



Fault Name	Fault Descriptions	Corrective Actions
ocA	Over-current during acceleration: 1. Short-circuit at motor output. 2. Torque boost too high. 3. Acceleration time too short. 4. AC drive output capacity is too small.	1. Check for possible poor insulation at the output line. 2. Decrease the torque boost setting in Pr.7-02. 3. Increase the acceleration time. 4. Replace the AC drive with one that has a higher output capacity (next HP size).
ocd	Over-current during deceleration: 1. Short-circuit at motor output. 2. Deceleration time too short. 3. AC drive output capacity is too small.	1. Check for possible poor insulation at the output line. 2. Increase the deceleration time. 3. Replace with the AC drive with one that has a higher output capacity (next HP size).
ocn	Over-current during steady state operation: 1. Short-circuit at motor output. 2. Sudden increase in motor loading. 3. AC drive output capacity is too small.	1. Check for possible poor insulation at the output line. 2. Check for possible motor stall. 3. Replace the AC drive with one that has a higher output capacity (next HP size).
EF	The external terminal EF-GND goes from OFF to ON.	1. When external terminal EF-GND is closed, the output will be turned off. (Under N.O. E.F.) 2. Press RESET after fault has been cleared.
cf1	Internal memory IC can not be programmed.	1. Return to the factory. 2. Check the EEPROM on the control board.



Fault Name	Fault Descriptions	Corrective Actions
cF2	Internal memory IC can not be read.	<ol style="list-style-type: none"> 1. Return to the factory. 2. Reset drive to factory defaults.
cF3	Drive's internal circuitry abnormal.	Return to the factory.
HPF	Hardware protection failure	Return to the factory.
codeE	Software protection failure	Return to the factory.
cFA	Auto accel/decel failure	Don't use the function of auto acceleration /deceleration.
bb	External Base Block. AC drive output is turned off.	<ol style="list-style-type: none"> 1. When the external input terminal (B.B) is active, the AC drive output will be turned off. 2. Disable this connection and the AC drive will begin to work again.



CHAPTER 8 SUMMARY OF PARAMETER SETTINGS

Group 0: User Parameters

⚡The parameter may be set during operation.

Parameters	Functions	Settings	Factory Setting
0-00	Identity code of drive (Read only)	1: 40W 2: 100W 3: 200W 4: 400W 5: 750W 6: 1.5KW	
0-01	Rated current display (Read only)	40W: 0.4A 100W: 0.8A 200W: 1.6A 400W: 2.5A 750W: 4.2A 1.5K: 7.0A	
0-02	Parameter reset	10: Reset Parameters to Factory Setting	0
⚡ 0-03	Start-up display of AC drive	0: F (Frequency command) 1: H (output frequency) 2: U (user-defined unit) 3: A (output current)	0
⚡ 0-04	User-defined Unit	0: Display User-Defined Unit (u) 1: Display Counter Value (C) 2: Display Process Operation (1=tt) 3: Display DC-BUS voltage (U) 4: Display output voltage (E)	0
⚡ 0-05	User-defined coefficient K	0.1 ~ 160	1.0
0-06	Software version	Read only	#. #
0-07	Password input	0 ~ 999	0
0-08	Password configuration	0 ~ 999	0

Group 1: Basic Parameters

Parameters	Functions	Settings	Factory Setting
1-00	Maximum operation Freq.	50.0 ~ 400Hz	60.0
1-01	Maximum setting Freq.	10.0 ~ 400Hz	60.0
1-02	Maximum output voltage	2.0 ~ 255V	220
1-03	Mid-point freq.	1.0 ~ 400Hz	1.0
1-04	Mid-point voltage	2.0 ~ 255V	12.0
1-05	Minimum output freq.	1.0 ~ 60.0Hz	1.0



