



Kinetix 6200 and Kinetix 6500 IAM and AM Power Modules

Catalog Numbers 2094-BC01-MP5-M, 2094-BC01-M01-M, 2094-BC02-M02-M,
2094-BC04-M03-M, 2094-BC07-M05-M,
2094-BMP5-M, 2094-BM01-M, 2094-BM02-M, 2094-BM03-M, 2094-BM05-M

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About the IAM and AM Power Modules

The Kinetix® 6200 or Kinetix 6500 modular drives consist of an integrated axis (IAM) power module and up to seven axis (AM) power modules each coupled with a Kinetix 6200 or Kinetix 6500 control module. The IAM and AM power modules provide power for up to eight servo motors or actuators.

Refer to the Kinetix 6200 and Kinetix 6500 Modular Servo Drives User Manual, publication [2094-UM002](#), for detailed information on wiring, applying power, troubleshooting, and integration with ControlLogix®, CompactLogix™, or SoftLogix™ controller platforms.

Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.



WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.



ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.

IMPORTANT Identifies information that is critical for successful application and understanding of the product.

Labels may also be on or inside the equipment to provide specific precautions.



SHOCK HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.



BURN HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.

ARC FLASH HAZARD: Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

Catalog Number Explanation

This publication applies to the following Kinetix 6200 and Kinetix 6500 modular drive components.

IAM and AM Power Module Catalog Numbers

Cat. No.	Description
2094-BC01-MP5-M	IAM power module, 460V, 6 kW converter, 4 A (0-pk) inverter
2094-BC01-M01-M	IAM power module, 460V, 6 kW converter, 9 A (0-pk) inverter
2094-BC02-M02-M	IAM power module, 460V, 15 kW converter, 15 A (0-pk) inverter
2094-BC04-M03-M	IAM power module, 460V, 28 kW converter, 30 A (0-pk) inverter
2094-BC07-M05-M	IAM power module, 460V, 45 kW converter, 49 A (0-pk) inverter
2094-BMP5-M	AM power module, 460V, 4 A (0-pk) inverter
2094-BM01-M	AM power module, 460V, 9 A (0-pk) inverter
2094-BM02-M	AM power module, 460V, 15 A (0-pk) inverter
2094-BM03-M	AM power module, 460V, 30 A (0-pk) inverter
2094-BM05-M	AM power module, 460V, 49 A (0-pk) inverter

Before You Begin

Remove all packing material, wedges, and braces from within and around the components. After unpacking, check the item nameplate catalog number against the purchase order.

Parts List

Drive Component	Ships With
IAM Power Module	<ul style="list-style-type: none"> Wiring plug connector set for main VAC input power (IPD), control VAC input power (CPD), contactor enable relay (CED), motor power (MP), and motor/resistive brake power (BC). These installation instructions, publication 2094-IN011.
AM Power Module	<ul style="list-style-type: none"> Wiring plug connector set for motor power (MP) and motor/resistive brake power (BC). These installation instructions, publication 2094-IN011.

TIP

Connector kits for user I/O, safety, and auxiliary feedback (catalog numbers 2090-K6CK-D44M and 2090-K6CK-D44S0) and motor feedback (catalog number 2090-K6CK-D15M) are not provided. Replacement connector sets, as described in the [Parts List](#), are available. Refer to the Kinetix Motion Accessories Technical Data, publication [GMC-TD004](#), for more information on connector kits and replacement connector sets.

Setting the Ground Jumper in Ungrounded Power Configurations

Setting the ground jumper is necessary only when using an ungrounded or high-impedance grounded power configuration. Setting the jumper involves removing the IAM power module from the power rail, opening the IAM module, and moving the jumper.

IMPORTANT

If you have grounded power distribution, you do not need to set the ground jumper. Go to [Install the IAM/AM Power Modules on page 7](#).

Setting the ground jumper is best done when the IAM power module is removed from the power rail and placed face-up on a solid surface equipped as a grounded static-safe workstation.



ATTENTION: To avoid personal injury and/or damage to equipment, remove the IAM power module from the power rail before setting the ground jumper.

By setting the ground jumper for ungrounded power configurations, you no longer maintain line-to-neutral voltage protection.

