Allen-Bradley

Kinetix 6000 Multi-axis Servo Drives, Firmware Revisions 1.113…1.129

Catalog Numbers

Kinetix 6000 Multi-axis Servo Drives	Cat. No. (230V)		Cat. No. (460V)	
Integrated Axis Modules	2094-AC05-MP5-S	2094-AC05-MP5	2094-BC01-MP5-S	2094-BC01-MP5
	2094-AC05-M01-S	2094-AC05-M01	2094-BC01-M01-S	2094-BC01-M01
	2094-AC09-M02-S	2094-AC09-M02	2094-BC02-M02-S	2094-BC02-M02
	2094-AC16-M03-S	2094-AC16-M03	2094-BC04-M03-S	2094-BC04-M03
	2094-AC32-M05-S	2094-AC32-M05	2094-BC07-M05-S	2094-BC07-M05
Axis Modules	2094-AMP5-S	2094-AMP5	2094-BMP5-S	2094-BMP5
	2094-AM01-S	2094-AM01	2094-BM01-S	2094-BM01
	2094-AM02-S	2094-AM02	2094-BM02-S	2094-BM02
	2094-AM03-S	2094-AM03	2094-BM03-S	2094-BM03
	2094-AM05-S	2094-AM05	2094-BM05-S	2094-BM05

About This Publication

This publication contains release notes for Kinetix® 6000 drives, firmware revisions 1.113, 1.114, 1.116, 1.118, 1.120, 1.122, 1.123, 1.124, 1.125, 1.126, and 1.127, and 1.129 when used with RSLogix™ 5000 software or the Studio 5000 Logix Designer™ application.

The -S in the catalog number indicates the safe torque-off feature in Kinetix 6000 multi-axis servo drives.

IMPORTANT	When series A and B drive modules exist on the same power rail or sercos ring as series C drive modules, it is necessary to use the same firmware revision (1.125 or later) across all drive modules. Mixing firmware revisions has been known to cause nuisance faults, for example, E75 during ring phase-up. Although these faults can be cleared after the ring reaches phase 4, the faults are logged in the module fault queue.

IMPORTANT	When commissioning your Kinetix 6000 drive (IAM or AM modules) with the safe-off feature, firmware revision 1.88 or later is required. For Kinetix 6000 safe-off connector, wiring, and troubleshooting information, refer to the Kinetix Safe-off Feature Safety Reference Manual, publication GMC-RM002.

IMPORTANT	Using firmware revision 1.83 or later with Motor Feedback Noise fault-action set to Status Only can result in absolute position offset due to the loss of feedback information. For applications requiring precise absolute positioning or axis synchronization, verify the Motor Feedback Noise fault action is correct for your application.

IMPORTANT	If you currently use a custom RSLogix 5000 motion database in RSLogix 5000 software, versions 12…18, you need an updated motion database to use RSLogix 5000 software, version 19 or later. To initiate the process of getting the database updated, please email your request to raeptechsupport@ra.rockwell.com. If your current database includes non-Rockwell Automation motors, please include any prior technical support case numbers.

Enhancements

These enhancements correspond to Kinetix 6000 drive firmware revision 1.113, 1.114, 1.116, 1.118, 1.123, 1.124, 1.125, and 1.127.

Enhancements with Revision 1.127

Cat. No.	Enhancement
2094-*xCxx*-M*xx*-S and 2094-*xMxx*-S	Added detection of motor movement when the Stegmann encoder is read during initialization of the position and commutation variables. If motor movement is excessive during these times (typically occurring at power up, sercos ring phase-up, or during a fault reset) an E31 fault is generated. Lgx00143069

Enhancements with Revision 1.125

Cat. No.	Enhancement
2094-*xCxx*-M*xx*-S and 2094-*xMxx*-S	Added IDN P00066 for setting the maximum low-pass filter frequency to enhance the load observer feature introduced in firmware revision 1.124. Refer to the Kinetix 6000 Multi-axis Servo Drives User Manual, publication 2094-UM001, for specific Load Observer information.

IMPORTANT Because the Absolute/Immediate Home anomaly associated with firmware revision 1.124 was corrected in firmware revision 1.125, the drive firmware required for series C drives is now revision 1.125 or later.

