



GALaxy IV – KEB AC PM Gearless QUICKSTART



Elevator control products must be installed by elevator personnel who have been trained in the construction, maintenance, repair, inspection, and testing of elevator equipment. The elevator personnel must comply with all applicable safety codes and standards.



Every precaution, whether or not specifically stated in this document, should be taken when installing, adjusting or servicing any elevator. All safety precautions should be followed to make sure life and limb of the service person and public is not endangered.

Power Requirement and Voltages

Check the power requirement and voltages according to the job schematics.

- 1) Wire Motor and Main Line Power as shown in job schematics.
- 2) Install and wire Governor.
- 3) Add temporary connections and set toggle switches on Main I/O Board GALX-1102 as shown below.
- 4) Wire the DBR temperature sensor to the temperature sensor board, if controller is equipped with dynamic breaking resistors.
- 5) Check/set parameters in controller LCD user interface. See “GALaxy IV Controller Settings” page of this guide.
- 6) Check/set parameters in drive. See “Drive Settings” page of this guide.
- 7) Wire encoder cable to the drive and check Encoder PPR.
- 8) Check PIC and PAL fault LEDS.
 - If LCD displays “Open” – check door lock/gate bypass switches.
 - If LCD displays “INS ERR” – make sure that the **INS** input is high and the **ACC**, **MRI**, **ICI**, and **AUTO** inputs are off.
- 9) Check speed and direction of motor rotation.
 - If platform runs slow, overcurrent fault on drive, or motor rotation or encoder channels are set wrong, check LE03 parameter on drive.

To configure the controller to operate a running platform for construction use, set toggle switches and install temporary connections as shown below.

Left Side of Board	Right Side of Board	Toggle Switches
S10 – GOV GOV – TF TF – BF BF – PS PS – HSS RG7 – RG5	HSS – FFS FFS – CST CST – UN UN – DN DN – INS	Door Lock Bypass – Down (Bypassed) Gate Bypass – Down (Bypassed) Independent – Down Auto Door – Down Stop Switch – Up (Run) Inspection – Down
Run Bug		1106/1107 I/O Board
Inspection Common – INS Inspection Up – IU Inspection Down – ID Inspection Enable – IEN (Cannot be held high)		FEP (on 1102 Board) – FEP (on 1106/1107 Board) FEP – MES MES – ALT ALT – MRS MRS- HWS HSW – HWS2
Main I/O Board Jumpers		
EQS1 – EQST (if earthquake mode is enabled)		

GALaxy IV Controller Settings

Preset the following parameters from the LCD User Interface “Adjustable Variables” menu.

Safety Processor Adjustable Variables Submenu (Motor Encoder Speed Feedback):	
<ul style="list-style-type: none"> TOP SPEED (contract speed FPM) ENCODER RPM (set to motor RPM) ENCODER PPR (set to motor encoder PPR) ENCODER TYPE (set to 4 = incremental) CONTROL TYPE (set to 2 = Tract DF) 2 STOP (0 = Mult – Stop; 1 = 2 Stop) REAR DOORS (0 = Front Only; 1 = Rear) UTS VELOCITY (set to TOP SPEED) DTS VELOCITY (set to TOP SPEED) 	<ul style="list-style-type: none"> INSP VELOCITY (set to 140) LEVELING VEL. (set to 140) ETS UP VEL. (set to TOP SPEED – only used for reduced stroke buffer) ETS DOWN VEL. (set to TOP SPEED – only used for reduced stroke buffer) SOFT STOP TIME (set to 3) PAL ETS UP VEL. (set to TOP SPEED) PAL ETS DN VEL. (set to TOP SPEED)
NTS Processor Adjustable Variables Submenu	
<ul style="list-style-type: none"> TOP SPEED (contract speed FPM) ENCODER RPM (set to motor RPM) ENCODER PPR (set to motor encoder PPR) ENCODER TYPE (set to 0 if using tape selector; set to 1 if using tapeless selector) UT VELOCITY (set to TOP SPEED) 	<ul style="list-style-type: none"> DT VELOCITY (set to TOP SPEED) UT1 VELOCITY (set to TOP SPEED) DT1 VELOCITY (set to TOP SPEED) UTn VELOCITY (set to TOP SPEED) DTn VELOCITY (set to TOP SPEED)
Car Motion Submenu	
When Using Tape Selector:	When Using Tapeless Selector:
<ul style="list-style-type: none"> TOP SPEED (set to Contract Speed) INSPECT SPEED (set to 25 FPM) ENCODER PPR (set to 64 PPR) ENCODER RPM (FPM value of Contract Speed and set) ENCODER TYPE (set to 4) MOTOR RPM (= LM02 value in KEB drive) 	<ul style="list-style-type: none"> TOP SPEED (set to Contract Speed) INSPECT SPEED (set to 25 FPM) ENCODER PPR (set to 10,000 PPR) ENCODER RPM (set to governor RPM) MOTOR RPM (= LM02 value in KEB drive)
	When Using APS Selector:
	<ul style="list-style-type: none"> TOP SPEED (set to Contract Speed) INSPECT SPEED (set to 25 FPM) ENCODER PPR (not used) ENCODER RPM (not used) MOTOR RPM (= LM02 value in KEB drive)
System Options Submenu	
Encoder Type:	Encoder Node:
<ul style="list-style-type: none"> 0 = Based on CONS.DAT file 1 = Turck Encoder 2 = Dynapar Encoder 3 = Wachendorff Encoder 4 = Tape Selector Feedback 	<ul style="list-style-type: none"> Not used for tape selector. If tapeless, then set node as follows: Turck = 63 Dynapar = 1 Wachendorff = 127 Note: This parameter gets set automatically when encoder type is changed.
	Encoder Baud Rate:
	<ul style="list-style-type: none"> 0 = 250K (default) 1 = 125k (used if communication errors)



