Preface

Thank you for choosing DELTA's high-performance VFD-B Series. The VFD-B Series is manufactured with high-quality components and materials and incorporates the latest microprocessor technology available.

📖 Getting Started

This quick start will be helpful in the installation and parameter setting of the AC motor drives. To guarantee safe operation of the equipment, read the following safety guidelines before connecting power to the AC motor drives. For detail information, refer to the VFD-B User Manual on the CD supplied with the drive.

DANGER!

1. AC input power must be disconnected before any wiring to the AC motor drive is made.
2. A charge may still remain in the DC-link capacitors with hazardous voltages, even if the power has been turned off. To prevent personal injury, please ensure that power has been turned off before opening the AC motor drive and wait ten minutes for the capacitors to discharge to safe voltage levels.
3. Never reassemble internal components or wiring.
4. The AC motor drive may be destroyed beyond repair if incorrect cables are connected to the input/output terminals. Never connect the AC motor drive output terminals U/T1, V/T2, and W/T3 directly to the AC mains circuit power supply.
5. Ground the VFD-B using the ground terminal. The grounding method must comply with the laws of the country where the AC motor drive is to be installed. Refer to the Basic Wiring Diagram.
6. VFD-B series is used only to control variable speed of 3-phase induction motors, NOT for 1-phase motors or other purpose.
7. VFD-B series shall NOT be used for life support equipment or any life safety situation.

WARNING!

1. DO NOT use Hi-pot test for internal components. The semi-conductor used in the AC motor drive is easily damaged by high-pressure.
2. There are highly sensitive MOS components on the printed circuit boards. These components are especially sensitive to static electricity. To prevent damage to these components, do not touch these components or the circuit boards with metal objects or your bare hands.
3. Only quality person is allowed to install, wire and maintain AC motor drive.

CAUTION!

1. Some parameter settings will cause the motor to run immediately after applying power.
2. DO NOT install the AC motor drive in a place subjected to high temperature, direct sunlight, high humidity, excessive vibration, corrosive gases or liquids, or airborne dust or metallic particles.
3. Only use AC motor drives within specification. Failure to comply may result in fire, explosion or electric shock.
4. To prevent personal injury, please keep children and unqualified people away from the equipment.
5. When the motor cable between the AC motor drive and motor is too long, the layer insulation of the motor may be damaged. Please use a frequency inverter duty motor or add an AC output reactor to prevent damage to the motor. Refer to appendix B Reactor for details.
6. The rated voltage for the AC motor drive must be ≤240V (≤480V for 460V models, ≤600V for 575V models) and the mains supply current capacity must be ≤5000A RMS (≤10000A RMS for the ≥40hp (30kW) models).

Specifications

Voltage Class		230V Class											
Model Number VFD-XXXB		007	015	022	037	055	075	110	150	185	220	300	370
Max. Applicable Motor Output (kW)		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37
Max. Applicable Motor Output (hp)		1.0	2.0	3.0	5.0	7.5	10	15	20	25	30	40	50
Output Rating	Rated Output Capacity (kVA)	1.9	2.5	4.2	6.5	9.5	12.5	18.3	24.7	28.6	34.3	45.7	55.0
	Rated Output Current (A)	5.0	7.0	11	17	25	33	49	65	75	90	120	145
	Maximum Output Voltage (V)	3-Phase Proportional to Input Voltage											
	Output Frequency (Hz)	0.1~400 Hz											
	Carrier Frequency (kHz)	1-15									1-9		
Input Rating	Rated Input Current (A)	Single/3-phase			3-phase								
		11.9/ 5.7	15.3/ 7.6	22/ 15.5	20.6	26	34	50	60	75	90	110	142
	Input Current for 1-phase models when using 3-phase power	7.0	9.4	14.0	--								
	Rated Voltage/Frequency	Single/3-phase 200-240V,50/60Hz			3-phase 200-240V, 50/60Hz								
	Voltage Tolerance	±10%(180~264 V)											
	Frequency Tolerance	±5%(47~63 Hz)											
Cooling Method		Natural	Fan Cooled										
Weight (kg)		2.7	3.2	4.5	6.8	8	10	13	13	13	13	36	36

Voltage Class		460V Class													
Model Number VFD-XXXB		007	015	022	037	055	075	110	150	185	220	300	370	450	550	750
Max. Applicable Motor Output (kW)		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75
Max. Applicable Motor Output (hp)		1.0	2.0	3.0	5.0	7.5	10	15	20	25	30	40	50	60	75	100
Output Rating	Rated Output Capacity (kVA)	2.3	3.2	4.2	6.5	9.9	13.7	18.3	24.4	28.9	34.3	45.7	55.6	69.3	84	114
	Rated Output Current (A)	2.7	4.2	5.5	8.5	13	18	24	32	38	45	60	73	91	110	150
	Maximum Output Voltage (V)	3-phase Proportional to Input Voltage														
	Output Frequency (Hz)	0.1~400 Hz														
	Carrier Frequency (kHz)	1-15									1-9				1-6	
Input Rating	Rated Input Current (A)	3-phase														
		3.2	4.3	5.9	11.2	14	19	25	32	39	49	60	63	90	130	160
	Rated Voltage	3-phase 380 to 480 V														
	Voltage Tolerance	±10%(342~528 V)														
	Frequency Tolerance	±5%(47~63 Hz)														
Cooling Method		Natural	Fan Cooled													
Weight (kg)		2.7	3.2	4.5	6.8	8	10	13	13	13	13	36	36	36	50	50

Voltage Class		575V Class													
Model Number VFD-XXXB		007	015	022	037	055	075	110	150	185	220	300	370	450	550	750
Max. Applicable Motor Output (kW)		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75
Max. Applicable Motor Output (hp)		1.0	2.0	3.0	5.0	7.5	10	15	20	25	30	40	50	60	75	100
Output Rating	Rated Output Capacity (kVA)	1.7	3.5	4.5	7.5	10	13.4	18.9	21.9	26.9	33.9	40.8	51.8	61.7	79.7	99.6
	Rated Output Current (A)	1.7	3.5	4.5	7.5	10	13.5	19	22	27	34	41	52	62	80	100
	Maximum Output Voltage (V)	3-phase Proportional to Input Voltage														
	Output Frequency (Hz)	0.1~400 Hz														
	Carrier Frequency (kHz)	1-10							1-8						1-6	
Input Rating	Rated Input Current (A)	3-phase														
		1.2	3.1	4.0	8.3	10.3	13.8	18.2	22	27.7	32	41	52	62	74	91
	Rated Voltage	3-phase 500 to 600 V														
	Voltage Tolerance	-15~+10% (425~660V)														
	Frequency Tolerance	±5% (47~63Hz)														
Cooling Method		Natural	Fan Cooled													
Weight (kg)		2.7	3.2	4.5	6.8	8	10	13	13	13	13	36	36	36	50	50

General Specifications			
Control Characteristics	Control System		SPWM(Sinusoidal Pulse Width Modulation) control (V/f or sensorless vector control)
	The Resolution of Frequency Setting and Output Frequency		0.01Hz
	Torque Characteristics		Including the auto-torque, auto-slip compensation; starting torque can be 150% at 1.0Hz
	Overload Endurance		150% of rated current for 1 minute
	Skip Frequency		Three zones, settings range 0.1-400Hz
	Accel/Decel Time		0.1 to 3600 seconds (4 Independent settings for Accel/Decel time)
	Stall Prevention Level		20 to 250%, setting of rated current
	DC Brake		Operation frequency 0.1-400.0Hz, output 0-100% rated current Start time 0-60 seconds, stop time 0-60 seconds
	Regenerated Brake Torque		Approx. 20%(up to 125% possible with option brake resistor or brake unit externally mounted, 1-15HP brake chopper built-in)
	V/f Pattern		Adjustable V/f pattern, 1.5 power curve, 1.7 power curve, square and cube curve
Operating Characteristics	Frequency Setting	Keypad	Setting by ▲▼
		External Signal	Potentiometer-5kΩ/0.5W, 0 to +10VDC; -10 to +10VDC, 4 to 20mA RS-485 interface; Multi-Function Inputs 1 to 6 (15 steps, Jog, up/down)
	Operation Setting Signal	Keypad	Set by RUN, STOP and JOG
		External Signal	2 wires/3 wires (Fwd, Rev, EF), JOG operation, RS-485 serial interface (MODBUS), process logic control
	Multi-Function Input Signal		Multi-step selection 0 to 15, Jog, accel/decel inhibit, first to forth accel/decel switches, counter, PLC operation, external Base Block (NC, NO), auxiliary motor control is invalid, ACI/AVI/AUI selections, driver reset, UP/DOWN key settings, sink/source selection
	Multi-Function Output Indication		AC drive operating, frequency attained, non-zero, Base Block, fault indication, local/remote indication, PLC operation indication, auxiliary motor output, driver is ready, overheat alarm, emergency stop
	Analog Output Signal		Output frequency/current/voltage/frequency command/speed/factor
Alarm Output Contact			Contact will be On when it malfunctions (1 Form C contact or 3 open collector outputs)
Operation Functions			AVR, accel/decel S-Curve, over-voltage/over-current stall prevention, fault records, reverse inhibition, momentary power loss restart, DC brake, auto torque/slip compensation, auto tuning, adjustable carrier frequency, output frequency limits, parameter lock/reset, vector control, counter, PG feedback control, PID control, fan & pump control, external counter, PLC, MODBUS communication, abnormal reset, abnormal re-start, power-saving, sleep/revival function, digital frequency output, fan control, sleep/wake frequency, master/auxiliary frequency, 1st/2nd frequency source selections
Protection Functions			Over voltage, over current, under voltage, under current, external fault, overload, ground fault, overheating, electronic thermal, IGBT short circuit
Display Keypads			8-key, 7-segment LED with 5-digit, 8 status LEDs, master frequency, output frequency, output current, custom units, parameter values for setup and lock, faults, RUN, STOP, RESET, FWD/REV, JOG
Environmental Conditions	Enclosure Rating		IP20
	Pollution Degree		2
	Installation Location		Altitude 1,000 m or lower, keep from corrosive gasses, liquid and dust
	Ambient Temperature		-10°C to 40°C Non-Condensing and not frozen
	Storage/ Transportation Temperature		-20 °C to 60 °C
	Ambient Humidity		Below 90% RH (non-condensing)
	Vibration		9.80665m/s^2 (1G) less than 20Hz, 5.88m/s^2 (0.6G) at 20 to 50Hz
Approvals			CE cULus

