OPTIMAL
DRIVE

S.S.P

Elevator AC Drive Controller (Open Loop)

MD380L Series

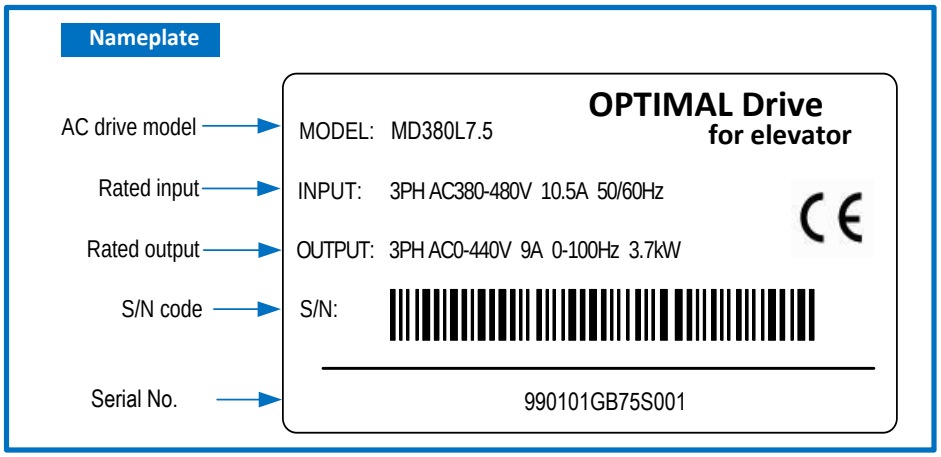
User Manual

SABET Sanat Parsian Co.

Contents

1 Product information

1.1 Nameplate



1.2 Designation rule

3300 X X.X G B

3300
Open loop elevator drive

Mark	Build-in braking unit
B	Yes

Mark	Voltage class
-2T	Three-phase 220 V
T	Three-phase 380 V

Mark	2.2	3.7	5.5	...	15
Applicable motor [kW]	2.2	3.7	5.5	...	15

1.3 General specifications

Voltage class			220VAC				380/400/415VAC				
Drive Model			3300 -2T2.2GB	3300 -2T3.7GB	3300 -2T5.5GB	3300 -2T7.5GB	3300 T3.7GB	3300 T5.5GB	3300 T7.5GB	3300 T11GB	3300 T15GB
Dimension	Height Width Depth		[H] : 248 mm [W] : 160 mm [D] : 183 mm		[H] : 322 mm [W] : 208 mm [D] : 192 mm		[H] : 248 mm [W] : 160 mm [D] : 183 mm		[H] :322 mm [W] :208 mm [D] : 192 mm		
Mounting Hole			Ø5		Ø6		Ø5		Ø6		
Drive Input	Rated Input Voltage		Three-phase 200Vac to 240Vac, -15% to +10% (170Vac to 264Vac)				Three-phase 380 to 480V, -15% to +10% (323Vac to 528Vac)				
	Rated Input Current, [A]		10.5	14.6	26	35	10.5	14.6	20.5	26	35
	Rated input frequency		50/60 Hz, ±5% (47.5 to 63Hz)								
Drive Output	Applicable Motor	[kW]	2.2	3.7	5.5	7.5	3.7	5.5	7.5	11	15
		[HP]	3	5	7.5	10	5	7.5	10.0	15	20
	Output Current ,[A]*1		9	13	25	32	9	13	17.0	25	32
	Power Capacity, [kVA]		5.9	8.9	17	21	5.9	8.9	11	17	21
	Overload Capacity		150% for 60 Sec & 180% for 3 Sec								
	Max. output voltage		Three-phase 200Vac to 240Vac (Proportional to input voltage)				Three-phase 380Vac to 480Vac (Proportional to input voltage)				
	Max. output frequency		100 Hz								
Braking Resistor	Recommended Power, [W]		500	750	1200	1500	750	1200	1500	2500	3000
	Recommended Resistance, [Ω]		≥ 65	≥ 45	≥ 22	≥ 16	≥ 130	≥ 90	≥ 65	≥ 43	≥ 32
Enclosure			IP 21								

☆: At 4 kHz carrier frequency without derating.
★: The mounting dimensions are shown below.

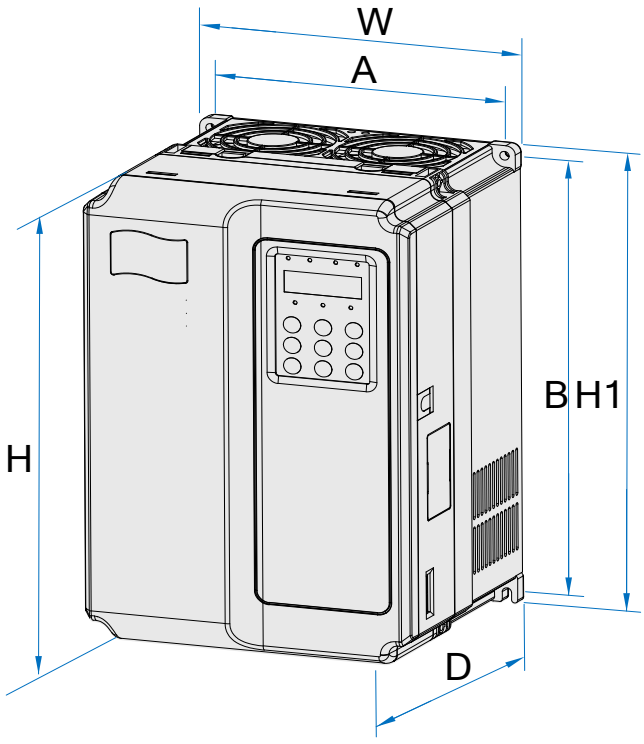


Fig 1. Physical appearance and dimensions

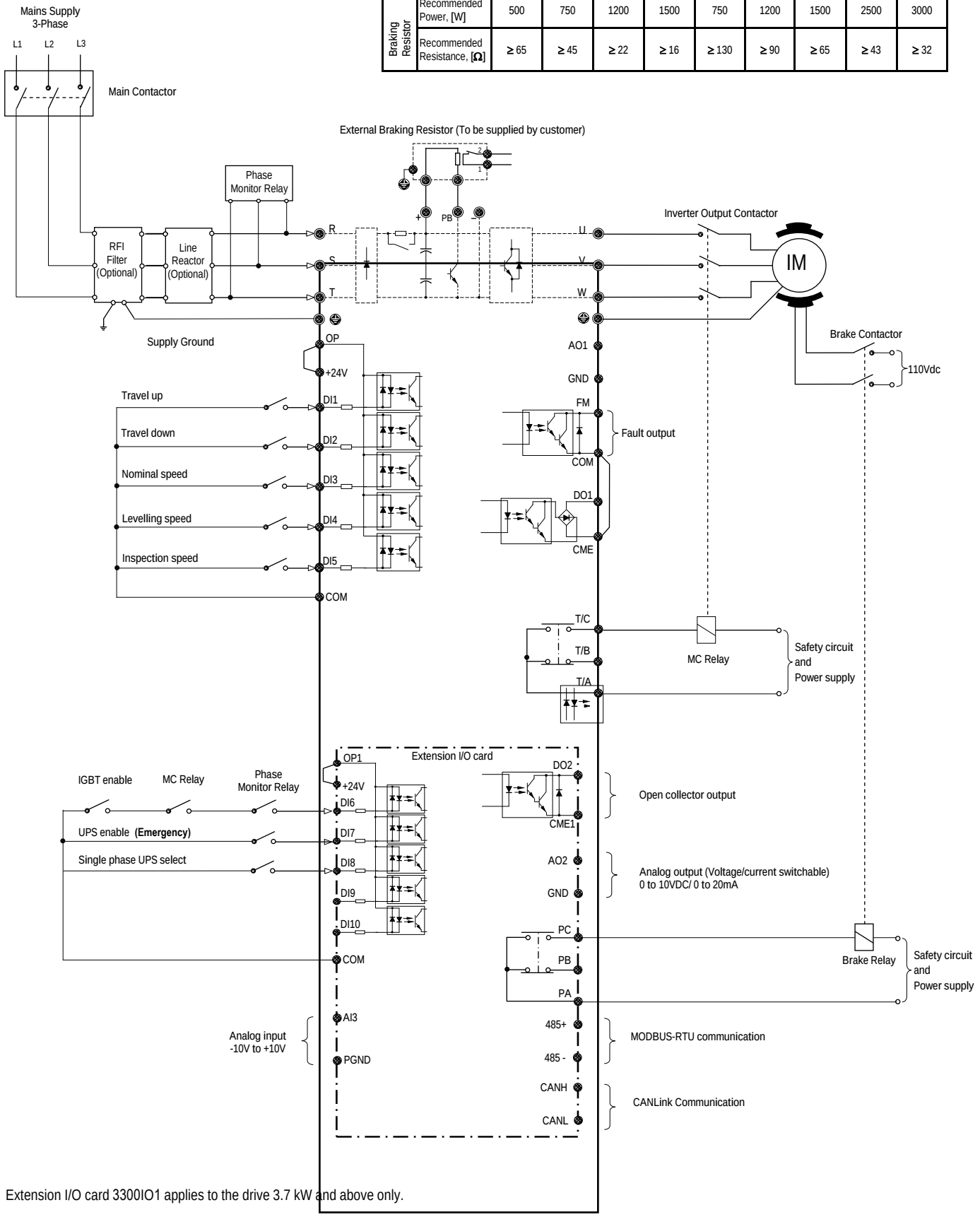
2 Wiring

2.1 Typical wiring 1 (use multi-reference input as frequency reference)

(Default: F0-03=6, use multi-reference)

Recommended Braking Resistor

Voltage class		220VAC				380/400/415VAC				
Drive Model		**3300** -2T2.2GB	**3300** -2T3.7GB	**3300** -2T5.5GB	**3300** -2T7.5GB	**3300** T3.7GB	**3300** T5.5GB	**3300** T7.5GB	**3300** T11GB	**3300** T15GB
Braking Resistor	Recommended Power, [W]	500	750	1200	1500	750	1200	1500	2500	3000
	Recommended Resistance, [Ω]	≥ 65	≥ 45	≥ 22	≥ 16	≥ 130	≥ 90	≥ 65	≥ 43	≥ 32



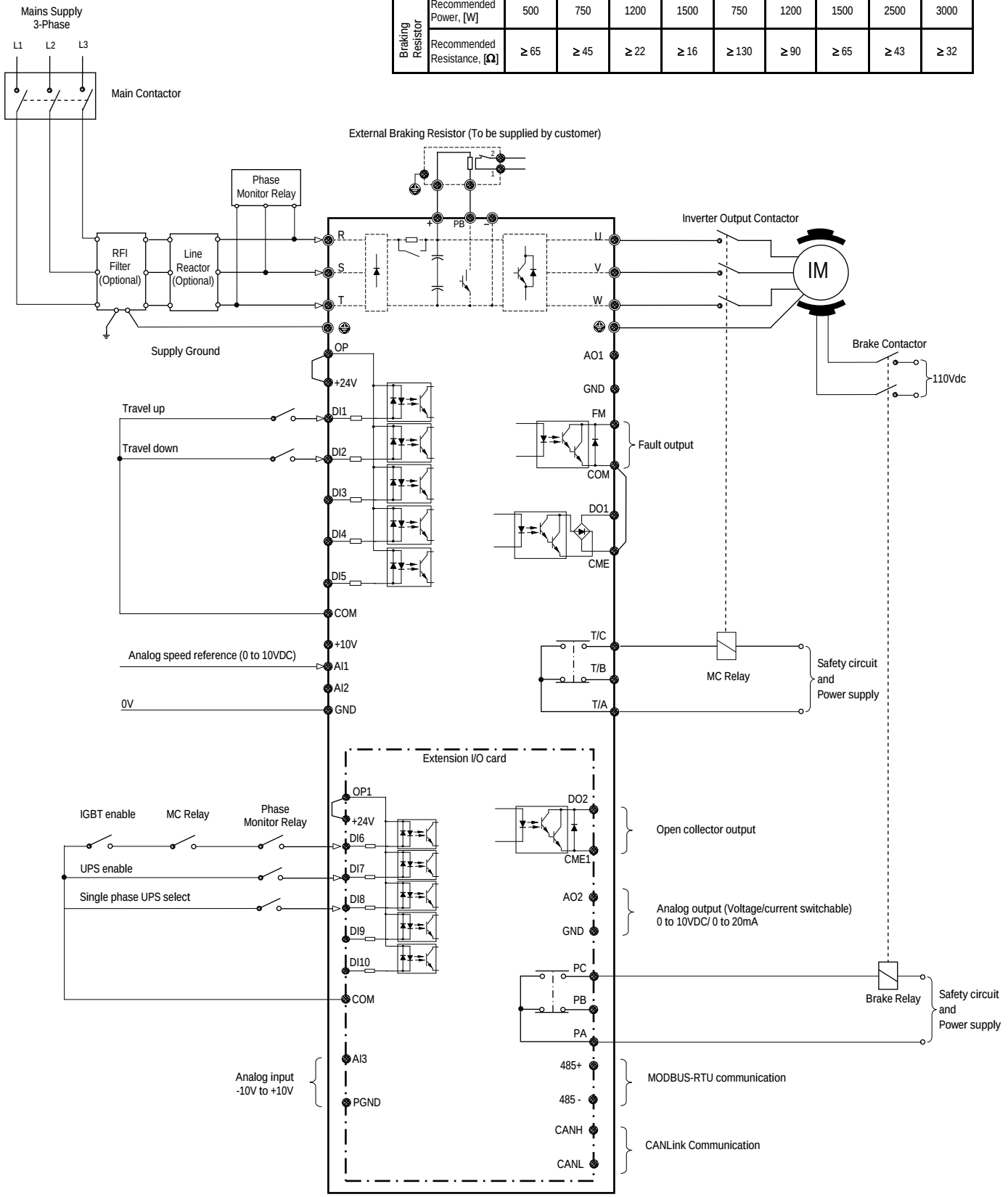
NOTE: Extension I/O card 3300IO1 applies to the drive 3.7 kW and above only.

