

## Preface








Thank you for choosing DELTA's high-performance VFD-M Series. VFD-M Series are manufactured by adopting high-quality components, material and incorporating 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-M User Manual on the CD supplied with the drive.

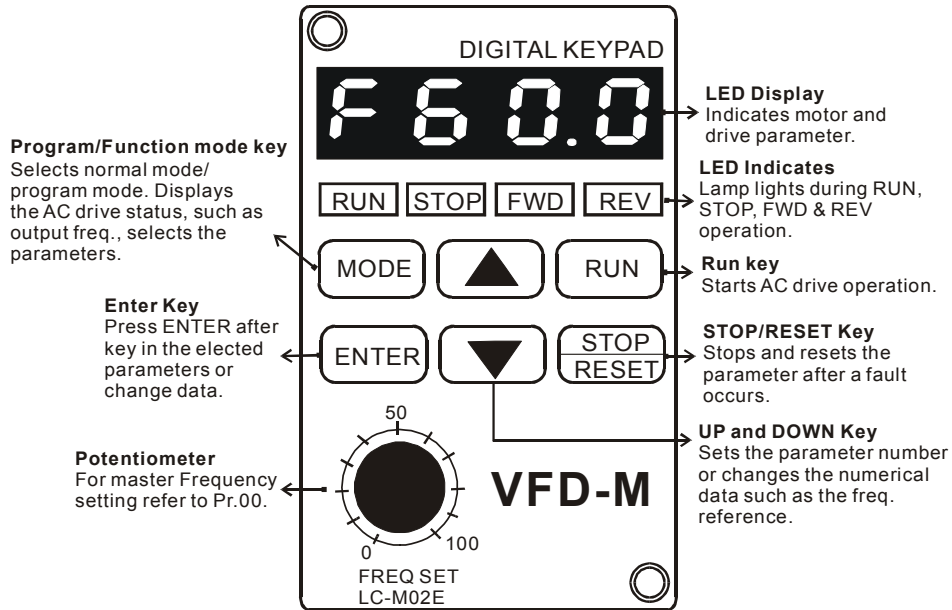


### WARNING

-  Always read this manual thoroughly before using VFD-M series AC Motor Drives.
-  **DANGER!** AC input power must be disconnected before any maintenance. Do not connect or disconnect wires and connectors while power is applied to the circuit. Maintenance must be performed by qualified technicians.
-  **CAUTION!** There are highly sensitive MOS components on the printed circuit boards. These components are especially sensitive to static electricity. To avoid damage to these components, do not touch these components or the circuit boards with metal objects or your bare hands.
-  **DANGER!** A charge may still remain in the DC-link capacitor with hazardous voltages even if the power has been turned off. To avoid personal injury, please ensure that power has turned off before operating AC drive and wait ten minutes for capacitors to discharge to safe voltage levels.
-  **CAUTION!** Ground the VFD-M using the ground terminal. The grounding method must comply with the laws of the country where the AC drive is to be installed. Refer to Basic Wiring Diagram.
-  **CAUTION!** The final enclosures of the AC drive must comply with EN50178. (Live parts shall be arranged in enclosures or located behind barriers that meet at least the requirements of the Protective Type IP20. The top surface of the enclosures or barrier that is easily accessible shall meet at least the requirements of the Protective Type IP40). (Users must provide this environment for VFD-M series.)
-  **DANGER!** The AC drive may be destroyed beyond repair if incorrect cables are connected to the input/output terminals. Never connect the AC drive output terminals U/T1, V/T2, and W/T3 directly to the AC main circuit power supply.

### Description of 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.



### STANDARD SPECIFICATIONS

Voltage Class		115V Series		
Model Number VFD-□□□M		002	004	007
Max. Applicable Motor Output (KW)		0.2	0.4	0.75
Max. Applicable Motor Output (HP)		0.25	0.5	1.0
Output Rating	Rated Output Capacity (KVA)	0.6	1.0	1.6
	Rated Output Current (A)	1.6	2.5	4.2
	Max. Output Voltage (V)	Two times proportion to input voltage		
	Rated Frequency (Hz)	0.1 to 400 Hz		
Input Rating	Rated Voltage	1-phase 100 to 120 VAC		
	Frequency Tolerance	50/60 Hz ±5%		
	Rated Input Current	6	9	16

