Installation Instructions

Kinetix 6200 IAM and AM Power Modules

Catalog Numbers
2094-BC01-MP5-M, 2094-BC01-M01-M,
2094-BC02-M02-M, 2094-BMP5-M, 2094-BM01-M,
2094-BM02-M

About the Kinetix 6200 IAM and AM Power Modules

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

Refer to the Kinetix 6200 Modular Multi-axis Servo Drive User Manual, publication 2094-UM002, for detailed information on wiring, applying power, troubleshooting, and integration with ControlLogix, CompactLogix, or SoftLogix controller platforms.

Allen-Bradley • Rockwell Software

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Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls (publication SGI-1.1 available from your local Rockwell Automation sales office or online at http://literature.rockwellautomation.com) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

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

Catalog Number Explanation

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

IAM/AM Module Catalog Numbers

Integrated Axis Modules (460V)	Cat. No.
Kinetix 6200, IAM, 6 kW converter, 4 A inverter	2094-BC01-MP5-M
Kinetix 6200, IAM, 6 kW converter, 9 A inverter	2094-BC01-M01-M
Kinetix 6200, IAM, 15 kW converter, 15 A inverter	2094-BC02-M02-M
Axis Modules (460V)	
Kinetix 6200, AM, 4 A	2094-BMP5-M
Kinetix 6200, AM, 9 A	2094-BM01-M
Kinetix 6200, AM, 15 A	2094-BM02-M

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
Integrated Axis Module (IAM)	• 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.
Axis Module (AM)	• 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 number 2090-K6CK-D44M) 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 Control Selection Guide, publication GMC-SG001, 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 Modular Multi-axis Servo Drive 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 IAM module	Kinetix 6200 IAM module	Leader drive
Kinetix 6200 IAM module	Non-Kinetix 6200 drive	Leader drive
Non-Kinetix 6200 drive	Kinetix 6200 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 Modular Multi-axis Servo Drive 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)		

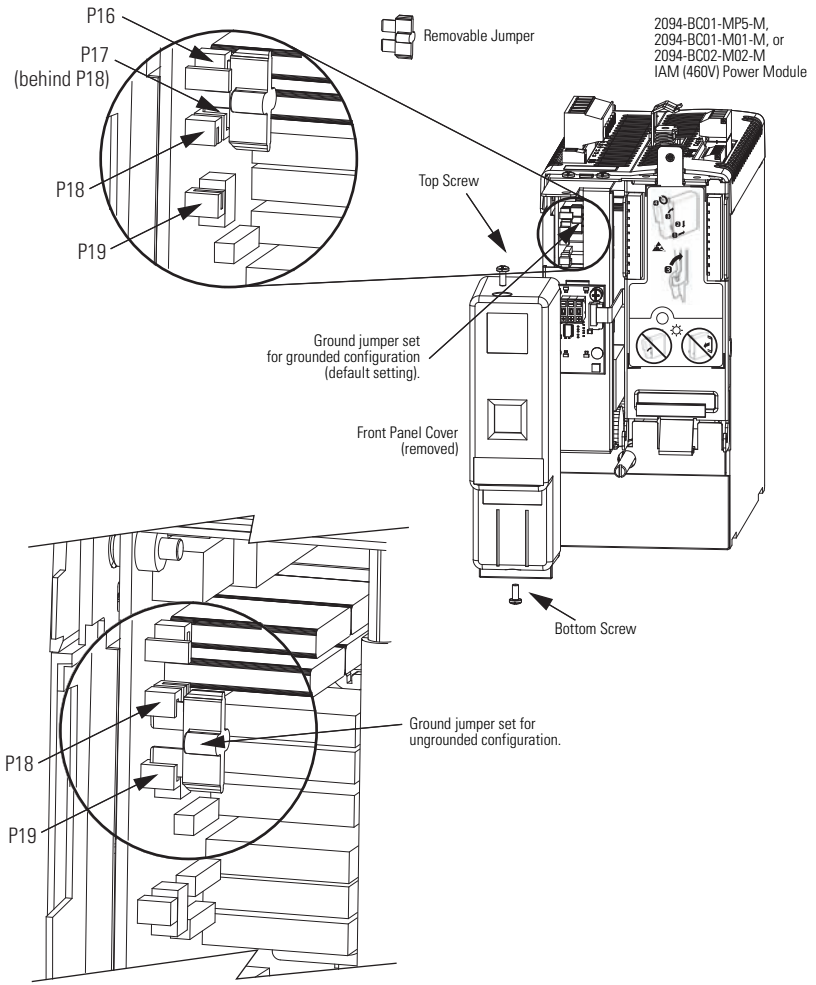
4. Replace the IAM power module front panel cover and two screws.