2.2 Typical wiring 2 (use analog input as frequency reference)

(Set F0-03=2 to use AI1)

Recommended Braking Resistor

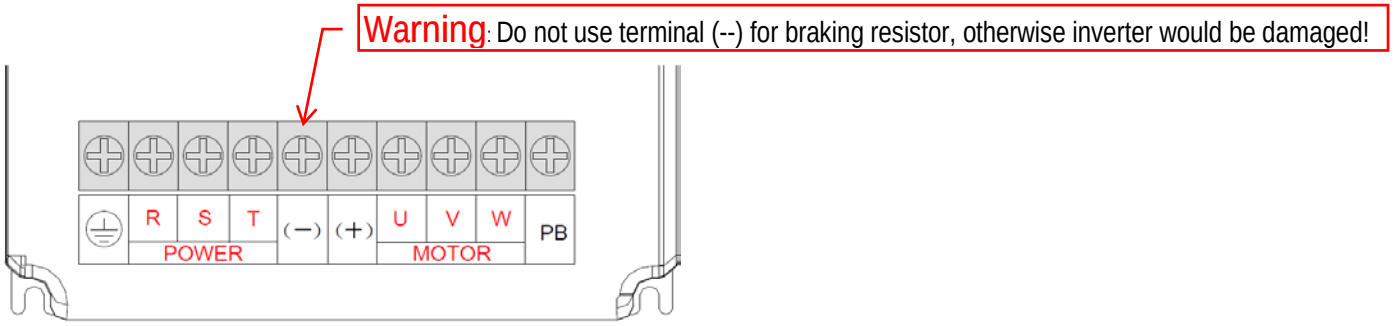
Voltage class		220VAC				380/400/415VAC				
Drive Model		**3300** -2T2.2GB	**3300** -2T3.7GB	**3300** -2T5.5GB	**3300** -2T7.5GB	**3300** T3.7GB	**3300** T5.5GB	**3300** T7.5GB	**3300** T11GB	**3300** T15GB
Braking Resistor	Recommended Power, [W]	500	750	1200	1500	750	1200	1500	2500	3000
	Recommended Resistance, [Ω]	≥ 65	≥ 45	≥ 22	≥ 16	≥ 130	≥ 90	≥ 65	≥ 43	≥ 32



NOTE Extension I/O card 3300IO1 applies to the drive 3.7 kW and above only.

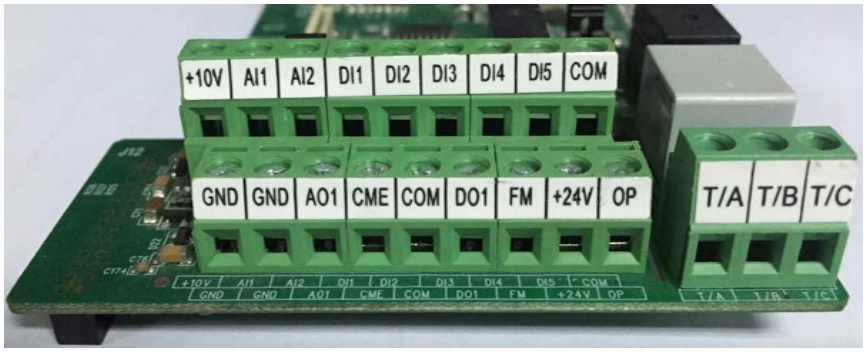
2.3 Terminal description

✓ Terminals of main circuit



Terminal	Terminal Name	Description
R, S, T	Three-phase power supply input terminals	Connect to the three-phase AC power supply.
(-), (+)	Positive and negative terminals of DC bus	Common DC bus input point.
PB, (+)	Connecting terminals of braking resistor	Connect to a braking resistor.
U, V, W	Output terminals	Connect to a three-phase motor.
⏚	Grounding terminal	Must be grounded.

✓ Terminals of main control board

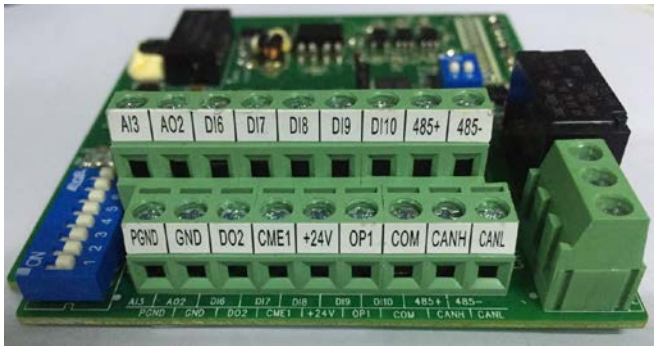


Terminal	Terminal Name	Description
+10V-GND	+10 VDC power supply	Provide +10 VDC power supply externally. Usually, it provides power supply to the external potentiometer with resistance range of 1 to 5 kΩ. Max. output current: 10 mA.
+24V-COM	+24 VDC power supply	Provide +24 VDC power supply externally. Usually, it provides power supply to DI/DO terminals and external sensors. Max. output current: 200 mA.
OP	Input terminal of external power supply	Connect to +24 VDC by default. Whether it connects to +24 V or COM is decided by jumper J7. When DI1 to DI5 need to be driven by the external signal, OP needs to be connected to the external power supply and be disconnected from +24 VDC.
AI1-GND	Analog input 1	AI1 input voltage range: 0 to 10 VDC. Impedance: 22 kΩ.
AI2-GND	Analog input 2	AI2 can be used as voltage input or current input, which is chosen by jumper J8 on main control card. Input range: 0 to 10 VDC or 4 to 20 mA. Impedance: 22 kΩ if voltage input, 500 Ω if current input.
DI1-COM	Digital input 1	Optical coupling isolation, compatible with dual-polarity input. Impedance: 2.4 kΩ. Input voltage range: 9 to 30 VDC.
DI2-COM	Digital input 2	
DI3-COM	Digital input 3	
DI4-COM	Digital input 4	
DI5-COM	High-speed pulse input	Besides features of DI1 to DI4, it can be used for high-speed pulse input. Max. input frequency: 100 kHz.
AO1-GND	Analog output 1	Voltage or current output, determined by jumper J5 on main control board. Output voltage range: 0 to 10 VDC. Output current range: 0 to 20 mA.
DO1-CME	Digital output 1	Open-collector, dual polarity output, optical coupling isolated. Voltage range: 0 to 24 VDC. Current range: 0 to 50 mA.
FM-COM	High-speed pulse output	It is restricted by F5-00 (FM terminal output mode selection). As a high-speed pulse output, the maximum frequency is 100 kHz. As an open-collector output, its specification is the same as that of DO1: Voltage range: 0 to 24 VDC. Current range: 0 to 50 mA.
T/A-T/B	Normally closed terminal	Contact driving capacity: 250 VAC, 3 A; 30 VDC, 1 A.
T/A-T/C	Normally open terminal	

NOTE: Default Drive comes with jumper between +24V → OP and CME → COM.

2.4 Extension I/O card 3300IO1

NOTE: 3300IO1 applies to the drive 3.7 kW and above only.



✓ Control configuration

Item	Listing	Description
Inputs	5 digital inputs; 1 analog input	AI range:-10 to 10 VDC, it can be used as AI, PT100 and PT1000 input (thermal sensor, 0 to 200°C).
Outputs	1 relay; 1 digital output; 1 analog output	
Communication	RS485 interface; CAN interface	RS485 supports MODBUS-RTU protocol; CAN supports CANlink protocol

✓ Terminals

NOTE: Default Drive comes with jumper between +24V → OP and CME → COM.

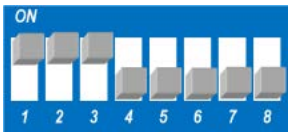
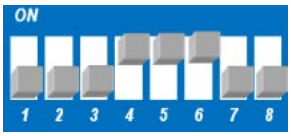
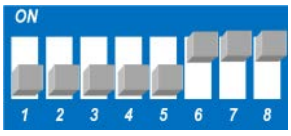
Terminal	Terminal Name	Description
+24V-COM	+24 VDC power supply	Provide +24 VDC power supply externally. Usually, it provides power supply to DI/DO terminals and external sensors. Max. output current: 200 mA.
OP1	Input terminal of external power supply	Connect to +24 VDC by default. Whether it connects to +24 V or COM is decided by jumper J8. When DI6 to DI10 need to be driven by the external signal, OP1 needs to be connected to the external power supply and be disconnected from +24 VDC.
AI3-PGND	Analog input 3	Optical coupling isolation, compatible with differential signal and PT100/PT1000 temperature sensor input (0 to 200°C). Input voltage range: -10 to 10 VDC. Use dial switch S1 to select different input mode: Analog, or PT1000 or PT100, must not select more than one mode at one time.
DI6-COM	Digital input 6	Optical coupling isolation, compatible with dual-polarity input. Impedance: 2.4 kΩ. Input voltage range: 9 to 30 VDC. .
DI7-COM	Digital input 7	
DI8-COM	Digital input 8	
DI9-COM	Digital input 9	
DI10-COM	Digital input 10	
AO2-GND	Analog output 2	Voltage or current output, determined by jumper J3 on extension I/O card. Output voltage range: 0 to 10 VDC. Output current range: 0 to 20 mA. Impedance range: for current output,0 to 500 Ω

Terminal	Terminal Name	Description
DO2-CME1	Digital output 2	Multi-function and dual-polarity and open-collector output. Voltage range: 0 to 24 VDC. Current range: 0 to 50 mA.
485+-485-	MODBUS communication terminal	MODBUS protocol. Baud rate: 300 to 115200 bps. Max. nodes: 32. Terminal resistance dial switch: S2.
PA-PB	Normally closed terminal	Contact driving capacity: 250 VAC, 3 A; 30 VDC, 1 A.
PA-PC	Normally open terminal	
CANH-CANL	CANlink communication terminal	CANlink communication.

NOTE: see below configuration of jumpers

Jumper	Description
J3	AO2 output mode selection: voltage or current.
J4	CAN terminal resistance selection
J7	CME1 connection mode selection: connected to COM or not.
J8	OP1 connection mode selection: connected to internal +24V or not.
S1	AI input mode selection: analog input (voltage) or PT100 or PT1000 input (both 0 to 200°C).
S2	RS485 terminal resistance selection (RTU).

NOTE: see below configuration methods for dial switch S1:

S1 configuration	AI input mode
	Analog input (voltage).
	PT1000 thermal sensor (0 to 200°C).
	PT100 thermal sensor (0 to 200°C).

