Motion Control Engineering
11380 White Rock Road
Rancho Cordova, CA 95742

voice 916 463 9200
fax 916 463 9201
www.mceinc.com

iControl AC Drive with KEB LCD
Addendum # 42-02A-2223-C2 A2

Affected Manual: 42-02-2223 C2

This document provides information about changes to the iControl AC User Guide. The affected pages are listed below.

Addendum Section 1 TORQMAX LCD KEYPAD

Manual Page	Manual Section	Changes
2-20	Construction Mode	Replaced **TORQMAX/KEB F5 Drive** content and figures with **TORQMAX F5 Drive v3.xx** content and figures.
9-23	Reference	Added **TORQMAX F5 Drive v3.xx** parameter table.

Addendum Section 2 COUNTERWEIGHT/SAFTEY TESTS

Manual Page	Manual Section	Changes
4-43	Safety Tests	Corrected Car/Counterweight Safety Test introduction and step 10 (9). Removed step 5. Clarified closing paragraph text.
4-43	Safety Tests	Added new step 12.

NOTE: This document encompasses content from addendum revision 42-02A-2223-C2 A1

Copyright

Trademarks

Warning and Disclaimer

Although every effort has been made to make this document as complete and accurate as possible, Motion Control Engineering and the document authors, publishers, distributors, and representatives have neither liability nor responsibility for any loss or damage arising from information contained in this document or from informational errors or omissions. Information contained in this document shall not be deemed to constitute a commitment to provide service, equipment, or software by Motion Control Engineering or the document authors, publishers, distributors, or representatives.

Limited Warranty

Motion Control Engineering (manufacturer) warrants its products for a period of 15 months from the date of shipment from its factory to be free from defects in workmanship and materials. Any defect appearing more than 15 months from the date of shipment from the factory shall be deemed to be due to ordinary wear and tear. Manufacturer, however, assumes no risk or liability for results of the use of the products purchased from it, including, but without limiting the generality of the forgoing: (1) The use in combination with any electrical or electronic components, circuits, systems, assemblies or any other material or equipment (2) Unsuitability of this product for use in any circuit, assembly or environment. Purchasers' rights under this warranty shall consist solely of requiring the manufacturer to repair, or in manufacturer's sole discretion, replace free of charge, F.O.B. factory, any defective items received at said factory within the said 15 months and determined by manufacturer to be defective. The giving of or failure to give any advice or recommendation by manufacturer shall not constitute any warranty by or impose any liability upon the manufacturer. This warranty constitutes the sole and exclusive remedy of the purchaser and the exclusive liability of the manufacturer, AND IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, OR STATUTORY AS TO MERCHANTABILITY, FITNESS, FOR PURPOSE SOLD, DESCRIPTION, QUALITY PRODUCTIVENESS OR ANY OTHER MATTER. In no event will the manufacturer be liable for special or consequential damages or for delay in performance of this warranty.

Products that are not manufactured by MCE (such as drives, CRTs, modems, printers, etc.) are not covered under the above warranty terms. MCE, however, extends the same warranty terms that the original manufacturer of such equipment provides with their product (refer to the warranty terms for such products in their respective manual).

End User License Agreement

This End User License Agreement ("Agreement") grants you the right to use the software contained in this product (the "Software") subject to the following restrictions: You may not: (i) copy the Software, except for archive purposes consistent with your standard archive procedures; (ii) transfer the Software to a third party apart from the entire product; (iii) modify, decompile, disassemble, reverse engineer or otherwise attempt to derive the source code of the Software; (iv) export the Software or underlying technology in contravention of applicable U.S. and foreign export laws and regulations; and (v) use the Software other than in connection with operation of the product.

"LICENSOR'S SUPPLIERS DO NOT MAKE OR PASS ON TO END USER OR ANY OTHER THIRD PARTY, ANY EXPRESS, IMPLIED OR STATUTORY WARRANTY OR REPRESENTATION ON BEHALF OF SUCH SUPPLIERS, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, TITLE, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE."

Important Precautions and Useful Information

This preface contains information that will help you understand and safely maintain MCE equipment. We strongly recommend you review this preface and read this manual before installing, adjusting, or maintaining Motion Control Engineering equipment. This preface discusses:

- Safety and Other Symbol Meanings
- Safety Precautions
- Environmental Considerations

Safety and Other Symbol Meanings

Danger

This manual symbol is used to alert you to procedures, instructions, or situations which, if not done properly, might result in personal injury or substantial equipment damage.

Caution

This manual symbol is used to alert you to procedures, instructions, or situations which, if not done properly, might result in equipment damage.

This manual symbol is used to alert you to instructions or other immediately helpful information.

Safety Precautions

Danger

This equipment is designed to comply with ASME A17.1, National Electrical Code, CE, and CAN/ CSA-B44.1/ASME-A17.5 and must be installed by a qualified contractor. It is the responsibility of the contractor to make sure that the final installation complies with all local codes and is installed in a safe manner.

This equipment is suitable for use on a circuit capable of delivering not more than 10,000 rms symmetrical amperes, 600 volts maximum. The three-phase AC power supply to the Drive Isolation Transformer used with this equipment must originate from a fused disconnect switch or circuit breaker sized in conformance to all applicable national, state, and local electrical codes in order to provide the necessary motor branch circuit protection for the Drive Unit and motor. Incorrect motor branch circuit protection will void the warranty and may create a hazardous condition.
Proper grounding is vitally important to safe and successful operation. Bring your ground wire to the system subplate. You must choose the proper conductor size and minimize the resistance to ground by using the shortest possible routing. See National Electrical Code Article 250 or the applicable local electrical code.

Before applying power to the controller, physically check all the power resistors and other components located in the resistor cabinet and inside the controller. Components loosened during shipment may cause damage.

For proper operation of the AC Drive Unit in your controller, you must make sure that: 1) A direct solid ground is provided in the machine room to properly ground the controller and motor. Indirect grounds such as the building structure or a water pipe may not provide proper grounding and could act as an antenna to radiate RFI noise, thus disturbing sensitive equipment in the building. Improper grounding may also render any RFI filter ineffective. 2) The incoming power to the controller and the outgoing power wires to the motor are in their respective, separate, grounded conduits.

This equipment may contain voltages as high as 1000 volts. Use extreme caution. Do not touch any components, resistors, circuit boards, power devices, or electrical connections without ensuring that high voltage is not present.

Environmental Considerations

- Keep the machine room clean.
- Controllers are generally in NEMA 1 enclosures.
- Do not install the controller in a dusty area.
- Do not install the controller in a carpeted area.
- Keep room temperature between 32 and 104 degrees F (0 to 40 degrees C).
- Prevent condensation on the equipment.
- Do not install the controller in a hazardous location or where excessive amounts of vapors or chemical fumes may be present.
- Make certain that power line fluctuations are within plus or minus 10% of proper value.