Voltage Class		230V Series					
Model Number VFD-□□□M		004	007	015	022	037	055
Max. Applicable Motor Output (KW)		0.4	0.75	1.5	2.2	3.7	5.5
Max. Applicable Motor Output (HP)		0.5	1.0	2.0	3.0	5.0	7.5
Output Rating	Rated Output Capacity (KVA)	1.0	1.9	2.7	3.8	6.5	9.5
	Rated Output Current (A)	2.5	5.0	7.0	10	17	25
	Max. Output Voltage (V)	Proportional to input voltage					
	Rated Frequency (Hz)	0.1 to 400 Hz					
Input Rating	Rated Voltage	180 to 264 VAC					
	Frequency Tolerance	50/60 Hz ±5%					
	Single (3-phase Input Current)	1-phase / 3-phase			3-phase		
		2.9	7.6	8.8	12.5	--	--
	Rated Input Current	6.3/3.2	11.5/6.3	15.7/9.0	27/15	19.6	28

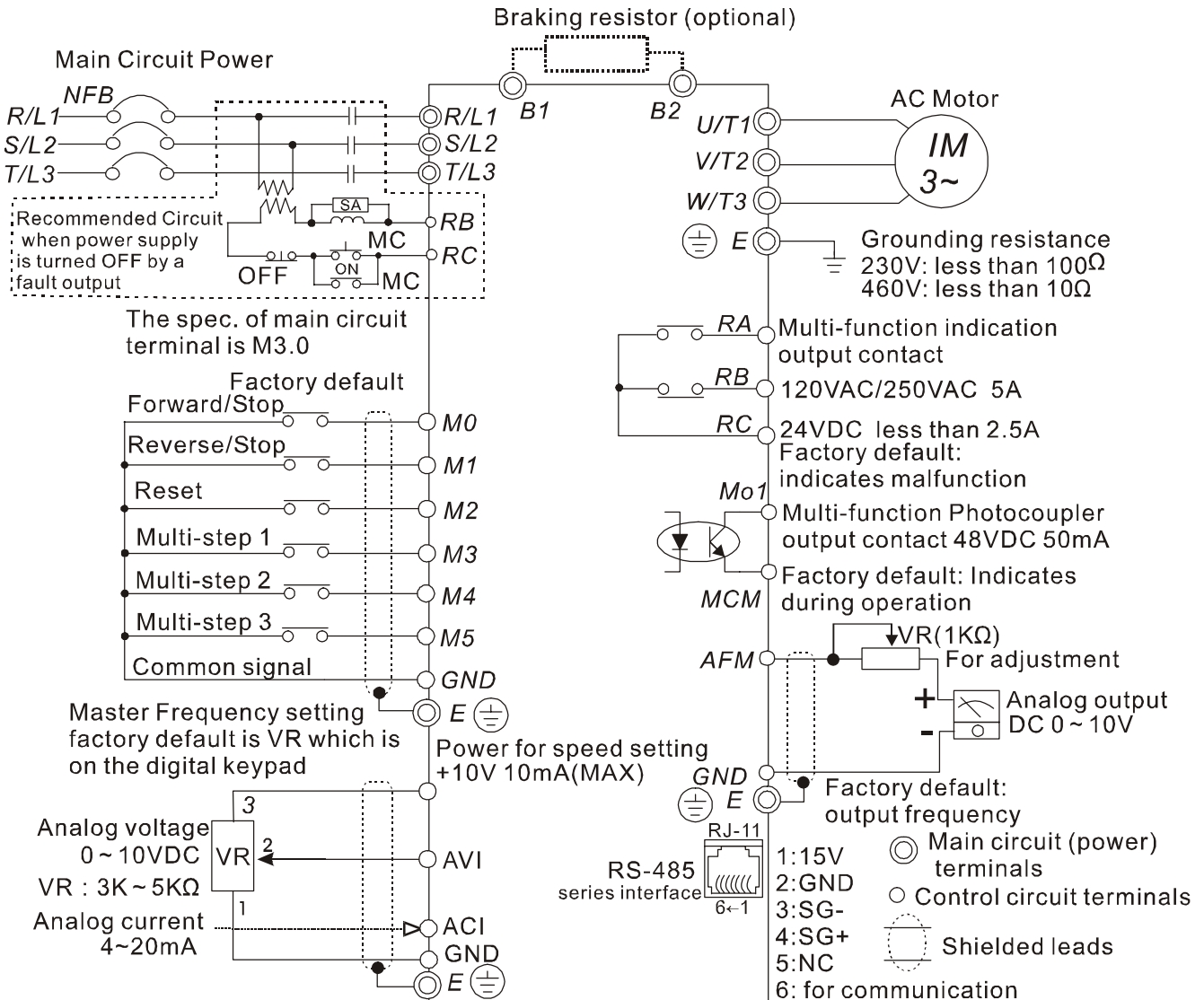
Voltage Class		460V Series					
Model Number VFD-□□□M		007	015	022	037	055	075
Max. Applicable Motor Output (KW)		0.75	1.5	2.2	3.7	5.5	7.5
Max. Applicable Motor Output (HP)		1.0	2.0	3.0	5.0	7.5	10
Output Rating	Rated Output Capacity (KVA)	2.3	3.1	3.8	6.2	9.9	13.7
	Rated Output Current (A)	3.0	4.0	5.0	8.2	13	18
	Max. Output Voltage (V)	Proportional to input voltage					
	Rated Frequency (Hz)	0.1 to 400 Hz					
Input Rating	Rated Voltage	3-phase					
		342 to 528 VAC					
	Frequency Tolerance	50/60 Hz ±5%					
	Rated Input Current	4.2	5.7	6.0	8.5	14	23