	Parameters	Functions	Settings	Factory Setting
	1-06	Minimum output voltage	2.0 ~ 255V	12.0
	1-07	Upper bound of freq.	1 ~ 110%	100
	1-08	Lower bound of freq.	0 ~ 100%	0.0
↗	1-09	Accel time 1 (Tacc1)	0.1 ~ 600 Sec	10.0
↗	1-10	Decel time 1 (Tdec1)	0.1 ~ 600 Sec	10.0
↗	1-11	Accel time 2	0.1 ~ 600 Sec	10.0
↗	1-12	Decel time 2	0.1 ~ 600 Sec	10.0
↗	1-13	JOG Accel time	0.1 ~ 600 Sec	10.0
↗	1-14	JOG Decel time	0.0 ~ 600 Sec	10.0
↗	1-15	JOG frequency	1.0Hz~400Hz	6.0
	1-16	Auto-accel/decel	0: Linear Accel/Decel 1: Auto accel, linear decel 2: Linear accel, auto decel, 3: Auto Accel/Decel 4: Linear accel. Auto decel, stall prevention during deceleration 5: Auto accel. Linear decel, stall prevention during deceleration	0
	1-17	S-curve setting in acceleration	0 ~ 7	0
	1-18	S-curve setting in deceleration	0 ~ 7	0

Group 2: Operation Method Parameters

	Parameters	Functions	Settings	Factory Setting
	2-00	Source of frequency command	0: Digital keypad 1: 0 ~ 10V from AVI 2: 4 ~ 20mA from AVI 3: Controlled by V.R on drive 4: RS-485 communication interface	0
	2-01	Source of operation command	0: By digital keypad 1: By external terminals, keypad STOP enable 2: By external terminals, keypad STOP disable 3: By RS-485 communication interface, keypad STOP enable 4: By RS-485 communication interface, keypad STOP disable	0
	2-02	Stop method	0: Ramp stop 1: Coast stop	0
	2-03	Carrier freq.	3 ~10K Hz	10



2-04	Reverse operation inhibit	0: Enable reverse 1: Disable reverse 2: Disable forward	0
2-05	ACI (4 ~ 20mA) input loss detection	0: Accel to 0Hz 1: Stop immediately, display EF 2: Run with the last freq.	0
2-06	Line Start Lockout	0: Enable 1: Disable	0

Group 3: Output Function Parameters

Parameters	Functions	Settings	Factory Setting
3-00	Desired freq. attained	1.0 ~ 400 Hz	1.0
3-01	Terminal count value	0 ~ 999	0
3-02	Preliminary count value	0 ~ 999	0
3-03	Multi-function (relay output)	0: not used 1: AC drive operational 2: Max. Output Freq. Attained 3: Zero Speed 4: Over Torque 5: Base-Block (B.B.) 6: Low Voltage Detection 7: AC Drive Operation Mode 8: Fault Indication 9: Desired Freq. Attained 10: PLC Program Running 11: PLC Program Step Complete 12: PLC Program Complete 13: PLC Program Operation Pause 14: Terminal Count Value Attained 15: Preliminary Count Value Attained 16: Ready State Indicator	8

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Group 4: Input Function Parameters

Parameters	Functions	Settings	Factory setting
⚡ 4-00	Potentiometer bias freq.	0.0 ~ 350Hz	0.0
⚡ 4-01	Potentiometer bias polarity	0: positive bias 1: negative bias	0
⚡ 4-02	Potentiometer freq. gain	1 ~ 200%	100
4-03	Potentiometer reverse motion enable	0: not used 1: reverse motion enable 2: forward motion only	0



Parameters	Functions	Settings	Factory setting
4-04	Multi-function input terminal1 (M0, M1) (d 0~d 20)	0: not used 1: M0: FWD/STOP, M1:REV/STOP 2: M0: FWD/REV, M1:RUN/STOP 3: M0, M1, M2: 3-wire operation control mode 4: External fault, normally open (N.O.) 5: External fault, normally closed (N.C.) 6: RESET 7: multi-step speed command 1 8: multi-step speed command 2 9: jog operation 10: accel/decel speed inhibit 11: first or second accel/decel time selection 12: base-block (B.B.),normally open (N.O.) 13: base-block (B.B.),normally closed (N.C) 14: increase master freq. 15: decrease master freq. 16: run PLC program 17: pause PLC 18: counter trigger signal 19: counter reset 20: select ACI/deselect AVI	1
4-05	Multi-function input terminal 2(M2)		6
4-06	Multi-function input terminal 3(M3) (d 0, d 4~d 20)		7