Basic Wiring Diagram

Users must connect wiring according to the following circuit diagram shown below.

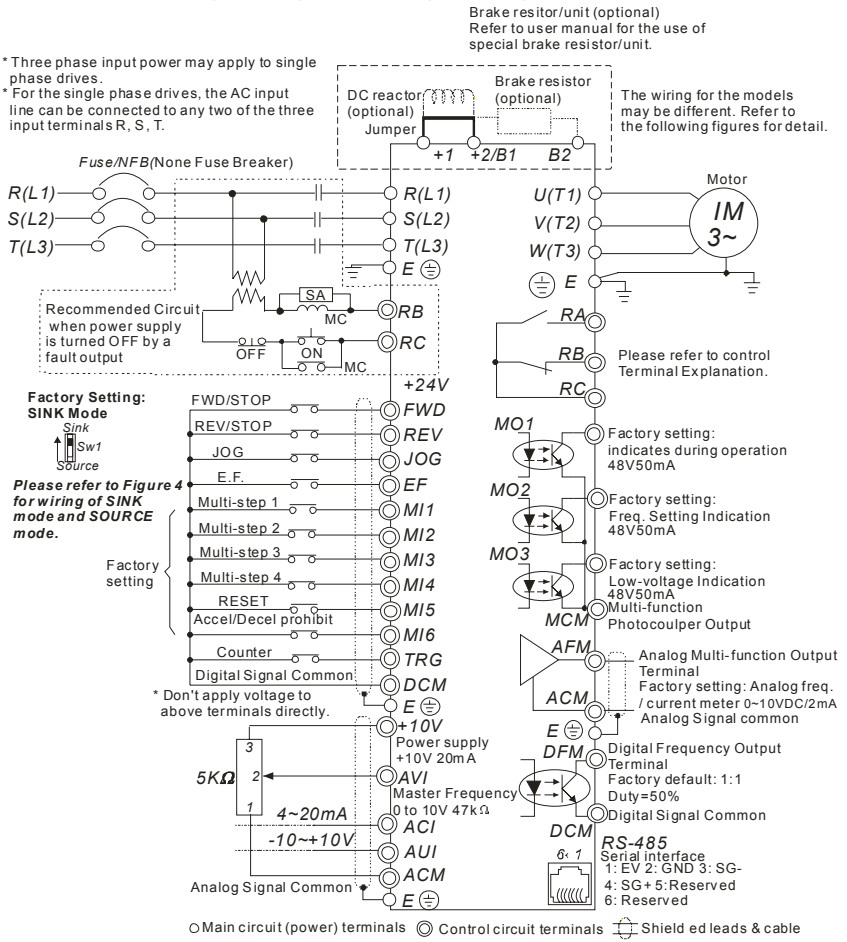


Figure 1 for models of VFD-B Series
VFD007B21A/23A/43A/53A,
VFD015B21A/21B/23A/23B/43A/53A,
VFD022B23B/43B/53A

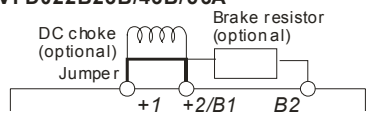


Figure 2 for models of VFD-B Series
VFD022B21A, VFD037B23A/43A/53A

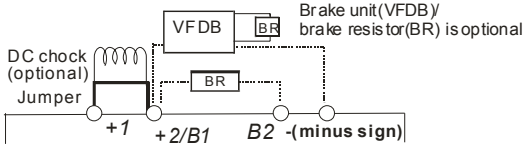


Figure 3 for models of VFD-B Series
VFD055B23A/43A/53A, VFD075B23A/43A/53A, VFD110B23A/43A/53A,
VFD150B23A/43A/53A, VFD185B23A/43A/53A, VFD220B23A/43A/53A,
VFD300B23A/43A/53A, VFD370B23A/43A/53A, VFD450B43A/53A,
VFD550B43A/43C/53A, VFD750B43A/43C/53A

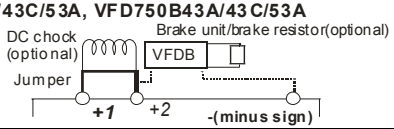
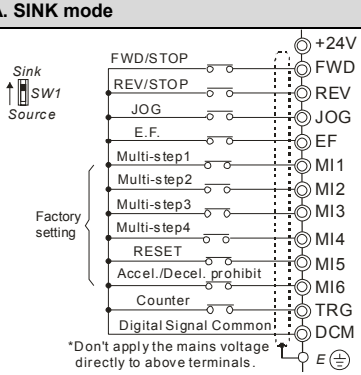
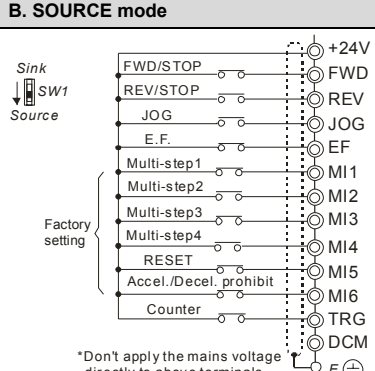


Figure 4 Wiring for SINK mode and SOURCE mode

A. SINK mode

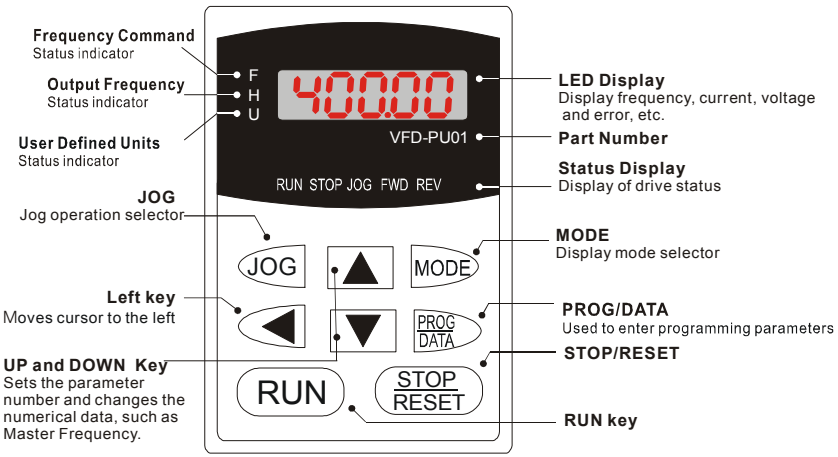


B. SOURCE mode

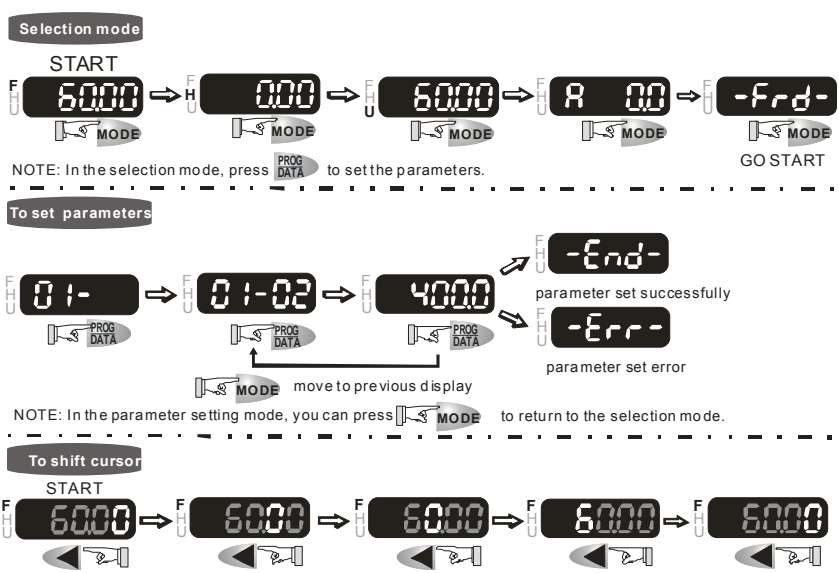


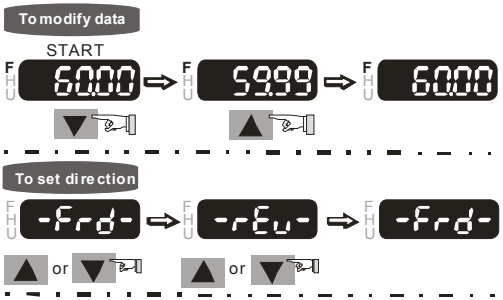
Description of the Digital Keypad

The digital keypad includes two parts: Display panel and keypad. The display panel provides the parameter display and shows the operation status of the AC drive and the keypad provides programming and control interface.