   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 or remove the jumper entirely 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 may 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, which can 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 drive system.

The Bulletin 2094 power rail comes in lengths to support one IAM module, and up to seven additional AM modules or up to six additional AM modules and one shunt module. The connector pins for each slot are covered by a protective boot. The boot 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.

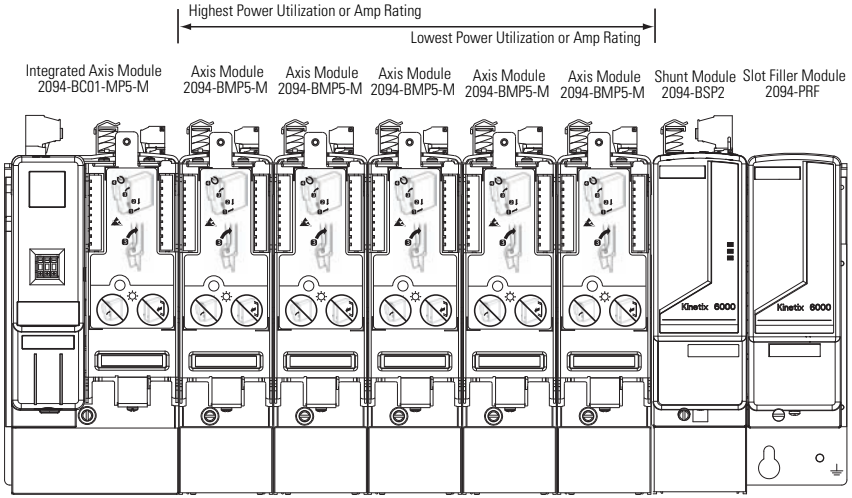
ATTENTION

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

Determining Mounting Order

Mount the IAM, AM, shunt, and slot-filler modules in the order (left to right) as shown. Mount axis 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.

Module Mounting Order Example



IMPORTANT

The IAM power module must be positioned in the leftmost slot of the power rail. Position your AM power 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 module. Only slot-filler modules may 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 will disable the Kinetix 6200 system, however, control power will still be present.

Mount the IAM/AM Power Modules

Follow these steps to mount the IAM, AM, 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 boots 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.

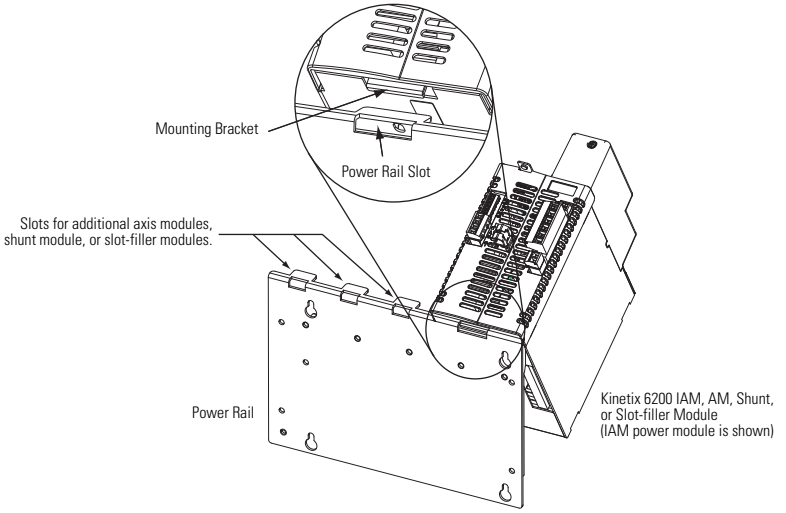
2. Determine the next available slot and module for mounting.
3. Remove the label (applied to back and side of module) covering the pins that mate with the power rail.
4. Inspect power module connector pins and power rail connectors and remove any foreign objects.

