

ACE-4GBLM3 FOR OPEN LOOP GEARED ELEVATOR APPLICATION

**MADE IN
INDIA**



1. Introduction.

This chapter provides the information about the commissioning of FRENIC ACE-4GBLM3 in open loop geared elevator application.

ACE-4GBLM3 is a high performance compact inverter for elevators, designed to drive a three phase induction motor under variable speed control for elevator application. In open loop ACE-4GBLM3 drive the motor without speed feedback (without encoder) from motor.

In ACE-4GBLM3 for open loop there is control mode i.e. Dynamic vector control.

In open loop control drive will follow the speed command from lift controller and continues its operation .It will receive command from controller through digital inputs (X1....X5). Drive common is CM /PLC (Sink or Source respectively).

There is one relay output in drive (30 ABC) and two transistor output (Y1 and Y2), through which we can control motor contactor and brake contactor.

In ACE-4GBLM3, there are two functional safety inputs i.e. EN1 and EN2 which complies IEC/EN 61800-5-2: 2007 (SIL3) and IEC/EN 62061: 2005 SIL3.

2. ACE-4GBLM3-open loop commissioning procedure:

This chapter does not pretend to describe all possible solutions but tries to highlight the important concepts about ACE-4GBLM3 commissioning procedure in open loop geared elevator application.

This document shall be referred along with technical manual, in case of any further clarification required for steps mentioned for installation & commissioning.

Note: This guideline does not cover safety aspects which is sole responsibility of the lift supplier.

2.1 Dedicated elevator function of ACE-4GBLM3: Figure 1 shows connection diagram of ACE-4GBLM3 with details of power terminal and control terminal.

