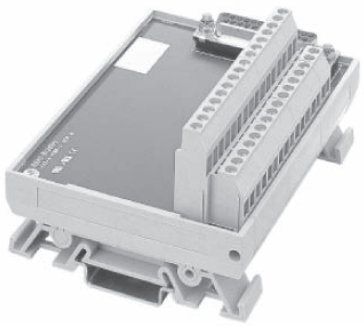
Analog Interface Modules (AIFMs)
Feed-Through

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

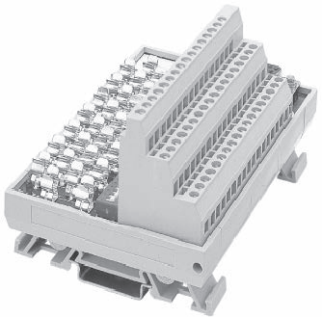


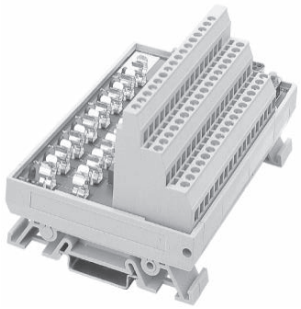
Standard Terminal 8-channel for
3-wire sensor devices:
Cat. No. 1492-AIFM8-3

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

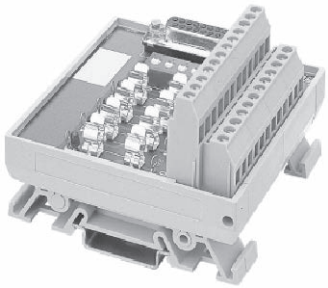
Analog Interface Modules (AIFMs)
Fusible

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



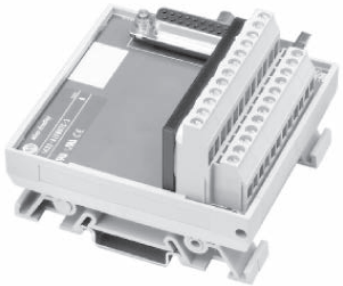
Analog Fused Products
Cat. No. 1492-AIFM4C-F-5, 1492-AIFM4F-F-5, 1492-AIFM8-F-5, 1492-AIFM16-F-3, 1492-AIFM16-F-5

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 (a) 010 (b) A (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 (a) 005 (b) A46 (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 IFM Specifications

Analog IFM Cat. No.	Voltage Range	Max. Current (Per Circuit) [A]	Max. Current (Per Module) [A]	Dimensions (W x H x D) [in.]	Indicator Circuit Current (Nominal) [mA]	Label Card Cat. No.❄
1492-AIFM4-3, -RAIFM4-3	0…10V DC	2	12	2.36 x 3.27 x 2.74‡	—	46006-205-01
1492-AIFM4C-F-5	10…30V DC	2	12	3.15 x 3.27 x 2.74	2	46006-203-01
1492-AIFM4I-F-5	10…30V DC	2	12	3.15 x 3.27 x 2.74	2	46006-203-01
1492-AIFM6S-3, -RAIFM6S-3	0…132V AC/DC	2	12	3.15 x 3.27 x 2.74‡	—	46006-202-01
1492-AIFM6TC-3	0…132V AC/DC	2	12	3.15 x 3.27 x 2.74	—	46006-202-01
1492-AIFMCE4	5…32V AC/DC	2	8	5.12 x 3.27 x 2.74	—	46006-232-01
1492-AIFMCE4-F	5…32V AC/DC	2	8	5.12 x 3.27 x 2.74	1 mA @ 5V DC 6 mA @ 24V DC	46006-232-01
1492-AIFM8-3, -RAIFM8-3	0…132V AC/DC	2	12	4.33 x 3.27 x 2.74‡	—	46006-200-01, 46006-238-01
1492-AIFM8-F-5	10…30V DC	2	12	4.72 x 3.27 x 2.74	2	46006-196-01, -254-01
1492-AIFM16-F-3	10…30V DC	2	12	4.72 x 3.27 x 2.74	2	46006-213-01
1492-AIFM16-F-5	10…30V DC	2	12	8.27 x 3.27 x 2.74	2	46006-198-01
1492-AIFMQS	10…30V DC	3	12	4.72 x 3.27 x 2.74	2	46006-199-01
1492-AIFMPI	0…30V DC	2	12	4.72 x 3.27 x 2.74	2	46006-243-01
1492-TAIFM16-F-3	24V DC	2	12	9.88 x 3.27 x 2.74	2	46006-231-01

❄ Ships with each module. For spare part, precede the part number with the letter "W."
‡ Add 0.39 in. to the width dimension for Bulletin 1492-Rxxx modules.

Relay Master/Expandable Interface Module Specifications

Relay Master/Expandable XIM Cat. No.	Voltage Range	Max. Current (Per Circuit/Per Relay Pair) [A]	Max. Current (Per Module) [A]	Dimensions (W xH x D) [in.]	Indicator Circuit Current (Nominal) [mA]	Label Card Cat. No.❄
1492-XIM4024-16R, -RXIM4024-16R	20…26V DC	10/12	96	9.06 x 3.27 x 2.78	2	46006-222-01
1492-XIM4024-8R	20…26V DC	10/12	48	6.30 x 3.27 x 2.78	2	46006-216-01
1492-XIM2024-8R	20…26V AC	10/12	48	6.30 x 3.27 x 2.78	2	46006-216-01
1492-XIM20120-8R	96…132V AC	10/12	48	6.30 x 3.27 x 2.78	2	46006-216-01
1492-XIM24-8R, RXIM24-8R	20…26V AC	10/12	48	6.30 x 3.27 x 2.78	2	46006-217-01
1492-XIM120-8R	96…132V AC	10/12	48	6.30 x 3.27 x 2.78	2	46006-217-01
1492-XIM2024-16R	20…26V DC	10/12	96	10.65 x 3.27 x 2.78	2	46006-223-01
1492-XIM2024-16RF	20…26V DC	10/12	96	10.65 x 3.27 x 2.78	2	46006-223-01
1492-XIM20120-16R	96…132V AC	10/12	96	10.65 x 3.27 x 2.78	2	46006-223-01
1492-XIM20120-16RF	96…132V DC	10/12	96	10.65 x 3.27 x 2.78	2	46006-223-01
1492-XIM4024-16RF	20…26V AC	10/12	96	11.5 x 3.27 x 2.78	2	46006-223-01
1492-XIMF-2	0…132V AC/DC	2/NA	4	3.15 x 3.27 x 2.19	—	46006-218-01
1492-XIMF-F24-2	10…30V DC	2/NA	4	3.15 x 3.27 x 2.19	2	46006-218-01
1492-XIMF-F120-2	85…132V AC	2/NA	4	3.15 x 3.27 x 2.19	2	46006-218-01
1492-XIM24-16RF	20…26V AC	10/12	96	11.5 x 3.27 x 2.78	2	46006-219-01
1492-XIMTR2024-16R, -RXIMTR2024-16R	24 V DC	4	64	4.72 x 3.27 x 2.74	2	46006-257-01
1492-XIMTR4024-32R, -RXIMTR4024-32R	24 V DC	4	128	9.45 x 3.27 x 2.74	2	46006-257-01
1492-XIMTS2024-16R, -RXIMTS2024-16R	24 V DC	.75	12	4.72 x 3.27 x 2.74	2	46006-257-01
1492-XIMTS4024-32R, -RXIMTS4024-32R	24 V DC	.75	24	9.45 x 3.27 x 2.74	2	46006-257-01

❄ Ships with each module. For spare part, precede the part number with the letter "W."