ATTENTION

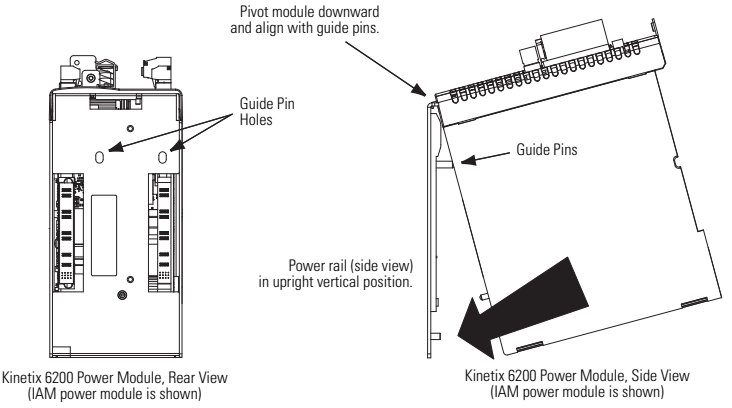
To avoid damage to the pins located on the back of each IAM, AM, shunt, and slot-filler module and to make sure that module pins mate properly with the power rail, hang modules as shown in steps 5…8.

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.

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

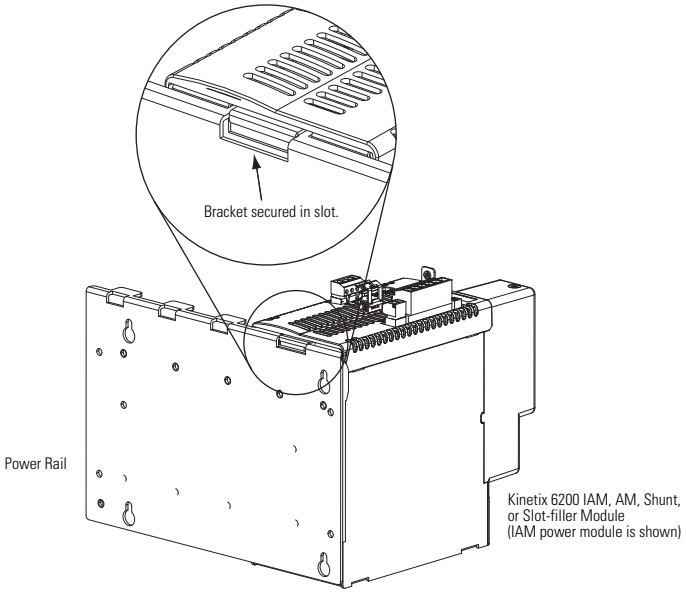


6. Pivot module downward and align the guide pins on the power rail with the guide pin holes in the back of the module.

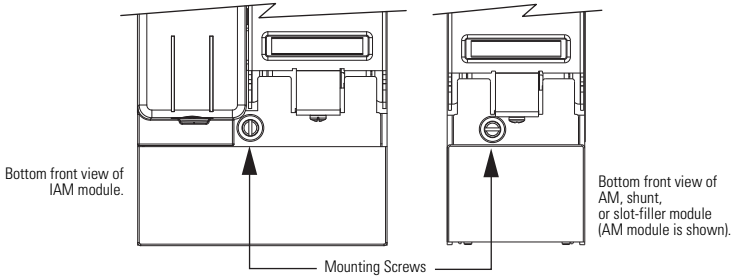


TIP The IAM power module has two power rail connectors and guide pins, the AM module and all other modules have one.