General Specification			
Control Characteristics	Control System		SPWM (Sinusoidal Pulse Width Modulation) (carried frequency 1kHz~15kHz)/ Sensorless Vector Control
	Output Frequency Resolution		0.1Hz
	Overload Endurance		150% of rated current for 1 minute
	Accel/Decel Time		0.1 to 600 seconds (Independent setting for Accel/Decel time)
	Torque Characteristics		Including the auto-torque, auto-slip compensation; starting torque can be 150% at 5Hz
	V/F Pattern		Adjustable V/F pattern
	Stall Prevention Level		Setting to percentage of rated current
Operating Characteristics	Frequency Setting	Keypad	Set by <input type="checkbox"/> <input type="checkbox"/> or potentiometer
		External Signal	Potentiometer-5K $\Omega$ /0.5W, 0 to +10VDC or 0 to +5V (Input impedance 47K $\Omega$ ), RS-485 interface, 4 to 20mA (Input impedance 250 $\Omega$ ), multi-function input 1 to 5 steps selections
	Operation Setting Signal	Keypad	Set by RUN, STOP, FWD / REV
		External Signal	FWD/STOP, REV/STOP (RUN/STOP, FWD/REV), 3-wire control, serial communication
	Multi-Function Input Signal		Multi-step selections 1 to 7, Jog, accel/decel prohibit, first/second accel/decel switch, counter, External BB (Base Block), PLC operation.
	Multi-Function Output Indication		Operating, Up to frequency, Desired frequency, Non-zero B.B., Abnormal indication, Local/Remote indication, PLC, Low Voltage.
Analog Output Signal		Analog frequency/current signal output.	
Other Functions			AVR, S-Curve, Over-Voltage, Over-Current stall prevention, Abnormal records checking, Carrier Frequency adjustable, DB, DB set out freq. setting, Momentary power loss restart, Frequency limit setting, Parameter lock/reset, Frequency input operation method selection, Reverse run inhibit, PID feedback control, Sleep/Wake up function, simply position control, saving-energy operation, etc.
Protection			Self-testing, Over-voltage, Over-current, Under-voltage, Overload, Overheating, External Fault, Electronic thermal, Ground Fault.
Cooling Systems			Forced air-cooling (3HP)
Environment	Installation Location		Altitude 1,000 m or lower, keep from corrosive gasses, liquid and dust
	Pollution Degree		2
	Ambient Temperature		-10°C to 50°C (Non-Condensing and not frozen) -10°C to 40°C for the models of 5.5kW and above
	Storage Temperature		-20°C to 60°C
	Ambient Humidity		Below 90% RH (non-condensing)
	Vibration		9.80665 m/s <sup>2</sup> (1G) less than 20Hz, 5.88m/s <sup>2</sup> (0.6G) at 20 to 50Hz

Note: Do not attempt to connect a single-phase power source to a three-phase models drive. However it is acceptable to connect two wires of a three-phase power source to a single-phase drive.