For governor mounted encoders, to calculate the RPM, divide the contract speed of the car by the distance traveled in one revolution with the governor as shown below: $RPM = Speed\ fpm / (diameter\ GOV\ (in\ feet) * pi)$

NOTE

- For a 1 ft. Dia. Governor: $RPM = 350 / (1 * pi) = 350 / 3.1415 = 111.4$
- For a 16 in Dia. Governor: $RPM = 350 / (1.33 * 3.1415) = 350 / 4.188 = 83.5$ [NOTE: (16"/12" = 1.33ft)]

Drive Settings KEB AC Geared

Preset the following parameters from the KEB drive keypad.



In this section, make a habit of writing the configuration to the drive – all parameters are held in the KEB keypad and parameters can be lost if not written to the drive.

Complete the following items first (Sets the Drive Mode):

Drive Mode Settings (First):		
US03	Motor Type	= PM SYNCH GEARLESS
US04	Control Type	= SERIAL SPEED DIN66019 SERV 49
LI15	Direction Selection Inputs	= UP & DN, Serial Control Word + Function by Dir. Inputs
US05	Load Configuration	= WRITE CONFIG. TO DRIVE

Complete all the following items next:

Field Bus		
FB11	Baud Rate	= 55500 (Adjustable Variables => System Options => Drive Baud Rate = 57600 in Controller)
FB12		= 50
FB51		= 49
FB52		= 6
FB53		= 0
FB55	Software Filter	= 80
Basic Parameters		
US02	System Units	= FT. / MIN. (FPM)
US06	Contract Speed	= TOP SPEED
Input Parameters		
LI01	Type of Input	= PNP
LI05	Input 2 Function	= EMERGENCY SLOWDOWN
LI08	Input 5 Up Direction	= UP DIRECTION
LI09	Input 6 Down Direction	= DN DIRECTION
LI11	Input 8 Fault Reset	= FAULT RESET
Control Settings (see G. A. L. Manual Section 3.7.2)		
LC01	Closed Loop FOC	= 2
LC03	KP Speed Acceleration	= 3000
LC04	KP Speed Deceleration	= 3000
LC05	KP Speed Pretorque	= 3000
LC08	KI Speed Acceleration	= 250
LC09	KI Speed Deceleration	= 250
LC10	KI Speed Pretorque	= 3000
LC11	KI Speed Offset Accel.	= 3000
LC12	KI Speed Offset Decel.	= 1000
LC30	Maximum Torque	= 250%
Encoder Data		
LE01	Encoder Interface	= Endat
LE02	Encoder PPR	= 2048
LE03	Swap Encoder Channels	= (SEE KEB MANUAL)
LE04	Encoder Sample Rate	= 8 MS.
LE05	Encoder Multiplier	= 2
Motor Data		
LM02	Rated Motor Speed	= Nameplate Full Load RPM
LM03	Rated Motor Current	= Nameplate AMPS
LM04	Rated Motor Frequency	= Nameplate HZ
LM05	Rated Motor Voltage	= Motor Voltage
LM06	Motor Power Factor	= 0.9 (if unknown)
LM07	Rated Motor Torque	= Nameplate (PM Only)
LM08	Electric Motor Protection	= ON
LM09	Ele. Mtr. Protect. Current	= Nameplate AMPS
Machine Data		
LN01	Sheave Diameter	= INCHES
LN03	Roping Ratio	= 1.1 or 2.1
LN04	Load Capacity	= Car Capacity
Output Parameters		
LO15	Relay 1	= DRIVE READY
LO20	Relay 2	= DRIVE ON
Speed Profile		
LS01	Leveling Speed	= 6 (Used for NTSD)
LS02	High Speed	= CONTRACT SPEED
LS48	ESD Deceleration	= 6 (Used for NTSD)
LS49	ESD Jerk	= 8 (Used for NTSD)