Group 5: Multi-step Speed and PLC Parameters

Parameters	Functions	Settings	Factory Setting
5-00	1 st step speed freq.	0.0 ~ 400Hz	0.0
5-01	2 nd step speed freq.	0.0 ~ 400Hz	0.0
5-02	3 rd step speed freq.	0.0 ~ 400Hz	0.0
5-03	PLC mode	0: Disable PLC operation 1: Execute one program cycle 2: Continuously execute program cycles 3: Execute one program cycle step by step (separate by STOP) 4: Continuously execute one program cycle step by step (separate by STOP)	0
5-04	PLC forward/reverse motion	0 ~ 15 (0: Forward 1: Reverse)	0
5-05	Time duration step 0	0 ~ 65500 Sec	0
5-06	Time duration step 1	0 ~ 65500 Sec	0
5-07	Time duration step 2	0 ~ 65500 Sec	0
5-08	Time duration step 3	0 ~ 65500 Sec	0



Group 6: Protection Parameters

Parameters	Functions	Settings	Factory Setting
6-00	Over-Voltage Prevention Level	0:disable 350~410V	390
6-01	Over-current Prevention Level	0: disable 20~200%	170
6-02	Over-torque detection	0:disable 1:enable during constant speed operation and continues until the continuous limit is reached. 2:enabled during constant speed operation and halted after detection. 3:enabled during accel and continues before continuous output time limit is reached. 4:enabled during accel and halted after over-torque detection.	0
6-03	Over-torque detection level	30 ~ 200%	150
6-04	Over-torque detection time	0.1 ~ 10.0 Sec	0.1
6-05	Electronic thermal overload relay	0: Not used 1: Act with standard motor 2: Act with special motor	0
6-06	Electronic thermal characteristic	30~600 Sec	60
6-07	Present fault record	0: No fault occurred	0
6-08	Second most recent fault record	1: oc (over current) 2: ov (over voltage)	
6-09	Third most recent fault record	3: oH (over heat) 4: oL (over load)	
6-10	Forth most recent fault record	5: oL1 (electronic thermal) 6: EF (external fault)	
6-11	Fifth most recent fault record	7: Reserved 8: Reserved	
6-12	Sixth most recent fault record	9: ocA (current exceed during acceleration) 10: ocd (current exceed during deceleration) 11: ocn (current exceed during steady state)	



Group 7: Motor Parameters

	Parameters	Functions	Settings	Factory Setting
↗	7-00	Motor rated current	30~120 %	85
↗	7-01	Motor no-load current	0 ~ 90 %	50
↗	7-02	Torque compensation	0 ~ 10	1
↗	7-03	Slip compensation	0.0 ~ 10.0	0.0

Group 8: Special Parameters

	Parameters	Functions	Settings	Factory Setting
	8-00	DC braking voltage level	0 ~ 30%	0
	8-01	DC braking time during start-up	0.0 ~ 60.0 Sec	0.0
	8-02	DC braking time during stopping	0.0 ~ 60.0 Sec	0.0
	8-03	Start-point for DC braking	0.0 ~ 400.0 Sec	0.0
	8-04	Momentary power loss	0: Stop operation after momentary power loss. 1: Continues after momentary power loss, speed search starts with master freq. 2: Continues after momentary power loss, speed search starts with min. output freq.	0
	8-05	Max. allowable power loss time	0.3 ~ 5.0 Sec	2.0
	8-06	B.B. time for speed search	0.3~5.0 Sec	0.5
	8-07	Max. speed search current level	30~200%	150
	8-08	Skip freq. 1 upper bound	0.0~400 Hz	0.0
	8-09	Skip freq. 1 lower bound	0.0~400 Hz	0.0
	8-10	Skip freq. 2 upper bound	0.0~400 Hz	0.0
	8-11	Skip freq. 2 lower bound	0.0~400 Hz	0.0
	8-12	Skip freq. 3 upper bound	0.0~400 Hz	0.0
	8-13	Skip freq. 3 lower bound	0.0~400 Hz	0.0