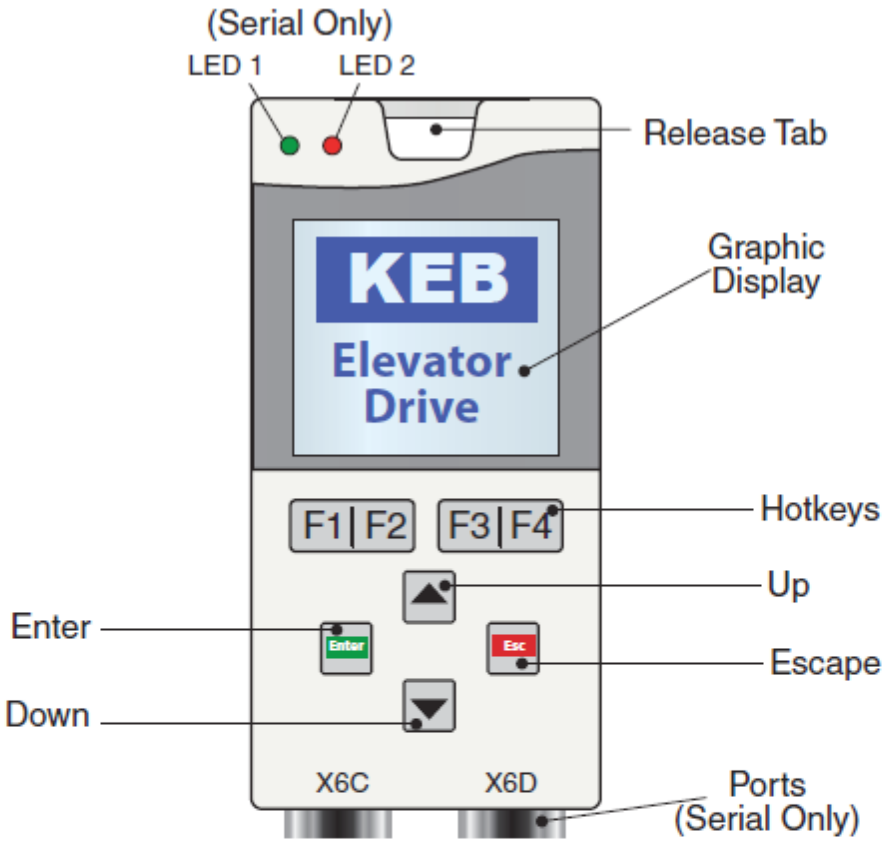
Contents

Table of Figures

Section 1: KEB Combivert F5-LCD AC Drive

KEB COMBIVERT F5-LCD AC DRIVE INTRODUCTION

This guide addresses parameters and adjustments that require unique attention for the KEB Combivert F5-LCD AC Drive as compared with the MCE System 12 DC Drive or KEB Combivert F5-Digital AC Drive. Note that drive firmware 4.3 or greater and operator firmware 3.31 or greater is required for proper operation.



Button	Name	Function
▲ ▼	Up/Down	Increment/Decrement through menu or values
Enter	Enter	Selects a parameter or group, Enters *Edit Mode*, Save parameter setting
Esc	Escape	Backs out of parameter group or exits *Edit Mode*
F1 | F2 F3 | F4	Hotkeys	Keys correspond to display LCD text above Allows a user to quickly jump menus

X2A

PIN	Function	Name	Description	
1	Analog Input 1 +	AN1+	Pattern speed input	Resolution: 12 bit
2	Analog Input 1 -	AN1-		
3	Analog Input 2 +	AN2+	Pre-torque input	Scan time: 1 ms
4	Analog Input 2 -	AN2-		
5	Analog Output 1	ANOUT1	Analog output of the motor speed closed loop, calculated open loop	Voltage range: 0...±10V
6	Analog Output 2	ANOUT2	Analog output of the motor torque 0...10VDC (0...2x$T_{Rated\ (motor)}$)	Ri = 100 kOhm, resolution: 12 bit
7	+10V Output	CRF	Analog supply voltage for speed ref.	+10VDC +5%, max. 4mA
8	Analog Common	COM	Common for analog in- and outputs	
9	Analog Common	COM		
10	Prog. Input LI04	I1	When I1...I6, I8 are assigned as speed selection, I1>I2>...I8 Inputs not used for speed selection can be assigned special functions.	Ri = 2.1 kOhm, scan time: 1msec, LI02 digital filter reduces false trigger due to relay chatter, filter time: 5-50msec (adjustable)
11	Prog. Input LI05	I2		
12	Prog. Input LI06	I3		
13	Prog. Input LI07	I4		
14	Prog. Input LI08	I5	When I1...I8 are assigned as direction inputs, both directions cannot be signaled together	
15	Prog. Input LI09	I6		
16	Drive Enable	I7	Enable/Disable; response time < 1 msec; Enable instantly turns off motor current	
17	Prog. Input LI11	I8	Same as I1...I6	
18	Digital Out 1	O1	Programmable output LO05 - Default = At Speed	
19	Digital Out 2	O2	Programmable output LO10 - Default = Deceleration Active	
20	24V-Output	V_{out}	Approx. 24V output (max.100 mA load)	
21	20...30V-Input	V_{in}	Voltage input when an external 24VDC supply is used	
22	Digital Common	0V	Common for digital in-/outputs	
23	Digital Common	0V	Common for digital in-/outputs	
24	Relay 1	NO	Programmable output LO15 - Default “Off”	max. 30VDC, 1A
25		NC		
26		COM		
27	Relay 2	NO	Programmable output LO20 - Default - “Brake Control”	
28		NC		
29		COM		