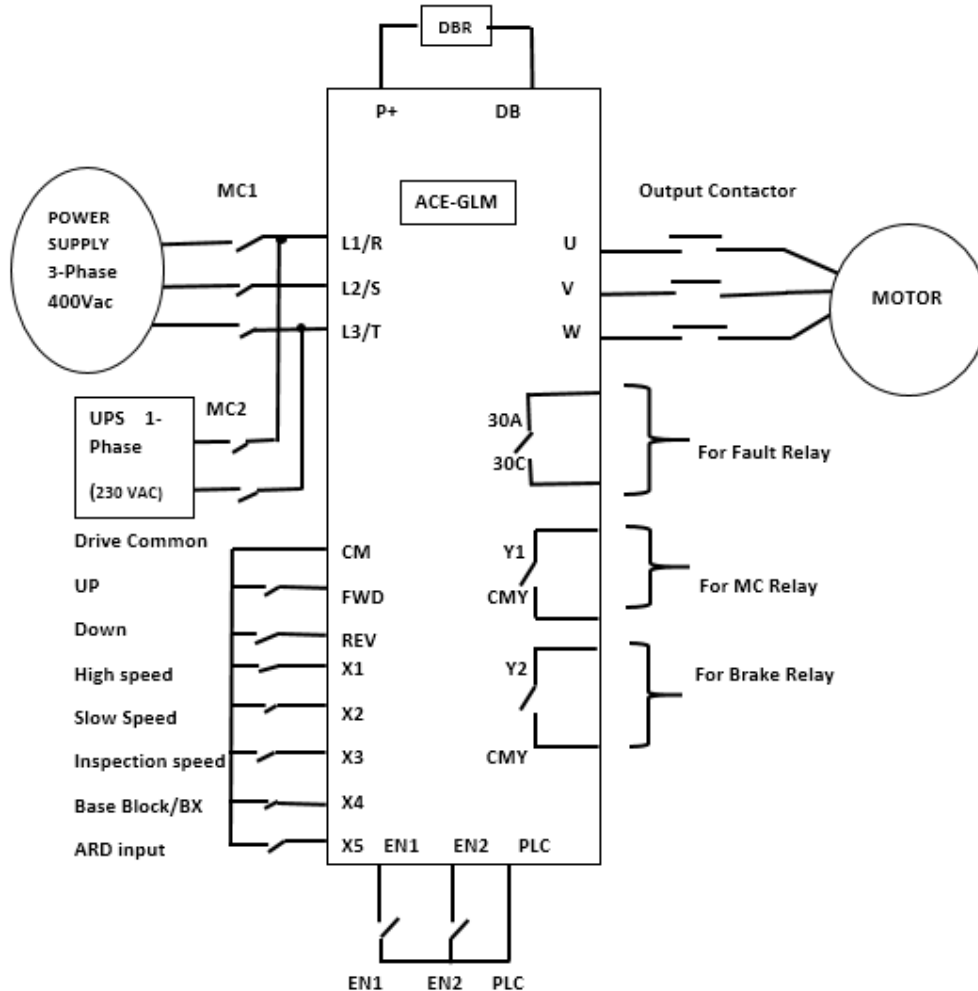


Figure 1. Power and control Connection diagram of ACE-4GBLM3 (default: sink Mode)

L1/R, L2/S, L3/T: Three phase (400 Vac) input power supply.

U, V, W : Drive output to the motor.

P+ and DB: Connect Dynamic braking resistor (DBR).

FWD: UP

REV: Down

30A-30C- Relay output (AC250 V 0.3 A /DC48 V 0.5 A)

Y1-CMY- Transistor output (DC+24 V, maximum 50 mA)

Y2-CMY- Transistor output. (DC+24 V, maximum 50 mA)

X1: High speed

X2: Slow Speed

X3: Inspection Speed

X4: Base Block/BX

X5: ARD input

2.2 Sink and Source mode selection: Select SW1 switch for sink and source mode, drive is in sink mode by default (Common is CM). For source mode change SW1 switch position to source position .when drive is in sink mode the drive common is CM and when drive is in source mode drive common is PLC .The connection of sink mode and source are as follows.

Note: Never short PLC and CM.

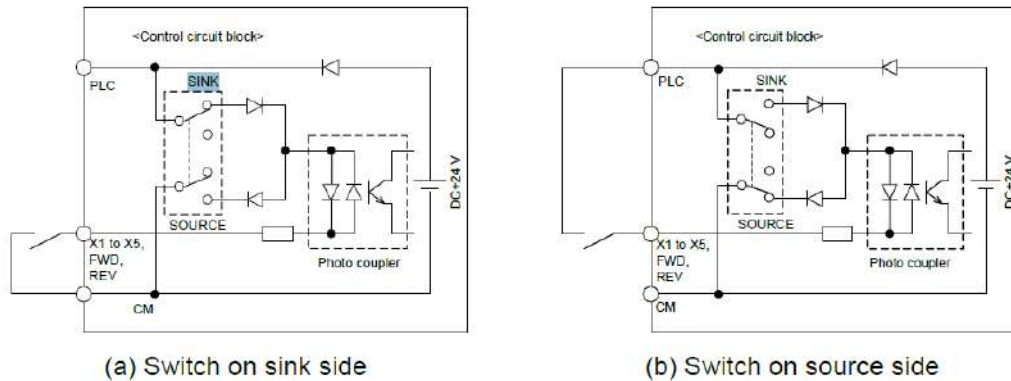


Figure 2. Connection diagram of sink mode and source mode.

2.3 Optimum Parameters list:

Function Code	NAME	Default value	Parameter to be set	Unit
F42	Drive control selection 1	1	1	
P01	No. of poles	4	***	
F03	Maximum frequency	50	50	Hz
F CODES:FUNDAMENTAL FUNCTIONS				
F 01	Frequency setting 1	0	0	
F 02	Operation Method	1	1	
F03	Maximum output frequency 1	50	50	Hz
F04	Base frequency 1	50	50	Hz
F 05	Rated voltage at base frequency 1	380	415	Volts
F 06	Maximum output voltage1	380	415	Volts
F 07	Acceleration time 1	2	2.8	S
F 08	Deceleration time 1	1.8	1.8	S
F 11	Overload detection Level	As per drive ratings	***	A
F 12	Thermal time Constant	0.5	0.5	Min
F20	DC braking 1 (Braking starting frequency)	0.5	0.3	Hz
F21	DC braking 1 (Braking level)	80	50	%
F22	DC braking 1 (Braking time)	1.5	1	S
F 23	Starting frequency 1	0.5	0.3	Hz
F 24	Starting frequency 1 (Holding time)	0.8	0.4	S
F 25	Stop Frequency	0.2	0.1	S