Special Functions		
LX11	Reference Splitting	= 20 msec
When Using EPRS (UPS Emergency Power Rescue)		
LI04		= UPS OPERATION (Input Function)
LS10		= 15 ft / min (Battery Operation Speed)
LT03		= 1.5 sec (Speed Start Delay)
LT10		= 0.1 sec (Break Release Delay)
EPRS Controller Parameters => Adjustable Variables => Modified Motion		
	EP Recovery Speed	= 15
	EP Top Speed	= 15
	EP Target Distance	= 2

We strongly recommend learning the motor and encoder with the machine unroped, to avoid having the elevator cab in the overhead.

Motor Learn (per Section 3.3.3 in GALaxy IV Manual):

- Inspection Speed to 0
- Turn off the brake circuit breaker
- **LL01 (Motor Tuning) => Start**
- Press "UP" on inspection and hold until KEB keypad says "Calculation Complete" – takes 2 to 5 minutes.

Encoder Learn: SPI – Stationary Pole Identification (per Section 3.3.4.1 in GALaxy IV Manual):

- Machine is ROPED.
- Set inspection speed to 0
- Turn off the brake circuit breaker
- **LL05 (SPI) => Start**
- Press *UP* on inspection; hold until keypad says *Complete*.

Encoder Learn: Encoder Pole Learn (Machine is UNROPED or balanced)

- Set inspection speed to 25
- Allow brake to pick
- **LL06 (Encoder Pole Position Learn) => Start**
- Press *UP* on inspection; hold until keypad says *Complete*.

Encoder Synchronization: PM Gearless (per Section 3.3.4 in GALaxy IV Manual):

- Set inspection speed to 25
- Allow brake to pick
- **LL07 (Encoder Synchronization) => Start (Follow instructions on the screen)**

Alternatively, see section "3.3.5 Manual Encoder and Motor Direction Setup Procedure" in the GALaxy IV Manual to synchronize the encoder.

All temporary connections must be removed before allowing the elevator to run on automatic operation. Refer to the GALaxy IV Manual for complete adjustment procedures.



Drive "Control Settings"

NOTE

- Parameters **LC05** and **LC10** refer to pre-torque gains **prior to the start of motion**.
- Parameters **LC03**, **LC08** and **LC11** (KI Offset) refer to gains **during the start of motion, acceleration and also high speed**.
- Parameters **LC04**, **LC09** and **LC12** (KI Offset) refer to gains **during deceleration and final stop**.
- Proportional gains (how hard it reacts) **LC03** and **LC04**.
- Integral gains (how quickly it reacts) **LC08** and **LC09**.
- Integral offset gains (added to the integral gains at the start and stop) **LC11** and **LC12**.
- Lower values make the drive less responsive, and higher values make the drive more responsive.

Adjuster Password: 2503 – On the Keypad, press Home=>Prog=>Pass

Useful Formulas:

- Torque in lb./ft. = HP x 5250 /RPM
- HP = Torque x PM /5250
- RPM = 120 x Frequency / # of Poles
- RPM = 5250 x HP /Torque
- Freq = # of Poles x RPM /120
- Poles = 120 x Freq /RPM