## Basic Wiring Diagram

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

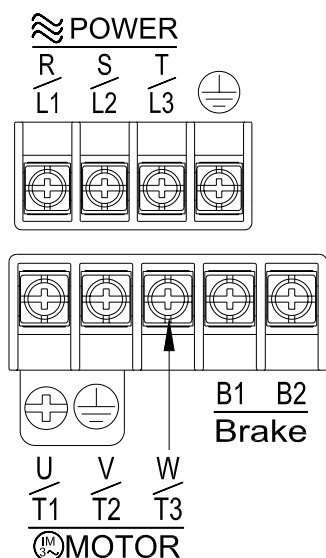


NOTE: Do not plug a Modem or telephone line to the RS-485 communication port, permanent damage may result. Terminal 1 & 2 are the power sources for the optional copy keypad and should not be used while using RS-485 communication.

\* If it is single phase model, please select any of the two input power terminals in main circuit power.

\* Single phase model can be input 3-phase power.

## Power Terminals



Model Name	Max. Current (input / output)	Wire Gauge AWG (mm <sup>2</sup> )	Torque kgf-cm (in-lbf)
002M11A	6A	12-14 (3.3-2.1)	14 (12)
004M11A	9A		
007M11A	16A		
004M21B(1-phase)	6.3A	12-14 (3.3-2.1)	
004M21B(3-phase)	2.9A		
007M21B(1-phase)	11.5A		
007M21B(3-phase)	7.6A		
015M21B(1-phase)	15.7A	12 (3.3)	
015M21B(3-phase)	8.8A	12-14 (3.3-2.1)	
022M21A(1-phase)	27A	8 (8.4)	
022M21A(3-phase)	12.5A	8-12 (8.4-3.3)	
037M23A	19.6A	8-10 (8.4-5.3)	
055M23A	28A	8 (8.4)	
007M43B	4.2A	12-14 (3.3-2.1)	14 (12)
015M43B	5.7A		
022M43B	6.0A		
037M43A	8.5A	8-14 (8.4-2.1)	15 (13)
055M43A	14A	8-12 (8.4-3.3)	
075M43A	23A	8-10 (8.4-5.3)	

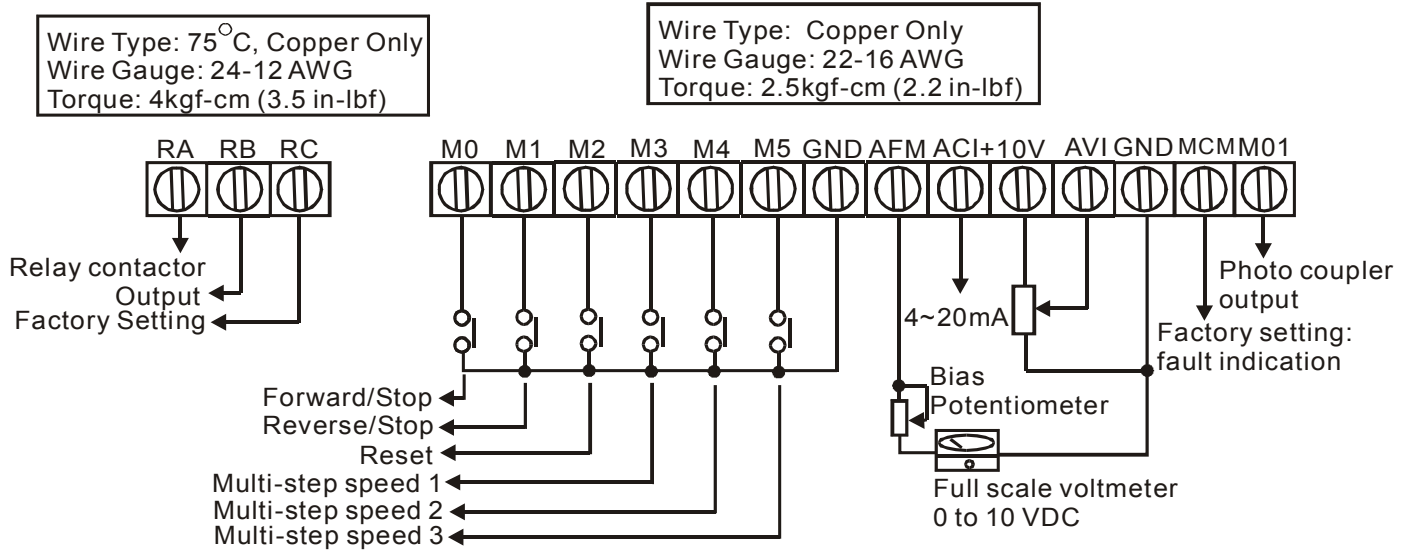
**Wire Type: 75 °C Copper Only**

**Note: It needs to use the Recognized Ring Terminal to conduct a proper wiring.**

### Terminal Explanations

Terminal Symbol	Explanation of Terminal Function
R/L1, S/L2, T/L3	AC line input terminals (three phase)
U/T1, V/T2, W/T3	Motor connections
B1 – B2	Connections for Braking Resistor (optional)
	Earth Ground