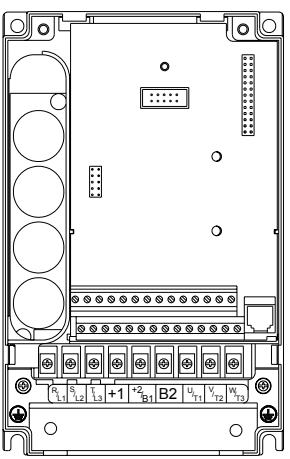
Operation Steps of the Digital Keypad





Power Terminals and Control Terminals

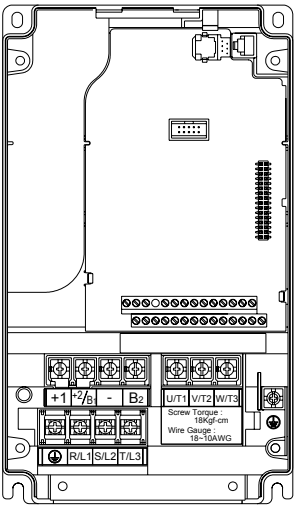
1HP to 3HP (0.75 to 2.2kW) VFD007B21A/23A/43A/53A, VFD015B21A/21B//23A/23B/43A/53A, VFD022B23B/43B/53A



Control Terminal
Torque: 4Kgf-cm (3 in-lbf)
Wire: 12-24 AWG (3.3-0.2 mm^2)

Power Terminal
Torque: 18 kgf-cm (15.6 in-lbf)
Wire Gauge: 10-18 AWG (5.3-0.8 mm^2) stranded wire, 12-18 AWG (3.3-0.8 mm^2) solid wire
Wire Type: Copper only, 75°C

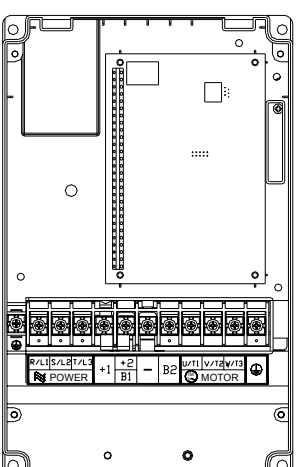
3HP to 5HP (2.2 to 3.7kW) VFD022B21A, VFD037B23A/43A/53A



Control Terminal
Torque: 4Kgf-cm (3 in-lbf)
Wire: 12-24 AWG (3.3-0.2mm^2)

Power Terminal
Torque: 18 kgf-cm (15.6 in-lbf)
Wire Gauge: 10-18 AWG (5.3-0.8mm^2)
Wire Type: Stranded copper only, 75°C

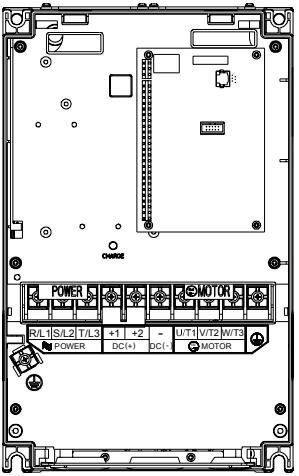
7.5 HP to 15 HP (5.5kW to 11kW) VFD055B23A/43A/53A, VFD075B23A/43A/53A, VFD110B23A/43A/53A



Control Terminal
Torque: 4Kgf-cm (3 in-lbf)
Wire: 12-24 AWG (3.3-0.2mm^2)

Power Terminal
Torque: 30Kgf-cm (26 in-lbf)
Wire: 8-12 AWG (8.4-3.3mm^2)
Wire Type: Stranded Copper only, 75°C
NOTE: To connect 6 AWG (13.3 mm^2) wires, use Recognized Ring Terminals

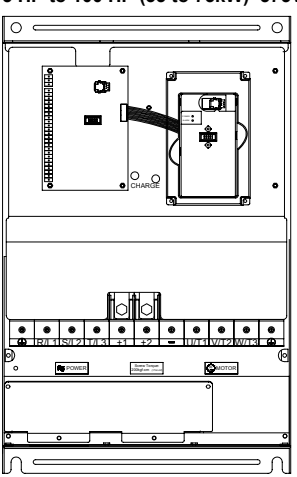
20 HP to 30 HP (15kW to 22kW) VFD150B23A/43A/53A, VFD185B23A/43A/53A, VFD220B23A/43A/53A



Control Terminal
Torque: 4Kgf-cm (3 in-lbf)
Wire: 12-24 AWG (3.3-0.2 mm^2)

Power Terminal
Torque: 30Kgf-cm (26 in-lbf)
Wire: 2-8 AWG (33.6-8.4 mm^2)
Wire Type: Stranded Copper only, 75°C
NOTE: To connect 6 AWG (13.3 mm^2) wires, use Recognized Ring Terminals

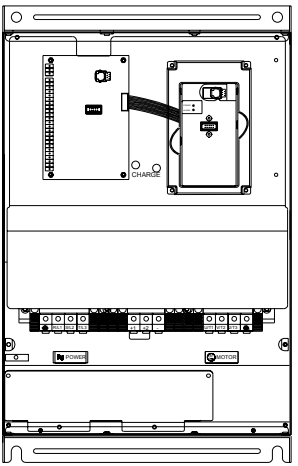
40 HP to 50 HP (30 to 37kW) 230V (VFD300B23A, VFD370B23A)
75 HP to 100 HP (55 to 75kW) 460V (VFD550B43C, VFD750B43C)
75 HP to 100 HP (55 to 75kW) 575V (VFD550B53A, VFD750B53A)



Control Terminal
Torque: 4Kgf-cm (3 in-lbf)
Wire: 12-24 AWG (3.3-0.2 mm^2)

Power Terminal
Torque: 200kgf-cm (173 in-lbf)
Wire Gauge: 1 - 3/0 AWG (42.4-85 mm^2)
Wire Type: Stranded copper only, 75°C

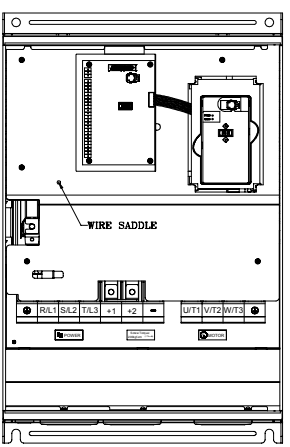
40 HP to 60 HP (30 to 45kW) 460V (VFD300B43A, VFD370B43A, VFD450B43A)
40 HP to 60 HP (30 to 45kW) 575V (VFD300B53A, VFD370B53A, VFD450B53A)



Control Terminal
Torque: 4Kgf-cm (3 in-lbf)
Wire: 12-24 AWG (3.3-0.2 mm^2)

Power Terminal
Torque: 58.7kgf-cm (50.9 in-lbf) max.
Wire Gauge: 2-6AWG (33.6-13.3 mm^2)
Wire Type: Stranded copper only, 75°C

75-100 HP (55-75kW) 460V (VFD550B43A, VFD750B43A)



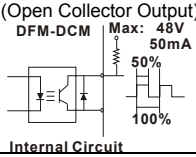
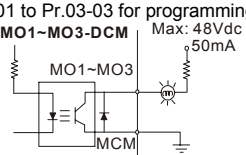
Control Terminal
Torque: 4Kgf-cm (3 in-lbf)
Wire: 12-24 AWG (3.3-0.2 mm^2)

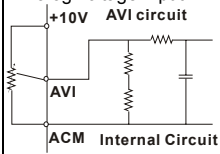
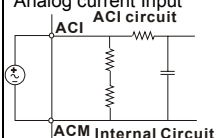
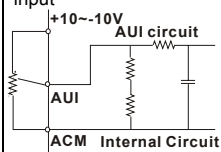
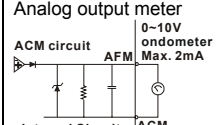
Power Terminal
Torque: 200 kgf-cm (173 in-lbf)
Wire: VFD550B43A : 2/0 AWG (67.4 mm^2)
VFD750B43A: 3/0 AWG (85 mm^2)
Wire Type: Stranded copper only, 75°C

Terminal Explanations

Terminal Symbol		Explanation of Terminal Function
R, S, T	R/L1, S/L2, T/L3	AC line input terminals (1-phase/3-phase)
U, V, W	U/T1, V/T2, W/T3	AC drive output terminals for connecting 3-phase induction motor
P1, P2	+1, +2	Connections for DC Choke (optional)
P-B, P2/B1~B2	+2/B1~B2	Connections for Brake Resistor (optional)
P2~N, P2/B1~N	+2~(-), +2/B1~(-)	Connections for External Brake Unit (VFDB series)
⏚		Earth connection, please comply with local regulations.