3 Operation panel

3.1 Get familiar with operation panel

✓ Overview

✓ Parameter unit indicator

Indicator appearance	Meaning
Hz RPM A % V	Hz for frequency
Hz RPM A % V	A for current
Hz RPM A % V	V for voltage
Hz RPM A % V	% for anything relevant

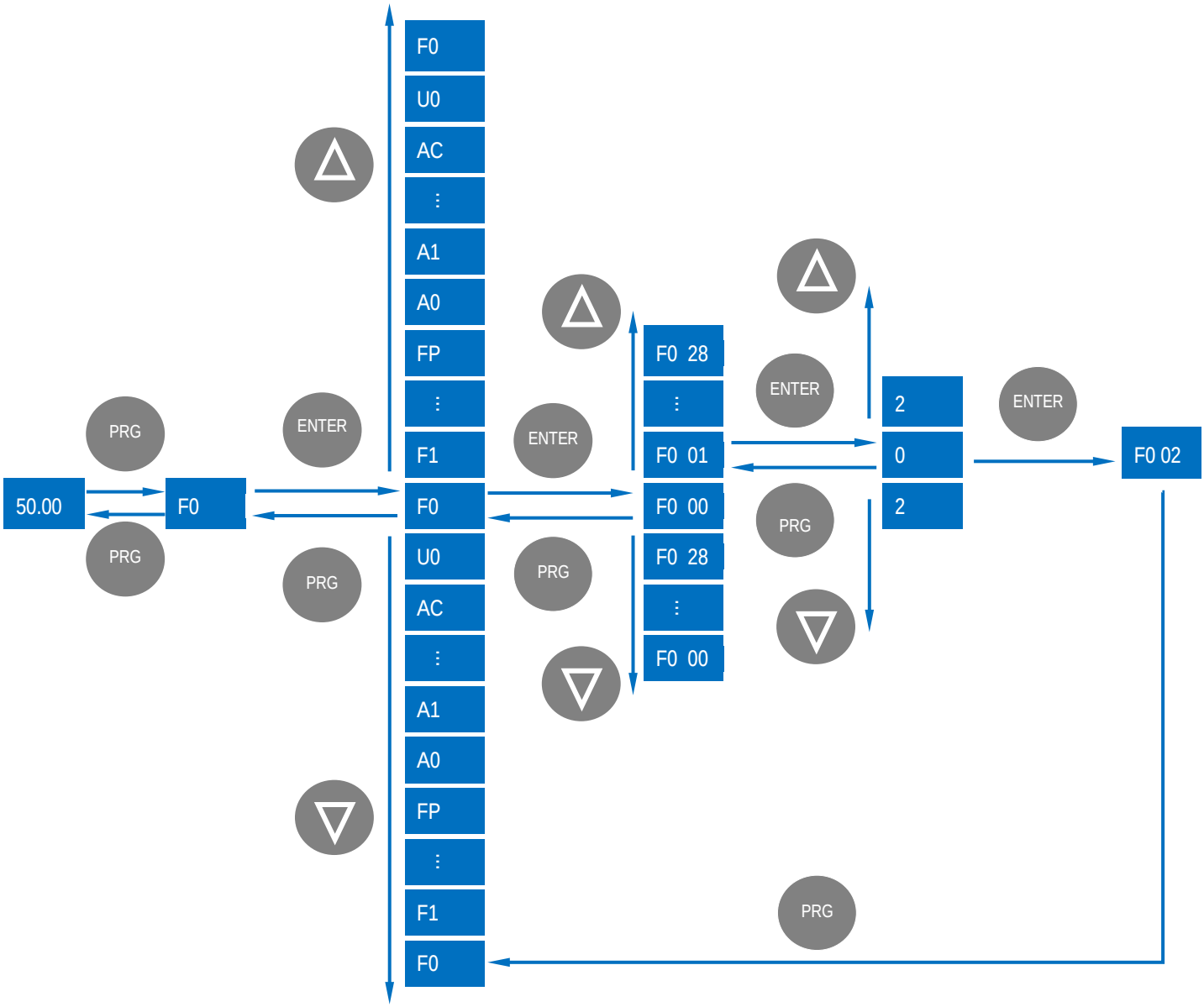
✓ Keys on operation panel

Key	Key Name	Function
PRG	Programming	Enter or exit Level I menu.
ENTER	Confirm	Enter the menu interfaces level by level, and confirm the parameter setting.
△	Increment	Increase data or function code.
▽	Decrement	Decrease data or function code.
▷	Shift	Select the displayed parameters in turn in the stop or running state, and select the digit to be modified when modifying parameters.
RUN	RUN	Start the AC drive in the keypad operation mode.
STOP RES	Stop/Reset	Stop the AC drive when it is in the running state and perform the reset operation when it is in the faulty state. The functions of this key are restricted by F7-02.
MF.K	Multifunction	Perform function switchover (such as quick switchover of command source or direction) according to the setting of F7-01.
QUICK	Menu mode selection	Perform switchover between menu modes according to the setting of FP-03.

✓ Relevant parameters for operation panel setting

Function code	Parameter Name	Setting Range	Unit	Default	Commission
F7-01	MF.K key function selection	0: MF.K key disabled 1: Switchover from remote control (terminal or communication) to keypad control 2: Switchover between forward rotation and reverse rotation 3: Forward jog 4: Reverse jog 5: Individualized parameter display	N.A.	0	0
F7-02	STOP/RESET key function	0: STOP/RESET key enabled only in keypad control 1: STOP/RESET key enabled in any operation mode	N.A.	1	1
FP-03	Parameter display property	For user defined and user modified parameters 00: non of them will display 01: user defined parameters will display 10: user modified parameters will display 11: both of them will display	N.A.	00	

✓ Operations of parameters

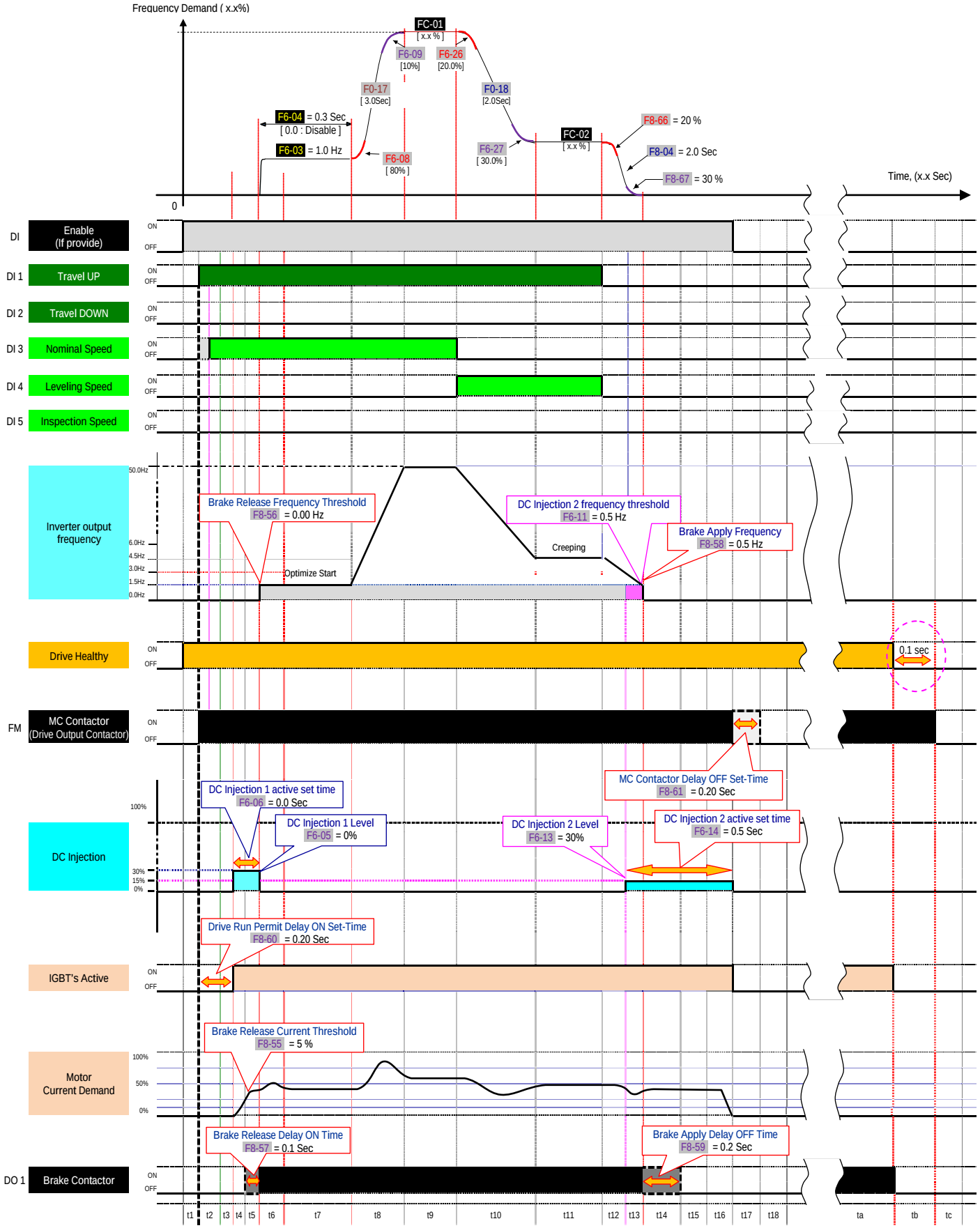


✓ Parameter arrangement

Function code Group	Description	Remark
F0 to FF	Standard function code group	Standard function parameters
A0 to AC	Advanced function code group	AI/AO correction
U0	Running state function code group	Display of state-monitoring parameters

4 Quick setup

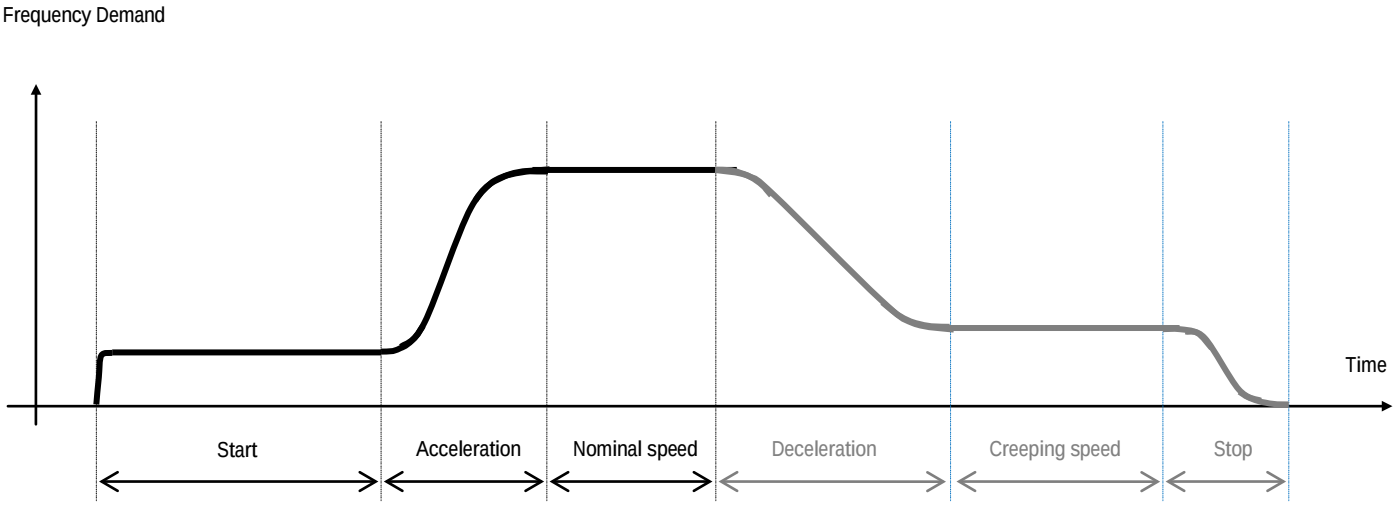
4.1 Complete timing diagram for normal travel (use multi-reference as frequency reference)



✓ Timing diagram description

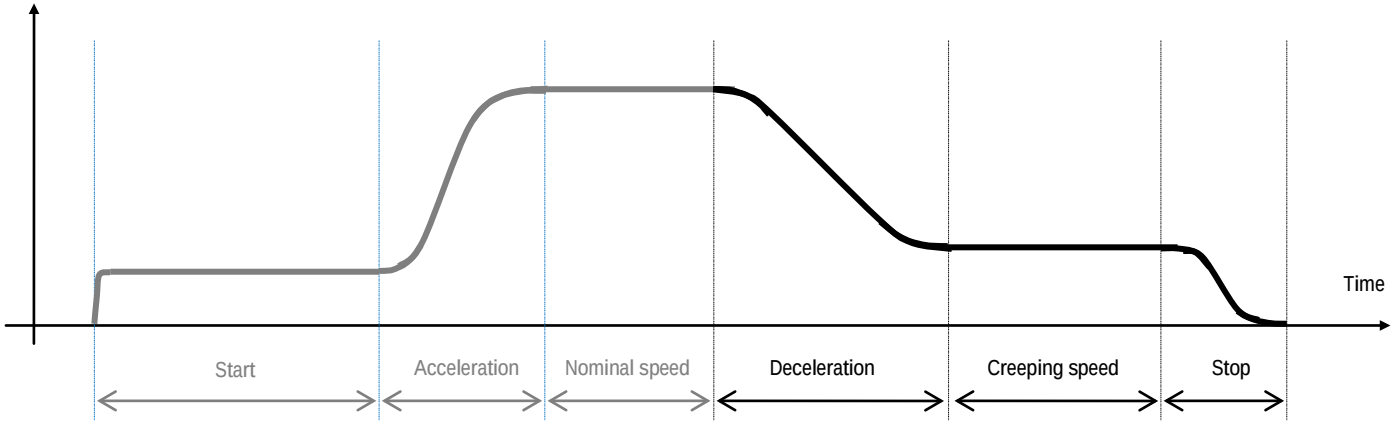
Event	Descriptions	Function	Drive Status
ta	- Drive healthy - MC and brake Contactor are energised	----	RUN
tb	- Drive Trip - IGBTs disable - Brake contactor de-energised	----	Trip
tc	- MC contactor got de-energised provided drive IGBTs are disabled after 0.1sec	----	Trip
t1	- Drive waits to enable by lift controller	----	Inhibit
t2	- Drive MC contactor output energized when direction demand command enable by the lift controller. - Desired preset speed reference command enable by lift controller	F8-60	Ready
t3	- Drive IGBTs immediately go into active mode after the desire drive run permit delay ON set time has elapse.	F8-60	STOP
t4	- DC injection active - Motor brake contactor energized when motor current demand excess the brake release current level and brake release frequency	F6-05 F6-06 F8-55 F8-56	RUN
t5	- Motor brake contactor is energized - Optimize profile generator active - Motor start to run	F8-57 F6-03 F6-04	RUN
t6	- DC injection 1 disable after the desired set time has elapsed	F6-06	RUN
t7	- Start optimizer profile generator disable after the desired set time has elapse.	F6-04	RUN
t8	- Motor ramp up to the desire preset speed reference.	F6-08 F6-09 F0-17 FC-0x	RUN
t9	- Drive output at speed status	FC-0x	RUN
t10	- Change of preset speed reference demand - Motor ramp down to the desire preset speed reference	F6-08 F6-09 F0-17 FC-0x	RUN
t11	- Drive output at speed status	FC-0x	RUN
t12	- Direction demand command disabled - Motor ramp down to zero speed	F6-08 F6-09 F0-18	RUN
t13	- DC injection active when drive output falls below the DC injection 2 frequency threshold	F6-11 F6-13	RUN
t14	- Brake contactor got de-energise when the drive output frequency fall below the brake apply frequency	F8-56 F8-59	RUN
t15	- DC injection still active when brake contactor got de-energise.	F6-13	RUN
t16	- DC injection disable after the desire set time has elapse	F6-14	STOP
t17	- Drive IGBTs got disable - MC contactor delay OFF time active	-----	Ready
t18	- MC contactor de-energise after the desire set time has elapse	F8-61	Inhibit