To remove the IAM power module from the power rail, refer to the Kinetix 6200 and Kinetix 6500 Modular Servo Drives User Manual, publication [2094-UM002](#).



ATTENTION: This drive contains electrostatic discharge (ESD) sensitive parts and assemblies. You are required to follow static-control precautions when you install, test, service, or repair this assembly. If you do not follow ESD control procedures, components can be damaged. If you are not familiar with static control procedures, refer to [Guarding Against Electrostatic Damage, publication 8000-4.5.2](#), or any other applicable ESD awareness handbook.

When using ungrounded input power in common-bus configurations, use this table to determine where to set the ground jumper.

Ground Jumper to Set

Leader Drive	Follower Drive	Set the Jumper in This Drive
Kinetix 6200\6500 IAM module	Kinetix 6200\6500 IAM module	Leader drive
Kinetix 6200\6500 IAM module	Non-Kinetix 6200\6500 drive	Leader drive
Non-Kinetix 6200\6500 drive	Kinetix 6200\6500 IAM module	Follower drive (if no setting exists in the leader drive)

Set the Ground Jumper

Follow these steps to set the ground jumper for ungrounded power.

1. Remove the top and bottom front-panel cover screws.
Refer to the figure on [page 6](#) for an illustration of your actual hardware.
2. Pull the front panel cover straight out, as shown, and locate the ground jumper.

TIP

Access to the jumper improves when the Bulletin 2094 control module is removed from the IAM power module.

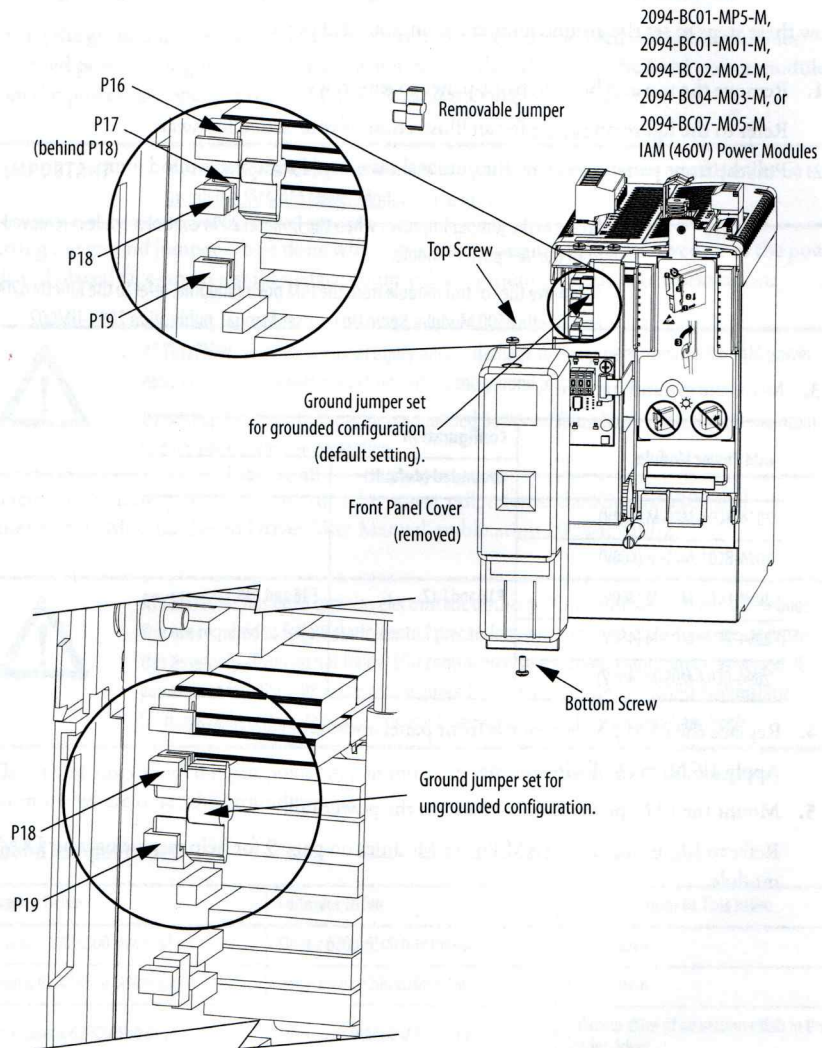
To remove the control module from the IAM power module, refer to the Kinetix 6200 and Kinetix 6500 Modular Servo Drives User Manual, publication [2094-UM002](#).