Control Terminals Explanations

Terminal Symbol	Terminal Function	Factory Settings (SINK) ON: Connect to DCM
FWD	Forward-Stop command	ON: Run in FWD direction, OFF: Stop acc. to Stop Method
REV	Reverse-Stop command	ON: Run in REV direction, OFF: Stop acc. to Stop Method
JOG	Jog command	ON: JOG operation, OFF: Stop acc. to Stop Method
EF	External fault	ON: External Fault. Display "EF" and stop acc. To Stop Method. OFF: No fault
TRG	External counter input	ON: At every pulse counter is advanced by 1.
MI1-6	Multi-function Input 1-6	Refer to Pr.04-04 to Pr.04-09 for programming the Multi-function Inputs.
DFM	Digital Frequency Meter (Open Collector Output) 	Pulse voltage output monitor signal, proportional to output frequency Duty-cycle: 50% Ratio: Pr.03-07 Min. load: 10KΩ Max. current: 50mA Max. voltage: 48VDC.
+24V	DC Voltage Source	+24VDC, 20mA: used for SOURCE mode
DCM	Digital Signal Common	Common for digital inputs and used for SINK mode.
RA	Multi-function Relay output (N.O.) a	Resistive Load: 5A(N.O.)/3A(N.C.) 240VAC 5A(N.O.)/3A(N.C.) 24VDC Inductive Load: 1.5A(N.O.)/0.5A(N.C.) 240VAC 1.5A(N.O.)/0.5A(N.C.) 24VDC Refer to Pr.03-00 for programming
RB	Multi-function Relay output (N.C.) b	
RC	Multi-function Relay common	
MO1	Multi-function Output 1 (Photocoupler)	Maximum 48VDC, 50mA Refer to Pr.03-01 to Pr.03-03 for programming 
MO2	Multi-function Output 2 (Photocoupler)	
MO3	Multi-function Output 3 (Photocoupler)	

Terminal Symbol	Terminal Function	Factory Settings (SINK) ON: Connect to DCM
MCM	Multi-function output common	Common for Multi-function Outputs
+10V	Potentiometer power supply	+10VDC 20mA
AVI	Analog voltage Input 	Impedance: 47kΩ Resolution: 10 bits Range: 0 ~10VDC = 0 ~ Max. Output Frequency (Pr.01-00) Selection: Pr.02-00, Pr.02-13, Pr.10-00 Set-up: Pr.04-00 ~ Pr.04-03
ACI	Analog current Input 	Impedance: 250Ω Resolution: 10 bits Range: 4 ~ 20mA =0 ~ Max. Output Frequency (Pr.01-00) Selection: Pr.02-00, Pr.02-13, Pr.10-00 Set-up: Pr.04-11 ~ Pr.04-14
AUI	Auxiliary analog voltage input 	Impedance: 47kΩ Resolution: 10 bits Range:-10 ~ +10VDC=0~Max. Output Frequency(Pr.01-00) Selection: Pr.02-00, Pr.02-13, Pr.10-00 Set-up: Pr.04-15 ~ Pr.04-18
AFM	Analog output meter 	0 to 10V, 2mA Impedance: 470Ω Output current 2mA max Resolution: 8 bits Range: 0 ~ 10VDC Function: Pr.03-05
ACM	Analog control signal (common)	Common for AVI, ACI, AUI, AFM

****Control signal wiring size: 18 AWG (0.75 mm^2) with shielded wire.**

Summary of Parameter Settings

✓: The parameter can be set during operation.

Pr.	Explanation	Settings	Factory Setting	NOTE
Group 0 User Parameters				
00-00	Identity Code of the AC motor drive	Read-only	##	
00-01	Rated Current Display of the AC motor drive	Read-only	#.#	

Pr.	Explanation	Settings	Factory Setting	NOTE
00-02	Parameter Reset	08: Keypad lock 09: All parameters are reset to factory settings (50Hz, 220V/380V/575V) 10: All parameters are reset to factory settings (60Hz, 220V/440V/575V)	00	
✓00-03	Start-up Display Selection	00: Display the frequency command value (LED F) 01: Display the actual output frequency (LED H) 02: Display the content of user-defined unit (LED U) 03: Multifunction display, see Pr.00-04 04: FWD/REV command	00	
✓00-04	Content of Multi Function Display	00: Display output current (A) 01: Display counter value (C) 02: Display process operation (1.tt) 03: Display DC-BUS voltage ($\bar{u}$) 04: Display output voltage (E) 05: Output power factor angle (n) 06: Display output power (P) 07: Display actual motor speed (HU) 08: Display the estimated value of torque as it relates to current (t) 09: Display PG numbers/10ms (G) 10: Display analog feedback signal value (b) (%) 11: Display AVI (U1.) (%) 12: Display ACI (U2.) (%) 13: Display AUI (U3.) (%) 14: Display the temperature of heat sink (°C)	00	
✓00-05	User-Defined Coefficient K	0.01 to 160.00	1.00	
00-06	Software Version	Read-only	#.##	
00-07	Password Input	00 to 65535	00	
00-08	Password Set	00 to 65535	00	
00-09	Control Method	00: V/f Control 01: V/f + PG Control 02: Vector Control 03: Vector + PG Control	00	
00-10	Reserved			
		Group 1 Basic Parameters		
01-00	Maximum Output Frequency (Fmax)	50.00 to 400.00 Hz	60.00	
01-01	Maximum Voltage Frequency (Fbase)	0.10 to 400.00 Hz	60.00	
01-02	Maximum Output Voltage (Vmax)	230V series: 0.1V to 255.0V 460V series: 0.1V to 510.0V 575V series: 0.1V to 637.0V	220.0 440.0 575.0	

Pr.	Explanation	Settings	Factory Setting	NOTE
01-03	Mid-Point Frequency (Fmid)	0.10 to 400.00 Hz	0.50	
01-04	Mid-Point Voltage (Vmid)	230V series: 0.1V to 255.0V 460V series: 0.1V to 510.0V 575V series: 0.1V to 637.0V	1.7 3.4 4.8	
01-05	Minimum Output Frequency (Fmin)	0.10 to 400.00 Hz	0.50	
01-06	Minimum Output Voltage (Vmin)	230V series: 0.1V to 255.0V 460V series: 0.1V to 510.0V 575V series: 0.1V to 637.0V	1.7 3.4 4.8	
01-07	Output Frequency Upper Limit	1 to 120%	100	
01-08	Output Frequency Lower Limit	0 to100 %	0	
✗01-09	Accel Time 1	0.01 to 3600.0 sec	10.0	
✗01-10	Decel Time 1	0.01 to 3600.0 sec	10.0	
✗01-11	Accel Time 2	0.01 to 3600.0 sec	10.0	
✗01-12	Decel Time 2	0.01 to 3600.0 sec	10.0	
01-09 ~ 01-12: Factory setting for models of 30hp (22kW) and above is 60sec.				
✗01-13	Jog Acceleration Time	0.1 to 3600.0 sec	1.0	
✗01-14	Jog Frequency	0.10 Hz to 400.00 Hz	6.00	
✗01-15	Auto acceleration / deceleration (refer to Accel/Decel time setting)	00: Linear Accel/Decel 01: Auto Accel, Linear Decel 02: Linear Accel, Auto Decel 03: Auto Accel/Decel (Set by load) 04: Auto Accel/Decel (set by Accel/Decel Time setting)	00	
01-16	Acceleration S-Curve	00 to 07	00	
01-17	Deceleration S-Curve	00 to 07	00	
✗01-18	Accel Time 3	0.01 to 3600.0 sec	10.0	
✗01-19	Decel Time 3	0.01 to 3600.0 sec	10.0	
✗01-20	Accel Time 4	0.01 to 3600.0 sec	10.0	
✗01-21	Decel Time 4	0.01 to 3600.0 sec	10.0	
01-18 ~ 01-21: Factory setting for models of 30hp (22kW) and above is 60sec.				
✗01-22	Jog Deceleration Time	0.1 to 3600.0 sec	1.0	
01-23	Accel/Decel Time Unit	00: Unit: 1 sec 01: Unit: 0.1 sec 02: Unit: 0.01 sec	01	
Group 2 Operation Method Parameters				
✗02-00	Source of First Master Frequency Command	00: Digital keypad (PU01) UP/DOWN keys or Multi-function Inputs UP/DOWN. Last used frequency saved.	00	