Enhancements with Revision 1.124

Cat. No.	Enhancement
2094-*xCxx*-M*xx*-S and 2094-*xMxx*-S	Support for the Kinetix 6000 (series C) servo drives has been added for the 2094-*xCxx*-M*xx*-S IAM modules and 2094-*xMxx*-S AM modules.
	Added load observer IDN instructions. With Load Observer, it is possible to achieve more robust control in most applications. The feature approximates the load torque of the system in real time and uses this approximation as part of the control system to eliminate the dynamics of the mechanical load. The resulting system behaves as an unloaded motor and is easily tuned. Refer to Rockwell Automation Knowledgebase article 515199 - Video - Demonstration of Load Observer in RSLogix 5000 software. Also refer to the Kinetix 6000 Multi-axis Servo Drives User Manual, publication 2094-UM001, for specific Load Observer information.

Enhancements with Revision 1.123

Cat. No.	Enhancement
2094-BC*xx*-M*xx*-S and 2094-BM*xx*-S	Support for the Kinetix 6000M integrated drive-motor (IDM) power interface module (IPIM) has been added for the 2094-BC*xx*-M*xx*-S IAM modules and 2094-BM*xx*-S AM modules.
	Added support for detecting when a motor has been changed, so that absolute positioning applications can programmatically detect when re-referencing of the axis is necessary. When the absolute reference is set by the user, the serial number of the motor is stored into non-volatile memory. Subsequently, upon power up, the serial number of the motor (encoder) is read and compared to the serial number previously stored in non-volatile memory. If the encoder serial numbers match (same motor), the absolute reference flag remains set. If a different serial number is detected, the absolute reference flag is cleared and the reference offsets are set to 0. When updating a drive from an older firmware revision to revision 1.123, the absolute reference flag is cleared.

Enhancements with Revision 1.118

Cat. No.	Enhancement
2094-BC*xx*-M*xx*-S and 2094-BM*xx*-S	The peak current ratings of the Kinetix 6000 AM modules (series A, B, and C) are configured at the factory as 150% of continuous current. You can program 460V (series B and C) AM modules and the equivalent IAM (inverter) modules, for up to 250% of continuous inverter current.

Kinetix 6000 Series Change Applicability

IAM Module Cat. No.	AM Module Cat. No.	Peak Current Rating	
		Series A (inverter)	Series B and C (inverter)
2094-BC01-MP5-S	2094-BMP5-S	150%	250%
2094-BC01-M01-S	2094-BM01-S	150%	250%
2094-BC02-M02-S	2094-BM02-S	150%	250%
2094-BC04-M03-S	2094-BM03-S	150%	250%
2094-BC07-M05-S	2094-BM05-S	150%	200%

IMPORTANT Before your drive can deliver enhanced peak performance, you must enable the peak enhancement feature by configuring your drive by using DriveExplorer™ or RSLogix 5000 software.

Refer to the interactive Peak Enhancement Configuration Utility to recalculate torque and acceleration/deceleration limit values, and paste them into the appropriate Axis Properties dialog box. To download the utility, go to http://www.ab.com/motion/software/peak.html.

For sizing your drive/motor combination when using series B drives and the peak enhancement feature, use Motion Analyzer version 4.6 or later.

Enhancements with Revision 1.116

Cat. No.	Enhancement
2094-*xCxx*-M*xx*-S and 2094-*xMxx*-S	Support for the 2090-K6CK-KENDAT EnDat to Hiperface feedback module has been added for the 2094-*xCxx*-M*xx*-S IAM modules and 2094-*xMxx*-S AM modules.
	The Current Low Pass Filter limits have been modified. By setting the Current Low Pass Filter Override IDN (16 bit, P00065) to a value of 1, the filter value can now be set to any value in the range of 0...8000 radians/second.

IMPORTANT Use of the 2090-K6CK-KENDAT feedback module requires motion database version 5.14 or later.

Enhancements with Revision 1.114

Cat. No.	Enhancement
2094-*xCxx*-M*xx*-S and 2094-*xMxx*-S	When the drive is in the disabled state, the engagement and disengagement of the motor parking brake, if present, can be manually controlled. By setting the Brake Override IDN (16 bit, P00140) to a value of 1, the sercos Brake Enable/Disable IDN528 becomes writable and allows manual control of the motor parking brake. Once the drive is enabled, the Brake Override IDN140 is reset to 0, the parking brake is again under control of the axis, and the Brake Enable/Disable IDN528 becomes read-only, reflecting the current state of the parking brake.

