



Kinetix 6500 Modular Multi-axis Servo Drives, Firmware Revisions 2.001...2.018

Catalog Numbers 2094-EN02D-M01-S0, 2094-EN02D-M01-S1

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About This Publication

This publication contains release notes for Kinetix® 6500 drives, firmware revisions 2.001, 2.005, 2.006, 2.010, 2.013, 2.014, 2.015, 2.016, 2.017, and 2.018 when used with RSLogix™ 5000 software or the Studio 5000 Logix Designer™ application.

IMPORTANT

If you currently use a Custom RSLogix 5000 Motion Database in RSLogix 5000 software, versions 12...19, you need an updated motion database to use RSLogix 5000 software, version 20 or later. To initiate the process of getting the database updated, email your request to raeptechsupport@ra.rockwell.com. If your current database includes non-Allen-Bradley® motors, include any prior technical support ticket and case numbers.

IMPORTANT

The first time you attempt to upgrade your Kinetix 6500 drive to firmware revision 2.010, the ControlFLASH™ program can report an error. The drive runs firmware revision 2.010, but if an error is reported, verify the revision number by reading the front display or checking the drive's web page. Call Rockwell Automation technical support if the drive does not upgrade to revision 2.010 on your first attempt. Refer to the Rockwell Automation Support Center and [Knowledgebase 474993](#) for more information.

For information about installing and configuring Kinetix 6500 servo drives, refer to the Kinetix 6200 and Kinetix 6500 Modular Multi-axis Servo Drives User Manual, publication [2094-UM002](#).



Enhancements

These enhancements correspond to Kinetix 6500 drive firmware revisions when used with RSLogix 5000 software or the Logix Designer application.

Enhancements with Revision 2.017

Cat. No.	Enhancement
2094-EN02D-M01-S0 and 2094-EN02D-M01-S1	The limit on the accepted Load Observer Bandwidth and Integrator Bandwidth (Kop and Koi) values, have been increased from 12,500 to 65,535 rd/s. Lgx00131270
	The drive inhibits motion if the controller-provided commutation offset disagrees with the motor-stored commutation offset. Lgx00126513
	Enhanced Commutation test detects incorrect wiring of Sine/Cosine signals with EnDat encoders. Lgx00129557
	Added support for Stegmann SCL encoders. Lgx00138491

Enhancements with Revision 2.013

Cat. No.	Enhancement
2094-EN02D-M01-S0 and 2094-EN02D-M01-S1	The default gateway is configured to a default address when the IP address is assigned with the rotary switches.
	The drive can detect reversed wiring of the encoder's sine and cosine signals when running a commutation test.
	Adds the Torque Prove feature: <ul style="list-style-type: none"> The purpose of Torque Prove is to verify that the drive is able to produce torque at the motor prior to releasing the motor brake. The feature works by applying current to motor phases in such a way that it can verify all three power phases are connected. You must enable Torque Prove by sending a Message instruction to the drive's Motion Device Axis object (Class Hex 42, Attribute Number Hex 44C). Bit 0 of this attribute controls Torque Prove Enable. Setting this bit 0 to 1 enables Torque Prove. Setting bit 0 to 0 disables Torque Prove. The remaining bits of this attribute are reserved. When Torque Prove is enabled, the test is performed each time the drive transitions to 'Servo On'. If Torque Prove fails, the drive issues a Torque Prove fault (M18) and does not release the brake or enable. The Torque Prove feature is not able to detect all possible motor wiring problems. Complete the appropriate Hookup tests to verify proper motor wiring. Torque Prove is primarily meant to detect a loose or broken motor connection. The Torque Prove feature is not supported for motors without a brake. Enabling the torque prove feature on a motor without a brake results in unintended motion when the drive transitions to 'Servo On'.
	The drive can run passive hookup tests without bus power or when Safe-off is active.
	Single-turn absolute encoders now support use as incremental feedback devices.