F26	Motor sound (Carrier frequency)	8	8	Hz
F37	Load selection	1	1	
E CODES: EXTENSION TERMINAL FUNCTION				
E01	Terminal [X1] function	0	0	
E02	Terminal [X2] function	1	1	
E03	Terminal [X3] function	2	2	
E04	Terminal [X4] function	1007	7 or 1007	
E05	Terminal [X5] function	10	59	
E20	Terminal [Y1] function	57	57	
E21	Terminal [Y2] function	13	13	
E 27	Terminal [30A/B/C] function (Relay output)	1099	99/1099	
C CODES: CONTROL FUNCTIONS.				
C05	Multistep frequency 1	0	High Speed	Hz
C06	Multistep frequency 2	0	Slow Speed	Hz
C08	Multistep frequency 4	0	Inspection Speed	Hz
C19	UPS Operation Speed	2.5	ARD Speed	Hz
P CODES:MOTOR 1 PARAMETERS				
P 02	Motor 1 (Rated capacity)	As per drive ratings	***	
P 03	Motor 1 (Rated current)	As per drive ratings	***	
P 04	Motor 1 (Auto tuning)	0		
P 99	Motor 1 selection	0	4	
H codes: High Performance Functions				
H 07	Curve acceleration/ deceleration	4	4	
H16	Allowable momentary power failure time	999	0	S
H57	S-curve Setting 1	20	40	%
H58	S-curve Setting 2	20	30	%
H59	S-curve Setting 3	20	25	%
H60	S-curve Setting 4	20	25	%
J codes: Application functions 1				
J 68	Brake control signal (Brake-release current)	10	5	%
J 69	Brake control signal (Brake-release frequency/speed)	0.3	0.3	Hz
J 70	Brake control signal (Brake-release timer)	0.2	0.2	S
J 71	Brake control signal (Brake-applied frequency/speed)	0.5	0.2	Hz
J 72	Brake control signal (Brake-applied timer)	0.5	0.2	S
L codes: Option functions 1				
L 01	S-curve Setting 5	20	20	%
L 02	S-curve Setting 6	20	20	%
L 03	Starting Speed (Soft start time)	0.25	0.25	S

Note: *** Motor name plate data.