Parameters	Functions	Settings	Factory Setting
8-14	Auto restart after fault	0~10	0
8-15	AVR function	0: AVR function enable 1: AVR function disable 2: AVR function disable when decel	2
8-16	Dynamic braking voltage	350 ~ 450V	380
8-17	DC braking lower bound limit	0.0 ~ 400 Hz	0.0

Group 9: Communication Parameters

Parameters	Functions	Settings	Factory Setting				
⚡ 9-00	Communication address	1 ~ 247	1				
⚡ 9-01	Transmission speed	0: Baud rate 4800 1: Baud rate 9600 2: Baud rate 19200	1				
⚡ 9-02	Transmission fault treatment	0: Warn and continue running 1: Warn and ramp to stop 2: Warn and coasting stop 3: No warn and keep running	0				
⚡ 9-03	Modbus communication watchdog timer	0: Disable 1~20: 1 ~ 20 Sec	0				
⚡ 9-04	Communication protocol	<table border="1"> <tbody> <tr> <td>ASCII mode</td> <td>0: 7,N,2 1: 7,E,1 2: 7,O,1 3: 8,N,2 4: 8,E,1 5: 8,O,1</td> </tr> <tr> <td>RTU mode</td> <td>6: 8,N,2 7: 8,E,1 8: 8,O,1</td> </tr> </tbody> </table>	ASCII mode	0: 7,N,2 1: 7,E,1 2: 7,O,1 3: 8,N,2 4: 8,E,1 5: 8,O,1	RTU mode	6: 8,N,2 7: 8,E,1 8: 8,O,1	0
ASCII mode	0: 7,N,2 1: 7,E,1 2: 7,O,1 3: 8,N,2 4: 8,E,1 5: 8,O,1						
RTU mode	6: 8,N,2 7: 8,E,1 8: 8,O,1						



SPECIFICATIONS

Voltage Class		115V		230V			
Model Number VFD-□□□L□□A/B		002	004	002	004	007	015
Applicable Motor Output (kW)		0.2	0.4	0.2	0.4	0.7	1.5
Output Rating	Rated Output Capacity (KVA)	0.6	1.0	0.6	1.0	1.6	2.7
	Rated Output Current (A)	1.6	2.5	1.6	2.5	4.2	7.0
	Max. Output Voltage (V)	3-phase corresponds to double input voltage		Three-phase corresponds to input voltage			
	Rated Frequency (Hz)	1.0~400Hz					
Power	Rated Input Current (A)	6	9	4.9/1.9	6.5/2.7	9.7/5.1	*/9
	Input voltage Tolerance	Single phase 90~132V 50/60Hz		Single / 3-phase 180~264V 50/60Hz			3-phase 180~264V 50/60Hz
	Frequency tolerance	±5%					
Control Characteristics	Control system		SVPWM (Sinusoidal Pulse Width Modulation, carried frequency 3kHz~10kHz)				
	Output Frequency Resolution		0.1Hz				
	Torque Characteristics		Including the auto-torque, auto-slip compensation, starting torque can be 150% at 5 Hz				
	Overload Endurance		150% of rated current for 1 minute				
	Accel/Decel Time		0.1~600Sec. (can be set individually)				
	V/F pattern		V/F pattern adjustable				
	Stall Prevention Level		20~200%, setting of Rated Current				
Operating Characteristics	Frequency Setting	Keypad	Setting by ▲▼ keys or V.R				
		External Signal	Potentiometer-5KΩ/0.5W, DC 0 ~ +10V (input impedance 100KΩ), 4~20mA (output impedance 250Ω), multi-function inputs 1 to 3 (3steps, JOG, UP/DOWN command), communication setting				
	Operation Setting	Keypad	Setting by RUN//STOP keys				
	Signal	External Signal	M0,M1,M2,M3 can be combined to offer various modes of operation, RS-485 communication port				
	Multi-function Input Signal		Multi-step selection 0 to 3, Jog, accel/decel inhibit, first/second accel/decel switch, counter, PLC Operation, external Base Block (NC,NO) selection				
Multi-function Output Signal		AC Drive Operating, Frequency Attained, Non-zero speed, Base Block, Fault Indication, Local/Remote indication, PLC Operation indication.					
Other Function		AVR, S-curve, Over-Voltage Stall Prevention, DC Braking, Fault Records, Adjustable Carried Frequency, Starting Frequency Setting of DC Braking , Over-Current Stall Prevention, Momentary Power Loss restart, Reverse Inhibition, Frequency Limits, Parameter Lock/Reset					
Protection		Over Voltage, Over Current, Under Voltage, Overload, Electronic thermal, Overheating, Self-testing					
Other		Including EMI Filter					
Cooling		Forced air-cooling					
Environment	Installation Location		Altitude 1,000 m or below, keep from corrosive gasses, liquid and dust				
	Ambient Temperature		-10℃~40℃ (Non-Condensing and not frozen)				
	Storage Temperature		-20℃ to 60℃				
	Ambient Humidity		Below 90%RH (non-condensing)				
	Vibration		9.80665m/s ² (1G) less than 20Hz, 5.88m/s ² (0.6Gat) 20 to 50Hz				