3. Move the ground jumper.

IAM Power Module	Configuration	
	Grounded (default)	Ungrounded
2094-BC01-MP5-M (460V)	P16 and P17	P18 and P19
2094-BC01-M01-M (460V)		
2094-BC02-M02-M (460V)		
2094-BC04-M03-M (460V)		
2094-BC07-M05-M (460V)		

4. Replace the IAM power module front panel cover and two screws.
Apply 1.6 N•m (14 lb•in) torque.
5. Mount the IAM power module back on the power rail.
Refer to [Mount the IAM/AM Power Modules](#) on [page 9](#) for help mounting your IAM module.

Setting the IAM Power Module Ground Jumper (460V)



IMPORTANT

Use the default jumper setting for grounded power configurations. Move the jumper, as shown above, for ungrounded power.

Install the IAM/AM Power Modules

This procedure assumes you have prepared your panel, mounted your Bulletin 2094 power rail, and understand how to bond your system. For installation instructions regarding equipment and accessories not included here, refer to the instructions that came with those products.



SHOCK HAZARD: To avoid hazard of electrical shock, perform all mounting and wiring of the Bulletin 2094 power rail and drive modules prior to applying power. Once power is applied, connector terminals can have voltage present even when not in use.



ATTENTION: Plan the installation of your system so that you can perform all cutting, drilling, tapping, and welding with the system removed from the enclosure. Because the system is of the open type construction, be careful to keep any metal debris from falling into it. Metal debris or other foreign matter can become lodged in the circuitry and result in damage to components.

You can use Bulletin 2094 mounting brackets to mount the power rail or line interface module (LIM) over the AC line filter. Refer to the 2094 Mounting Brackets Installation Instructions, publication 2094-IN008, when using mounting brackets with your Kinetix 6200 and Kinetix 6500 drive system.

The Bulletin 2094 power rail comes in lengths to support one IAM module and up to seven additional AM/IPIM modules, or up to six additional AM/IPIM modules and one shunt module. The connector pins for each slot are covered by a protective cover. The cover is designed to protect the pins from damage and make sure that no foreign objects lodge between the pins during installation. Refer to the Kinetix 6000 Power Rail Installation Instructions, publication 2094-IN003, when installing your power rail.



ATTENTION: To avoid damage to the power rail during installation, do not remove the protective covers until the module for each slot is ready for mounting.

Determine Mounting Order

Mount the IAM, AM/IPIM, shunt, and slot-filler modules in the order (left to right) as shown. Mount the axis modules and IPIM modules according to power utilization (highest to lowest) from left to right starting with the highest power utilization. If power utilization is unknown, position axis modules (highest to lowest) from left to right based on amp rating.

Power utilization is the average power (kW) consumed by a servo axis. If Motion Analyzer software was used to size the axis, the calculated axis power required can be used for the power utilization value. If Motion Analyzer software was not used, you can use the continuous power value (kW) for each module to determine mounting order.

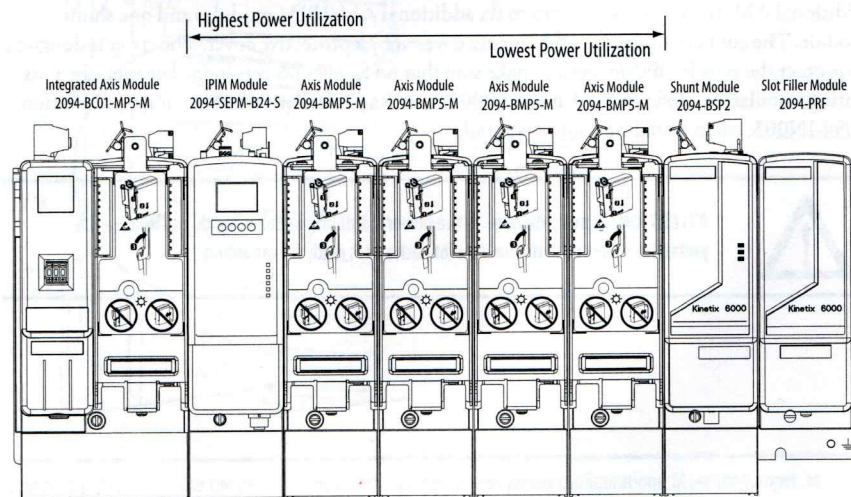
Kinetix 6200/6500 (400V-class) Axis Modules