Enhancements with Revision 1.113

Cat. No.	Enhancement
2094-*xCxx*-M*xx*-S and 2094-*xMxx*-S	Modifications were made to reduce the amount of time the drive takes to reset a fault on an incremental feedback device.

Corrected Anomalies

These corrections correspond to Kinetix 6000 drive firmware revision 1.113, 1.118, 1.120, 1.122, 1.124, 1.125, 1.126, and 1.129.

Corrected Anomalies with Revision 1.129

Cat. No.	Description
2094-*xCxx*-M*xx*-S and 2094-*xMxx*-S	**CORRECTED:** Loss of absolute reference status after power cycle for feedback-only axis. Lgx00149184

IMPORTANT This anomaly was introduced with firmware revision 1.127 and is not present in earlier revisions.

Corrected Anomalies with Revision 1.126

Cat. No.	Description
2094-*xCxx*-M*xx*-S and 2094-*xMxx*-S	**CORRECTED:** Load observer bandwidth and load observer integral gain (Kop and Koi) have a low maximum allowed value. The maximum allowed value has been increased from 12,500 to 65,535 rd/s. Lgx00144339

IMPORTANT Because the Absolute/Immediate Home anomaly associated with firmware revision 1.124 was corrected in firmware revision 1.125, the drive firmware required for series C drives is now revision 1.125 or later.

Corrected Anomalies with Revision 1.125

Cat. No.	Description
2094-*xCxx*-M*xx*-S and 2094-*xMxx*-S	**CORRECTED:** The drive fails to enable if the Brake Release Delay is set to the maximum value.
	CORRECTED: Absolute/Immediate Home establishes incorrect position when executed after axis motion.

Corrected Anomalies with Revision 1.124

Cat. No.	Description
2094-*xCxx*-M*xx*-S and 2094-*xMxx*-S	**CORRECTED:** The motor parking brake output never engages when running the Test Marker or Test Feedback hookup tests.
	CORRECTED: Short Actual and Command Position spikes can be seen in RSLogix 5000 software when an MAFR or MASR instruction is issued or when attempting to clear a Position Error (E19) fault. These spikes are not physically occurring in the motor, but rather there is an error in reporting the attributes to Logix.

Corrected Anomalies with Revision 1.122

Cat. No.	Description
2094-*xCxx*-M*xx*-S and 2094-*xMxx*-S	**CORRECTED:** The drive posts error code E09 (BusUndervoltage fault) if the DC bus drops below the lower threshold within two seconds of the axis being disabled. Lgx00120357
	CORRECTED: The drive loses the ability to control a resolver equipped Bulletin MPM motor after a feedback related fault is cleared, due to an inadvertent change in the motor's commutation alignment. Lgx00116429

Corrected Anomalies with Revision 1.120

Cat. No.	Description
2094-*xCxx*-M*xx*-S and 2094-*xMxx*-S	**CORRECTED:** After cycling power to the LDC-Series™ and LDL-Series™ linear motors and MP-Series™ linear stages, you receive error code E69.

Corrected Anomalies with Revision 1.118

Cat. No.	Description
2094-*xCxx*-M*xx*-S and 2094-*xMxx*-S	**CORRECTED:** The start-up commutation-angle calculation for linear motors with feedback type UVW applies an inappropriate current when enabled.

Corrected Anomalies with Revision 1.113

Cat. No.	Description
2094-*xCxx*-M*xx*-S and 2094-*xMxx*-S	**CORRECTED:** The home to marker does not work reliably on a motor with an incremental encoder at drive powerup. Lgx00096262
	CORRECTED: The feedback loss detection does not clear the Logix AxisHomedStatus bit when a feedback loss fault occurs after a feedback noise fault. Lgx00096262

Known Anomalies

This table lists the known anomalies for revisions 1.113 through 1.127.