ACCESSORIES

B.1 Non-fuse Circuit Breaker Chart

Per UL 508C, paragraph 44.8.6, part a,

1. For 1-phase drives, the current rating of the breaker shall be four times maximum of input current rating.
2. For 3-phase drives, the current rating of the breaker shall be four times maximum of output current rating.

(Note: Please select enough current capacity of NFB.)

1-phase		3-phase	
Model	Input Current (A)	Model	Output Current (A)
VFD002L11A	6.0	VFD002L21A	1.6
VFD002L21A	4.9	VFD004L21A	2.5
VFD004L11A	9.0	VFD007L21A	4.2
VFD004L21A	6.5	VFD015L23A	7.5
VFD007L21A	9.7		

Fuse Specification Chart

Smaller fuses than those shown in the table are permitted.

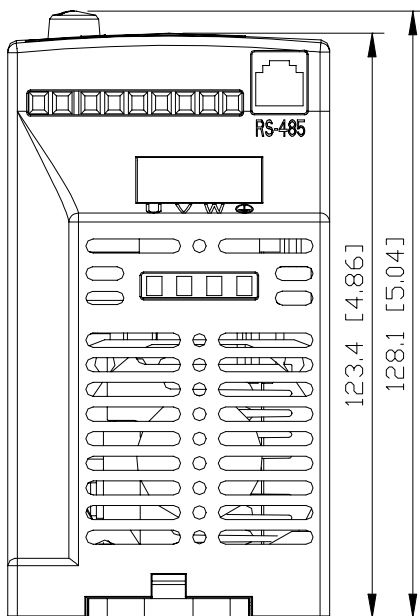
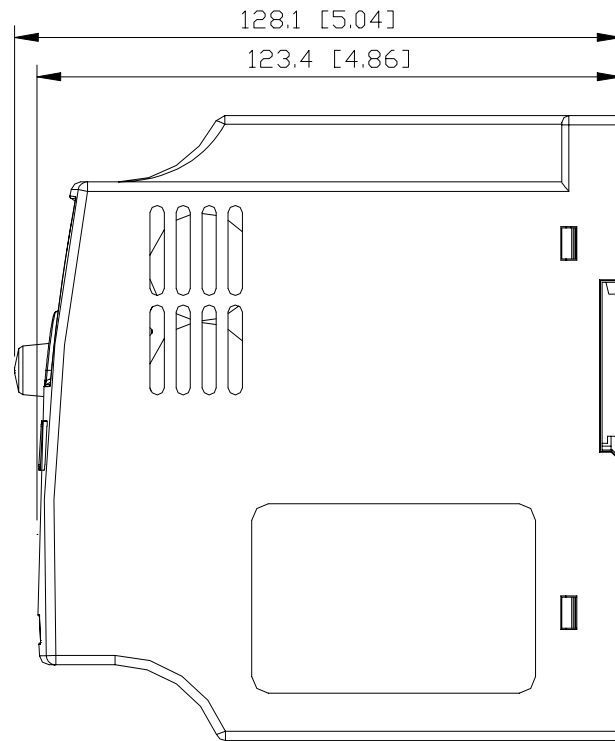
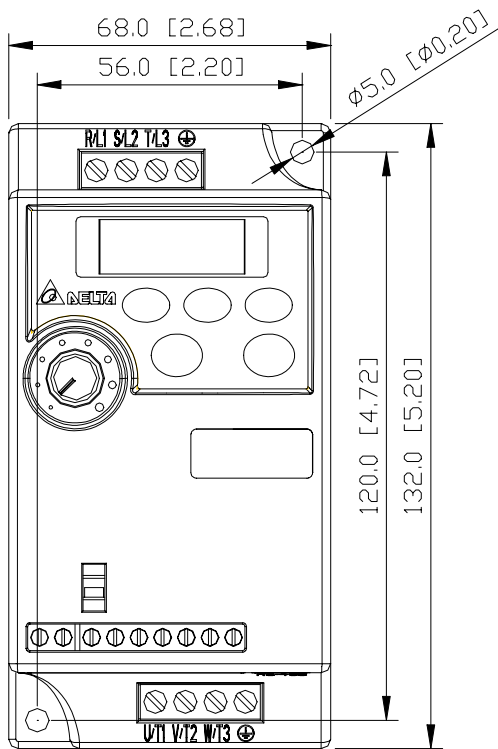
Model	I (input)(A)	I (output)(A)	Line Fuse	
			I (A)	Bussmann P/N
VFD002L11A	6.0	1.6	15(20)	JJN-15(20)
VFD002L21A(1 Ø/3 Ø)	4.9/1.9	1.6/1.6	15/6.4	JJN-15/JJN-6
VFD004L11A	9.0	2.5	30	JJN-30
VFD004L21A(1 Ø/3 Ø)	6.5/2.7	2.5/2.5	20/10	JJN-20/JJN-10
VFD007L21A(1 Ø/3 Ø)	9.7/5.1	4.2/4.2	30/16.8	JJN-30/JJN-15
VFD015L23A	9.0	7.5	30	JJN-30