4.2 Elevator performance fine tuning



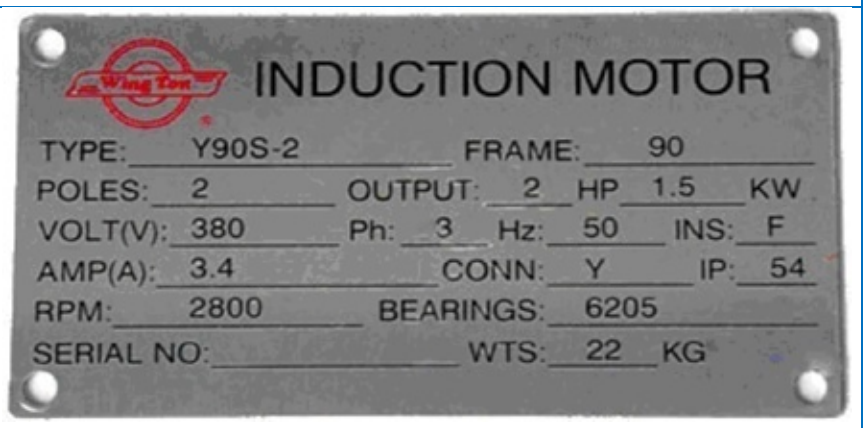
Stage	Symptom	Diagnostics	Remedies
Start	Rollback	Brake device releases too early	Increase F8-57,ranging 0 to 0.5s
		Start frequency is too low	Increase F6-03, ranging 0 to1.5Hz
		Torque output is insufficient	Make sure F3-00=0, F3-01=0
	Starting jerk	Brake device releases too late	Decrease F8-57, ranging 0 to 0.5s
		Start frequency is too high	Decrease F6-03, ranging 0 to 1.5Hz
Acceleration	Jerk when acceleration starts	Too fast acceleration at this section	Increase F6-08, ranging 0 to 80%; Or increase F0-17, ranging 0 to 20s; Or Decrease F2-00, ranging 0 to 100 and increase F2-01, ranging 0.01 to 10.00s in SVC control mode
	Jerk when acceleration end	Too fast acceleration at this section	Increase F6-09, ranging 0 to (100-(F6-08))% Or increase F0-17, ranging 0 to 20s
	Overshoot when acceleration ends	Too big speed loop PI gains	Decrease F2-03, ranging 0 to 100 Or increase F2-04, ranging 0 to 10
	Vibration	Too small margin between F2-02 and F2-05	Make sure F2-05 - F2-02 > 3Hz, usually increase F2-05, ranging from F2-02 to 7Hz
		Overcurrent stall prevention occurs	Make sure F3-18=170%
Nominal speed	Vibration	Too big speed loop PI gains	Decrease F2-00 or F2-03, ranging 0 to 100; Or increase F2-01 or F2-04, ranging 0.01 to 10.00 NOTE: F2-00 and F2-01 are only applicable as running frequency is lower than F2-02. F2-03 and F2-04 are only applicable as running frequency is higher than F2-05. The others are the linear relationship as running frequency between F2-02 and F2-05.
		Too big current loop PI gains	Double check the motor parameters and then perform motor auto-tuning once more

Frequency Demand



Stage	Symptom	Diagnostics	Remedies
Deceleration	Jerk when deceleration starts	Too fast deceleration at this section	Increase F6-26, ranging 0 to 80%; Or increase F0-18, ranging 0 to 20s
	Vibration	Overcurrent stall prevention occurs	Make sure F3-18=170%
	Jerk when deceleration ends	Too fast deceleration at this section	Increase F6-27, ranging 0 to 80%; Or increase F0-18, ranging 0 to 20s
Creeping speed	Vibration	Torque output is insufficient	Make sure F3-00=0, F3-01=0
	Elevator gets stuck	Torque output is insufficient	Make sure F3-00=0, F3-01=0
	Move much slower than expected	Torque output is insufficient	Make sure F3-00=0, F3-01=0
		Too small creeping speed setting	Increase F4-16, ranging 0 to 100%; Or decrease relevant multi-reference; Or increase F3-09 to 100.0%
Stop	Jerk	Too fast deceleration at this section	Use Stop stage deceleration time F8-04: Set F8-04 bigger than F0-18, ranging F0-18 to 20s;
		Braking device applies too early	Make sure F8-58=0.2Hz, then increase F8-59,ranging 0 to 0.5s
		Too strong DC injection at stop	Decrease F6-13, ranging 0 to 100%
	Slip	Too short DC injection active time at stop	Increase F6-14,ranging 0 to 1s
		Too weak DC injection at stop	Increase F6-13, ranging 0 to 100%
		Braking device applies too late	Make sure F8-58=0.2Hz, then decrease F8-59, ranging 0 to 0.5s
	Inaccurate levelling position	Too slow deceleration	Decrease F8-04, ranging F0-18 to 20s; Or decrease F8-66,ranging 0 to 80% and F8-67,ranging 0 to 80%; Or decrease relevant slow speed multi-reference
		Slip occurs	Refer to problem 'Slip'
	Levelling varies with different loads	Too weak slip compensation	For SVC, increase F2-06 or F 2-00; For VF, increase F3-09

4.3 Setup flowchart

START	Para	Parameter name	Default	Commissioning
Ahead of setup		Default values are elicited from enormous real elevator applications, so users can rely on them usually, only some adjustments are necessary. If parameter restoration is prohibited due to some reasons, then the following steps have to be followed one by one.		
Remove DI wirings		usually if any DI is set as Forward or Reverse run and if signal is active, then some operations cannot succeed, such as restoring parameters, changing command source, which are necessary steps for quick setup. So it's seriously recommended to remove DI wirings at the beginning of commissioning.		
Restore parameters	FP-01	Parameter operation	0	1
		0: No operation 1: Restore default settings except motor parameters 2: Clear records including errors 4: Restore user's backup parameters 501: Backup parameters NOTE: usually people have no idea what parameters have been changed, so it's seriously recommended to restore parameters to default at the beginning of commissioning.		
Set motor parameters		Motor Nameplate		
				
	F1-01	Rated motor power	model dependent	
		Unit: kW		
	F1-02	Rated motor voltage	400	
		Unit: V		
	F1-03	Rated motor current	model dependent	
		Unit: A		
	F1-04	Rated motor frequency	50.00	
		Unit: Hz		
	F1-05	Rated motor speed	1440	
		Unit: rpm.		

CONTINUE	Para.	Parameter name	Default	Commissioning

CONTINUE	Para.	Parameter name	Default	Commissioning
Select command source	F0-02	Command source selection	1	0
		0: Operation panel control (indicator 'LOCAL/REMOT' OFF) 1: Terminal control (indicator 'LOCAL/REMOT' ON) 2: Communication control (indicator 'LOCAL/REMOT' blinking)		
Perform motor auto tuning	F1-37	Auto-tuning selection	0	3
		0: No auto-tuning 2: Asynchronous motor dynamic auto-tuning 3: Asynchronous motor static auto-tuning(NEW) NOTE: Motor won't rotate at this stage. Steps of auto-tuning: 1. Make sure the UVW connection between inverter and motor is not cut off by output contactor; if it is cut off, then manually handle with the output contactor; 3. Set F1-37=3, press ENTER, then LED on panel will display letters 'TUNE'; 4. Press the key RUN on panel, then motor starts auto-tuning, it usually takes about 30 seconds to finish this auto-tuning, wait until LED stops displaying 'TUNE'; 5. Restore F0-02 to the default value 1.		
Select Control mode	F0-01	Control mode selection	2	0 or 2
		0: SVC control 2: VF control		
Select frequency reference source	F0-03	Main frequency source X selection	6	2 or 6
		0:Digital setting F0-08(pressing ▼ or ▲ can change F0-08 easily, and the changed value won't be cleared even after power off) 1:Digital setting F0-08(pressing ▼ or ▲ can change F0-08 easily, but changed value would be cleared after power off) 2: AI1 3: AI2 4: AI3 5: Pulse setting (DI5) 6: Multi-reference setting 7: Simple PLC 8: PID 9: Communication setting		
Set AI if AI is frequency reference	F4-13	AI curve 1 minimum input	0.00	0.00
		0 V to F4-15;		
	F4-14	Corresponding setting of AI1minimum input	0.0	0.0
		-100.0% to 100.0%		
	F4-15	AI1 maximum input	5.00	
		F4-13 to 10.00 V		
	F4-16	Corresponding setting of AI1maximum input	100.0	
		-100.0% to 100.0%		
CONTINUE	Para.	Parameter name	Default	Commissioning

CONTINUE

Set multi-reference values

if multi-reference is frequency reference

Set DI function

Para.	Parameter name	Default	Commissioning
FC-01	Reference 1	100.0	100.00
	0.0 to 100.0%. NOTE: FC-01 is set as nominal speed of elevator.		
FC-02	Reference 1	11.0	11.0
	0.0 to 100.0%. NOTE: FC-02 is set as creep speed of elevator.		
FC-04	Reference 4	40.0	40.00
	0.0 to 100.0%. NOTE: FC-04 is set as inspection speed of elevator.		
FC-08	UPS reference frequency	10.0	10.0
	0.0 to 100.0%. NOTE: FC-08 is set as UPS speed of elevator.		
F4-00	DI1 function selection	1	1 (Forward run)
	0: No function 1: Forward RUN (FWD) 2: Reverse RUN (REV) 8: IGBT Enable 9: Fault reset (RESET) 12: Multi-reference terminal 1 13: Multi-reference terminal 2 14: Multi-reference terminal 3 Setting range:0 to 59; NOTE: this signal comes from elevator controller.		
F4-01	DI2 function selection	2	2 (Reverse run)
	Setting range same as DI1; NOTE: this signal comes from elevator controller.		
F4-02	DI3 function selection	12	12
	Setting range same as DI1 NOTE: if analog input is used as frequency reference, then DI3 is useless, just leave it alone. If multi-reference is used as frequency reference, then signal 'nominal speed' comes from elevator controller.		
F4-03	DI4 function selection	13	13
	Setting range same as DI1. NOTE: if analog input is used as frequency reference, then DI4 is useless, just leave it alone. If multi-reference is used as frequency reference, then signal 'creep speed' comes from elevator controller.		
F4-04	DI5 function selection	14	14
	setting range same as DI1; NOTE: if analog input is used as frequency reference, then DI5 is useless, just leave it alone. If multi-reference is used as frequency reference, then signal 'inspection speed' comes from elevator controller.		
F4-05	DI6 function selection	0	
	setting range same as DI1;		

CONTINUE

Para.	Parameter name	Default	Commissioning

CONTINUE

	Para.	Parameter name	Default	Commissioning
Set DO function	F5-01	FM function selection	2	2(Fault output)
		0 : No output 1 : AC Drive running 2 : Fault output 36: Software current exceeding limit 42 : Brake output 43 : MC (Magnetic contactor) output Setting range:0 to 59; NOTE: this signal goes to magnetic contactor.		
	F5-02	Relay function selection(TA/TB/TC)	43	43 (MC)
		Setting range same as FM; NOTE: this signal goes to magnetic controller.		
	F5-03	Relay function selection(PA/PB/PC)	42	42(Brake)
		Setting range same as FM; NOTE: this signal goes to brake contactor.		
Set magnetic contactor	F8-60	Drive run delay ON set time	0.20	0.20
		0.00 to 10.00 Sec; NOTE: if MC is controlled by elevator controller, then F8-60 is useless.		
	F8-61	MC contactor delay OFF set time	0.20	0.20
		0.00 to 10.00 Sec; NOTE: if MC is controlled by elevator controller, then F8-61 is useless.		
Set brake contactor	F8-55	Brake release current threshold	20	20
		0 to 200%;		
	F8-56	Brake release frequency threshold	0.20	0.20
		0.00 to 25.00 Hz;		
	F8-57	Brake release delay ON set time	0.0	0.0
		0.0 to 5.0 Sec;		
	F8-58	Brake apply frequency threshold	0.5	0.5
		0.00 to 25.00 Hz;		
	F8-59	Brake apply delay OFF set time	0.2	0.2
		0.0 to 5.0 Sec;		
Set acceleration and deceleration	F0-17	Acceleration time 1	3.0	3.0
		0.0 to 6500.0 sec.		
	F0-18	Deceleration time 1	2.0	2.0
		0.0 to 6500.0 sec.		
	F8-04	Stop stage deceleration time	2.0	2.0
		0.0 to 6500.0 sec.		
Set startup frequency	F6-03	Startup frequency	1.0	1.0
		0.0 to 10.0 Hz;		