2.4 Timing diagram:

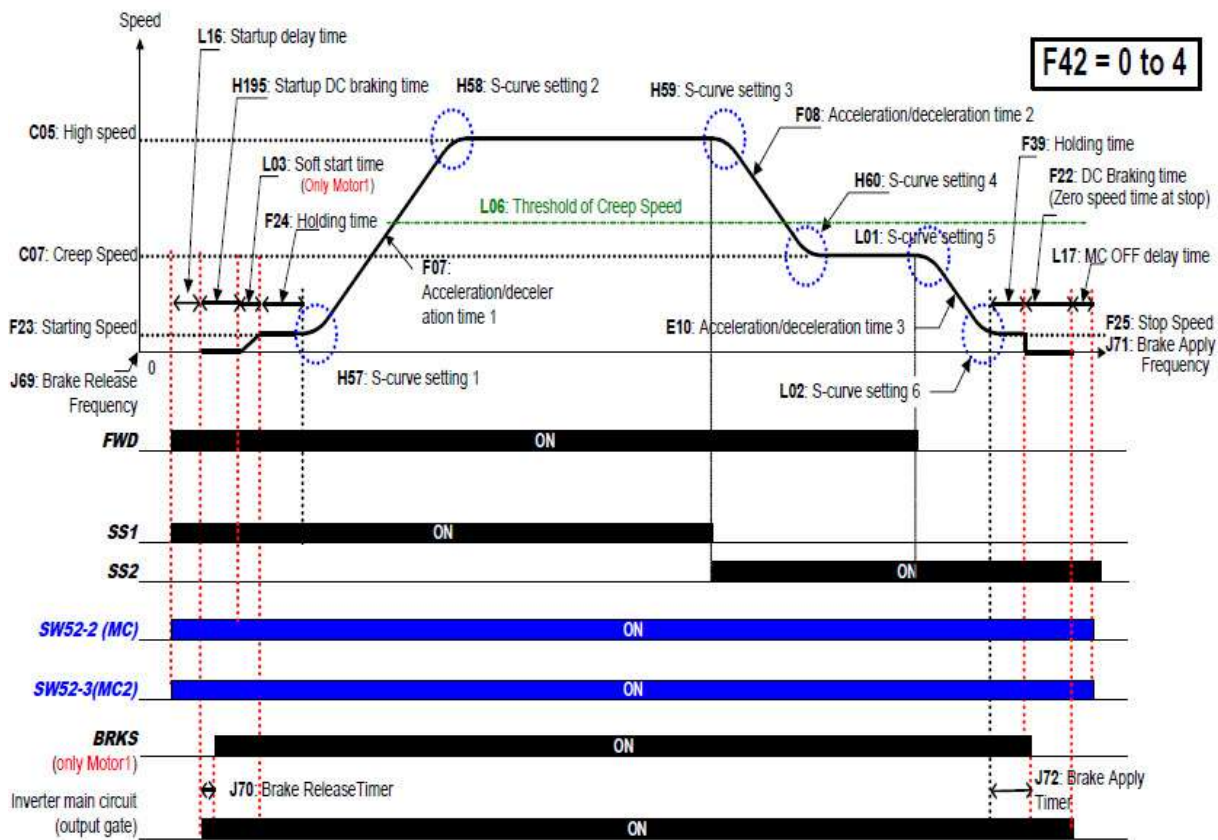


Figure 3. Timing diagram of ACE-4GBLM3 open loop.

2.5 Motor tuning:

In case of the static auto-tuning for motor, no-load current can be tuned by the motor static condition (P04=1).

If the inverter finds any abnormality in the tuning results or any error in the tuning process, it displays Er7 and discards the tuning data.

When the tuning error (Er7) appears, check that:

- The inverter's output (secondary) circuit is opened or not.
- The mechanical brake is applied or not.
- The terminal command BX ("Coast to a stop") is turned ON or not.
- Any function code is wrongly configured

2.6 UPS operation:

The UPS operation enables the inverter (during under voltage or power failure situation) to move the elevator cage to the nearest floor with 230Volts single phase UPS supply.

2.6.1 Requirements for UPS operation:

- The *BATRY/UPS* function (data = 59) must be assigned to any digital input terminal. (I.e. X5 terminal).
- An AC voltage must be supplied from the UPS to the main circuit (R-T). The voltage level will differ depending on the operation speed and load.
- The *BATRY/UPS* function must be turned on.

2.6.2 Specifications:

- The inverter can run the elevator starting from the voltage level specified in H111.
- During the UPS operation, the inverter runs the elevator at the speed specified by C19.
- In UPS operation, the acceleration/deceleration time are specified by E11. The S-curve during acceleration/deceleration is disabled.