Cat. No.	Description
2094-*xCxx*-M*xx*-S and 2094-*xMxx*-S	In a system where the rated current of the drive is less than the rated current of the motor, certain torque attributes (torque limits and motor torque feedback) are incorrect. RSLogix 5000 software assumes that 100% current is always motor rated current, but in the case of a drive limiting the rated current, the values are incorrect. Lgx00042711/Lgx00061099
	The Test Command and Feedback Hook-up Test fails with a missing feedback error when used on dual loop configurations. Lgx00035449
	If dual-position servo loop configuration is selected and auxiliary feedback is set to none, an Encoder Feedback Loss fault (E07) is displayed rather than an Auxiliary Feedback fault (E62) following the drive enable command. Lgx00056423
	When the axis is operating in one of the position servo-loop configurations (without velocity feed-forward gain), the position error value is being incorrectly reported as negative, when the drive polarity is set negative and positive motion is commanded. Lgx00067579
	When using an induction motor, a program needs to wait approximately 200 ms after a Motion Servo On (MSO) command before commanding an aggressive move profile. Not doing so could result in an Excess Following Error (E19). Also, if Autotune does not produce accurate results, manual tuning is required. This is due to the time it takes to flux the field on the motor producing full torque. Lgx00058430
	Home to Torque Level in Forward Bi-directional or Reverse Bi-directional mode should reverse direction and move until Homing Torque Above Threshold status is low. Then the process complete (PC) bit should set. However, when the torque level is reached, the PC bit is set and the motor remains at that torque level. If the Peak Torque/Force Limit value is not reduced, the motor remains at the dynamic torque limit value. Lgx00072872

Restrictions

These restrictions apply when using RSLogix 5000 software in conjunction with a 1756-M*xx*SE (ControlLogix®), 1768-M04SE (CompactLogix™), or 1784-PM16SE (SoftLogix™) sercos module, and Kinetix 6000 servo drives.

Cat. No.	Description
2094-*xCxx*-M*xx*-S and 2094-*xMxx*-S	Support for EnDat auxiliary feedback when using the 2090-K6CK-KENDAT feedback module is not supported.
	When removing an axis association on the Associated Axes tab of the Module Properties dialog box, control power to the drive must be cycled to clear the previous associations. Failing to do so results in the Kinetix 6000 drive reporting a sercos Ring fault (E38).
	When changing from a dual loop configuration (dual position servo, dual command servo, aux dual command servo, and dual command/feedback servo) to a single loop configuration (position servo, aux position servo, velocity servo, and torque servo), control power to the drive must be cycled to clear out the previous loop-configuration setting. Failing to do so results in the Kinetix 6000 drive reporting an Auxiliary Feedback fault (E62) when the auxiliary feedback device is removed.
	When using a dual loop configuration, the resolution units setting (Rev, Inch, and Millimeter) on the Motor Feedback and Aux Feedback tabs of the Axis Properties dialog box must be the same.
	After issuing a Set System Variable (SSV) on a drive parameter, wait at least 3 ms after the ConfigUpdateComplete bit is set before acting on the result of the setting.
	The auxiliary encoder channel does not generate a marker from any sine/cosine device, including SRS/SRM feedback.
	Setting the low-pass output filter bandwidth to a value greater than 3183 Hz causes a configuration error when downloaded.
	An E19 or E05 fault can occur if an MSO instruction is executed and the motor shaft is still rotating.
	When using a Kinetix 6000 drive system in Common Bus Follower mode, the IAM module must be included in the RSLogix 5000 motion group and must remain uninhibited. Lgx00063427
	Make sure motor and auxiliary position does not change during sercos ring phase-up; otherwise absolute position can recover an incorrect axis position.

Additional Resources

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

Resource	Description
Kinetix 6000 Multi-axis Servo Drive User Manual, publication 2094-UM001	Provides detailed mounting, wiring, setting up with RSLogix 5000 software, applying power, and troubleshooting information with appendices to support firmware upgrades and common-bus applications.
Home to Torque Level Application Note, publication MOTION-AT001	Provides Information on the use and restrictions of the Home to Torque Level feature.
MP-Series Integrated Linear Stages User Manual, publication MP-UM001	Provides detailed mounting, wiring, and troubleshooting information.
LDC-Series Iron Core Linear Motors User Manual, publication LDC-UM001	
LDL-Series Ironless Linear Motors User Manual, publication LDL-UM001	

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.

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Publication 2094-RN021F-EN-P - June 2014
Supersedes Publication 2094-RN021E-EN-P - May 2014