Pr.	Explanation	Settings	Factory Setting	NOTE
✓02-00	Source of First Master Frequency Command	01: 0 to +10V from AVI 02: 4 to 20mA from ACI 03: -10 to +10Vdc from AUI 04: RS-485 serial communication (RJ-11). Last used frequency saved. 05: RS-485 serial communication (RJ-11). Last used frequency not saved. 06: Combined use of master and auxiliary frequency command (See Pr. 02-10 to 02-12)	00	
✓02-01	Source of First Operation Command	00: Digital keypad (PU01) 01: External terminals. Keypad STOP/RESET enabled. 02: External terminals. Keypad STOP/RESET disabled. 03: RS-485 serial communication (RJ-11). Keypad STOP/RESET enabled. 04: RS-485 serial communication (RJ-11). Keypad STOP/RESET disabled.	00	
02-02	Stop Method	00: STOP: ramp to stop; E.F.: coast to stop 01: STOP: coast to stop; E.F.: coast to stop 02: STOP: ramp to stop; E.F.: ramp to stop 03: STOP: coast to stop; E.F.: ramp to stop	00	
02-03	PWM Carrier Frequency Selections	230V&460V:1-5hp/0.75-3.7kW: 1-15kHz 7.5-25hp/5.5-18.5kW: 01-15kHz 30-60hp/22-45kW: 01-09kHz 75-100hp/55-75kW: 01-06kHz 575V: 1-15hp/0.75-11kW: 01-10 kHz 20-60hp/15-45kW: 01-08 kHz 75-100hp/55-75kW: 01-06kHz	15 09 06 06 06 06 06	
02-04	Motor Direction Control	00: Enable forward/reverse operation 01: Disable reverse operation 02: Disabled forward operation	00	
02-05	2-wire/3-wire Operation Control Modes	00: 2-wire: FWD/STOP, REV/STOP 01: 2-wire: FWD/REV, RUN/STOP 02: 3-wire operation	00	
02-06	Line Start Lockout	00: Disable. Operation status is not changed even if operation command source Pr.02-01 and/or Pr.02-14 is changed. 01: Enable. Operation status is not changed even if operation command source Pr.02-01 and/or Pr.02-14 is changed. 02: Disable. Operation status will change if operation command source Pr.02-01 and/or Pr.02-14 is changed.	00	

Pr.	Explanation	Settings	Factory Setting	NOTE
		03: Enable. Operation status will change if operation command source Pr.02-01 and/or Pr.02-14 is changed.		
02-07	Loss of ACI Signal (4-20mA)	00: Decelerate to 0 Hz 01: Coast to stop and display “EF” 02: Continue operation by last frequency command	00	
✓02-08	Up/Down Mode	00: Based on accel/decel time 01: Constant speed 02: Based on accel/decel time, but frequency command will be 0 when stopped.	00	
✓02-09	Accel/Decel Rate of Change of UP/DOWN Operation with Constant Speed	0.01~1.00 Hz/msec	0.01	
✓02-10	Source of the Master Frequency Command	00: Digital keypad (PU01) UP/DOWN keys or Multi-function Inputs UP/DOWN. Last used frequency saved. 01: 0 to +10V from AVI 02: 4 to 20mA from ACI 03: -10 to +10Vdc from AUI 04: RS-485 serial communication (RJ-11). Last used frequency saved.	00	
✓02-11	Source of the Auxiliary Frequency Command	00: Digital keypad (PU01) UP/DOWN keys or Multi-function Inputs UP/DOWN. Last used frequency saved. 01: 0 to +10V from AVI 02: 4 to 20mA from ACI 03: -10 to +10Vdc from AUI 04: RS-485 serial communication (RJ-11). Last used frequency saved.	00	
✓02-12	Combination of the Master and Auxiliary Frequency Command	00: Master frequency + auxiliary frequency 01: Master frequency - auxiliary frequency	00	
✓02-13	Source of Second Frequency Command	00: Digital keypad (PU01) UP/DOWN keys or Multi-function Inputs UP/DOWN. Last used frequency saved. 01: 0 to +10V from AVI 02: 4 to 20mA from ACI 03: -10 to +10Vdc from AUI 04: RS-485 serial communication (RJ-11). Last used frequency saved 05: RS-485 serial communication (RJ-11). Last used frequency not saved.	00	

Pr.	Explanation	Settings	Factory Setting	NOTE
		06: Combined use of master and auxiliary frequency command (See Pr. 02-10 to 02-12)		
✓02-14	Source of Second Operation Command	00: Digital keypad (PU01) 01: External terminals. Keypad STOP/RESET enabled. 02: External terminals. Keypad STOP/RESET disabled. 03: RS-485 serial communication (RJ-11). Keypad STOP/RESET enabled. 04: RS-485 serial communication (RJ-11). Keypad STOP/RESET disabled.	00	
✓02-15	Keypad Frequency Command	0.00 ~ 400.00Hz	60.00	
Group 3 Output Function Parameters				
03-00	Multi-Function Output Relay (RA1, RB1, RC1)	00: No function 01: AC drive operational 02: Master frequency attained 03: Zero speed 04: Over torque detection 05: Base-Block (B.B.) indication 06: Low-voltage indication 07: Operation mode indication 08: Fault indication 09: Desired frequency attained 1 10: PLC program running 11: PLC program step completed 12: PLC program completed 13: PLC program operation paused 14: Terminal count value attained 15: Preliminary count value attained 16: Auxiliary motor No.1 17: Auxiliary motor No.2 18: Auxiliary motor No.3 19: Heat sink overheat warning 20: AC motor drive ready 21: Emergency stop indication 22: Desired frequency attained 2 23: Software brake signal 24: Zero speed output signal 25: Under-current detection 26: Operation indication (H>=Fmin) 27: Feedback signal error 28: User-defined low-voltage detection 29: Brake control (Desired frequency attained 3)	08	
03-01	Multi-Function Output Terminal MO1		01	
03-02	Multi-Function Output Terminal MO2		02	
03-03	Multi-Function Output Terminal MO3		20	
03-04	Desired Frequency Attained 1	0.00 to 400.00 Hz	0.00	

Pr.	Explanation	Settings	Factory Setting	NOTE
03-05	Analog Output Signal	00: Analog frequency meter 01: Analog current meter 02: Output voltage 03: Output frequency command 04: Output motor speed 05: Load power factor (cos90° to Cos0°)	00	
✓03-06	Analog Output Gain	01 to 200%	100	
✓03-07	Digital Output Multiplying Factor	01 to 20	01	
✓03-08	Terminal Count Value	00 to 65500	00	
✓03-09	Preliminary Count Value	00 to 65500	00	
03-10	Desired Frequency Attained 2	0.00 to 400.00 Hz	0.00	
03-11	EF Active When Preliminary Count Value Attained	00: Preliminary count value attained, no EF display 01: Preliminary count value attained, EF active	00	
03-12	Fan Control	00: Fan always ON 01: 1 minute after AC motor drive stops, fan will be OFF 02: AC motor drive runs and fan ON, AC motor drive stops and fan OFF 03: Fan ON to run when preliminary heatsink temperature attained	00	
03-13	Brake Release Frequency	0.00 to 400.00Hz	0.00	
03-14	Brake Engage Frequency	0.00 to 400.00Hz	0.00	
		Group 4 Input Function Parameters		
✓04-00	AVI Analog Input Bias	0.00~200.00 %	0.00	
04-01	AVI Bias Polarity	00: Positive bias 01: Negative bias	00	
✓04-02	AVI Input Gain	1 to 200 %	100	
04-03	AVI Negative Bias, Reverse Motion Enable/Disable	00: No AVI negative bias command 01: Negative bias: REV motion enabled 02: Negative bias: REV motion disabled	00	
04-04	Multi-Function Input Terminal 1 (MI1)	00: No function 01: Multi-Step speed command 1 02: Multi-Step speed command 2 03: Multi-Step speed command 3 04: Multi-Step speed command 4 05: External reset (N.O.)	01	
04-05	Multi-Function Input Terminal 2 (MI2)	06: Accel/Decel inhibit 07: Accel/Decel time selection command 1 08: Accel/Decel time selection command 2 09: External base block (N.O.)	02	

Pr.	Explanation	Settings	Factory Setting	NOTE
04-06	Multi-Function Input Terminal 3 (MI3)	10: External base block (N.C.) 11: Up: Increment master frequency 12: Down: Decrement master frequency 13: Counter reset 14: Run PLC program 15: Pause PLC program 16: Auxiliary motor No.1 output disable 17: Auxiliary motor No.2 output disable 18: Auxiliary motor No.3 output disable 19: Emergency stop (N.O.) 20: Emergency stop (N.C.) 21: Master frequency selection AVI/ACI 22: Master frequency selection AVI/AUI 23: Operation command selection (keypad/external terminals) 24: Auto accel/decel mode disable 25: Forced stop (N.C.) 26: Forced stop (N.O.) 27: Parameter lock enable (N.O.) 28: PID function disabled 29: Jog FWD/REV command 30: External reset (N.C.) 31: Source of second frequency command enabled 32: Source of second operation command enabled 33: One shot PLC 34: Proximity sensor input for simple Index function 35: Output shutoff stop (NO) 36: Output shutoff stop (NC)	03	
04-07	Multi-Function Input Terminal 4 (MI4)		04	
04-08	Multi-Function Input Terminal 5 (MI5)		05	
04-09	Multi-Function Input Terminal 6 (MI6)		06	
04-10	Digital Terminal Input Debouncing Time	1 to 20 (*2ms)	01	
✓04-11	ACI Analog Input Bias	0.00~200.00 %	0.00	
04-12	ACI Bias Polarity	00: Positive bias 01: Negative bias	00	
✓04-13	ACI Input Gain	01 to 200 %	100	
04-14	ACI Negative Bias, Reverse Motion Enable/Disable	00: No ACI negative bias command 01: Negative bias: REV motion enabled 02: Negative bias: REV motion disabled	00	
✓04-15	AUI Analog Input Bias	0.00~200.00 %	0.00	
04-16	AUI Bias Polarity	00: Positive bias 01: Negative bias	00	
✓04-17	AUI Input Gain	01 to 200 %	100	
04-18	AUI Negative Bias Reverse Motion Enable/Disable	00: No AUI negative bias command 01: Negative bias: REV motion enabled 02: Negative bias: REV motion disabled	00	