Attribute	2094-BMP5-M	2094-BM01-M	2094-BM02-M	2094-BM03-M	2094-BM05-M
Continuous Power Output, nom	1.8 kW	3.9 kW	6.6 kW	13.5 kW	22.0 kW

Kinetix 6000M (400V-class) IPIM Module

Attribute	2094-SEPM-B24-S
Continuous Power Output, nom	15.0 kW

Module Mounting Order Example



IMPORTANT

The IAM power module must be positioned in the leftmost slot of the power rail. Position your AM/IPIM modules, shunt module, and slot-filler modules to the right of the IAM module.

The shunt module must be installed to the right of the last AM/IPIM module. Only slot-filler modules can be installed to the right of the shunt module.

Do not mount the shunt module on power rails with a follower IAM module. Common-bus follower IAM modules disable the internal, rail mounted, and external shunt modules.



SHOCK HAZARD: To avoid personal injury due to electrical shock, place a 2094-PRF slot-filler module in all empty slots on the power rail.

Any power rail connector without a module installed disables the drive system; however, control power is still present.

Mount the IAM/AM Power Modules

Follow these steps to mount the IAM, AM, IPIM, shunt, and slot-filler modules.

TIP

All modules mount to the power rail by using the same technique; however, only the IAM module is shown.

1. Remove the protective covers from the power rail connectors.

IMPORTANT

The IAM module must be positioned in the leftmost slot of the power rail. Position your axis modules, shunt module, and slot-filler modules to the right of the IAM module.

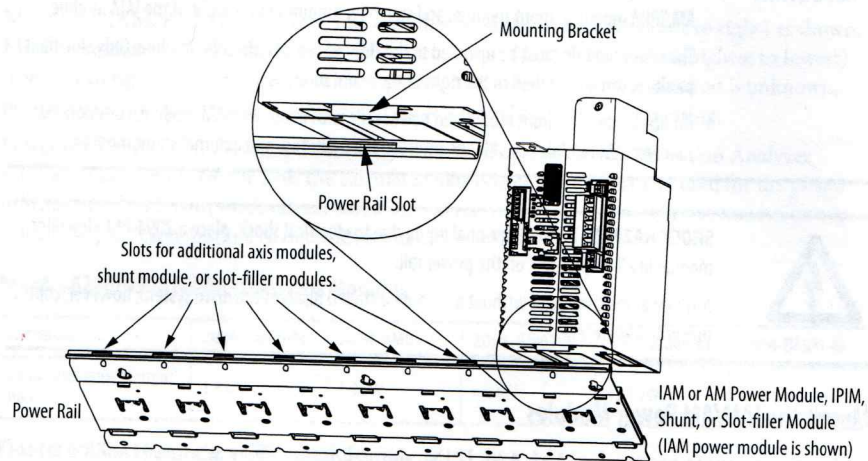
2. Determine the next available slot and module for mounting.



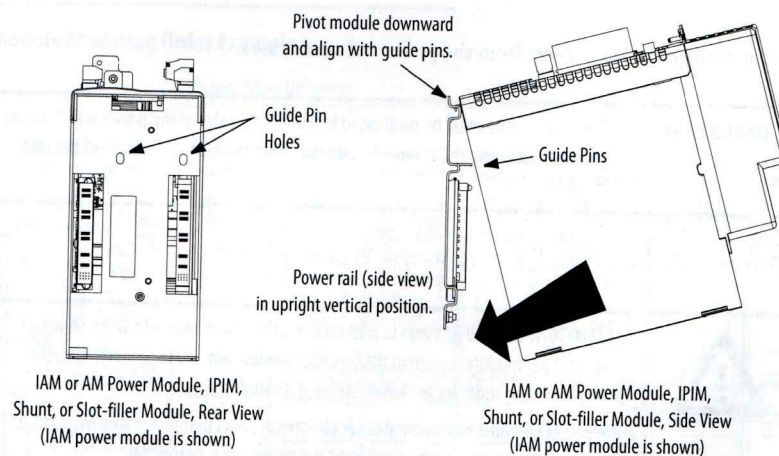
ATTENTION: To avoid damage to pins on the back of each IAM, AM, IPIM, shunt, and slot-filler module, and to make sure that module pins mate properly with the power rail, hang modules as shown in [step 3](#) through [step 6](#).