### Control Terminal Wiring (Factory Setting)



Terminal symbols	Terminal name	Remarks
RA – RC	Multi-Function Indication Output Contact	Refer to Pr.46 Relay output contact RA-RC (N.O. Contact) RB-RC (N.C. Contact)
RB – RC	Multi-Function Indication Output Contact	
MO1 -MCM	Multi-function PHC output	Refer to Pr.45
RJ – 11	Serial communication port	RS-485 serial communication interface
+10V - GND		Power Supply (+10 V)
AVI - GND	Analog voltage freq. command	0 to +10 V (Max. Output Frequency) Input
ACI - GND	Analog current freq. command	4 to 20mA (Max. Output Frequency) Output
AFM - GND	Analog frequency/current meter	0 to +10 V (Max. output Frequency) Output
M0 - GND	Multi-function auxiliary input	Refer to Pr.38 to Pr.42
M1 - GND	Multi-function input 1	
To M5 - GND	To Multi-function input 5	

**Note:** Use twisted-shielded, twisted-pair or shielded-lead wires for the control signal wiring. It is recommended to run all signal wiring in a separate steel conduit. The shield wire should only be connected at the drive. Do not connect shield wire on both ends.

## SUMMARY OF PARAMETER SETTINGS

↗: The parameter can be set during operation

	Parameter	Explanation	Settings	Factory Setting	Customer
	Pr.00	Source of Frequency Command	00: Master frequency determined by digital keypad (LC-M02E) 01: Master frequency determined by 0 to +10 V input on AVI terminal with jumpers 02: Master frequency determined by 4 to 20mA input on ACI terminal with jumpers 03: Master frequency determined by RS-485 Communication port 04: Master frequency determined by potentiometer on digital keypad	00	
↗	Pr.01	Source of Operation command	00: Operation determined by digital keypad 01: Operation determined by external control terminals, keypad STOP is effective 02: Operation determined by external control terminals, keypad STOP is ineffective 03: Operation determined by RS-485 communication port, keypad STOP is effective 04: Operation determined by RS-485 communication port, keypad STOP is ineffective	00	
↗	Pr.02	Stop Method	00: Ramp stop 01: Coast Stop	00	
	Pr.03	Maximum Output Frequency	50.00 to 400.0 Hz	60.00	
	Pr.04	Maximum Voltage Frequency (Base Frequency)	10.00 to 400.0Hz	60.00	
	Pr.05	Maximum Output Voltage (Vmax)	230V: 0.1 to 255.0V 460V: 0.1 to 510.0V	220.0 440.0	
	Pr.06	Mid-point Frequency	0.10 to 400.0Hz	1.50	
	Pr.07	Mid-point Voltage	230V: 0.1 to 255.0V 460V: 0.1 to 510.0V	10.0 20.0	
	Pr.08	Minimum Output Freq	0.10 to 20.00Hz	1.50	
	Pr.09	Minimum Output Voltage	230V: 0.1 to 255.0V 460V: 0.1 to 510.0V	10.0 20.0	
↗	Pr.10	Acceleration Time 1	0.1 to 600.0 sec or 0.01 to 600.0 sec	10.0	
↗	Pr.11	Deceleration Time 1	0.1 to 600.0 sec or 0.01 to 600.0 sec	10.0	
↗	Pr.12	Acceleration Time 2	0.1 to 600.0 sec or 0.01 to 600.0 sec	10.0	
↗	Pr.13	Deceleration Time 2	0.1 to 600.0 sec or 0.01 to 600.0 sec	10.0	
	Pr.14	Accel S-curve	00 to 07	00	
↗	Pr.15	Jog Accel/Decel Time	0.1 to 600.0 sec or 0.01 to 600.0 sec	1.0	
↗	Pr.16	Jog Frequency	0.00 to 400.0 Hz	6.00	
↗	Pr.17	1st Step Speed Freq.	0.00 to 400.0Hz	0.00	
↗	Pr.18	2nd Step Speed Freq.	0.00 to 400.0Hz	0.00	
↗	Pr.19	3rd Step Speed Freq.	0.00 to 400.0Hz	0.00	
↗	Pr.20	4th Step Speed Freq.	0.00 to 400.0Hz	0.00	
↗	Pr.21	5th Step Speed Freq.	0.00 to 400.0Hz	0.00	
↗	Pr.22	6th Step Speed Freq.	0.00 to 400.0Hz	0.00	
↗	Pr.23	7th Step Speed Freq.	0.00 to 400.0Hz	0.00	