2.6.3 Block diagram:

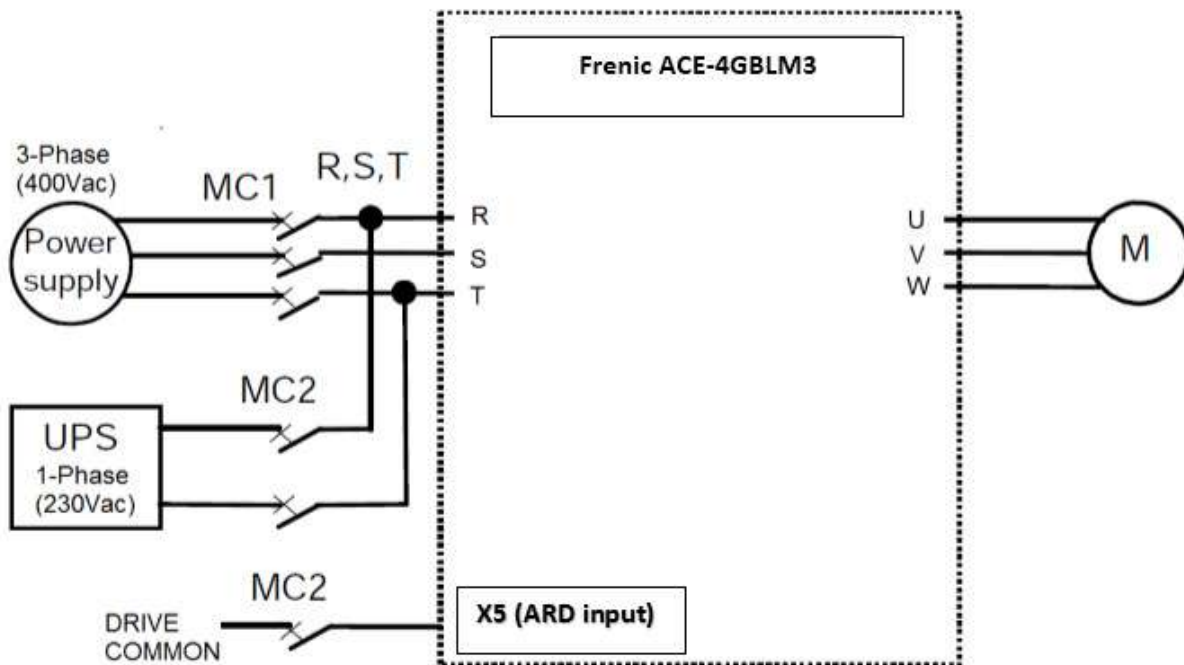


Figure 4. Connection diagram of UPS operation.

2.6.4 Operation Profile:

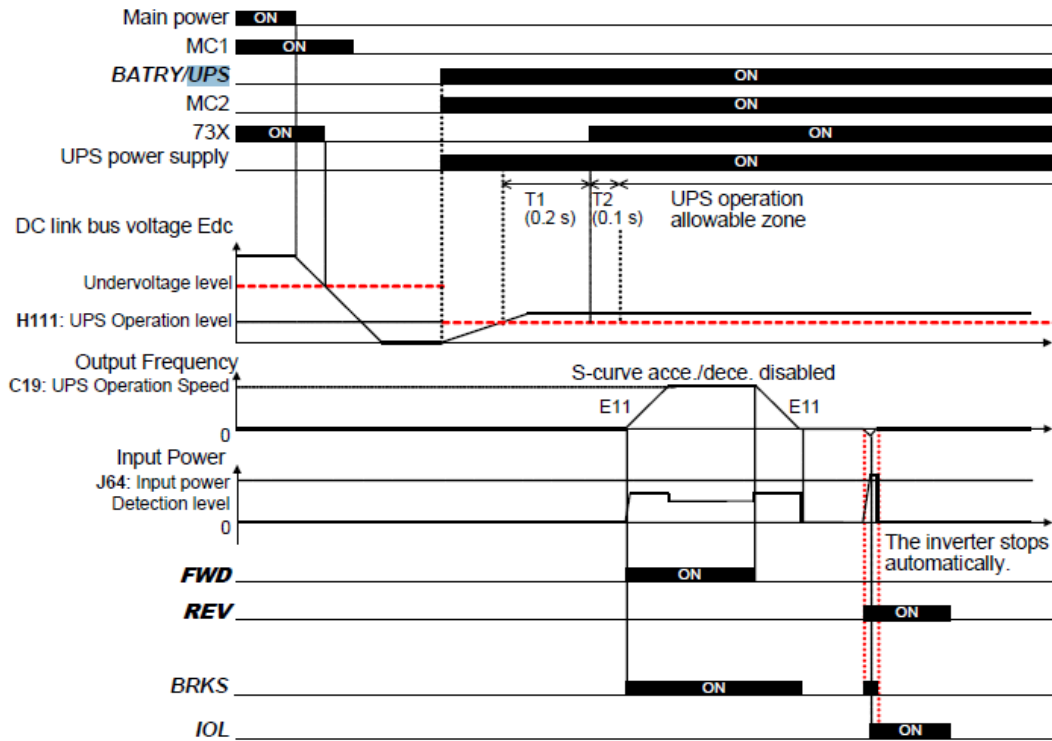


Figure 5. Timing diagram of UPS operation

3. Document Details:

Doc. No/Version	Name of document	Date	Prepared by	Checked by	Approved by
FEI-LIFT-AL001/1.0.0	Commissioning guidelines of ACE-4GBLM3 for open loop geared elevators	19/04/2016	Subhrit Shyamal	Ajay Bhosale	Mahendra Chalke
			Sign:	Sign:	Sign:

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