The power rail must be mounted vertically on the panel before hanging modules on the power rail. Do not mount modules if the power rail is horizontal.

3. Hang the mounting bracket from the slot on the power rail.



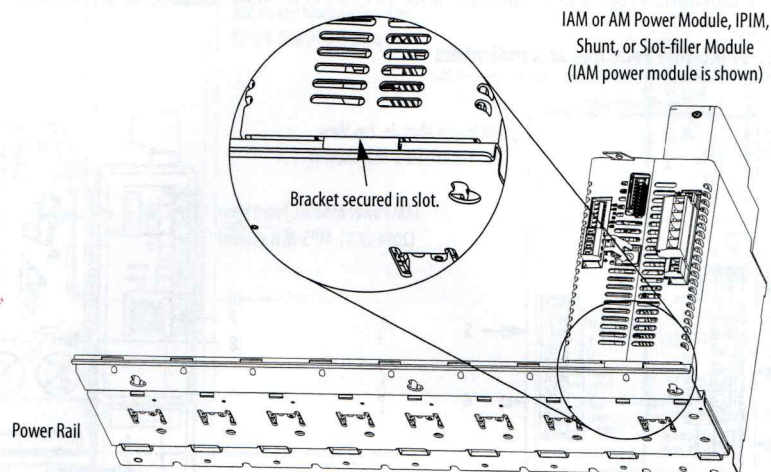
4. Pivot module downward and align the guide pins on the power rail with the guide pin holes in the back of the module.



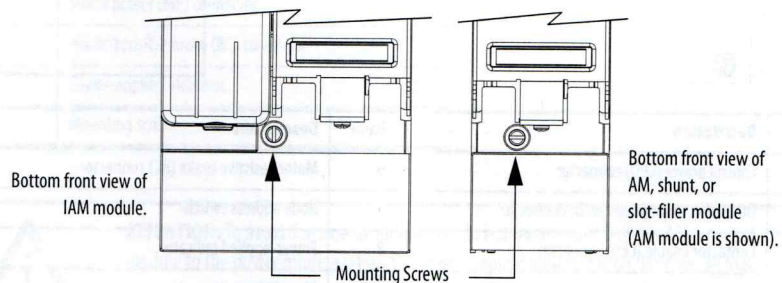
TIP

The IAM module can have two or three power rail connectors and guide pins. The AM module can have one or two, all other modules have one.

5. Gently push the module against the power rail connectors and into the final mounting position.



6. Use 2.26 N•m (20 lb•in) torque to tighten the mounting screws.



IMPORTANT

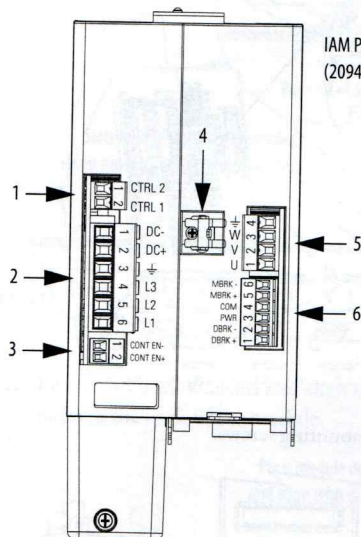
There are two mounting screws when mounting 2094-BC04-M03-M, and 2094-BC07-M05-M (double-wide) IAM modules, and 2094-BM03-M and 2094-BM05-M (double-wide) AM modules.

7. Repeat [step 1](#) through [step 6](#) for each AM, IPIM, shunt, or slot-filler module in your Bulletin 2094 drive system.