Pr.	Explanation	Settings	Factory Setting	NOTE
04-19	AVI Analog Input Delay	0.00 to 10.00 sec	0.05	
04-20	ACI Analog Input Delay	0.00 to 10.00 sec	0.05	
04-21	AUI Analog Input Delay	0.00 to 10.00 sec	0.05	
04-22	Analog Input Frequency Resolution	00: 0.01Hz 01: 0.1Hz	01	
04-23	Gear Ratio for Simple Index Function	4 ~ 1000	200	
04-24	Index Angle for Simple Index Function	0.0 ~360.0°	180.0	
✗04-25	Deceleration Time for Simple Index Function	0.00 ~100.00 sec	0.00	
Group 5 Multi-Step Speed and PLC Parameters				
✗05-00	1st Step Speed Frequency	0.00 to 400.00 Hz	0.00	
✗05-01	2nd Step Speed Frequency	0.00 to 400.00 Hz	0.00	
✗05-02	3rd Step Speed Frequency	0.00 to 400.00 Hz	0.00	
✗05-03	4th Step Speed Frequency	0.00 to 400.00 Hz	0.00	
✗05-04	5th Step Speed Frequency	0.00 to 400.00 Hz	0.00	
✗05-05	6th Step Speed Frequency	0.00 to 400.00 Hz	0.00	
✗05-06	7th Step Speed Frequency	0.00 to 400.00 Hz	0.00	
✗05-07	8th Step Speed Frequency	0.00 to 400.00 Hz	0.00	
✗05-08	9th Step Speed Frequency	0.00 to 400.00 Hz	0.00	
✗05-09	10th Step Speed Frequency	0.00 to 400.00 Hz	0.00	
✗05-10	11th Step Speed Frequency	0.00 to 400.00 Hz	0.00	
✗05-11	12th Step Speed Frequency	0.00 to 400.00 Hz	0.00	
✗05-12	13th Step Speed Frequency	0.00 to 400.00 Hz	0.00	
✗05-13	14th Step Speed Frequency	0.00 to 400.00 Hz	0.00	
✗05-14	15th Step Speed Frequency	0.00 to 400.00 Hz	0.00	
05-15	PLC Mode	00: Disable PLC operation 01: Execute one program cycle 02: Continuously execute program cycles 03: Execute one program cycle step by step 04: Continuously execute program cycles step by step	00	

Pr.	Explanation	Settings	Factory Setting	NOTE
05-16	PLC Forward/ Reverse Motion	00 to 32767 (00: FWD, 01: REV)	00	
05-17	Time Duration of 1st Step Speed	00 to 65500 sec or 00 to 6550.0 sec	00	
05-18	Time Duration of 2nd Step Speed	00 to 65500 sec or 00 to 6550.0 sec	00	
05-19	Time Duration of 3rd Step Speed	00 to 65500 sec or 00 to 6550.0 sec	00	
05-20	Time Duration of 4th Step Speed	00 to 65500 sec or 00 to 6550.0 sec	00	
05-21	Time Duration of 5th Step Speed	00 to 65500 sec or 00 to 6550.0 sec	00	
05-22	Time Duration of 6th Step Speed	00 to 65500 sec or 00 to 6550.0 sec	00	
05-23	Time Duration of 7th Step Speed	00 to 65500 sec or 00 to 6550.0 sec	00	
05-24	Time Duration of 8th Step Speed	00 to 65500 sec or 00 to 6550.0 sec	00	
05-25	Time Duration of 9th Step Speed	00 to 65500 sec or 00 to 6550.0 sec	00	
05-26	Time Duration of 10th Step Speed	00 to 65500 sec or 00 to 6550.0 sec	00	
05-27	Time Duration of 11th Step Speed	00 to 65500 sec or 00 to 6550.0 sec	00	
05-28	Time Duration of 12th Step Speed	00 to 65500 sec or 00 to 6550.0 sec	00	
05-29	Time Duration of 13th Step Speed	00 to 65500 sec or 00 to 6550.0 sec	00	
05-30	Time Duration of 14th Step Speed	00 to 65500 sec or 00 to 6550.0 sec	00	
05-31	Time Duration of 15th Step Speed	00 to 65500 sec or 00 to 6550.0 sec	00	
05-32	Time Unit Settings	00: 1 sec 01: 0.1 sec	00	
05-33	The Amplitude of Wobble Vibration	0.00~400.00 Hz	0.00	
05-34	Wobble Skip Frequency	0.00~400.00 Hz	0.00	
		Group 6 Protection Parameters		
06-00	Over-Voltage Stall Prevention	230V series: 330.0V to 410.0V 460V series: 660.0V to 820.0V 575V series: 825.0V to1025.0V 00: Disable over-voltage stall prevention	390.0V 780.0V 975.0V	
06-01	Over-Current Stall Prevention during Accel	20 to 250%	170	
06-02	Over-Current Stall Prevention during Operation	20 to 250%	170	

Pr.	Explanation	Settings	Factory Setting	NOTE
06-03	Over-Torque Detection Mode (OL2)	00: Disabled 01: Enabled during constant speed operation. After the over-torque is detected, keep running until OL1 or OL occurs. 02: Enabled during constant speed operation. After the over-torque is detected, stop running. 03: Enabled during accel. After the over-torque is detected, keep running until OL1 or OL occurs. 04: Enabled during accel. After the over-torque is detected, stop running.	00	
06-04	Over-Torque Detection Level	10 to 200%	150	
06-05	Over-Torque Detection Time	0.1 to 60.0 sec	0.1	
06-06	Electronic Thermal Overload Relay Selection	00: Standard motor (self cooled by fan) 01: Special motor (forced external cooling) 02: Disabled	02	
06-07	Electronic Thermal Characteristic	30 to 600 sec	60	
06-08	Present Fault Record	00: No fault 01: Over current (oc) 02: Over voltage (ov) 03: Over heat (oH) 04: Over load (oL) 05: Over load (oL1) 06: External fault (EF) 07: IGBT protection (occ) 08: CPU failure (cF3) 09: Hardware protection failure (HPF) 10: Excess current during acceleration (ocA) 11: Excess current during deceleration (ocd) 12: Excess current during steady state (ocn) 13: Ground fault (GFF) 14: Reserved 15: CF1 16: CF2 17: Reserved 18: Motor over-load (oL2) 19: Auto Acel/Decel failure (CFA) 20: SW/Password protection (codE) 21: External Emergency Stop (EF1) 22: Phase-Loss (PHL)	00	
06-09	Second Most Recent Fault Record			
06-10	Third Most Recent Fault Record			
06-11	Fourth Most Recent Fault Record			

Pr.	Explanation	Settings	Factory Setting	NOTE
		23: Preliminary count value attained, EF active (cEF) 24: Under-current (Lc) 25: Analog feedback signal error (AnLEr) 26: PG feedback signal error (PGErr)		
06-12	Under-Current Detection Level	00~100% (00: Disabled)	00	
06-13	Under-Current Detection Time	0.1~ 3600.0 sec	10.0	
06-14	Under-Current Detection Mode	00: Warn and keep operating 01: Warn and ramp to stop 02: Warn and coast to stop 03: Warn, after coast to stop, restart (delay 06-15 setting time)	00	
06-15	Under-Current Detection Restart Delay Time (Lv)	1~600 Min.	10	
06-16	User-Defined Low-Voltage Detection Level	00: Disabled 230V: 220 to 300VDC 460V: 440 to 600VDC 575V: 520 to 780VDC	00	
06-17	User-Defined Low-Voltage Detection Time	0.1~ 3600.0 sec	0.5	
06-18	Reserved			
Group 7 Motor Parameters				
✓07-00	Motor Rated Current	30 to 120%	100	
✓07-01	Motor No-Load Current	01 to 90%	40	
✓07-02	Torque Compensation	0.0 to 10.0	0.0	
✓07-03	Slip Compensation (Used without PG)	0.00 to 3.00	0.00	
07-04	Number of Motor Poles	02 to 10	04	
07-05	Motor Parameters Auto Tuning	00: Disable 01: Auto tuning R1 02: Auto tuning R1 + no-load test	00	
07-06	Motor Line-to-line Resistance R1	00~65535 mΩ	00	
07-07	Reserved			
07-08	Motor Rated Slip	0.00 to 20.00 Hz	3.00	
07-09	Slip Compensation Limit	0 to 250%	200	
07-10	Reserved			
07-11	Reserved			
07-12	Torque Compensation Time Constant	0.01 ~10.00 Sec	0.05	
07-13	Slip Compensation Time Constant	0.05 ~10.00 sec	0.10	
07-14	Accumulative Motor Operation Time (Min.)	00 to 1439 Min.	00	
07-15	Accumulative Motor Operation Time (Day)	00 to 65535 Day	00	
Group 8 Special Parameters				