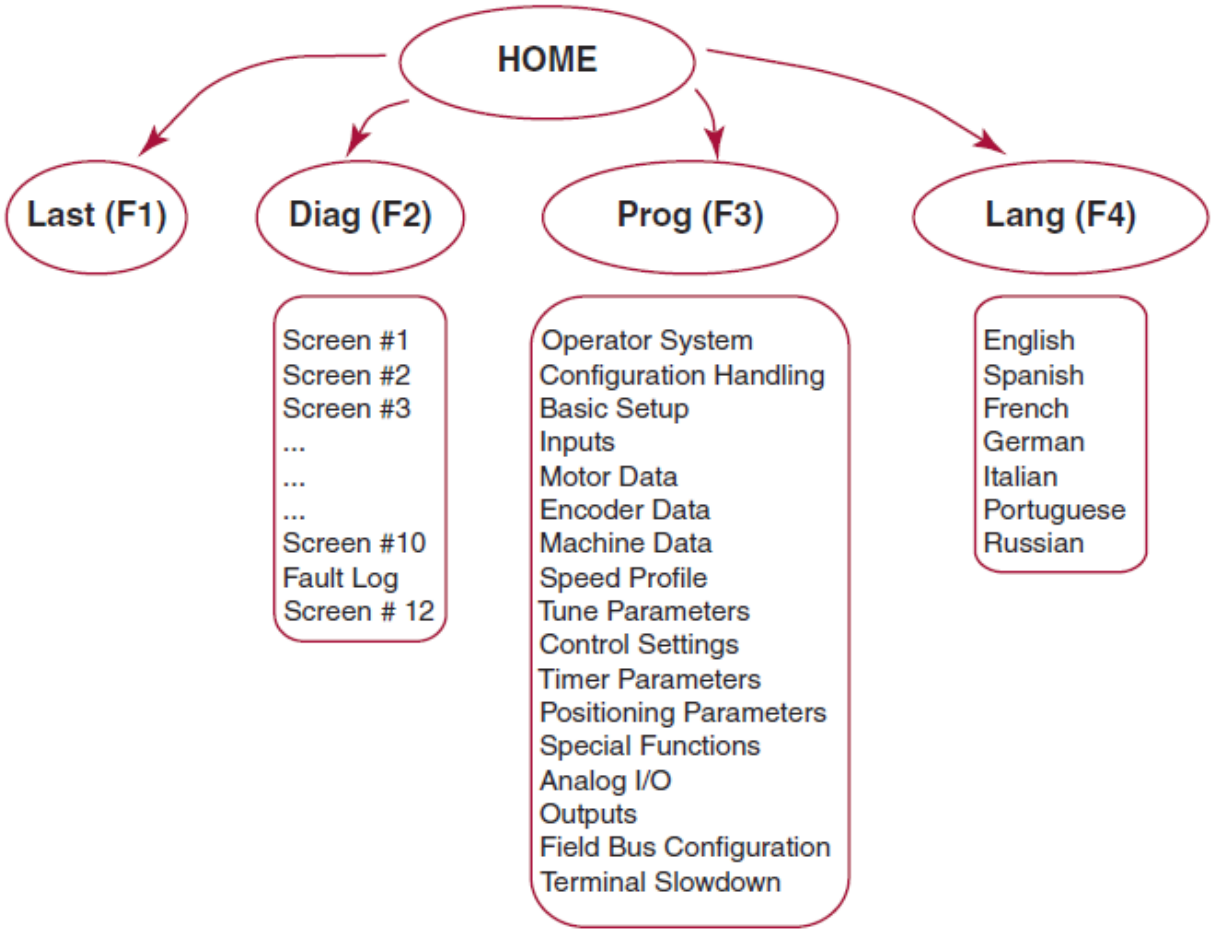
PARAMETERS

iControl Controller

iView Configuration (View ⇨ Configuration ⇨ Drive ⇨ General)

Drive Type	KEB F5 (LCD Operator)
Drive Interface	Serial
Reference Type	Serial
Profile Advance	[drive tuning specific]
Note:	*Initially set to 75 milliseconds*

KEB Combivert F5-LCD AC Drive



Preparation

WARNING! When the controller is shipped from the factory, the drive parameters have already been preconfigured for the job and saved as the OEM parameters. If issues with drive operation persist, and all the relevant parameters appear valid, defaulting all drive parameters to the manufacturer default settings may be attempted. This step should be performed only after the steps of adjustment, tuning, and OEM parameter restoration have already been attempted. Please remember that once the parameters are defaulted, a significant number of parameters will need to be re-entered to get the drive working.

It may be useful to start parameter entry from a known default condition where all parameters and dependent parameters are at The drive manufacturers default values:

1. On the drive's Home ⇨ Prog ⇨ Pass menu (F4 at bottom of LCD), set the password parameter to 3141592653. The display will indicate that the parameters are being defaulted and that the operator will need to be reset to restore normal operation. The previous password value will be restored.
2. Power down the controller for three minutes to reset the drive.
3. Once power is restored, navigate to the drive's Home ⇨ Prog ⇨ Basic Setup menu and set parameter US05 to 2 (Write Config. to Drive).
4. Configure parameters.

Configuration

Password

In order to access all the available categories within the drive's Home ⇨ Prog screen, the password on the Home ⇨ Prog ⇨ Pass screen needs to be set to 479, the OEM password.

Basic Setup

US02 - System Units	1=ft / min
US03 - Motor Type	[job specific]
Note (possible motor types):	*0=Induction Geared*
	1=Induction Gearless
	2=PM Geared
	3=PM Gearless
US04 - Control Type	5=Serial Speed DIN66019 (Service 50)
US05 – Load Configuration	2=Write Configuration to Drive
Note:	*Perform after US02, US03, and US04 are set correctly*
	Once written, Configuration OK will be displayed
US06 - Contract Speed	[job specific]

Inputs

LI01 - Type of Input	0=PNP
LI04 - Input Function	0=no function
LI05 - Input Function	0=no function
LI06 - Input Function	0=no function
LI07 - Input Function	0=no function
LI08 - Input Function	0=no function
LI09 - Input Function	0=no function
LI11 - Input Function	0=no function
LI15 – Direction Selection Inputs	0=up and down inputs + function by direction inputs

Motor Data

Induction Motor

LM01 - Motor Power	[job specific]
LM02 - Motor Speed	[job specific]
LM03 - Motor Current	[job specific]
LM04 - Motor Frequency	[job specific]
LM05 - Motor Voltage	[job specific]
LM06 - Motor Power Factor	[job specific]
Note (if not known):	*0.9 for high slip motors* *0.75 for induction motors*
LM08 - Electric Motor Protection	1=On
LM09 - Motor Protection Current	[job specific]

Permanent Magnet Motor

LM02 - Motor Speed	[job specific]
LM03 - Motor Current	[job specific]
LM04 - Motor Frequency	[job specific]
LM05 - Motor Voltage	[job specific]
LM07 - Motor Torque	[job specific]
LM08 - Motor Protection	1=On
LM11 - Peak Current Factor	[job specific]

Encoder Data

LE02 - Encoder 1 Pulse Number	[job specific]
LE03 - Swap Encoder 1 Channels	[job specific]
Note (initially set to 0):	*0=Not Inverted* *1=A-B Swapped* *2=Inverted Rotation* *3=A-B Swap & Inverted Rotation*
LE04 - Sample Rate for Encoder 1	4=8 msec
LE05 - Encoder 1 Multiplier	[job specific]
Note (no affect for incremental):	*2 for Geared* *8 for Gearless*

Machine Data

LN01 - Sheave Diameter	[job specific]
LN02 - Gear Ratio	[job specific]
Note:	*See LN05 for the estimated value*
LN03 - Roping Ratio	[job specific]

Speed Profile Parameters

LS02 - High Speed	[contract speed]
LS03 - Inspection Speed	150 fpm or contact speed if less
LS10 - Battery Operation Speed	50 fpm or contact speed if less

Tune Parameters

Induction Motor

LL01 - Motor Tuning	[Perform after all parameters are initial set]
LL07 – Encoder Synchronization	[Perform after motor tuning - LL01]

Permanent Magnet Motor

LL01 - Motor Tuning	[Perform after all parameters are initial set]
LL05 - SPI	[Perform after motor tuning - LL01]
LL07 – Encoder Synchronization	[Perform after encoder synchronization - LL05]

Control Settings

LC01 - Control Mode	4=Closed Loop Digital Pre-Torque
LC30 – Maximum Torque	[job specific]
Note:	*Typically set between 200% and 250% (150% during commissioning)*

Timer Parameters

LT01 - Brake Release Delay	0 seconds
LT02 - Control Hold Off	0.4 seconds
Note:	*Delay should be less than controller's speed pick delay*
LT03 – Speed Start Delay	10.0 seconds
Note:	*Delay should be more than controller's speed pick delay*
LT10 - Brake Drop Delay	0 seconds
LT12 – Current Hold Time	0 seconds
LT13 – Current Ramp Down Time	0.3 seconds

Special Functions

LX01 - Auto Reset	10
LX06 – Function Test	0=Off
LX08 - Phase Current Check	1=Phase Current Check
LX11 - Reference Splitting	40 msec
LX13 - Speed Following Error	1=On with Error % Contract Speed
LX14 - Speed Difference	10%

Outputs

LO01 - Output Inversion	0=None
LO05 - Output Function O1	2=Drive Ready
LO10 - Output Function O2	3=Drive On
LO15 - Output Function RLY1	2=Drive Ready
LO20 - Output Function RLY2	3=Drive On