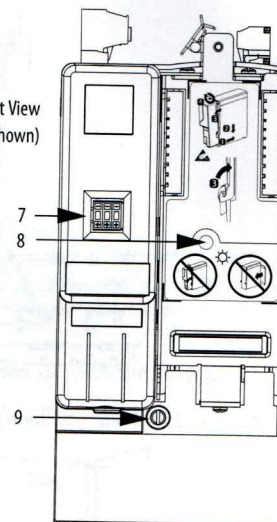
Connector Data

Use these illustrations to identify the IAM and AM power module features and indicators.

IAM Power Module Features and Indicators



IAM Power Module, Top View
(2094-BC01-MP5-M is shown)



IAM Power Module, Front View
(2094-BC01-MP5-M is shown)

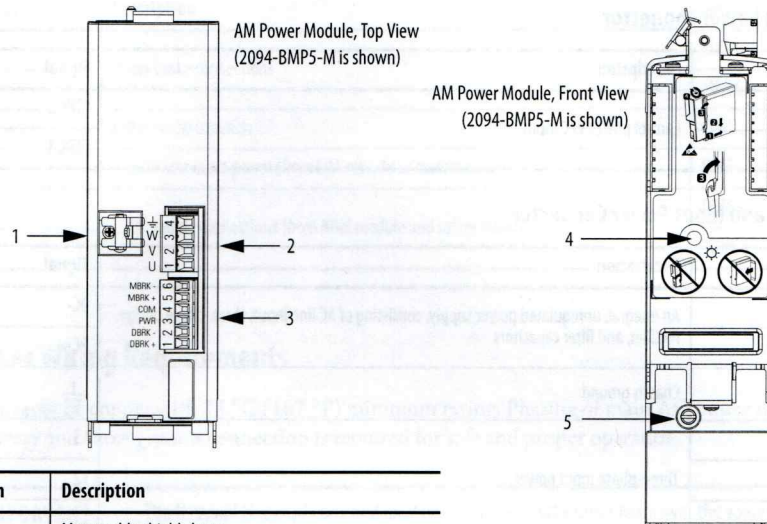
Item	Description
1	Control power (CPD) connector
2	DC bus/AC input power (IPD) connector
3	Contactor Enable (CED) connector
4	Motor cable shield clamp
5	Motor power (MP) connector

Item	Description
6	Motor/resistive brake (BC) connector
7	Node address switch
8	Power-applied indicator
9	Mounting screw



ATTENTION: To avoid damage to equipment, do not mount your Bulletin 2094 control module to the power module when the Power-applied indicator is on. Remove all input power from the IAM power module before mounting the control module.

AM Power Module Features and Indicators



Item	Description
1	Motor cable shield clamp
2	Motor power (MP) connector
3	Motor/resistive brake (BC) connector
4	Power-applied indicator
5	Mounting screw



ATTENTION: To avoid damage to equipment, do not mount your Bulletin 2094 control module to the power module when the Power-applied indicator is on. Remove all input power from the IAM power module before mounting the control module.


IAM/AM Module Connectors

Designator	Description	Connector	Module
CPD	Control input power (drive)	2-position plug/header	IAM
IPD	VAC input power (drive) and DC bus	6-position plug/header	IAM
CED	Contactor enable	2-position plug/header	IAM
MP	Motor power	4-position plug/header	IAM/AM
BC	Motor/resistive brake	6-position plug/header	IAM/AM

IAM Input Connector Pinouts**Control Power Connector**

CPD Pin	Description	Signal
1	Control power VAC input	CTRL 2
2		CTRL 1


DC Bus and Input Power Connector

IPD Pin	Description	Signal
1	An integral, unregulated power supply, consisting of AC line input, three-phase bridge rectifier, and filter capacitors	DC-
2		DC+
3	Chassis ground	
4	Three-phase input power	L3
5		L2
6		L1

Contactor Enable Connector

CED Pin	Description	Signal
1	Relay-driven dry contact used in the safety string for a three-phase power contactor	CONT EN-
2		CONT EN+

IAM /AM Motor Power and Brake Connector Pinouts**Motor Power Connector**

MP Pin	Description	Signal
4	Chassis ground	
3	Three-phase motor power	W
2		V
1		U

IMPORTANT To meet CE requirements, combined motor-power cable length for all axes on the same DC bus must not exceed 240 m (787 ft) with 460V systems. Drive-to-motor power cables must not exceed 90 m (295.5 ft).