Pr.	Explanation	Settings	Factory Setting	NOTE
08-00	DC Brake Current Level	00 to 100%	00	
08-01	DC Brake Time during Start-Up	0.0 to 60.0 sec	0.0	
08-02	DC Brake Time during Stopping	0.0 to 60.0 sec	0.0	
08-03	Start-Point for DC Brake	0.00 to 400.00Hz	0.00	
08-04	Momentary Power Loss Operation Selection	00: Operation stops after momentary power loss 01: Operation continues after momentary power loss, speed search starts with the Master Frequency reference value 02: Operation continues after momentary power loss, speed search starts with the minimum frequency	00	
08-05	Maximum Allowable Power Loss Time	0.1 to 5.0 sec	2.0	
08-06	B.B. Time for Speed Search	0.1 to 5.0 sec	0.5	
08-07	Current Limit for Speed Search	30 to 200%	150	
08-08	Skip Frequency 1 Upper Limit	0.00 to 400.00 Hz	0.00	
08-09	Skip Frequency 1 Lower Limit	0.00 to 400.00 Hz	0.00	
08-10	Skip Frequency 2 Upper Limit	0.00 to 400.00 Hz	0.00	
08-11	Skip Frequency 2 Lower Limit	0.00 to 400.00 Hz	0.00	
08-12	Skip Frequency 3 Upper Limit	0.00 to 400.00 Hz	0.00	
08-13	Skip Frequency 3 Lower Limit	0.00 to 400.00 Hz	0.00	
08-14	Auto Restart After Fault	00 to 10 (00=disable)	00	
08-15	Auto Energy Saving	00: Disable 01: Enable	00	
08-16	AVR Function	00: AVR function enable 01: AVR function disable 02: AVR function disable for decel.	00	
08-17	Software Brake Level	230V series: 370 to 430V 460V series: 740 to 860V 575V series: 925 to1075V	380 760 950	
08-18	Base-block Speed Search	00: Speed search starts with last frequency command 01: Starts with minimum output frequency	00	
08-19	Speed Search during Start-up	00: Speed search disable 01: Speed search enable	00	

Pr.	Explanation	Settings	Factory Setting	NOTE
✓08-20	Speed Search Frequency during Start-up	00: Setting frequency 01: Maximum operation frequency (01-00)	00	
08-21	Auto Reset Time at Restart after Fault	00 to 60000 sec	600	
✓08-22	Compensation Coefficient for Motor Instability	00~1000	00	
Group 9 Communication Parameters				
✓09-00	Communication Address	01 to 254	01	
✓09-01	Transmission Speed	00: Baud rate 4800bps 01: Baud rate 9600bps 02: Baud rate 19200bps 03: Baud rate 38400bps	01	
✓09-02	Transmission Fault Treatment	00: Warn and keep operating 01: Warn and ramp to stop 02: Warn and coast to stop 03: No warning and keep operating	03	
✓09-03	Time-out Detection	0.0 ~ 60.0 seconds 0.0: Disable	0.0	
✓09-04	Communication Protocol	00: 7,N,2 (Modbus, ASCII) 01: 7,E,1 (Modbus, ASCII) 02: 7,O,1 (Modbus, ASCII) 03: 8,N,2 (Modbus, RTU) 04: 8,E,1 (Modbus, RTU) 05: 8,O,1 (Modbus, RTU)	00	
09-05	Reserved			
09-06	Reserved			
✓09-07	Response Delay Time	00 ~ 200 msec	00	
Group 10 PID Control Parameters				
10-00	Input terminal for PID Feedback	00: Inhibit PID operation 01: Negative PID feedback from external terminal (AVI) 0 to +10V 02: Negative PID feedback from external terminal (ACI) 4 to 20mA 03: Positive PID feedback from external terminal (AVI) 0 to +10V 04: Positive PID feedback from external terminal (ACI) 4 to 20mA	00	
10-01	Gain over PID Detection value	0.00 to 10.00	1.00	
✓10-02	Proportional Gain (P)	0.0 to 10.0	1.0	
✓10-03	Integral Gain (I)	0.00 to 100.00 sec (0.00=disable)	1.00	
✓10-04	Derivative Control (D)	0.00 to 1.00 sec	0.00	
10-05	Upper Bound for Integral Control	00 to 100%	100	

Pr.	Explanation	Settings	Factory Setting	NOTE
10-06	Primary Delay Filter Time	0.0 to 2.5 sec	0.0	
10-07	PID Output Freq Limit	0 to 110%	100	
10-08	Feedback Signal Detection Time	0.0 to 3600.0 sec	60.0	
✓10-09	Treatment of the Erroneous Feedback Signals	00: Warn and keep operation 01: Warn and RAMP to stop 02: Warn and COAST to stop	00	
10-10	PG Pulse Range	1 to 40000	600	
10-11	PG Input	00: Disable PG 01: Single phase 02: Forward / Counterclockwise rotation 03: Reverse / Clockwise rotation	00	
✓10-12	ASR (Auto Speed Regulation) control (with PG only) (P)	0.0 to 10.0	1.0	
✓10-13	ASR (Auto Speed Regulation) control (with PG only) (I)	0.00 to 100.00 (0.00 disable)	1.00	
10-14	Speed Control Output Frequency Limit	0.00 to 100.00 Hz	10.00	
10-15	Sample time for refreshing the content of 210DH and 210EH	0.01~1.00 seconds	0.10	
10-16	Deviation Range of PID Feedback Signal Error	0.00~100.00%	100.00	
Group 11 Fan & Pump Control Parameters				
11-00	V/f Curve Selection	00: V/f curve determined by Pr.01-00 to Pr.01-06 01: 1.5 power curve 02: 1.7 power curve 03: Square curve 04: Cube curve	00	
11-01	Start-Up Frequency of the Auxiliary Motor	0.00 to 400.00 Hz	0.00	
11-02	Stop Frequency of the Auxiliary Motor	0.00 to 400.00 Hz	0.00	
11-03	Time Delay before Starting the Auxiliary Motor	0.0 to 3600.0 sec	0.0	
11-04	Time Delay before Stopping the Auxiliary Motor	0.0 to 3600.0 sec	0.0	
11-05	Sleep/Wake Up Detection Time	0.0 ~6550.0 sec	0.0	
11-06	Sleep Frequency	0.00~Fmax	0.00	
11-07	Wakeup Frequency	0.00~Fmax	0.00	