Enhancements with Revision 2.010

Cat. No.	Enhancement
2094-EN02D-M01-S0 and 2094-EN02D-M01-S1	Self-sensing-commutation configuration values have been added via drive attributes: <ul style="list-style-type: none"> 3004 for angle start 3005 for angle increment 3006 for on time 3007 for hold time 3008 for minimum acceleration angle
	The encoder programmed commutation offset has been added via drive attribute 561.

Enhancements with Revision 2.005

Cat. No.	Enhancement
2094-EN02D-M01-S0 and 2094-EN02D-M01-S1	Support for Heidenhain EnDat 2.1 and 2.2 on third-party motors has been added.

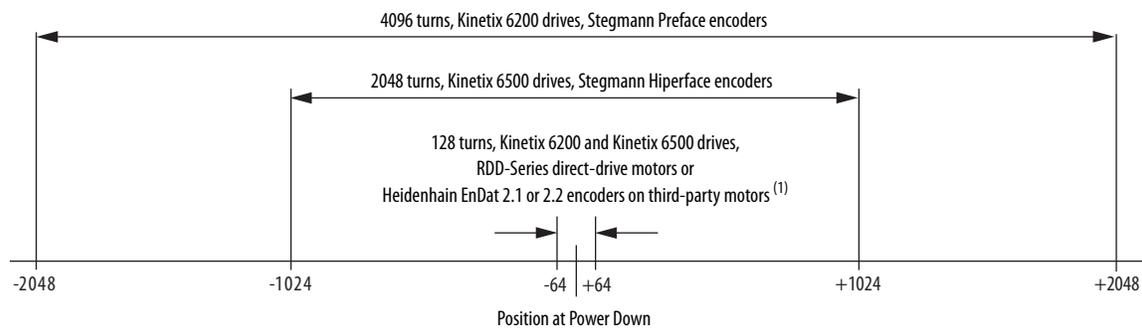
The drive's absolute position feature tracks the position of the motor, within the multi-turn retention limits, while the drive is powered off. The absolute position feature is available with only these multi-turn encoders.

Table 1 - Absolute Position Encoders

Encoder Type ⁽¹⁾	Motor Cat. No. Designator	Motor Cat. No. Example
Stegmann Hiperface	-M	MPL-B310P-Mx7xAA
	-V	MPL-B230P-Vx4xAA
Heidenhain EnDat	-7	RDB-B21519-7B72AA

(1) Refer to [Figure 1](#) and [Table 2](#) for additional information about these encoder types.

Figure 1 - Absolute Position Retention Limits



(1) Absolute position retention limit (± 64) for Heidenhain EnDat 2.2 is the worst case.

Table 2 - Support Requirements for EnDat Encoders on Third-party Motors

Requirement	EnDat 2.1 (digital only)	EnDat 2.1 (with sine/cosine)	EnDat 2.2 (digital only)	EnDat 2.2 (with sine/cosine)
Supported models	–	ECI11319 / EQ11331 ECI11118 / EQ11130	LC483 LIC4000 ECN125 ROQ437 ECN1123 / EQN1135 ECN1325 / EQN1337	ECN113 ECN1313 / EQN1325 ECN413 / EQN425 ROQ425
Cable length, max	–	50 m (164 ft)		
Position initialization	–	Digital		
Position tracking	–	Uses sine/cosine signals	Digital	Uses sine/cosine signals
Cabling	–	Shielded, twisted pair	Heidenhain EnDat 2.2 cable only	Shielded, twisted pair
Blob programming	–	Not required		
Commissioning/ field replacement	–	Kinetix 6200 or Kinetix 6500 drives: A one-time procedure must be executed via message instructions to program the blob file in the encoder (by using a Kinetix 6500 drive) so that it can be operated like any other Allen-Bradley motor. This is similar to the Stegmann encoder third-party motor requirement, except that a Kinetix 6500 drive is used instead of a Kinetix 6000 drive. Kinetix 6500 drives only: The commutation test procedure in RSLogix 5000 software, version 19 or later, or the Logix Designer application, version 21 or later, must be executed to obtain the commutation offset value and store it in the controller. This procedure must be executed any time a drive is connected to a new motor.		
Data frequency	–	100 kHz	4.125 MHz	100 kHz
Sine/cosine frequency	–	0...250 kHz	–	0...250 kHz