Motor Brake/Resistive Brake Connector

BC Pin	Description	Signal
6	Motor brake connections	MBRK-
5		MBRK+
4	Motor brake common	COM
3	+24V brake input power (from LIM module or customer supplied)	PWR
2	RBM module connections (from RBM module and safety string)	DBRK-
1		DBRK+

Power Wiring Requirements

Wire must be copper with 75 °C (167 °F) minimum rating. Phasing of main AC power is arbitrary and earth ground connection is required for safe and proper operation.

IMPORTANT The National Electrical Code and local electrical codes take precedence over the values and methods provided.

IAM Module Power Wiring Requirements

Module	IAM Module Cat. No.	Description	Terminals		Recommended Wire Size mm ² (AWG)	Strip Length mm (in.)	Torque Value N·m (lb·in)
			Pin	Signal			
IAM (460V)	2094-BC01-Mxx-M 2094-BC02-M02-M	DC bus ⁽¹⁾ and VAC input power	IPD-1	DC-	10...2.5 (8...14)	10 (0.38)	1.2...1.5 (10.6...13.2)
	2094-BC04-M03-M		IPD-2	DC+	10...6 (8...10)	16 (0.63)	2.4...3.0 (21.6...26.5)
			IPD-3	$\frac{L1}{L2}$			
	2094-BC07-M05-M		IPD-4	L3	30 (3)		
			IPD-5	L2			
			IPD-6	L1			
	2094-BCxx-Mxx-M	Control input power	CPD-1	CTRL 2	4...2.5 (12...14)	10 (0.38)	0.5...0.6 (4.4...5.3)
			CPD-2	CTRL 1	4...2.5 (12...14) ⁽²⁾		0.5...0.6 (4.4...5.3)
		Contactor Enable	CED-1	CONT EN-			
			CED-2	CONT EN+			

(1) Keep DC common-bus connections (leader IAM to follower IAM module) as short as possible.

(2) The actual gauge of the contactor enable wiring depends on the system configuration. Consult your machine builder, the NEC, and applicable local codes.



ATTENTION: To avoid personal injury and/or equipment damage, make sure installation complies with specifications regarding wire types, conductor sizes, branch circuit protection, and disconnect devices. The National Electrical Code (NEC) and local codes outline provisions for safely installing electrical equipment.

ATTENTION: To avoid personal injury and/or equipment damage, make sure motor power connectors are used only for connection purposes. Do not use them to turn the unit on and off.

ATTENTION: To avoid personal injury and/or equipment damage, make sure shielded power cables are grounded to prevent potentially high voltages on the shield.

IAM/AM Module Power Wiring Requirements

IAM/AM Module Cat. No.	Description	Terminals		Recommended Wire Size mm ² (AWG)	Strip Length mm (in.)	Torque Value N-m (lb-in)
		Pin	Signal			
2094-BC01-Mxx-M 2094-BC02-M02-M 2094-BMP5-M 2094-BM01-M 2094-BM02-M	Motor power	MP-4	⊥	Motor power cable depends on motor/drive combination.	10 (0.38)	0.5...0.6 (4.4...5.3)
2094-BC04-M03-M 2094-BM03-M		MP-3 MP-2 MP-1	W V U	6...1.5 (10...16)	10 (0.38)	1.2...1.5 (10.6...13.2)
2094-BC07-M05-M 2094-BM05-M				30...2.5 (3...14)	16 (0.63)	2.4...3.0 (21.6...26.5)
2094-BCxx-Mxx-M and 2094-BMxx-M	Brake power	BC-6 BC-5 BC-4 BC-3 BC-2 BC-1	MBRK- MBRK+ COM PWR DBRK- DBRK+	0.75 (18)	10 (0.38)	0.22...0.25 (1.9...2.2)

Motor Overload Protection

This servo drive uses solid-state motor overload protection that operates in accordance with UL 508C. Motor overload protection is provided by algorithms (thermal memory) that predict actual motor temperature based on operating conditions as long as control power is continuously applied. However, when control power is removed, thermal memory is not retained.

In addition to thermal memory protection, this drive provides an input for an external temperature sensor/thermistor device, embedded in the motor, to support the UL requirement for motor overload protection.

Some motors supported by this drive do not contain temperature sensors/thermistors; therefore, motor overload protection against excessive consecutive motor overloads with power cycling is not supported.