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



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

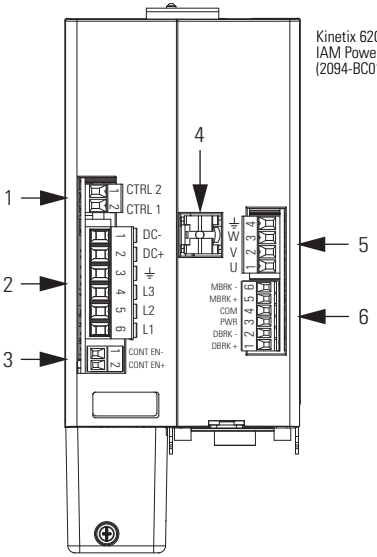


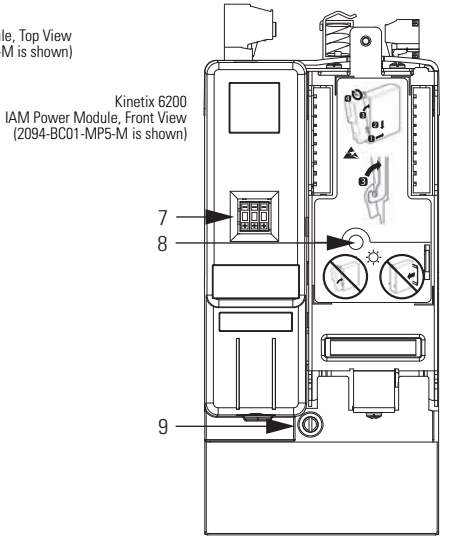
9. Repeat steps 1…8 for each AM, shunt, or slot-filler module in your Kinetix 6200 drive system.

Connector Data

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

IAM Power Module Features and Indicators





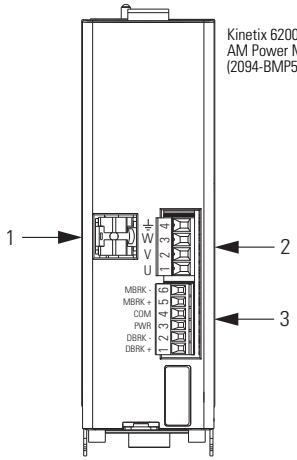
Item	Description
1	Control power (CPD) connector
2	DC bus/AC input power (IPD) connector
3	Contactor Enable (CED) connector
4	Motor cable shield clamp
5	Motor power (MP) connector

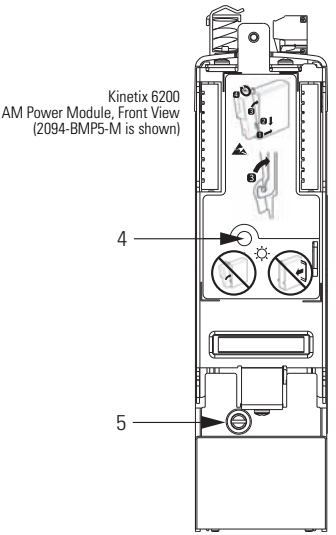
Item	Description
6	Motor/resistive brake (BC) connector
7	Node address switch
8	Power-applied indicator
9	Mounting screw

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 and 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 should 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	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-M*xx*-M 2094-BC02-M02-M	DC bus [1] and VAC input power	IPD-1 IPD-2 IPD-3 IPD-4 IPD-5 IPD-6	DC- DC+ ⏚ L3 L2 L1	10…2.5 (8…14)	10 (0.38)	1.2…1.5 (10.6…13.2)
	2094-BC*xx*-M*xx*-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			
		Contactor Enable	CED-1	CONT EN-	4…2.5 (12…14) [2]		0.5…0.6 (4.4…5.3)
			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.

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

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

Module	Cat. No.	Description	Terminals		Recommended Wire Size	Strip Length	Torque Value
			Pin	Signal	mm^2 (AWG)	mm (in.)	N•m (lb•in)
IAM or AM	2094-BC01-M*xx*-M 2094-BC02-M02-M 2094-BMP5-M, 2094-BM01-M, 2094-BM02-M	Motor power	MP-4 MP-3 MP-2 MP-1	⏚ W V U	Motor power cable depends on motor/drive combination. 6…1.5 (10…16)	10 (0.38)	0.5…0.6 (4.4…5.3)
	2094-BC*xx*-M*xx*-M and 2094-BM*xx*-M (460V)	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)

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