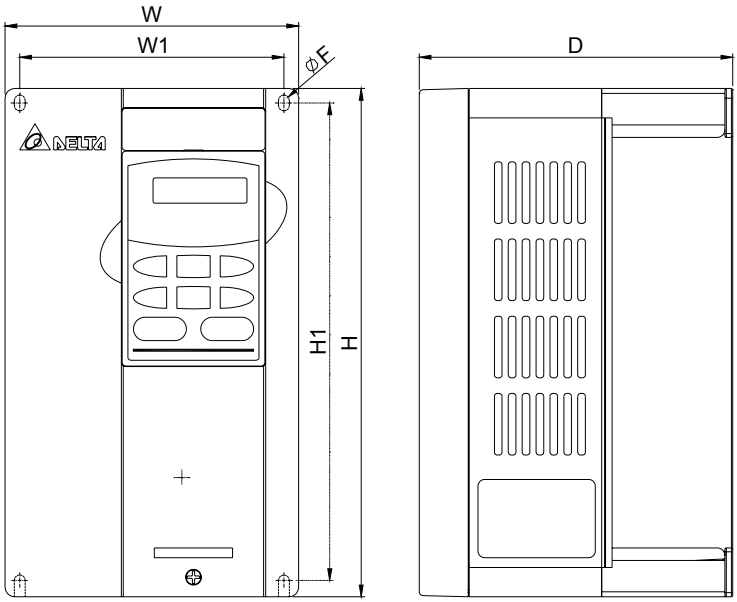
Fault Codes

Fault Name	Fault Descriptions	Corrective Actions
oc	**Over current** Abnormal increase in current.	1. Check if motor power corresponds with the AC motor drive output power. 2. Check the wiring connections to U, V, W for possible short circuits. 3. Check the wiring connections between the AC motor drive and motor for possible short circuits, also to ground. 4. Check for loose contacts between AC motor drive and motor. 5. Increase the Acceleration Time. 6. Check for possible excessive loading conditions at the motor. 7. If there are still any abnormal conditions when operating the AC motor drive after a short-circuit is removed and the other points above are checked, it should be sent back to manufacturer.
occ	**IGBT protection** (Insulated Gate Bipolar Transistor)	
ou	**Over voltage** The DC bus voltage has exceeded its maximum allowable value.	1. Check if the input voltage falls within the rated AC motor drive input voltage range. 2. Check for possible voltage transients. 3. DC-bus over-voltage may also be caused by motor regeneration. Either increase the Decel. Time or add an optional brake resistor (and brake unit). 4. Check whether the required brake power is within the specified limits.
oH	**Overheating** Heat sink temperature too high	1. Ensure that the ambient temperature falls within the specified temperature range. 2. Make sure that the ventilation holes are not obstructed. 3. Remove any foreign objects from the heatsinks and check for possible dirty heat sink fins. 4. Check the fan and clean it. 5. Provide enough spacing for adequate ventilation.
Lu	**Low voltage** The AC motor drive detects that the DC bus voltage has fallen below its minimum value.	1. Check whether the input voltage falls within the AC motor drive rated input voltage range. 2. Check whether the motor has sudden load. 3. Check for correct wiring of input power to R-S-T (for 3-phase models) without phase loss.
oL	**Overload** The AC motor drive detects excessive drive output current.	1. Check whether the motor is overloaded. 2. Reduce torque compensation setting in Pr.7-02. 3. Take the next higher power AC motor drive model. **NOTE: The AC motor drive can withstand up to 150% of the rated current for a maximum of 60 seconds.**
oL1	**Overload 1** Internal electronic overload trip	1. Check for possible motor overload. 2. Check electronic thermal overload setting. 3. Use a higher power motor. 4. Reduce the current level so that the drive output current does not exceed the value set by the Motor Rated Current Pr.7-00.

Fault Name	Fault Descriptions	Corrective Actions
oL2	**Overload 2** Motor overload.	1. Reduce the motor load. 2. Adjust the over-torque detection setting to an appropriate setting (Pr.06-03 to Pr.06-05).
HPF1	**GFF hardware error**	Return to the factory.
HPF2	**CC (current clamp)**	
HPF3	**OC hardware error**	
HPF4	**OV hardware error**	
cE-	**Communication Error**	1. Check the RS485 connection between the AC motor drive and RS485 master for loose wires and wiring to correct pins. 2. Check if the communication protocol, address, transmission speed, etc. are properly set. 3. Use the correct checksum calculation. 4. Please refer to group 9 in the chapter 5 for detail information.
ocA	**Over-current during acceleration**	1. Short-circuit at motor output: Check for possible poor insulation at the output lines. 2. Torque boost too high: Decrease the torque compensation setting in Pr.7-02. 3. Acceleration Time too short: Increase the Acceleration Time. 4. AC motor drive output power is too small: Replace the AC motor drive with the next higher power model.
ocd	**Over-current during deceleration**	1. Short-circuit at motor output: Check for possible poor insulation at the output line. 2. Deceleration Time too short: Increase the Deceleration Time. 3. AC motor drive output power is too small: Replace the AC motor drive with the next higher power model.
ocn	**Over-current during steady state operation**	1. Short-circuit at motor output: Check for possible poor insulation at the output line. 2. Sudden increase in motor loading: Check for possible motor stall. 3. AC motor drive output power is too small: Replace the AC motor drive with the next higher power model.
EF	**External Fault**	1. Input EF (N.O.) on external terminal is closed to GND. Output U, V, W will be turned off. 2. Give RESET command after fault has been cleared.
EF1	**Emergency stop**	1. When the multi-function input terminals MI1 to MI6 are set to emergency stop (setting 19 or 20), the AC motor drive stops output U, V, W and the motor coasts to stop. 2. Press RESET after fault has been cleared.
cF1	**Internal EEPROM can not be programmed.**	Return to the factory.
cF2	**Internal EEPROM can not be read.**	Return to the factory.

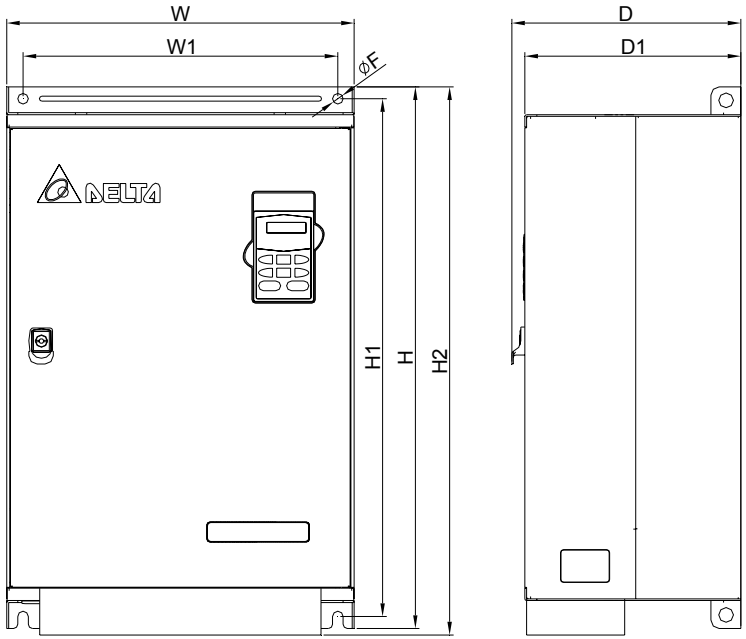
Fault Name	Fault Descriptions	Corrective Actions
cF3.3	**U-phase error**	Return to the factory.
cF3.4	**V-phase error**	
cF3.5	**W-phase error**	
cF3.6	**OV or LV**	Return to the factory.
cF3.7	**Current sensor error**	
cF3.8	**OH error**	
CcodE	**Software protection failure**	Return to the factory.
PcodE	**Password is locked.**	Keypad will be locked. Turn the power ON after power OFF to re-enter the correct password. See Pr.00-07 and 00-08.
cFA	**Auto accel/decel failure**	1. Check if the motor is suitable for operation by AC motor drive. 2. Check if the regenerative energy is too large. 3. Load may have changed suddenly.
GFF	**Ground fault**	When (one of) the output terminal(s) is grounded, short circuit current is more than 50% of AC motor drive rated current, the AC motor drive power module may be damaged. **NOTE: The short circuit protection is provided for AC motor drive protection, not for protection of the user.** 1. Check whether the IGBT power module is damaged. 2. Check for possible poor insulation at the output line.
bb	**External Base Block.** (Refer to Pr. 08-06)	1. When the external input terminal (B.B) is active, the AC motor drive output will be turned off. 2. Deactivate the external input terminal (B.B) to operate the AC motor drive again.
AnLEr	**Analog feedback error or ACI open circuit**	1. Check parameter settings and wiring of Analog feedback (Pr.10-00). 2. Check for possible fault between system response time and the feedback signal detection time (Pr.10-08).
PGErr	**PG feedback signal error**	1. Check parameter settings and signal type of PG feedback (Pr.10-10 and Pr.10-11). 2. Check if the wiring of PG card is correct.
AUE	**Auto Tuning Error**	1. Check cabling between drive and motor 2. Retry again
cEF	**EF when preliminary count value attained**	1. Check counter trigger signal 2. Check Pr.03-09, Pr.03-11setting
Lc	**Under Current**	1. Check Load current 2. Check Pr.06-12 to Pr.06-15 setting
PHL	**Phase Loss**	Check Power Source Input if all 3 input phases are connected without loose contacts.

Dimensions are in mm [inch]



Model Name	W	H	D	W1	H1	F
007B23A/43A/53A, 015B21B/23B, 022B23B/43B/53A	118.0 [4.65]	185.0 [7.28]	145.0 [5.71]	108.0 [4.25]	173.0 [6.81]	5.5 [0.22]
007B21A, 015B21A/23A/43A/53A	118.0 [4.65]	185.0 [7.28]	160.0 [6.30]	108.0 [4.25]	173.0 [6.81]	5.5 [0.22]
022B21A, 037B23A/43A/53A	150.0 [5.91]	260.0 [10.24]	160.2 [6.31]	135.0 [5.32]	244.3 [9.63]	6.5 [0.26]
055B23A/43A/53A, 075B23A/43A/53A, 110B23A/43A/53A	200.0 [7.88]	323.0 [12.72]	183.2 [7.22]	185.6 [7.31]	303.0 [11.93]	7.0 [0.28]
150B23A/43A/53A, 185B23A/43A/53A, 220B23A/43A/53A	250.0 [9.84]	403.8 [15.90]	205.4 [8.08]	226.0 [8.90]	384.0 [15.12]	10.0 [0.39]

Dimensions are in mm [inch]



Model Name	W	H	D1	W1	H1	F	D	H2
300B43A/53A, 370B43A/53A, 450B43A/53A	370.0 [14.57]	589.0 [23.19]	260.0 [10.24]	335.0 [13.19]	560.0 [22.05]	13.0 [0.51]	-	-
300B23A, 370B23A, 550B43C/53A, 750B43C/53A	370.0 [14.57]	589.0 [23.19]	260.0 [10.24]	335.0 [13.19]	560.0 [22.05]	13.0 [0.51]	-	595.0 [23.43]
550B43A, 750B43A	425.0 [16.73]	660.0 [25.98]	264.0 [10.39]	385.0 [15.16]	631.0 [24.84]	13.0 [0.51]	280.0 [11.02]	-