This servo drive meets the following UL 508C requirements for solid-state overload protection.

Motor Overload Protection Trip Point	Value
Ultimately	100% overload
Within 8 minutes	200% overload
Within 20 seconds	600% overload



ATTENTION: To avoid damage to your motor due to overheating caused by excessive, successive motor overload trips, follow the wiring diagram provided in the user manual for your motor and drive combination.

Refer to your servo drive user manual for the interconnect diagram that illustrates the wiring between your motor and drive.

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
Kinetix 6200 and Kinetix 6500 Modular Multi-axis Servo Drive User Manual, publication 2094-UM002	Provides information on installing, configuring, startup, troubleshooting, and applications for your Kinetix 6200 or Kinetix 6500 servo drive system.
Kinetix 6000M Integrated Drive-Motor System User Manual, publication 2094-UM003	Provides information on installing, configuring, startup, troubleshooting, and applications for your Kinetix 6000M integrated drive-motor (IDM) system.
Kinetix 6000 Power Rail Installation Instructions, publication 2094-IN003	Provides information on the installation of your Bulletin 2094 Power Rail.
Kinetix 6000 Shunt Module Installation Instructions, publication 2094-IN004	Provides information on the installation of your Bulletin 2094 Shunt Module.
Line Interface Module Installation Instructions, publication 2094-IN005	Provides information on the installation and troubleshooting of your Bulletin 2094 Line Interface Module (LIM).
2094 Mounting Bracket Installation Instructions, publication 2094-IN008	Provides information on the installation of Bulletin 2094 Mounting Brackets.
System Design for Control of Electrical Noise Reference Manual, publication GMC-RM001	Provides information, examples, and techniques designed to minimize system failures caused by electrical noise.
EMC Noise Management DVD, publication GMC-SP001	
Kinetix Motion Control Selection Guide, publication GMC-SG001	Specifications, motor/servo-drive system combinations, and accessories for Kinetix motion control products.
Kinetix Servo Drives Specifications Technical Data, publication GMC-TD003	Provides product specifications for Kinetix Integrated Motion over EtherNet/IP, Integrated Motion over sercos interface, EtherNet/IP networking, and component servo drive families.
Kinetix Motion Accessories Specifications Technical Data, publication GMC-TD004	Provides product specifications for Bulletin 2090 motor and interface cables, low-profile connector kits, drive power components, and other servo drive accessory items.
Rockwell Automation Configuration and Selection Tools, website http://rockwellautomation.com/en/e-tools	Online product selection and system configuration tools, including AutoCAD (DXF) drawings.
Rockwell Automation Product Certification, website http://rockwellautomation.com/products/certification	For declarations of conformity (DoC) currently available from Rockwell Automation.
National Electrical Code, published by the National Fire Protection Association of Boston, MA	An article on wire sizes and types for grounding electrical equipment.
Rockwell Automation Industrial Automation Glossary, publication AG-7.1	A glossary of industrial automation terms and abbreviations.

You can view or download publications at <http://www.rockwellautomation.com/literature>. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

Notes:

Kinetix 6200 and Kinetix 6500 IAM and AM Power Modules

Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products.

At <http://www.rockwellautomation.com/support> you can find technical and application notes, sample code, and links to software service packs. You can also visit our Support Center at <https://rockwellautomation.custhelp.com/> for software updates, support chats and forums, technical information, FAQs, and to sign up for product notification updates.

In addition, we offer multiple support programs for installation, configuration, and troubleshooting. For more information, contact your local distributor or Rockwell Automation representative, or visit <http://www.rockwellautomation.com/services/online-phone>.

Installation Assistance

If you experience a problem within the first 24 hours of installation, please review the information that's contained in this manual. You can also contact a special Customer Support number for initial help in getting your product up and running.

United States or Canada	1.440.646.3434
Outside United States or Canada	Use the Worldwide Locator at http://www.rockwellautomation.com/rockwellautomation/support/overview.page , or contact your local Rockwell Automation representative.

New Product Satisfaction Return

Rockwell Automation tests all of its products to help ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

United States	Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

Documentation Feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete this form, publication [RA-DU002](#), available at <http://www.rockwellautomation.com/literature/>.

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