B



DIMENSIONS

Unit: mm (inches)





DELTA ELECTRONICS, INC.

**EC Declaration of Conformity
According to the Low Voltage Directive 73/23/EEC and the
Amendment Directive 93/68/EEC**

For the following equipment:

AC Motor Drive

(Product Name)

VFD002L11A, VFD002L11B, VFD002L21A, VFD002L21B, VFD004L11A,
VFD004L11B, VFD004L21A, VFD004L21B, VFD007L21A, VFD007L21B,
VFD015L23A

(Model Name)

is herewith confirmed to comply with the requirements set out in the Council Directive 73/23/EEC for electrical equipment used within certain voltage limits and the Amendment Directive 93/68/EEC. For the evaluation of the compliance with this Directive, the following standard was applied:

EN 50178

The following manufacturer/importer is responsible for this declaration:

Delta Electronics, Inc.

(Company Name)

31-1, Shien Pan Road, Kuei San Industrial Zone, Taoyuan Shien, Taiwan,
R.O.C.

(Company Address)





EC Declaration of Conformity
According to the Electromagnetic Compatibility 89/336/EEC and
the Amendment Directive 93/68/EEC

For the following equipment:

AC Motor Drive

(Product Name)

VFD002L11A, VFD002L11B, VFD002L21A, VFD002L21B, VFD004L11A,

VFD004L11B, VFD004L21A, VFD004L21B, VFD007L21A, VFD007L21B,

VFD015L23A

(Model Designation)

is herewith confirmed to comply with the requirements set out in the Council Directive 89/336/EEC for electromagnetic compatibility and the Amendment Directive 93/68/EEC. For the evaluation of the compliance with this Directive, the following standard was applied:

EN61800-3, EN55011, EN61000-4-2, EN61000-4-3, EN61000-4-4,

EN61000-4-5, EN61000-4-6, EN61000-4-8

The following manufacturer/importer is responsible for this declaration:

Delta Electronics, Inc.

(Company Name)

31-1, Shien Pan Road, Kuei San Industrial Zone, Taoyuan Shien, Taiwan,

R.O.C.

(Company Address)