Field Bus Configuration

FB05 – Control Word Mask	FFFFh
FB06 - Speed Scale Multiplier	1
FB07 - Speed Scale Shift Right	0
FB10 - DIN66019 Node ID	1
FB11 - DIN66019 Baud Rate	3=55500 bps
FB12 - DIN66019 Watchdog	50 msec
FB13 - PDO1 Map Assignment	DG02=11820104h
FB14 - PDO2 Map Assignment	DG49=11B10102h
FB15 - PDO3 Map Assignment	DG05=11850102h
FB17 - PDI1 Map Assignment	FB02=12820102h
FB18 - PDI2 Map Assignment	FB01=12810102h
FB19 - PDI3 Map Assignment	FB03=12830102h
FB21 - Special Function 1	1=UPS Operation
FB22 - Special Function 2	2=Reduced Torque
FB23 - Special Function 3	0=no function
FB24 - Special Function 4	32=Inspection Speed
FB25 - Special Function 5	0=no function
FB26 - Special Function 6	0=no function
FB27 - Special Function 7	0=no function
FB54 - RS-485 Mode	0=full duplex

ADJUSTMENT

Enter KEB Combivert F5-LCD Parameters

1. Configure initial parameters on the drive's Home ⇨ Prog ⇨ Basic Setup menu in the following order:
   a. US02 (System Units).
   b. US03 (Motor Type).
   c. US04 (Control Type).
   d. US05 (Load Configuration).
      - Set parameter to: **2=Write Configuration to Drive**.
   e. US06 (Contract Speed).
2. Configure remaining parameters on the drive's Home ⇨ Prog ⇨ Inputs, Motor Data, Encoder Data, Machine Data, Control Settings, Timer Parameters, Special Functions, Analog I/O, Outputs, and Field Bus Configuration menu.

Auto Tune KEB Combivert F5-LCD Motor Data

Induction Motors

1. Review Sections 5.9 and 5.10.3 in the drive manual. The steps below implement the Motor Learn and Encoder Synchronization procedures.
2. Place controller on Machine Room Inspection.
3. Set the Fault/Function Bypass to **On**.
4. Activate the following bypasses on the controller's View ⇨ Diagnostics ⇨ Fault Bypass screen:
   a. Brake Voltage Not Off.
   b. Brake Voltage Not On.
5. On the controller's View ⇨ Configuration ⇨ Brake ⇨ Control menu, set the following parameters as indicated while taking note of their value:
   a. Pattern Scaling = 0%.
   b. Brake Pick Voltage = 5 V.
   c. Brake Partial Pick Voltage = 5 V.
   d. Brake Hold Voltage = 5 V.
   e. Brake Relevel Voltage = 5 V.
   f. Brake Weakening Voltage = 5 V.
6. On the Configuration tab of the controller's View ⇨ Configuration ⇨ Brake screen, set the following parameters as indicated while taking note of their value:
   a. 10% Current Reference value = 0.0.
   b. 20% Current Reference value = 0.0.
7. On the drive's Home ⇨ Prog ⇨ Tune Parameters menu, begin the motor tuning procedure by setting the LL01 parameter to **Start**.
8. On the controller, pick and hold up or down direction until the drive's display indicates that the procedure has completed.

9. Once the tuning procedure has completed, drop direction on the controller.
10. Restore parameters in part 5 & 6 above to their original value.
11. Set the Fault/Function Bypass to **Off**.
12. On the drive's Home ⇨ Prog ⇨ Tune Parameters menu, begin the encoder synchronization procedure by setting the LL07 parameter to **Start**.
13. On the controller, pick and hold up or down direction until the drive's display indicates that the procedure has completed.
14. Once the tuning procedure has completed, drop direction on the controller.
15. The LM30 parameter on the drive's Home ⇨ Prog ⇨ Motor Data menu will be set to **Motor Model + Flux Control**.

Permanent Magnet Motors (PM Motors)

1. Review Sections 5.9, 5.10.1, and 5.10.3 in the drive manual. The steps below implement the Motor Learn, SPI Encoder Learn, and Encoder Synchronization procedures.
2. Place controller on Machine Room Inspection.
3. Set the Fault/Function Bypass to **On**.
4. Activate the following bypasses on the controller's View ⇨ Diagnostics ⇨ Fault Bypass screen:
    a. Brake Voltage Not Off.
    b. Brake Voltage Not On.
5. On the controller's View ⇨ Configuration ⇨ Brake ⇨ Control screen, set the following parameters as indicated while taking note of their value:
    a. Pattern Scaling = 0%.
    b. Brake Pick Voltage = 5 V.
    c. Brake Partial Pick Voltage = 5 V.
    d. Brake Hold Voltage = 5 V.
    e. Brake Relevel Voltage = 5 V.
    f. Brake Weakening Voltage = 5 V.
6. On the Configuration tab of the controller's View ⇨ Configuration ⇨ Brake screen, set the following parameters as indicated while taking note of their value:
    a. 10% Current Reference value = 0.0.
    b. 20% Current Reference value = 0.0.
7. On the drive's Home ⇨ Prog ⇨ Tune Parameters menu, begin the motor learn procedure by setting the LL01 parameter to **Start**.
8. On the controller, pick and hold up or down direction until the drive's display indicates that the procedure has completed.
9. Once the tuning procedure has completed, drop direction on the controller.

10. On the drive's Home ⇨ Prog ⇨ Tune Parameters menu, begin the encoder learn procedure by setting the LL05 parameter to **Start.**
11. On the controller, pick and hold up or down direction until the drive's display indicates that the procedure has completed.
12. Once the tuning procedure has completed, drop direction on the controller.
13. Restore parameters in part 5 & 6 above to their original value.
14. Set the Fault/Function Bypass to **Off**.
15. On the drive's Home ⇨ Prog ⇨ Tune Parameters menu, begin the encoder synchronization procedure by setting the LL07 parameter to **Start**.
16. On the controller, pick and hold up or down direction until the drive's display indicates that the procedure has completed.
17. Once the tuning procedure has completed, drop direction on the controller.
18. The LM30 parameter on the drive's Home ⇨ Prog ⇨ Tune Parameters menu will be set to **Motor Model + Flux Control**.

Adjust for KEB Combivert F5-LCD Response

1. Depending on how the drive is tuned, the amount of lag between the commanded speed and drive response can vary. As a result, as the drive is adjusted, the Lag Delay parameter in the controller's View ⇨ Configuration ⇨ Pattern ⇨ Common menu will need to be changed as well. Use the information below along with the information in Figure 1 (Velocity and Acceleration) to make these adjustments. Generally, the lag will be between 50 and 150 milliseconds.
    a. If lag delay is insufficient, the elevator will plow into a landing. The acceleration and jerk rate during deceleration to a landing will be greater than profile values indicate.
    b. If lag delay is excessive, the elevator will drag into a landing. The acceleration and jerk rate during deceleration to a landing will be less than profile values indicate. In addition, a discontinuity in the profile will occur during the transition from acceleration to deceleration for movement between floors where a stabilized speed (contract speed) is not reached (short runs).
    c. To adjust lag delay, assign and observe commanded speed on analog Test Point 1 and commanded acceleration on analog Test Point 2. Perform one-floor-run movement and observe the peak acceleration transitioning to peak deceleration as the elevator reaches its peak speed (below contract speed). This transition should have no vertical discontinuity (too much lag delay). This transition adjustment is only valid when the elevator is unable to reach contract speed for the profile under normal operation. Adjust lag delay until the vertical discontinuity is eliminated.