CONTINUE

Para.	Parameter name	Default	Commissioning

CONTINUE

Para.	Parameter name	Default	Commissioning
F6-04	Startup frequency active set time	0.3	0.3
	0.0 to 100.0 Sec		
F6-07	Acceleration/Deceleration mode	3	3
	0 : Linear acceleration/ deceleration 3: S-curve acceleration/ deceleration C		
F6-08	Time proportion of S-curve at Accel start	80.0	80.0
	0.0% to Min[(100.0% - F6-09), 80%]		
F6-09	Time proportion of S-curve at Accel end	10.0	10.0
	0.0% to Min[(100.0% - F6-08), 80%]		
F6-26	Time proportion of S-curve at Decel start	20.0	20.0
	0.0% to Min[(100.0% - F6-27), 80%]		
F6-27	Time proportion of S-curve at Decel end	30.0	30.0
	0.0% to Min[(100.0% - F6-26), 80%]		
F8-65	Brake apply keep frequency set time	0.50	0.50
	0.00 to 10.00 Sec.		
F8-66	Time proportion of S-curve at Stop start	20.0	20.0
	0.0% to Min[(100.0% - F8-67), 80%]		
F8-67	Time proportion of S-curve at Stop start	30.0	30.0
	0.0% to Min[(100.0% - F8-66), 80%]		
F6-11	DC injection 2 frequency threshold	0.50	0.50
	0.00 Hz to maximum frequency		
F6-12	DC Injection 2 delay ON set time	0.0	0.0
	0.0 to 36.0 Sec		
F6-13	DC injection 2 level	30	30
	0 to 100 Hz		
F6-14	DC injection 2 active set time	0.5	0.5
	0.0 to 36.0 Sec		
F3-00	V/F curve selection	0	0
	0: Linear V/F 1: Multi-point V/F SETTING RANGE: 0 to 11;		
F3-01	Torque boost	0.0	0.0
	0.0 to 30.0 %; NOTE: if it is 0, then auto torque boost is activated, and it is recommended to use auto torque boost.		
F2-00	Speed loop proportional gain 1	10	10
	0 to 100.		
F2-01	Speed loop integral time 1	0.5	0.5
	0.01 to 10.00 Sec.		

Set S-curve

Set DC injection for stopping

Set VF parameters

if it is VF control

Set SVC parameters

CONTINUE

Para. Parameter name Default Commissioning

CONTINUE

Set SVC parameters

Set UPS parameters

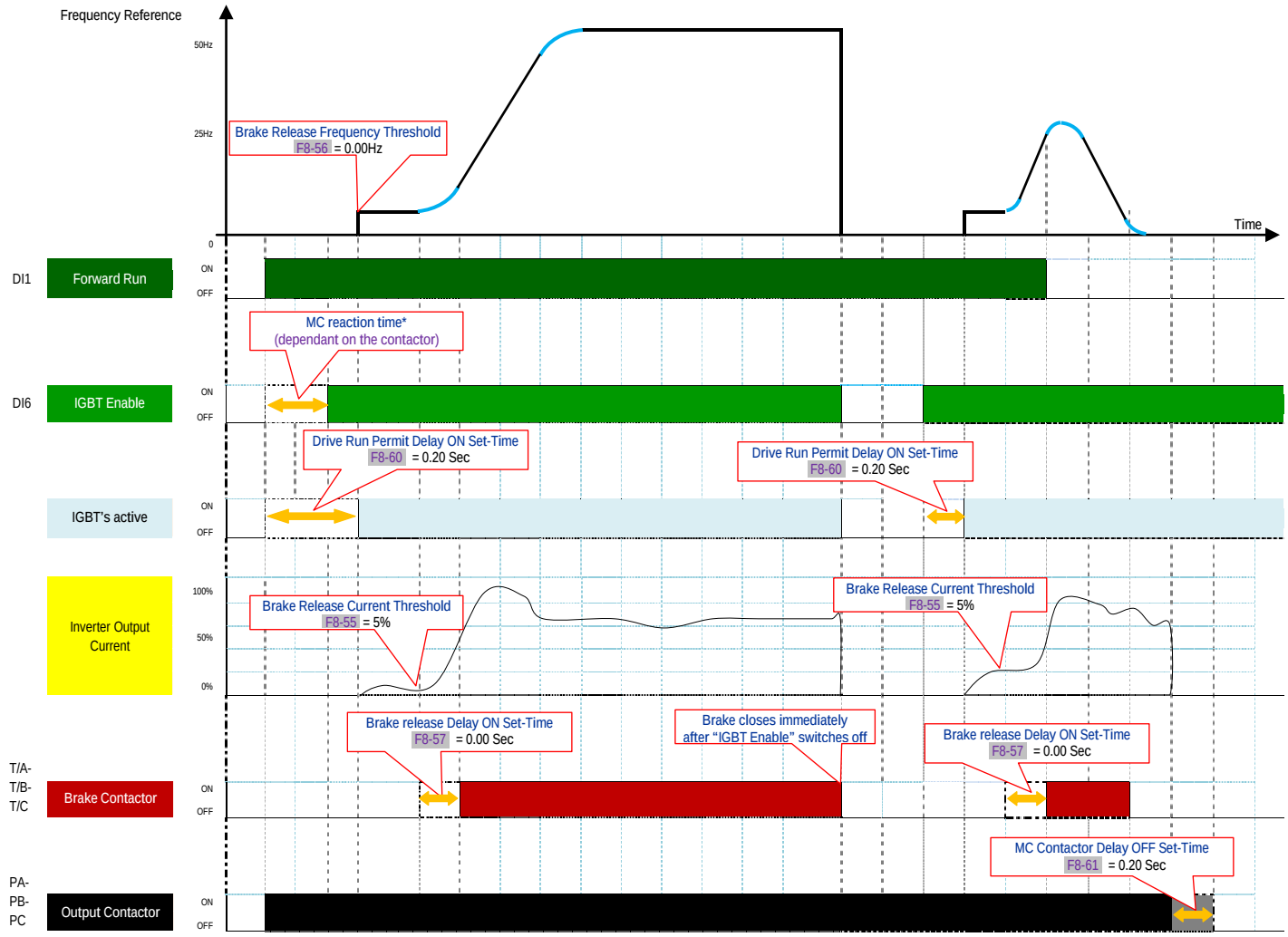
OVER

Para.	Parameter name	Default	Commissioning
F2-02	Switchover frequency 1	3.00	3.00
	0.00 to F2-05		
F2-03	Speed loop proportional gain 2	30	30
	0 to 100.		
F2-04	Speed loop integral time 2	0.5	0.5
	0.01 to 10.00 Sec.		
F2-05	Switchover frequency 2	7.0	7.0
	F2-02 to maximum output frequency		
F4-06	DI7 function selection	0	53
	setting range same as DI1;		
F4-07	DI8 function selection	0	54
	setting range same as DI1; NOTE: if elevators use single phase or two phase UPS, please enable this DI when set 54 or set F8-68 to 1.		
F8-62	Current threshold in UPS mode	100	100
	0 to 200.		
F8-63	Acceleration time in UPS mode	3.0	3.0
	0.0 to 20.0 Sec.		
F8-64	Deceleration time in UPS mode	3.0	3.0
	0.0 to 20.0 Sec.		
F8-68	UPS input phase mode select	0	1
	0 : Three phase 380Vac/415Vac 1 : Single phase 220Vac/240Vac NOTE: if elevators use single phase UPS, please set F8-68 to 1 or enable DI8 when set 54.		
F8-69	Single phase UPS under voltage point	60.0	60.0
	60.0 to 140.0 NOTE: when use single phase UPS, under voltage point is active by F8-69. Otherwise under voltage point is active by A5-06.		

4.4 IGBT Enable

In all elevator applications, an Output Contactor is installed between the inverter output U, V, W and the motor. In an emergency, the Safety Line is opened due to an unsafe condition and the Output Contactor disconnects the power from the inverter to the motor (the motor brake is also applied at the same time). When the Output Contactor opens with current flowing through to the motor (inverter IGBTs are active), there will be arcing in the Output Contactor depending on the motor inductive energy. Arcing of the Output Contactor can reduce the lifetime of the contactor and in some severe cases can damage the contacts poles. ~~Therefore it is recommended to electronically switch off the inverter IGBT firing circuits before opening the Output Contactor (milliseconds later).~~ The inverter IGBT firing can be electronically switched off with the "IGBT Enable" function as shown in the timing charts below.

CAUTION: An Output Contactor MUST always be installed as the final safety power cut off to the motor. The "IGBT Enable" function is NOT a substitute for an Output Contactor, it is designed to work together with the Output Contactor.



* MC reaction time: the reaction time of output relay of MC.

For some applications, the status of output contactor needs to be checked before inverter starts up, hence one relay output of MC will feedback to IGBT Enable (above in the diagram it is DI6).

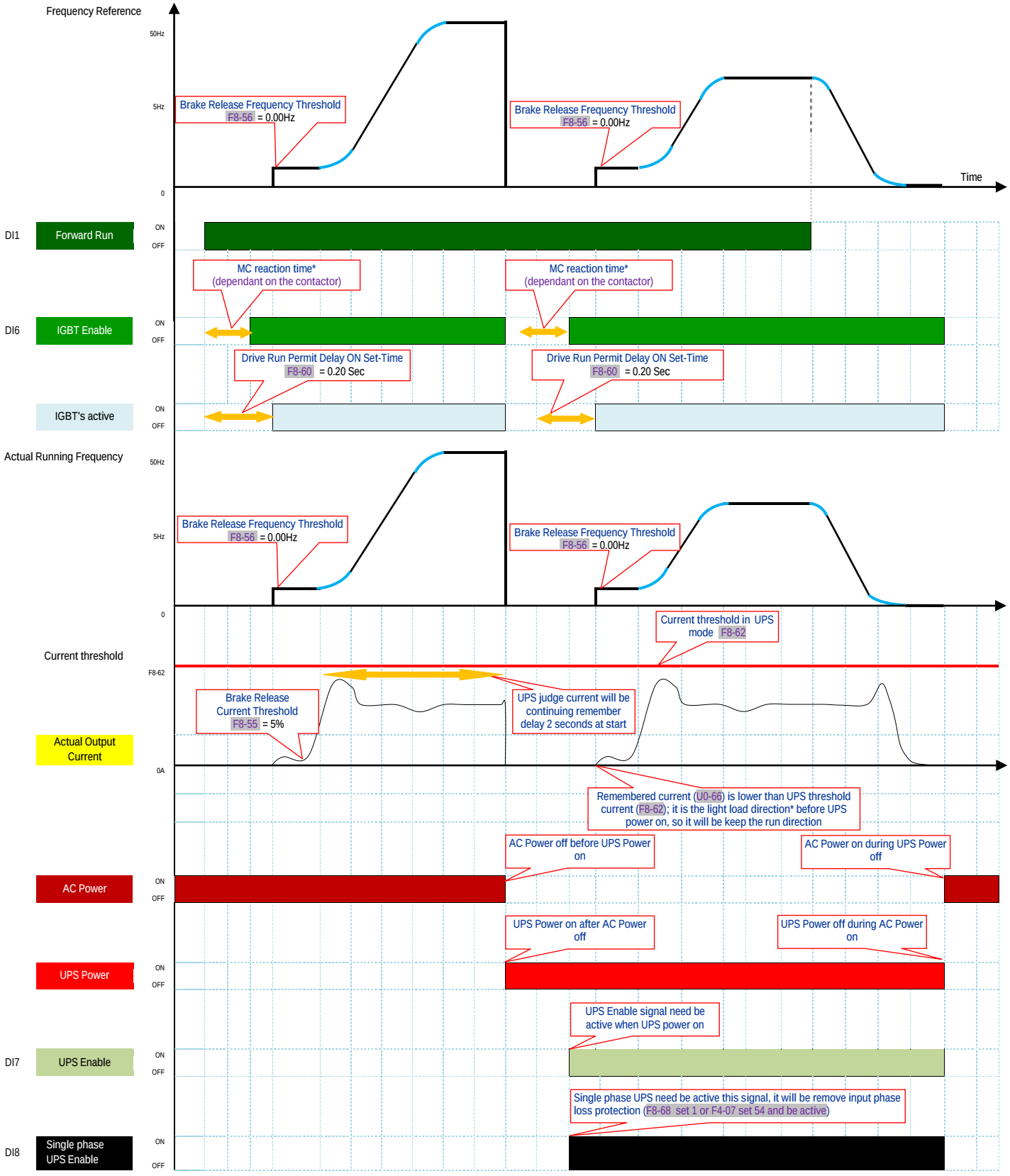
This function can work by assigning "IGBT Enable" function to a digital input, please refer to the table below to set.
Take DI6 for example: assign "IGBT Enable" to DI6, then set F4-05=8. If it's necessary to change active mode of IGBT Enable, then use F4-38 or F4-39 to set (low level or high level active).