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	Parameter	Explanation	Settings	Factory Setting	Customer
	Pr.24	Reserve Operation Inhibition	00: Enable REV operation 01: Disable REV operation	00	
	Pr.25	Over-Voltage Stall Prevention	00: Disable 230V: 330 to 450 Vdc 460V: 660 to 900 Vdc	390 780	
	Pr.26	Over-current Stall Prevention during Acceleration	00: Disable 20% to 200%	150	
	Pr.27	Over-current Stall Prevention during Operation	00: Disable 20% to 200%	150	
	Pr.28	DC Braking Current Level	00 to 100 %	00	
	Pr.29	DC Braking during Start-up	0.0 to 5.0 sec	0.0	
	Pr.30	DC Braking during Stopping	0.0 to 25.0 sec	0.0	
	Pr.31	Start-point for DC Braking	0.00 to 60.00 Hz	0.00	
	Pr.32	Momentary Power Loss Operation Selection	00: Stop operation after momentary power loss 01: Continues after momentary power loss, speed search starts with Master Frequency 02: Continues after momentary power loss, speed search starts with Minimum output Frequency	00	
	Pr.33	Maximum Allowable Power Loss Time	0.3 to 5.0 sec	2.0	
	Pr.34	Base-Block Time for Speed Search	0.3 to 5.0 sec	0.5	
	Pr.35	Maximum Current Level for Speed Search	30 to 200 %	150	
	Pr.36	Upper Bound of Output Frequency	0.10 Hz to 400.0 Hz	400.0	
	Pr.37	Lower Bound of Output Frequency	0.00 Hz to 400.0 Hz	0.00	
	Pr.38	Multi-function Input Terminal (M0,M1)	00: M0: FWD/STOP, M1: REV/STOP 01: M0: RUN/STOP, M1: REV/FWD 02: M0, M1, M2: 3-wire operation control mode	00	

	Parameter	Explanation	Settings	Factory Setting	Customer
	Pr.39	Multi-function Input Terminal (M2)	00: No Function 01: Output OFF (N.O.) (enabled when running) 02: Output OFF (N.C.) (enabled when running) 03: External Fault (normally open) N.O. 04: External Fault (normally close) N.C 05: RESET 06: Multi-Step Speed Command 1 07: Multi-Step Speed Command 2 08: Multi-Step Speed Command 3 09: Jog Operation 10: Accel/Decel Speed Inhibit 11: First or Second Accel/Decel Time 12: Base-block (B.B.) (N.O) 13: Base-block (B.B.) (N.C) 14: Increase Master Frequency 15: Decrease Master Frequency	05	
	Pr.40	Multi-function Input Terminal (M3)	16: Run PLC Program 17: Pause PLC		
	Pr.41	Multi-function Input Terminal (M4)	18: Counter Trigger Signal 19: Counter Reset	06	
	Pr.42	Multi-function Input Terminal (M5)	20: No function 21: RESET command (N.C) 22: Control source: External Terminal 23: Control source: Keypad 24: Control source: Communication 25: Parameter Lock (Write disable, Read is always 0) 26: PID Disable (N.O.) 27: PID Disable (N.C.) 28: Second Source for Frequency Command 29: Forward (contact is open) / Reverse (contact is close) 30: One-Shot PLC Run 31: Index input signal 32: Counter Incremented by Drive Output Frequency	07 08	
↗	Pr.43	Analog Output Signal	00: Analog Frequency Meter (0 to Maximum Output Frequency) 01: Analog Current Meter (0 to 250% of the rated AC drive current) 02: Feedback signal (0 - 100%) 03: Output power (0 - 100%)	00	
↗	Pr.44	Analog Output Gain	00 to 200 %	100	