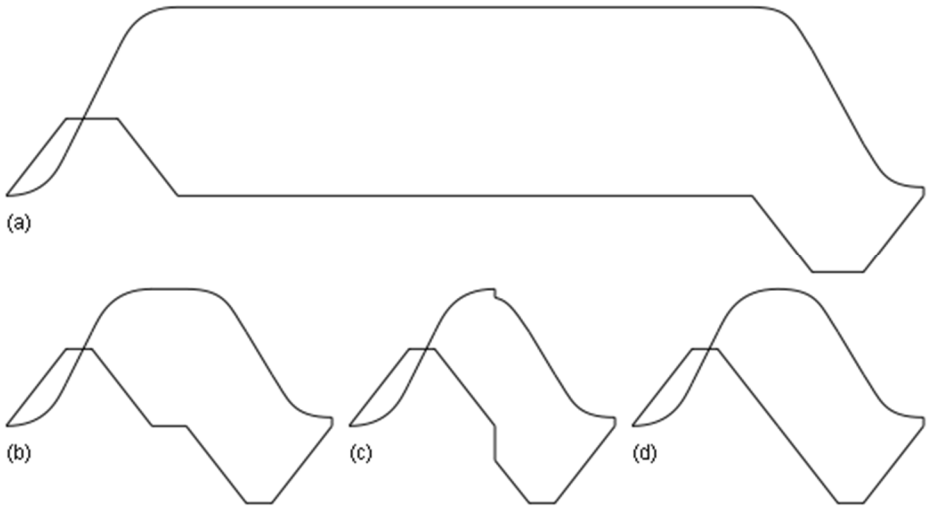


Figure 1 Velocity and acceleration

(a) Profile at contract speed
(b) Insufficient lag compensation with profile at less than contract speed
(c) Excessive lag compensation with profile at less than contract speed
(d) Optimum lag compensation with profile at less than contact speed

Verify Motor Rotation

1. Move the elevator on Inspection and verify that the motor is under control and rotating in the proper direction.
2. If the motor is rotating under control in the proper direction, skip the remaining steps.
    a. The LE03 parameter is located on the drive's Home ⇨ Prog ⇨ Encoder Data menu.
    b. If the motor draws normal current and rotates in the opposite direction, change the LE03 parameter between Not Inverted (0) and Inverted Rotation (2) or between A-B Swapped (1) and A-B Swap & Inverted Rotation (3).
    c. If the motor runs away or draws excessive current, change the LE03 parameter between Not Inverted (0) and A-B Swapped (1) or between Inverted Rotation (2) and A-B Swap & Inverted Rotation (3).

Verify Motor Speed

1. While running on Inspection, verify that the displayed speed on the controller's LCD display is virtually the same as the requested inspection speed via the controller's View ⇨ Configuration ⇨ Pattern ⇨ Modes ⇨ Inspection (High Speed) parameter. If these values do not match, adjust the gear ratio value via the drive's Home ⇨ Prog ⇨ Machine Data ⇨ LN02 parameter.

Verify One-Floor-Run Operation

1. Run the elevator on inspection between landings and verify that it moves properly. After taking the elevator out of inspection mode, verify that the elevator corrects to a landing and stops properly. Make a one-floor-run and observe the elevator as it moves between landings and stops at landings.
2. Adjust the KEB Combivert F5-LCD drive and items listed in **Adjust for KEB Combivert F5-LCD Response** above if necessary.
3. A subset of drive adjustments includes the following parameters: LC03, LC04, LC08, LC09, LC11-LC16, LC25, and LC30. These parameters are located on the drive's Home ⇨ Prog ⇨ Control Settings menu.

Verify Contract Speed Operation

1. Run the elevator between landings and verify that it moves properly. Observe the elevator as it starts from landings, moves between landings, and stops at landings. Progressively increase the number of landings traveled until contract speed is reached. When the elevator reaches contract speed, verify proper speed.
2. Adjust the gear ratio value via the drive's Home ⇨ Prog ⇨ Machine Data ⇨ LN02 parameter if necessary. Adjust the KEB Combivert F5-LCD drive and items listed in **Adjust for KEB Combivert F5-LCD Response** above if necessary.
3. A subset of drive adjustments includes the following parameters: LC03, LC04, LC08, LC09, LC11-LC16, LC25, and LC30. These parameters are located in the drive's Home ⇨ Prog ⇨ Control Settings menu.

Determine System Inertia

1. Learning the system inertia can provide better dynamic performance and a better ride quality.
2. With a balanced load in the elevator, bring the elevator to the middle of the hoistway. On Inspection, move the car in the up and down direction around the middle of the hoistway. The motor torque should be equal but in opposite direction. This motor torque can be observed on the drive's Home ⇨ Diag ⇨ Screen #3 display.
3. Move the car to the bottom landing.
4. Begin the inertia learn procedure by setting the LL10 parameter to **Start** on the drive's Home ⇨ Diag ⇨ Tune Parameters menu.
5. Run the elevator at full contract speed from the bottom landing to the top landing and then back down to the bottom landing. Repeat the run from bottom to top and then top to bottom. After four runs, the drive will automatically calculate the inertia value based on the average of the four runs. This value will be saved on the drive's Home ⇨ Prog ⇨ Control Settings ⇨ LC41 parameter.
6. Once the inertia has been learned, the LC02, LC42, LC43, and LC44 parameters can be adjusted. They are located on the drive's Home ⇨ Prog ⇨ Control Settings menu.

Safety Tests

1. For performing a Car/Counterweight Safety Test, Electrical Governor Test, Ascending Car Overspeed Test, or Contract Overspeed Test, refer to the Car Safety Test steps listed in Section 2 of this addendum.
2. For performing a Car/Counterweight Buffer Test, Inspection Overspeed Test, Emergency Brake Test - Unintended Motion, Normal Terminal Switch Overspeed Tests - Level 1, Normal Terminal Switch Overspeed Tests - Level 2, Normal Terminal Switch Position Tests, Emergency Terminal Switch Overspeed Test, or Emergency Terminal Switch Position Test, refer to the Counterweight Safety Test steps listed in Section 2 of this addendum.

DIAGNOSTICS

KEB Combivert F5-LCD

The drive diagnostics are located on the LCD's Home ⇨ Diag screen. The *Next* and *Prev* buttons access the various diagnostic screens.

iControl

On iView, the controller's serial diagnostics are located on the View ⇨ Diagnostics ⇨ Diagnostic Outputs screen. The available monitors are as follows:

1. Serial Device Break Errors
2. Serial Device Config Errors
3. Serial Device Framing Errors
4. Serial Device Noise Errors
5. Serial Device Parity Errors
6. Serial Device Rx Overflows
7. Serial Device Tx Errors
8. Serial Ioctl Rx Errors
9. Serial Ioctl Tx Errors
10. Serial KEB Rx Code
11. Serial KEB Rx Communication
12. Serial KEB Rx Errors[1]
13. Serial KEB Rx Errors[2]
14. Serial KEB Rx Errors[3]
15. Serial KEB Rx Errors[4]
16. Serial KEB Rx Errors[5]
17. Serial KEB Rx Errors[6]
18. Serial KEB Rx Errors[7]
19. Serial KEB Rx Errors[8]
20. Serial KEB Rx Messages
21. Serial KEB Rx Payloads
22. Serial KEB Tx Communication
23. Serial KEB Tx Errors
24. Serial KEB Tx Messages
25. Serial KEB Tx Payloads

TORQMAX F5 V 3.XX DRIVE PARAMETERS TABLE

WARNING: ***Do not change drive parameters while the elevator is running. Incorrect values of drive parameters can cause erratic elevator operation.***

WARNING: Parameters with an asterisk (⍰) must be set correctly for your specific motor / machine / job. Refer to the adjustment manual for detailed information.