Function Code	Parameter Name	Setting Range	Unit	Default	Commission
F4-00	DI 1 function selection	0 : No function 1 : Forward RUN (FWD) 2 : Reverse RUN (REV) …… 8 : IGBT Enable …… 12: Multi-reference terminal 1 13: Multi-reference terminal 2 14: Multi-reference terminal 3 15: Multi-reference terminal 4 ……	N.A	1	
F4-01	DI 2 function selection		N.A	2	
F4-02	DI 3 function selection		N.A	12	
F4-03	DI 4 function selection		N.A	13	
F4-04	DI 5 function selection		N.A	14	
F4-05	DI 6 function selection		N.A	0	8
F4-06	DI 7 function selection		N.A	15	
F4-07	DI 8 function selection		N.A	0	
F4-08	DI 9 function selection		N.A	0	
F4-09	DI 10 function selection		N.A	0	
F4-38	DI active mode selection (Normal: low level active)	7-segment 0 0 0 0 0	N.A	00000	
	DI5 active mode: 0: Normal 1: Opposite				
	DI4 active mode: 0: Normal 1: Opposite				
	DI3 active mode: 0: Normal 1: Opposite				
	DI 2 active mode: 0: Normal 1: Opposite				
	DI 1 active mode: 0: Normal 1: Opposite				
F4-39	DI active mode selection 2 (Normal: low level active)	7-segment 0 0 0 0 0	N.A	00000	
	DI10 active mode: 0: Normal 1: Opposite				
	DI9 active mode: 0: Normal 1: Opposite				
	DI8 active mode: 0: Normal 1: Opposite				
	DI7 active mode: 0: Normal 1: Opposite				
	DI6 active mode: 0: Normal 1: Opposite				

4.5 UPS Function

In all elevator applications, most time we will face the issue that passengers may be trapped in the car if power failure suddenly happens during use of the elevator. So the emergency evacuation mode is very important for safety. When the elevator is in UPS mode, the drive will be auto research light load direction to protect passengers can be reach levelling floor for safety.

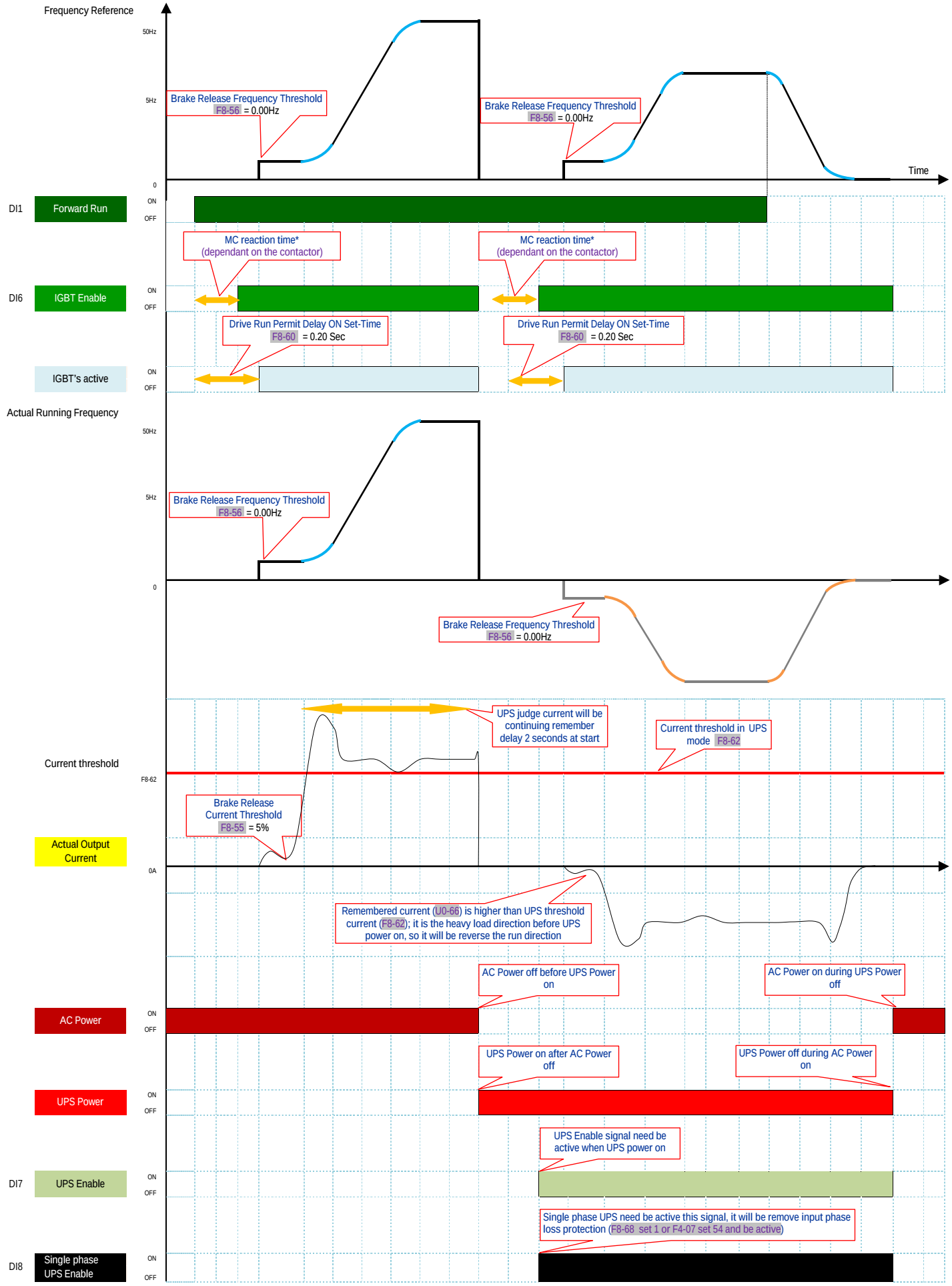
CASE 1 UPS mode Light load search operation for output current **of ≤ 100%**



* Light load direction: UPS mode will be auto research light load direction, and it will be running to nearest light load direction floor. Which is decided by F8-62 and U0-66, if U0-66 is lower than F8-62, it will be continue to keep the run direction before UPS; otherwise it will be reverse the direction.

For some applications, the status of Single phase UPS Enable needs to be checked before inverter starts up according to DI8 or F8-68, because it will be removed input phase loss protection in UPS mode, otherwise it will be trip Err12.

CASE 2 UPS mode Light load search operation for output current of > 100%



5 Function code table

NOTE: not all parameters are listed, here below are relevant to open loop elevator applications.

5.1 Group F0: fundamental

Function Code	Parameter name	Setting Range	Unit	Default	Commission
F0-01	Motor 1 control mode	0 : Sensor-less flux vector control (SFVC) 2 : V/F control	N.A	2	
F0-02	Command source selection	0 : Operation panel control (LED off) 1 : Terminal control (LED on) 2 : Communication control (LED flashing)	N.A	1	
F0-03	Main frequency source X selection	2 : AI-1 3 : AI-2 4 : AI-3 6 : Multi-reference	N.A	6	
F0-07	Frequency source selection	0 : Main frequency source X	N.A	0	
F0-09	Rotation direction	0: Same direction 1: Reverse direction	N.A	0	
F0-10	Maximum frequency	50.00 to 100.00	Hz	50.00	
F0-15	Carrier frequency	0.5 to 11.0 (SVC mode: 0.5 to 9) (VF mode: 0.5 to 11)	kHz	Model dependant	
F0-17	Acceleration time 1	0.00 to 650.00 (F0-19 = 2) 0.0 to 6500.0 (F0-19 = 1) 0 to 65000 (F0-19 = 0)	Sec	3.0	
F0-18	Deceleration time 1	0.00 to 650.00 (F0-19 = 2) 0.0 to 6500.0 (F0-19 = 1) 0 to 65000 (F0-19 = 0)	Sec	2.0	
F0-19	Acceleration/Deceleration time unit	0 : 1 1 : 0.1 2 : 0.01	Sec	1	1

5.2 Group F1: motor 1 parameters

Function Code	Parameter name	Setting Range	Unit	Default	Commission
F1-00	Motor type selection	0 : Common asynchronous motor 1 : Variable frequency asynchronous motor	N.A	0	
F1-01	Motor rated power	0.1 to 1000.0	kW	Model dependent	
F1-02	Motor rated voltage	1 to 2000	V	400	
F1-03	Motor rated current	0.01 to 655.35 (For AC drive power ≤ 55 kW) 0.1 to 6553.5 (For AC drive power > 55 kW)	A	Model dependent	
F1-04	Motor rated frequency	0.01 Hz to maximum frequency	Hz	50	
F1-05	Motor rated rotational speed	1 to 65535	RPM	1380	
F1-06	Stator resistance (asynchronous motor)	0.001 to 65.535 (AC drive power ≤ 55 kW) 0.0001 to 6.5535 (AC drive power > 55 kW)	Ω	0	
F1-07	Rotor resistance (asynchronous motor)	0.001 to 65.535 (AC drive power ≤ 55 kW) 0.0001 to 6.5535 (AC drive power > 55kW)	Ω	0.000	
F1-08	Leakage inductive reactance (asynchronous motor)	0.01 to 655.35mH (AC drive power ≤ 55 kW) 0.001 to 65.535 (AC drive power > 55 kW)	mH	0.00	
F1-09	Mutual inductive reactance (asynchronous motor)	0.01 to 655.35 (AC drive power ≤ 55 kW) 0.001 to 65.535 (AC drive power > 55 kW)	mH	0.00	
F1-10	No-load current (asynchronous motor)	0.01 to F1-03 (AC drive power ≤ 55 kW) 0.1 to F1-03 (AC drive power > 55 kW)	A	0.00	
F1-37	Auto tuning selection	0 : No auto-tuning 2: Asynchronous motor dynamic auto-tuning 3 : Asynchronous motor static auto-tuning(NEW)	N.A	0	

5.3 Group F2: vector control

Function Code	Parameter name	Setting Range	Unit	Default	Commission
F2-00	Speed loop proportional gain 1	0 to 100	N.A	10	
F2-01	Speed loop integral time 1	0.01 to 10.00	Sec	0.50	
F2-02	Switchover frequency 1	0.00 to F2-05	Hz	3.00	
F2-03	Speed loop proportional gain 2	0 to 100	N.A	30	
F2-04	Speed loop integral time 2	0.01 to 10.00	Sec	0.5	
F2-05	Switchover frequency 2	F2-02 to maximum output frequency	Hz	7.00	
F2-06	SVC slip gain	50 to 200	%	100	
F2-10	Torque upper limit (for SVC)	0.0 to 200.0 (% inverter rated current)	%	150.0	
F2-13	Excitation adjustment proportional gain	0 to 20000	N.A	2000	
F2-14	Excitation adjustment integral gain	0 to 20000	N.A	1300	
F2-15	Torque adjustment proportional gain	0 to 20000	N.A	2000	
F2-16	Torque adjustment integral gain	0 to 20000	N.A	1300	

5.4 Group F3: VF control

Function code	Parameter Name	Setting Range	Unit	Default	Commission
F3-00	V/F curve setting	0: Linear V/F 1: Multi-point V/F 2 to 11: not relevant settings	N.A.	0	
F3-01	Torque boost	0.0 to 30.0 (if it is 0, then auto torque boost is activated)	%	0	
F3-02	Cut-off frequency of torque boost	0.00 to max output frequency	Hz	4.00	
F3-03	Multi-point V/F frequency 1 (F1)	0.00 to F3-05	Hz	1.50	
F3-04	Multi-point V/F voltage 1 (V1)	0.0 to 100.0	%	6.0	
F3-05	Multi-point V/F frequency 2 (F2)	F3-03 to F3-07	Hz	3.00	
F3-06	Multi-point V/F voltage 2 (V2)	0.0 to 100.0	%	8.0	
F3-07	Multi-point V/F frequency 3 (F3)	F3-05 to rated motor frequency (F1-04)	Hz	8.00	
F3-08	Multi-point V/F voltage 3 (V3)	0.0 to 100.0	%	20.0	
F3-09	V/F slip compensation gain	0 to 200.0	%	100.0	
F3-10	V/F over-excitation gain	0 to 200	%	0	
F3-11	V/F oscillation suppression gain	0 to100	%	30	
F3-13	Voltage source for V/F separation	0 to 8	N.A.	0	
F3-14	Voltage digital setting for V/F separation	0 to rated motor voltage	V	0	
F3-15	Voltage rise time of V/F separation	0.0 to 1000.0	s	0.0	
F3-18	Overcurrent stall prevention current limit (for VF mode)	100 to 200 (% inverter rated current)	%	170	
F3-19	Overcurrent stall prevention enable(for VF mode)	0: Disable; 1: Enable	N.A.	1	
F3-20	Overcurrent stall prevention gain(for VF mode)	0 to 100	N.A.	20	
F3-22	Overvoltage stall prevention voltage limit(for VF/SVC)	650 to 800	V	770	
F3-23	Overvoltage stall prevention enable(for VF/SVC)	0: Disable; 1: Enable	N.A	0	
F3-24	Overvoltage stall prevention frequency gain(for VF/SVC)	0 to 100	N.A	30	
F3-25	Overvoltage stall prevention voltage gain(for VF/SVC)	0 to 100	N.A	30	