Enhancements with Revision 2.001

Cat. No.	Enhancement
2094-EN02D-M01-S0 and 2094-EN02D-M01-S1	Support for the Allen-Bradley RDD-Series™ (Bulletin RDB) motor family has been added.
	Support for DHCP-supplied IP addresses has been added.
	Support for the Motor Commutation Hookup Test has been added. The commutation test is available under the Axis Properties dialog box>Hookup Tests category>Commutation tab.
	Support for the Load Observer configuration has been added. The Load Observer parameters are available under the Axis Properties dialog box>Load category>Load Observer section.
	Support for forcing the speed and duplex settings in the Port Configuration tab of the Module Properties dialog box has been added.

Corrected Anomalies

These corrections correspond to Kinetix 6500 drive firmware revisions when used with RSLogix 5000 software or the Logix Designer application.

Corrected Anomalies with Revision 2.018

Cat. No.	Corrected Anomalies
2094-EN02D-M01-S0 and 2094-EN02D-M01-S1	CORRECTED: Control sync or module sync faults caused by high levels of broadcast network traffic. Lgx00144779

Corrected Anomalies with Revision 2.017

Cat. No.	Corrected Anomalies
2094-EN02D-M01-S0 and 2094-EN02D-M01-S1	CORRECTED: The drive loses an established connection when it receives another connection request from a second controller. Lgx00135169
	CORRECTED: The drive doesn't use Current Decel & Disable stopping action when operating in Torque Loop configuration. Lgx00103523
	CORRECTED: When power is removed from the safety-enable inputs while the drive is stopping, the drive continues to wait for the axis to reach zero velocity or for the stopping time limit to be exceeded before applying the motor brake. Lgx00141027
	CORRECTED: Using an interpolation value other than 2048 with Hiperface encoders and third party motors causes absolute position start-up errors or Incremental Feedback Loss faults. Lgx00134996, Lgx00134998, Lgx00134999

Corrected Anomalies with Revision 2.016

Cat. No.	Corrected Anomalies
2094-EN02D-M01-S0 and 2094-EN02D-M01-S1	CORRECTED: The drive fails to communicate with the controller or other devices over the EtherNet/IP network and scrolls STANDBY across the four-character status display.

Corrected Anomalies with Revision 2.015

Cat. No.	Corrected Anomalies
2094-EN02D-M01-S0 and 2094-EN02D-M01-S1	CORRECTED: The drive incorrectly sees digital inputs as active due to noise with long input wires or poorly shielded wires. Additional digital filtering of the input signals has been added to correct this issue.

Corrected Anomalies with Revision 2.014

Cat. No.	Corrected Anomalies
2094-EN02D-M01-S0 and 2094-EN02D-M01-S1	CORRECTED: Under certain network conditions, the drive fails to achieve time synchronization with the Precision Time Protocol (PTP) master, causing the drive to fail to respond properly to motion commands or to report incorrect PTP statistics. ⁽¹⁾

(1) This correction also requires ControlLogix® controller firmware revision 21 or later.

Corrected Anomalies with Revision 2.013

Cat. No.	Corrected Anomalies
2094-EN02D-M01-S0 and 2094-EN02D-M01-S1	CORRECTED: The drive fails to complete configuring when using a linear EnDat 2.2 feedback device.
	CORRECTED: The Commutation Hookup Test gives incorrect results when used with odd pole-pair motors or EnDat 2.1 feedback devices.
	CORRECTED: Using an interpolation other than 2048 with absolute encoders causes absolute position start-up errors or Incremental Feedback Loss faults.
	CORRECTED: Previous 2.xxx releases of drive firmware incorrectly reports a 'Commutation Not Configured' inhibit when used with LDC-Series™ linear motors and Bulletin MPAS direct-drive stages.
	CORRECTED: EnDat single-turn absolute encoders sometimes show a small absolute-position shift after a power cycle.
	CORRECTED: Drive experiences occasional control sync faults when other devices or personal computers are communicating with it at the same time as Logix.