P #	Name	Setting	#	Range	Units	Default	Factory
CH	**Configuration Handling Parameters**						
CH01	Default Parameters	**Off**-No action taken	0	-	-	Off	Off
		Factory Reset-Will load defaults, as created by controller OEM	1				
CH02	Save Parameters	**Off**- No action taken	0	-	-	Off	Off
		Save to Flash-All current parameter settings are saved to keypad operator flash memory	1				
		This function is not available	2				
		Write to Drive- Current keypad operator settings downloaded to drive	3				
CH03	Restore Parameters	**Off-** No action taken	0		-	Off	Off
		Restore from Flash-Previously saved parameter settings are restored from internal keypad operator flash	1				
		Load Parameters- Select below MCE config file as per controller Type and AC machine. **ECLIMGLS.DW5 1828**-Element closed loop with Induction Gearless Machine **ECLIMGRD.DW5 1826**- Element closed loop with Induction Geared Machine **ECLPMGLS.DW5 1833**- Element closed loop with PM Gearless Machine **ECLPMGRD.DW5 1831**- Element closed loop with PM Geared Machine **EOLIMGRD.DW5 1811**- Element open loop with Induction Geared Machine **ICLIMGLS.DW5 1828**- iController closed loop with Induction Gearless Machine **ICLIMGRD.DW5 1826**- iController closed loop with Induction Geared Machine **ICLPMGLS.DW5 1832**- iController closed loop with PM Gearless Machine **ICLPMGRD.DW5 1830**- iController closed loop with PM Geared Machine **IOLIMGRD.DW5 1811**- iController open loop with Induction Geared Machine **MCLIMGLS.DW5 1828**- Motion closed loop with Induction Gearless Machine **MCLIMGRD.DW5 1826**- Motion closed loop with Induction Geared Machine **MCLPMGLS.DW5 1833**- Motion closed loop with PM Gearless Machine **MCLPMGRD.DW5 1831**- Motion closed loop with PM Geared Machine **MOLIMGRD.DW5 1811**- Motion open loop with Induction Geared Machine	2				
		Restore from Drive- Current drive settings are uploaded from drive to keypad operator	3				
		Load Motor Data- Loads data from '.dw5' stored to flash.	4				
CH10-CH15	LED Diagnostics	-					
US	**Basic Setup Parameters**						
US02	System Units	m/sec ft/min	0 1	-	ft/min	ft/min	(1) ft/min
US03	Motor Type	Induction Geared Induction Gearless	0 1	-	-	Induction Geared	* 3=PM Sync Gearless

		PM Synchronous Geared PM Synchronous Gearless	2 3				
US04	Control Type	Digital Speed Selection Binary Speed Selection Absolute Analog Speed Bi-Polar Analog Speed Serial Spd DIN66019, Serv.49 Serial Spd DIN66019, Serv.50 Serial Binary Spd DIN66019, Serv.50	0 1 2 3 4 5 6	-	-	Binary Speed Selection	**(5) Serial Speed DIN66019, Serv.50**
US05	Load Configuration	Not configured Configuration OK Write config. to Drive Read Config. from drive Write config. to Flash Read config. From Flash Write config. to SD Card Read config. From SD Card Create OEM Defaults Restore OEM Defaults Restore KEB Defaults	0 1 2 3 4 5 6 7 8 9 10	-	-	Not Configured	**(1) Configuration OK**
US06	Contract Speed	-	-	0-1600	ft/min	0	*
LI	**Input Parameters**						
LI01	Type of Input	PNP NPN	0 1	-	-	PNP	**(0) PNP**
LI04-LI11	Input 1 Function (I1) to Input 1 Function (I8)	No Function UPS operation	-	-	-	-	**No Function**
LI15	Direction Selection Inputs	Up and Down Inputs Down Input Only Up & Down and Serial Control Word	0 1 2	-	-	(0) Up and Down Inputs	**(0) Up and Down Inputs + Function By direction inputs**
LM	**Motor Data Parameters**						
LM01	Motor Power	Induction geared/gearless	-	0.5-299.5	HP	10	*
		PM (Read Only)	-	0.5-299.5	HP	Calculated	
LM02	Motor Speed	Induction geared	-	20-4000	rpm	1164	*
		Induction Gearless	-	20.0-500.0	rpm	100.0	
		PM geared	-	400-4000	rpm	1000	
		PM Gearless	-	20.0-500.0	rpm	100.0	
LM03	Motor Current	-	-	1.0-1000	Amps	1.0	*
LM04	Motor Frequency	Induction geared/gearless	-	4.0-200.0	Hz	60.0	*
		PM geared/gearless	-	4.0-200.0	Hz	50.0	
LM05	Motor Voltage	Induction geared/gearless: Name plate rated voltage.	-	10-32000	V	400	*
		PM geared/gearless: No-load, phase-to-phase back EMF rms voltage at LF.11 MCE default setting is **80% of motor name plate voltage** but during auto tuning process, this value is measured and will provide the best value.	-	10-500	V	100	
LM06	Motor Power Factor	Induction geared/gearless- if not known then set 0.9, for high Slip motor 0.75 PM Machine—N/A	-	0.5-1.00	-	0.90	N/A
LM07	Motor Torque	Induction Geared (Read Only)	-	0.0-479.7	lb-ft	Calculated	*