5.5 Group F4: input terminals

Function Code	Parameter name	Setting Range	Unit	Default	Commission
F4-00	DI 1 function selection (Standard on-board)	0 : No function 1 : Forward RUN (FWD) 2 : Reverse RUN (REV) 3 : Three-line Control	N.A	1	
F4-01	DI 2 function selection (Standard on-board)	4 : Jog Forward (FJOG) 5 : Jog Reverse (RJOG) 6 : Terminal UP 7 : Terminal DOWN	N.A	2	
F4-02	DI 3 function selection (Standard on-board)	8 : IGBT Enable 9 : Fault reset (RESET) 10: RUN Pause 11: Normally open (NO) input of external fault	N.A	12	
F4-03	DI 4 function selection (Standard on-board)	12: Multi-reference terminal 1 13: Multi-reference terminal 2 14: Multi-reference terminal 3 15: Multi-reference terminal 4	N.A	13	
F4-04	DI 5 function selection (Standard on-board)	16: Terminal 1 for acceleration/deceleration time selection 17: Terminal 2 for acceleration/deceleration time selection	N.A	14	
F4-05	DI 6 function selection (On-board expansion card)	18: Frequency source switchover 19: UP and DOWN setting clear (terminal, operation panel) 20: Command source switchover terminal 1	N.A	0	8
F4-06	DI 7 function selection (On-board expansion card)	21: Acceleration/Deceleration prohibited 22: PID pause 23: PLC status reset 24: Swing pause	N.A	0	15
F4-07	DI 8 function selection (On-board expansion card)	25: Counter input 26: Counter reset 27: Length count input 28: Length reset	N.A	0	
F4-08	DI 9 function selection (On-board expansion card)	29: Torque control prohibited 30: Pulse input (enabled only for DI5) 31: Reserved 32: Immediate DC braking	N.A	0	
F4-09	DI 10 function selection (On-board expansion card)	33: Normally closed (NC) input of external fault 34: Frequency modification forbidden 35: Reverse PID action direction 36: External STOP terminal 1 37: Command source switchover terminal 2 38: PID integral pause 39: Switchover between main frequency source X and preset frequency 40: Switchover between auxiliary frequency source Y and preset frequency 41: Motor selection terminal 1 42: Motor selection terminal 2	N.A	0	

Function Code	Parameter name	Setting Range	Unit	Default	Commission
		43: PID parameter switchover 44: User defined fault 1 45: User defined fault 2 46: Speed control/Torque control switchover 47: Emergency stop 48: External STOP terminal 2 49: Deceleration DC braking 50: Clear the current running time 51: Switchover between two-line mode and three line mode 52: Forbidden reverse 53: UPS mode enable 54: Single/Two phase UPS enable 55 to 59 : Reserved			
F4-10	DI filter time	0.000 to 1.000	Sec	0.010	
F4-11	Terminal command mode	0 : Two-line mode 1 1 : Two-line mode 2 2 : Three-line mode 1 3 : Three-line mode 2	N.A	0	
F4-12	Terminal UP/DOWN rate	0.01 to 65.535	Hz/s	1.00	
F4-13	AI curve 1 minimum input	0.00 to F4-15	V	0.00	
F4-14	Corresponding setting of AI curve 1 minimum input	-100.00 to 100.00	%	0.0	
F4-15	AI curve 1 maximum input	F4-13 to 10.00V	Volt	5.00	
F4-16	Corresponding setting of AI curve 1 maximum input	-100.00 to 100.00	%	100.0	
F4-17	AI 1 filter time	0.00 to 10.00	Sec	0.10	
F4-38	DI valid mode selection (for DI1 to DI5)	00000 to 11111 (binary)	N.A	00000	
F4-39	DI valid mode selection 2 (for DI6 to DI10)	00000 to 11111 (binary)	N.A	00000	

5.6 Group F5: output terminals

Function Code	Parameter name	Setting Range	Unit	Default	Commission
F5-00	FM terminal output mode	0 : High-speed pulse output (FMP) 1 : ON/OFF output (FMR)	N.A	1	
F5-01	FMR function (open-collector output terminal) Attention! Set F5-00 = 1 when FM is used as MC or Brake output.	0 : No output 1 : AC Drive running 2 : Fault output (stop) 3 : Frequency-level detection FDT1 output 4 : Frequency reached 5 : Zero-speed running (no output at stop) 6 : Motor overload pre-warning 7 : AC Drive overload pre-warning 8 : Set count value reached	N.A	2	
F5-02	Relay function (T/A-T/BT/C)	9 : Designated count value reached 10 : Length reached 11 : PLC cycle complete 12 : Accumulated running time reached 13 : Frequency limited 14 : Torque limited 15 : Ready for RUN	N.A	43	
F5-03	Extension card relay function (P/A-P/B-P/C)	16 : AI-1 larger than AI-2 17 : Frequency upper limit reached 18 : Frequency lower limit reached (no output at stop) 19 : Under-voltage state output 20 : Communication setting 21-22 : Reserved 23 : Zero-speed running 2 (having output at stop)	N.A	42	
F5-04	DO-1 function selection (open-collector output terminal)	24 : Cumulative power-on time reached 25 : Frequency-level detection FDT2 output 26 : Frequency 1 reached 27 : Frequency 2 reached 28 : Current 1 reached 29 : Current 2 reached 30 : Timing reached	N.A	0	
F5-05	Extension card DO-2 function	31 : AI-1 input limit exceeded 32 : Load becoming 0 33 : Reverse running 34 : Zero current state 35 : Module temperature reached 36 : Software current limit exceeded 37 : Frequency lower limit reached (having output at stop) 38 : Alarm output 39 : Motor overheat warning 40 : Current running time reached 41 : Fault output (There is no output if it is the coast-to-stop fault and under-voltage occurs) 42 : Brake output 43 : MC (Magnetic contactor) output	N.A	0	
F5-07	AO1 function selection	0 : Running frequency 1 : Set frequency 2 : Output current 3 : Output torque (absolute value) ……	N.A	3	

5.7 Group F6: start and stop control

Function Code	Parameter name	Setting Range	Unit	Default	Commission
F6-00	Start mode	0 : Direct start 1 : Rotational speed tracking restart 2 : Pre-excited start (asynchronous motor)	N.A	0	
F6-03	Startup frequency	0.00 to 10.00	Hz	0.20	
F6-04	Startup frequency active set time	0.0 to 100.0	Sec	0.5	
F6-05	DC injection 1 level	0 to 150	%	60	
F6-06	DC injection 1 active set time	0.0 to 5.0	Sec	0.3	
F6-07	Acceleration/Deceleration mode	0 : Linear acceleration/ deceleration 3: S-curve acceleration/ deceleration C	N.A	3	
F6-08	Time proportion of S-curve at Accel start	0.0% to Min[(100.0% - F6-09), 80%]	%	80.0	
F6-09	Time proportion of S-curve at Accel end	0.0% to Min[(100.0% - F6-08), 80%]	%	20.0	
F6-10	Stop mode	0 : Decelerate to stop 1 : Coast to stop	N.A	0	
F6-11	DC injection 2 frequency threshold	0.00 Hz to maximum frequency	Hz	0.10	
F6-12	DC Injection 2 delay ON set time	0.0 to 36.0	Sec	0.0	
F6-13	DC injection 2 level	0 to 150	%	30	
F6-14	DC injection 2 active set time	0.0 to 5.0	Sec	0.0	
F6-26	Time proportion of S-curve at Decel start	0.0% to Min[(100.0% - F6-27), 80%]	%	20.0	
F6-27	Time proportion of S-curve at Decel end	0.0% to Min[(100.0% - F6-26), 80%]	%	30.0	

5.8 Group F7: product and software version checking

Function Code	Parameter name	Setting Range	Unit	Default	Commission
F7-08	Product number	N.A.	N.A.	380.00	display
F7-10	Performance software version	N.A.	N.A.	312.xx	display
F7-11	Functional software version	N.A.	N.A.	312.xx	display
F7-15	Performance software temporary version	N.A.	N.A.	0.00	display
F7-16	Functional software temporary version	N.A.	N.A.	0.00	display

5.9 Group F8: auxiliary functions

Function Code	Parameter Name	Setting Range	Unit	Default	Commission
F8-04	Stop stage deceleration time	0.0 to 6500.0	sec	2.0	
F8-26	Frequency switchover point between deceleration time 1 and deceleration time 2	0.00 to maximum frequency	Hz	0.00	
F8-55	Brake release current threshold	0 to 200	%	20	
F8-56	Brake release frequency threshold	0.00 to 25.00	Hz	0.20	
F8-57	Brake release delay ON set time	0.0 to 5.0	sec	0.2	
F8-58	Brake apply frequency threshold	0.00 to 25.00	Hz	0.20	
F8-59	Brake apply delay OFF set time	0.0 to 5.0	Sec	0.2	
F8-60	Drive run delay ON set time	0.20 to 10.00	Sec	0.20	
F8-61	MC contactor delay OFF set time	0.00 to 10.00	Sec	0.20	
F8-62	Current threshold in UPS mode	0 to 200	%	100	
F8-63	Acceleration time in UPS mode	0.0 to 20.0	Sec	3.0	
F8-64	Deceleration time in UPS mode	0.0 to 20.0	Sec	3.0	
F8-65	Brake apply keep frequency set time	0.00 to 10.00	Sec	0.50	
F8-66	Time proportion of S-curve at Stop stage start	0.0% to Min[(100.0% - F8-67), 80%]	%	20.0	
F8-67	Time proportion of S-curve at Stop stage end	0.0% to Min[(100.0% - F8-66), 80%]	%	30.0	
F8-68	UPS input phase mode select	0 : Three phase UPS 1 : Single/Two phase UPS	N.A	0	
F8-69	Single/Two phase UPS under voltage point	60.0 to 140.0	%	60.0	60% is 210V

5.10 Group F9: fault and protection

Function Code	Parameter Name	Setting Range	Unit	Default	Commission
F9-00	Motor thermal protection enable selection	0: disable motor thermal protection; 1: enable motor thermal protection	N.A	1	
F9-01	Motor thermal protection coefficient	0.1 to 10.00	N.A	1.00	
F9-02	Motor thermal protection pre-warning coefficient	50 to 99	%	80	
F9-07	Ground fault detection Enable	0: Disable; 1: Enable detection upon power on; 2: Enable detection upon power on and upon start;	N.A	2	
F9-08	Braking operation voltage level	700 to 800	V	750	
F9-09	Fault auto reset times	0 to 20	N.A	0	

Function Code	Parameter Name	Setting Range	Unit	Default	Commission
F9-11	Time interval of fault auto reset	0.1 to100.0	Sec	1.0	
F9-13	Drive output phase loss detection Enable	0: Disable; 1: Enable detection during running; 2: Enable detection upon start and during running	N.A	2	
F9-14	1st fault type	0 to 51	N.A.	N.A.	
F9-15	2nd fault type	0 to 51	N.A.	N.A.	
F9-16	3rd (latest) fault type	0 to 51	N.A.	N.A.	
F9-17	Frequency upon 3rd fault	N.A.	Hz	N.A.	
F9-18	Current upon 3rd fault	N.A.	A	N.A.	
F9-19	Bus voltage upon 3rd fault	N.A.	V	N.A.	
F9-20	Input terminal status upon 3rd fault	N.A.	N.A.	N.A.	
F9-21	Output terminal status upon 3rd fault	N.A.	N.A.	N.A.	
F9-22	AC drive status upon 3rd fault	N.A.	N.A.	N.A.	
F9-23	Power-on time upon 3rd fault	N.A.	N.A.	N.A.	

5.11 Group FC: multi-reference

Function Code	Parameter name	Setting Range	Unit	Default	Commission
FC-00	Reference 0	0.0 to 100.0	%	10.0%	
FC-01	Reference 1	0.0 to 100.0	%	100.0%	
FC-02	Reference 2	0.0 to 100.0	%	11.0%	
FC-03	Reference 3	0.0 to 100.0	%	12.0%	
FC-04	Reference 4	0.0 to 100.0	%	40.0%	
FC-05	Reference 5	0.0 to 100.0	%	13.0%	
FC-06	Reference 6	0.0 to 100.0	%	14.0%	
FC-07	Reference 7	0.0 to 100.0	%	15.0%	
FC-08	UPS reference frequency	0.0 to 20.0	%	10.0%	

Attention!