Corrected Anomalies with Revision 2.010

Cat. No.	Corrected Anomalies
2094-EN02D-M01-S0 and 2094-EN02D-M01-S1	CORRECTED: While commanding motion to an Allen-Bradley servo motor with an absolute encoder, the drive occasionally posts FLT 547 Motor Encoder Self Test. Lgx00123574
	CORRECTED: With a combination of TTL enabled motor on the motor channel and EnDat on the auxiliary channel, when the Feedback mode is changed by using an SSV to Motor Feedback and the axis is jogged, the VelocityStandstillStatus bit always stays low. Lgx00122129
	CORRECTED: Drive attribute 643 Feedback1Temperature (encoder temperature) can sporadically jump by ± 25 °C (77 °F) or higher in a span of less than 250 ms. Lgx00121355
	CORRECTED: The SafeTorqueOffInhibit bit in RSLogix 5000 software and the Logix Designer application does not update with a Safe-off condition on the drive.
	CORRECTED: During an action that interrupts communication to the drive, such as downloading a project, the drive can generate a fault that is not logged to the controller's fault queue, but is shown on the drive's display. Lgx00115625
	CORRECTED: When bus power is removed after performing an MSF and the drive is configured for a Decel and Disable stop with non-zero brake engage delay, the drive can produce a power loss fault. Lgx00108074
	CORRECTED: If a motion command in RSLogix 5000 software or the Logix Designer application uses an illegal floating-point value, resulting from an improper floating-point operation, the drive can fault with a position error or velocity error. When the fault is cleared and the axis is enabled, the drive can experience uncontrolled motion. Lgx00125016

Corrected Anomalies with Revision 2.006

Cat. No.	Corrected Anomalies
2094-EN02D-M01-S0 and 2094-EN02D-M01-S1	CORRECTED: The drive occasionally posts a NODE FLT 08...LOGIC WATCHDOG fault at the first enable after powerup. Lgx00113023

Corrected Anomalies with Revision 2.005

Cat. No.	Corrected Anomalies
2094-EN02D-M01-S0 and 2094-EN02D-M01-S1	CORRECTED: Support for Heidenhain EnDat encoder feedback has not been implemented.
	CORRECTED: The drive reports error code FLT S05...MTR OVERTEMP FL when the motor is at or below freezing, 0 °C (32 °F).

Corrected Anomalies with Revision 2.001

Cat. No.	Corrected Anomalies
2094-EN02D-M01-S0 and 2094-EN02D-M01-S1	CORRECTED: The condition where CONFIGURING remained on the four-character display while creating a feedback-only axis and resulted in a Velocity Threshold - Invalid Attribute Value error in RSLogix 5000 software or the Logix Designer application.
	CORRECTED: The module un-inhibit does not reliably let the drive transition to the RUNNING state while CIP messaging is in progress to the drive.
	CORRECTED: The stopping action of the drive does not prevent a position error fault if the drive was enabled or homed immediately after the drive was disabled while it was in motion.
	CORRECTED: Self-sensing commutation does not prevent unexpected motion during a move on an axis requiring self-sensing commutation and having the feedback polarity inverted compared to the motor power polarity.

Restrictions

These restrictions apply when using RSLogix 5000 software or the Logix Designer application in conjunction with a 1756-ENxT (ControlLogix) EtherNet/IP module, and Kinetix 6500 drives.

Cat. No.	Restrictions
2094-EN02D-M01-S0 and 2094-EN02D-M01-S1	When (multi-turn encoder) motors turn more than 1024 revolutions with either the controller or drive powered down, the absolute position is no longer valid even though the absolute position status bit remains asserted.

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