		Induction Gearless (Read Only)	-	0.1-4947.0	lb-ft	Calculated	
		PM Geared	-	0.0-479.7	lb-ft	0.0	
		PM Gearless	-	0-4797	lb-ft	0.0	
LM08	Electric Motor protection	Off On	0 1	-	-	On	On
LM09	Electric Motor protection Current	Induction Geared, Gearless	-	1.0-1000.0	Amps	0.90	N/A
		PM Geared, PM Gearless		N/A		N/A	
LM10	Motor Overheat temp	-	-	50-240	°C	140	140
LM20	Motor Ls	Induction Geared, Gearless	-	0.01-655.35	mH	10.00	Learned
		PM Geared, PM Gearless	-	0.01-500.00		0.01	
LM21	Motor Rs	Induction Geared, Gearless	-	0.000-68.535	Ohm	1.000	Learned
		PM Geared, PM Gearless					
LM22	Motor Rr	Induction Geared, Gearless	-	0.000-65.535	Ohm	1.000	N/A
		PM Geared, PM Gearless		N/A		N/A	
LM23	Motor Lm	Induction Geared, Gearless	-	0.1-3276.7	Ohm	100.0	N/A
		PM Geared, PM Gearless		N/A		N/A	
LM24	Field Weakening Corner	Induction Geared, Gearless	-	1-4000	rpm	Calculated	N/A
		PM Geared, PM Gearless		N/A		N/A	
LM25	Field Weakening Speed	Induction Geared, Gearless	-	1-4000	rpm	Calculated	N/A
		PM Geared, PM Gearless		N/A		N/A	
LM26	Motor Ls Max.	Induction Geared, Gearless	-	0.01-500.0	mH	N/A	N/A
		PM Geared, PM Gearless		N/A		0.01	
LM27	Motor Inductance Mode	Induction Geared, Gearless	-	N/A	-	N/A	Ld <> Lq
		PM Geared, PM Gearless		Ld <> Lq Ld = Lq	0 1	Ld <> Lq	
LM30	Motor Control	Induction Geared, Gearless	0 1 2 4 8 10	Off Motor Model Off+Vmax Regulation Flux Current Flux Proofing Zero Speed Model can be selected together	-	Off+Vmax Regulation	Off+Vmax Regulation
		PM Geared, PM Gearless	0 1 2	Off Motor Model Off+Vmax Regulation can be selected together	0 1 2	Off+Vmax Regulation	
LM31	Vmax Regulation		-	0-110	%	97	97
LM32	KP Current		-	1-32767	-	Calculated	Auto Calc.
LM33	KI Current		-	1-32767	-	Calculated	Auto Calc.
LE	**Encoder Data Parameters**						
LE01	Encoder 1 Inter- face (X3A)	-	-	-	-	Read Only	*
LE02	Encoder Pulse Number	For Incle and SinCo=Customer data For HIPER = 1024 For Endat = 2048	-	256 -16384	ppr	1024	*
LE03	Swap Encoder Channels	Not Inverted A-B Swapped Inverted Rotation A-B Swapped & Inv. Rotation	0 1 2 3	-	-	Not Inverted	(0) Not Inverted
LE04	Sample Rate for Encoder	0.5 ms (2kHz) 1 ms (1kHz) 2 ms (500Hz) 4 ms (250Hz) 8 ms (125Hz) 16 ms (63Hz) 32 ms (31Hz)	0 1 2 3 4 5 6	-	ms (Hz)	(4) 8 ms 125 Hz	(4) 8 ms 125 Hz
LE05	Encoder 1 Multiplier	2 For Geared mode 8 for Gearless mode	2 8	-	-	2 or 8	**8**
LE06	Encoder 1 Pole Position	Induction Geared, Gearless	-	N/A	-	N/A	Learned

		PM Geared, PM Gearless		Learned		Learned	
LE07	Rotor Detection Mode	Off NOP Power On NOP+Power on After Reset NOP+After Reset Power on+After Reset NOP+Poweron+After Reset	0 1 2 3 4 5 6 7	-	-	0	Off
LE11	Serial Encoder 1 Type	-	-	-	-	Read Only	Read Only
LE12	Serial Encoder 1 Status	-	-	-	-	Read Only	Read Only
LN	**Machine Data Parameters**						
LN01	Traction Sheave Diameter	-	-	3.94-62.99	in	24.00	*
LN02	Gear Reduction Ratio	**Program LN02 = LN05 (For iProduct, M4000 and Element)**	-	1.00250.00	x:1	30.00	*
LN03	Roping Ratio	-	-	1-4	x:1	1	*
LN04	Load	-	-	0-3000	lb	0	*
LN05	Estimated Gear Ratio	-	-	0.00	x:1	Calculated	Calculated
LS	**Speed Profile Parameters**						
LS01	Leveling Speed	-	-	0-25	ft/min	4	4
LS02	High Speed	-	-	0-1600	ft/min	0	*
LS03	Inspection Speed	Maximum setting = 150 ft/min or contract speed, whichever is less.	-	0-150	ft/min	30	**150**
LS04	Correction Speed	-	-	0-50	ft/min	0	0
LS05	Intermediate Speed 1	-	-	0-1600	ft/min	0	0
LS06	Intermediate Speed 2	-	-	0-1600	ft/min	0	0
LS07	Intermediate Speed 3	-	-	0-1600	ft/min	0	0
LS08	Earthquake Speed	-	-	0-150	ft/min	0	0
LS09	Emergency Power Speed	-	-	0-1600	ft/min	0	0
LS10	Battery Operation Speed	Maximum setting = 50 ft/min or contract speed, whichever is less	-	0-50	ft/min	0	**50**
LS15	High Speed profile	Custom Medium Soft Hard	0 1 2 3	-	-	(0) Custom+ External	(0) Custom+ External Profile + Ogive off
LS16	One floor Profile	Custom Medium Soft Hard	0 1 2 3	-	-	(0) Custom	(0) Custom
LS17	Emergency Profile	Same as LS16	" "	-	-	(0) Custom	(0) Custom
LS20	Acceleration High Speed	-	-	0.3-12.00	ft/min	2.3	2.3
LS21	Start Jerk High Speed	-	-	0.3-32.00	ft/min	2.3	Auto Calc
LS22	Acceleration Jerk Speed	-	-	0.3-32.00	ft/min	2.3	Auto Calc
LS23	Deceleration High Speed	-	-	0.3-32.00	ft/min	2.3	2.3
LS24	Deceleration Jerk High Speed	-	-	0.3-32.00	ft/min	2.3	Auto Calc
LS25	Stop Jerk High Speed	-	-	0.3-32.00	ft/min	2.3	Auto Calc
LS27-LS55	Speed Profile parameter	-	-	0.0-6.0	ft/min	0	Keb default
LL	**Tune Parameters**						
LL01	Motor Tuning	Off Start	0	-	-	Off	(0)

			1				Off
LL02	Tuning Current	Induction Geared, Gearless	-	N/A			100
		PM Geared, PM Gearless		10-100			
LL05	SPI	Induction Geared, Gearless	0	N/A	-	N/A	Off
		PM Geared, PM Gearless	1	Off, Start		Off	
LL06	Encoder Pole Position Learn	Induction Geared, Gearless	0	N/A	-	N/A	Off
		PM Geared, PM Gearless	1	Off, Start		Off	
LL07	Encoder Synchronization	Off Start	0 1	-	-	Off	(0) Off
LL10	Inertia Learn	Off Start	0 1	-	-	Off	(0) Off
LL15	Overspeed Test	Off Start	0 1	-	-	Off	(0) Off
LL16	Overspeed Test Speed	-	-	0-2400	ft/min	0	0
LL17	Safety release	Off Start	0 1	-	-	Off	(0) Off
LC	**Control Setting Parameters**						
LC01	Control Mode	Open Loop V/Hz Open Loop Vector Closed Closed Loop FOC Closed Loop Analog Pretorque Closed Loop Digital Pretorque Closed Loop Synth. Pretorque	0 1 2 3 4 5	-	-	Closed Loop Digital Pretorque	Closed Loop Digital Pretorque
LC02	Speed Gain Optimization	-	-	0-25	-	0	0
LC03	KP Speed Acceleration	-	-	1-50000		3000	3000
LC04	KP Speed Deceleration	-	-	1-50000		3000	3000
LC05	KP Speed Pretorque	-	-	1-50000		3000	3000
LC08	KI Speed Acceleration	-	-	1-25000		250	250
LC09	KI Speed Deceleration	-	-	1-25000		250	250
LC10	KI Speed Pretorque	-	-	1-30000		500	500
LC11	KI Speed Offset Accel	-	-	0-20000	-	3000	3000
LC12	KI Speed Offset Decel	-	-	0-20000	-	1000	1000
LC13	Speed for max KI Accel	-	-	1-50	ft/min	4	4
LC14	Speed for min KI Decel	-	-	1-200	ft/min	16	16
LC15	Speed for max KI Accel	-	-	1-50	ft/min	8	8
LC16	Speed for min KI Decel	-	-	1-200	ft/min	24	24
LC20	Gain Profile Mode	Variable Resonant	-	0 1	-	Variable	Variable
LC21	KP Speed Resonance Accel	-	-	0-5000	%	50	50
LC22	Speed at Resonance Accel	-	-	1-2000	ft/min	4	4
LC23	KP Speed Resonance Decel	-	-	0-5000	%	50	50
LC24	Speed at Resonance Decel	-	-	0-2000	ft/min	4	4
LC25	KP Speed High	-	-	0-400	-	100	100
LC30	Maximum Torque	Typically set between 200% and 250% (150% during commissioning)	-	0-500	%	150	150
LC31	Reduced Maximum Torque	-	-	0-500	%	100	100
LC32	Low Speed Torque Boost	Induction Geared, Gearless	-	0-25.5	%	5.0	N/A
		PM Geared, PM Gearless		N/A			
LC33	Auto Boost Gain	Induction Geared, Gearless	-	0-25.5	-	0.00	N/A
		PM Geared, PM Gearless		N/A		N/A	
LC34	Digital Pretorque	-	-	-100.00-100.00	%	0	0
LC40	Accel. Torque	-	-	0-12036	lb-ft	0	0