	F4-02 to F4-04 and F4-06 Multi-Reference				
Preset Reference Selector		F4-02	F4-03	F4-04	F4-06
FC-00 : Reference 0	0	OFF	OFF	OFF	OFF
FC-01 : Reference 1	1	ON	OFF	OFF	OFF
FC-02 : Reference 2	2	OFF	ON	OFF	OFF
FC-03 : Reference 3	3	ON	ON	OFF	OFF
FC-04 : Reference 4	4	OFF	OFF	ON	OFF
FC-05 : Reference 5	5	ON	OFF	ON	OFF
FC-06 : Reference 6	6	OFF	ON	ON	OFF
FC-07 : Reference 7	7	ON	ON	ON	OFF
~~FC-08 : Reference 8~~	~~8~~	~~OFF~~	~~OFF~~	~~OFF~~	~~ON~~

5.12 Group FF: drive parameters

Function Code	Parameter name	Setting Range	Unit	Default	Commission
FF-00	Factory password	0 to 65535	N.A.	0	
FF-01	Drive code	1 to 537	N.A.	Model dependent	
FF-02	G/P type selection	1: G type; 2: P type	N.A.	1	
FF-03	Drive rated power	0 to 6553.5	N.A.	Model dependent	display

5.13 Group FP: function code management

Function Code	Parameter name	Setting Range	Unit	Default	Commission
FP-00	User password	0 to 65535	N.A.	0	
FP-01	Parameter initialization	0: No operation 01: Restore factory settings except motor parameters 02: Clear records 04: Restore user backup parameters 501: Back up current user parameters	N.A.	0	
FP-03	Parameter display selection	7-segment: 0 0 Modified parameters: 0: No display 1: Display Customized parameters: 0: No display 1: Display	N.A	00	

5.14 Group A5: control optimization

Function Code	Parameter name	Setting Range	Unit	Default	Commission
A5-06	Under voltage threshold	60.0 to 140.0	%	130.0	100% is 350V
A5-09	Overvoltage tripping level	200.0 to 2500.0	V	810	

5.15 Group U0: monitoring

Function Code	Parameter name	Setting Range	Unit	Default	Commission
U0-00	Running frequency	N.A.	Hz	N.A.	
U0-01	Set frequency	N.A.	Hz	N.A.	
U0-02	Bus voltage	N.A.	V	N.A.	
U0-03	Output voltage	N.A.	V	N.A.	
U0-04	Output current	N.A.	A	N.A.	
U0-05	Output power	N.A.	kW	N.A.	
U0-06	Output torque	N.A.	%	N.A.	
U0-07	DI state	N.A.	N.A.	N.A.	
U0-08	DO state	N.A.	N.A.	N.A.	
U0-09	AI1 voltage	N.A.	V	N.A.	
U0-10	AI2 voltage	N.A.	V	N.A.	
U0-11	AI3 voltage	N.A.	V	N.A.	
U0-41	DI state visual display	N.A.	N.A.	N.A.	
U0-42	DO state visual display	N.A.	N.A.	N.A.	
U0-65	Torque upper limit	N.A.	%	N.A.	
U0-66	Remember current before UPS	N.A	A	N.A	

NOTE: DI/DO State description.

DI State:
If U0-07 display  , the corresponding binary value is 1111100, as the follow table,

Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
-	VDI5	VDI4	VDI3	VDI2	VDI1	DI10	DI9	DI8	DI7	DI6	DI5	DI4	DI3	DI2	DI1
-	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0
-	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	OFF	OFF

DO State:
If U0-08 display  , the corresponding binary value is 1110, as the follow table,

Bit9	Bit8	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
VDO5	VDO4	VDO3	VDO2	VDO1	DO2	DO1	Relay2	Relay1	DO3
0	0	0	0	0	0	1	1	1	0
OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	OFF

6 Trouble shooting

6.1 Inverter fault codes

Display	Fault Name	Possible Causes	Solutions
Err02	Overcurrent during acceleration	1. The output circuit is short circuited. 2. The acceleration time is too short. 3. Manual torque boost or V/F curve is not appropriate. 4. The power supply is too low. 5. The startup operation is performed on the rotating motor. 6. A sudden load is added during acceleration. 7. The AC drive model is of too small power class.	1: Eliminate short circuit. 2: Increase the acceleration time F0-17. 3: Adjust the manual torque boost or V/F curve. 4: Check that the power supply is normal. 5: Select speed tracking restart or start the motor after it stops. 6: Remove the added load. 7: Select a drive of higher power class.
Err03	Overcurrent during deceleration	1. The output circuit is short circuited. 2. The deceleration time is too short. 3. The power supply is too low. 4. A sudden load is added during deceleration. 5. The braking resistor is not installed.	1: Eliminate short circuit. 2: Increase the deceleration timeF0-18. 3: Check the power supply, and ensure it is normal. 4: Remove the added load. 5: Install the braking resistor.
Err04	Overcurrent at constant speed	1. The output circuit is short circuited. 2. The power supply is too low. 3. A sudden load is added during operation. 4. The AC drive model is of too small power class.	1: Eliminate short circuit. 2: Adjust power supply to normal range. 3: Remove the added load. 4: Select a drive of higher power class.
Err05	Overvoltage during acceleration	1. The DC bus voltage is too high☆. 2. An external force drives the motor during acceleration. 3. The acceleration time is too short. 4. The braking resistor is not installed.	1: Replace with a proper braking resistor. 2: Cancel the external force or install braking resistor. 3: Increase the acceleration time. 4: Install a braking resistor.
Err06	Overvoltage during deceleration	1. The DC bus voltage is too high☆. 2. An external force drives the motor during deceleration. 3. The deceleration time is too short. 4. The braking resistor is not installed.	1: Replace with a proper braking resistor. 2: Cancel the external force or install braking resistor. 3: Increase the deceleration time. 4: Install the braking resistor
Err07	Overvoltage at constant speed	1. The DC bus voltage is too high☆. 2. An external force drives the motor during deceleration.	1: Replace with a proper braking resistor. 2: Cancel the external force.

☆: Voltage thresholds

Voltage Class	DC Bus Overvoltage threshold	DC Bus Undervoltage threshold	Braking operation level
Three-phase 220 V	400VDC	200VDC	380VDC
Three-phase 380 V	810VDC	350VDC	750VDC

Err08	Control power fault	The input voltage exceeds the allowed range.	Adjust the input voltage to within the allowed range.

Display	Fault Name	Possible Causes	Solutions
Err09	Undervoltage	1. Instantaneous power failure occurs. 2. The input voltage exceeds the allowed range 3. The DC bus voltage is too low☆. 4. The rectifier bridge and buffer resistor are faulty. 5. The drive board is faulty. 6. The control board is faulty.	1: Reset the fault. 2: Adjust the input voltage to within the allowed range. 3 to 6: Seek for maintenance.
Err10	Drive overload	1. The load is too heavy or the rotor is locked. 2. The drive is of too small power class.	1: Reduce the load, or check the motor, or check the machine whether it is locking the rotor. 2: Select a drive of higher power class.
Err11	Motor overload	1. F9-01 is too small. 2. The load is too heavy or the rotor is locked. 3. The drive is of too small power class.	1: Set F9-01 correctly. 2: Reduce load, or check motor, or check the machine whether it is locking the rotor. 3: Select a drive of larger power class.
Err12	Power input phase loss	1. The three-phase power supply is abnormal. 2. The drive board is faulty. 3. The lightening protection board is faulty. 4. The control board is faulty.	1: Check the power supply. 2 to 4: Seek for maintenance.
Err13	One drive output phase loss	1. The cable between drive and motor is faulty. 2. The drive's three-phase output is unbalanced when the motor is running. 3. The drive board is faulty 4. The IGBT is faulty.	1: Check the cable. 2: Check the motor windings. 3 to 4: Seek for maintenance.
Err14	IGBT overheat	1. The ambient temperature is too high. 2. The air filter is blocked. 3. The cooling fan is damaged. 4. The thermal sensor of IGBT is damaged. 5. The IGBT is damaged.	1: Reduce the ambient temperature. 2: Clean the air filter. 3 to 5: Seek for maintenance.
Err15	External equipment fault	1. External fault signal is input via DI. 2. External fault signal is input via VDI.	Reset the fault.
Err16	Communication fault	1. The host computer is abnormal. 2. The communication cable is faulty. 3. The extension card type set in F0-28 is incorrect. 4. The communication parameters in group FD are set improperly.	1: Check cabling of the host computer. 2: Check the communication cabling. 3: Set F0-28 correctly. 4: Set the communication parameters properly.
Err18	Current detection fault	The drive board is faulty.	Replace the drive board.
Err19	Motor tuning fault	1. Motor parameters are wrong. 2. Motor tuning overtime.	1. Check motor parameters F1-00 to F1-05. 2. Check the wiring between drive and motor.
Err21	EEPROM read-write fault	The EEPROM chip is damaged.	Replace the main control board.
Err23	Short circuit to ground	The motor is short-circuited to ground.	Replace the cables or motor.
Err26	Accumulative running time reached	The accumulative running time reaches the setting of F8-17.	Clear the record by performing parameter initialization (set FP-01 to 2).

Display	Fault Name	Possible Causes	Solutions
Err27	User-defined fault 1	1. The user-defined fault 1 signal is input via DI. 2. User-defined fault 1 signal is input via VDI.	Reset the fault.
Err28	User-defined fault 2	1. The user-defined fault 2 signal is input via DI 2. The user-defined fault 2 signal is input via VDI.	Reset the fault.
Err29	Accumulative power-on time reached	The accumulative power-on time reaches the setting of F8-16.	Clear the record by performing parameter initialization (set FP-01 to 2).
Err30	Off load fault	Offload when it's running.	Check the connection between motor and load.
Err31	PID feedback lost during running	The PID feedback is lower than FA-26.	Check the PID feedback signal or set FA-26 to a proper value.
Err40	Quick current limit	1. The load is too heavy or the rotor is locked. 2. The drive is of too small power class.	1: Reduce the load, or check the motor, or check the machine whether it is locking the rotor. 2: Select a drive of higher power class.
Err41	Motor switchover fault during running	The current motor is switched over via a terminal during running of the AC drive.	Switch over the motor only after the AC drive stops.
Err61	Two or three drive output phases loss	1. The drive output connections get loose; 2. The output contactor gets wrongly operated or malfunctions.	1. Check drive output connections; 2. Check drive output contactor.

6.2 Inverter common symptoms and diagnostics

Fault Name	Possible Causes	Solutions
There is no display at power-on.	1. There is no power supply or the power supply is too low. 2. The switching power supply on the drive board is faulty. 3. The rectifier bridge is damaged. 4. The buffer resistor of the drive is damaged. 5. The control board or the keypad is faulty. 6. The cable between the control board and the drive board or keypad breaks.	1: Check the power supply. 2 to 5: Seek for maintenance. 6: Re-connect the 4-core and 28-core flat cables, or seek for maintenance.
"HC" is displayed at power-on.	1. The cable between the drive board and the control board is in poor contact. 2. The control board is damaged. 3. The motor winding or the motor cable is short-circuited to the ground. 4. The power supply is too low.	1: Re-connect the 4-core and 28-core flat cables, or seek for maintenance. 2: Seek for maintenance. 3: Check the motor or replace it, and check the motor cable. 4. Check the power supply according to charpter1.3.
The display is normal upon power-on, but "HC" is displayed after start and the motor stops immediately.	1. The cooling fan is damaged or the rotor is locked. 2. A certain terminal is short-circuited.	1: Replace cooling fan, or check the machine whether it is locking the rotor. 2: Eliminate short circuit.
Err14 is reported frequently.	1. The carrier frequency is set too high. 2. The cooling fan is damaged, or the air filter is blocked. 3. Components (thermal coupler or others) inside the drive are damaged.	1: Reduce F0-15. 2: Replace the fan and clean the air filter. 3: Seek for maintenance.
The motor does not rotate after the AC drive outputs a non-zero reference.	1. The motor or motor cable is damaged. 2. The motor parameters are set improperly. 3. The cable between the drive board and the control board is in poor contact. 4. The drive board is faulty. 5. The rotor is locked.	1: Check the motor, or check the cable between the drive and the motor. 2: Check and re-set motor parameters. 3: Re-connect the 4-core and 28-core flat cables, or seek for maintenance. 4: Seek for maintenance. 5: Check the machine whether it is locking the rotor.
The DI terminals are disabled.	1. The DI parameters are set incorrectly. 2. The input signal is incorrect. 3. The wire jumper between OP and +24V is in poor contact. 4. The control board is faulty.	1: Check and reset DI parameters in group F4. 2: Check the input signals, or check the input cable. 3: Check the jumper between OP and +24 V. 4: Seek for maintenance.
The drive reports overcurrent and overvoltage frequently.	1. The motor parameters are set improperly. 2. The acceleration/deceleration time is too small. 3. The load fluctuates.	1: Reset motor parameters. 2: Set proper acceleration/deceleration time. 3: Check the machine, or seek for maintenance.

OPTIMAL
DRIVE

S.S.P

Elevator AC Drive Controller (Open Loop)

MD380L Series