LC41	System Inertia	Induction Geared, PM Geared Induction Gearless, PM Gearless	-	0-65501 0.00-1073.7	lb-in2	0	0
LC42	FFTC Filter	Off 250Hz 125Hz 63Hz 31Hz 16Hz 8.0Hz 4.0Hz 2.0Hz 1.0Hz	-	0 1 2 3 4 5 6 7 8 9	Hz	Off	Off
LC43	FFTC Gain	-	-	0-200	%	0	0
LC44	Torque Command Filter	Off 2000Hz 1000Hz 500Hz 250Hz 125Hz 63Hz 31Hz	-	0 1 2 3 4 5 6 7	Hz	2000	2000
LT	**Timer Parameters**						
LT01	Brake release Delay	-	-	0.00-1.00	sec	0.40	**0.00**
LT02	Control Hold Off	-	-	0.00-1.00	sec	0.40	**0.40**
LT03	Speed Start Delay	-	-	0.0-10.00	sec	0.70	**10.00**
LT10	Brake Drop delay	-	-	0.00-1.00	sec	0.10	**0.00**
LT12	Current Hold Time	-	-	0.00 – 2.00	sec	0.50	**0.00**
LT13	Current Ramp Down time	-	-	0.10 – 0.50	sec	0.30	**0.30**
LP	**Positioning Parameters**						
LX	**Special Functions Parameters**						
LX01	Auto Reset	-	-	0-10	-	5	10
LX02	Switching Frequency	8 kHz 12 kHz 16 kHz	0 1 2	-	kHz	8	(0) 8
LX06	Function Test	Off Fans On	0 1	-	-	(0) Off	(0) Off
LX08	Phase Current Check	Mag Current check Phase Current Check	0 1	-	-	1	(1) Phase Current Check
LX10	EdOH Function	On Off	0 1	-	-	(0) Off	Off
LX11	Reference Splitting	-	-	0 - 127	msec	0	40
LX13	Speed following errors	Warning Digital Output On with Error % Contract Speed On with Error % Command Speed	0 1 2	-	-	-	**(1) On with Error % Contract Speed**
LX14	Speed Difference	-	-	0-50	%	10	10
LX15	Speed for Pre-Opening		-	1-100	ft/min	59	59
LX16	Decel Confirmation Speed		-	0-1600	ft/min	0	Auto cal
LX17	ETS Speed		-	0-1600	ft/min	0	0
LX18	Braking Resistance		-	0-200	Ohm	0	0

Section 2: Car/Counterweight Safety Test

This is a two-part test. Car safety testing verifies operation of the car safeties. The objective of the test is to set the safeties, causing the hoist motor to break traction. The over-speed must be sufficient in magnitude to cause the governor to trip mechanically and to set the car safeties. The electrical governor switch must not prevent the cars continued acceleration to the mechanical trip speed. To perform the

Car Safety Test:

1. Place a full load in the car.
2. Position the car some distance away from the bottom landing (about 10-feet per 100-feet-per-minute of contract speed).
3. On the iView, Configuration > Pattern > Modes tab, verify that Deceleration and Approach deceleration are set no higher than 2ft/s2 to avoid tripping the drive.
4. Place a jumper between the #3 bus and the GOV terminal on the iBox to bypass tripping the governor overspeed.
5. On the View > Safety Tests > Test Configuration, enter a speed sufficient to trip the mechanical governor (trip speed from the governor name plate plus 5 to 10%).
6. Calculate the overspeed as a percentage of Contract speed (see “Running a Test” on page 4-42) and set up the AC drive for an “Overspeed” test.

   For TORQMAX F5 software v1.7x, on the drive keypad:

   - Set LF.49 Over Speed Function Test = overspeed as a % of Contract speed.
   - Set LF.3 = OStSt Over Speed Test Function. With LF.3 displayed, press FUNC to display the present value. Press UP/DOWN until OStSt is displayed, and then press ENTER to load the value. The car will over speed for one run only, after which parameters are automatically reset.

   For TORQMAX F5 software v3.xx, on the drive keypad:

   - On the drive’s Home ⇨ Diag ⇨ Tune Parameters menu, set LL16 to the speed selected on the controller for the test.
   - To activate the drive’s Overspeed Test, set LL15 to “Start without Scaling” on the drive’s Home ⇨ Diag ⇨ Tune Parameters menu.
   - Run the elevator to perform the test.
   - When the run completes, the drive’s Overspeed Test will automatically deactivate.

   For Magnetek:

   - Set A1 > Overspeed Mult = overspeed as a % of Contract Speed.
   - Set U4 > Overspeed Test = Yes. The car will over speed for one run only.
7. On the iView > Controller > View > Safety Tests tab, select the Car/Counterweight Safety Test and click Select. Complete on-screen instructions.
8. Place a car call distant enough to allow the car to reach the necessary speed. If necessary, you may end the test and bring the car to an emergency stop using the iBox Stop switch.

9. Remove jumpers placed for the test in steps above.
10. Check the hoistway ropes to make sure they are still in their proper grooves before attempting to move the car.
11. Use the appropriate method required to reset the safeties. For flexible quick-clamp safeties, move the car on Inspection (UP and ENABLE buttons) to release the safety and restore the safety string.
12. To bypass the safety plank switch, temporarily place a jumper between SAFH and SAFC on the iBox. Remove once the safeties are reset.

Counterweight Safety Test:

The counterweight safety test verifies operation of the counterweight safeties. For this test, no drive adjustments are required. The test is comparable to the car safety test but performed in the opposite direction. If the counterweight has a governor, remember to jumper the overspeed switch out. Also, remember to remove jumpers when tests are complete.

1. Position the empty car near the bottom landing and arrange to over-speed in the up direction.
2. On the controller, activate the test.
3. Run the elevator to perform the test.