	Parameter	Explanation	Settings	Factory Setting	Customer
	Pr.45	Multi-Function Output Terminal 1 (Photocoupler output)	00: AC Drive Operational 01: Maximum Output Frequency Attained 02: Zero Speed 03: Over-Torque Detection 04: Base-Block (B.B) Indication 05: Low Voltage Indication 06: AC Drive Operation Mode 07: Fault Indication 08: Desired Frequency Attained 09: PLC Program Running 10: PLC Program Step Completed 11: PLC Program Completed 12: PLC Operation Paused 13: Top Count Value Attained 14: Preliminary Counter Value Attained	00	
	Pr.46	Multi-function Output Terminal 2 (Relay Output)	15: Warning (PID feedback loss, communication error) 16: Below the Desired Frequency 17: PID supervision 18: Over Voltage supervision 19: Over Heat supervision 20: Over Current stall supervision 21: Over Voltage stall supervision 22: Forward command 23: Reverse command 24: Zero Speed (Includes Drive Stop)	00	
↗	Pr.47	Desired Frequency Attained	0.00 to 400.0 Hz	0.00	
↗	Pr.48	Adjust Bias of External Input Frequency	0.00 to 200.0%	0.00	
↗	Pr.49	Potentiometer Bias Polarity	00: Positive Bias 01: Negative Bias	00	
↗	Pr.50	Potentiometer Frequency Gain	0.10 to 200.0%	100.0	
	Pr.51	Potentiometer Reverse Motion Enable	00: Reverse Motion Disabled in negative bias 01: Reverse Motion Enabled in negative bias	00	
↗	Pr.52	Motor Rated Current	30.0% FLA to 120.0% FLA	FLA	
↗	Pr.53	Motor No-Load Current	00%FLA to 99%FLA	0.4* FLA	
↗	Pr.54	Torque Compensation	00 to 10	00	
↗	Pr.55	Slip Compensation	0.00 to 10.00	0.00	
	Pr.56	Reserved			
	Pr.57	AC Drive Rated Current Display (unit: 0.1A)		###.#	
	Pr.58	Electronic Thermal Overload Relay	00: Standard Motor (self cool motor) 01: Inverter Motor (auxiliary cool fan on motor) 02: Inactive	02	
↗	Pr.59	Electronic Thermal Motor Overload	30 to 300 sec	60	

	Parameter	Explanation	Settings	Factory Setting	Customer
	Pr.60	Over-Torque Detection Mode	00: Over-Torque Detection Disable 01: Enabled during constant speed operation until the allowable time for detection (Pr.62) elapses. 02: Enabled during constant speed operation and halted after detection. 03: Enabled during acceleration until the allowable time for detection (Pr.62) elapses. 04: Enabled during acceleration and halted after detection.	00	
	Pr.61	Over-Torque Detection Level	30 to 200 %	150	
	Pr.62	Over-Torque Detection Time	0.0 to 10.0 seconds	0.1	
	Pr.63	Loss of ACI (4-20mA)	00: Decelerate to 0 Hz 01: Stop immediately and display "EF" 02: Continue operation by last frequency command	00	
↗	Pr.64	User Defined Function for Display	00: Display AC drive output Frequency (Hz) 01: Display User-defined output Frequency (H*Pr.65) 02: Output Voltage (E) 03: DC Bus Voltage (u_) 04: PV (i) 05: Display the value of internal counter (c) 06: Display the setting frequency (F or o=%) 07: Display the parameter setting (Pr.00) 08: Reserved 09: Output Current (A) 10: Display program operation (0.xxx), Fwd, or Rev	06	
↗	Pr.65	Coefficient K	0.01 to 160.0	1.00	
↗	Pr.66	Communication Frequency	0.00 to 400.0 Hz	0.00	
	Pr.67	Skip Frequency 1	0.00 to 400.0 Hz	0.00	
	Pr.68	Skip Frequency 2	0.00 to 400.0 Hz	0.00	
	Pr.69	Skip Frequency 3	0.00 to 400.0 Hz	0.00	
	Pr.70	Skip Frequency Band	0.00 to 20.00 Hz	0.00	
	Pr.71	PWM Carrier Frequency	01 to 15 The factory setting of VFD075M43A is 10.	15	
	Pr.72	Auto Restart Attempts after Fault	00 to 10	00	
	Pr.73	Present Fault Record	00: No fault occurred 01: Over-current (oc) 02: Over-voltage (ov) 03: Overheat (oH) 04: Overload (oL)	00	
	Pr.74	Second Most Recent Fault Record		00	



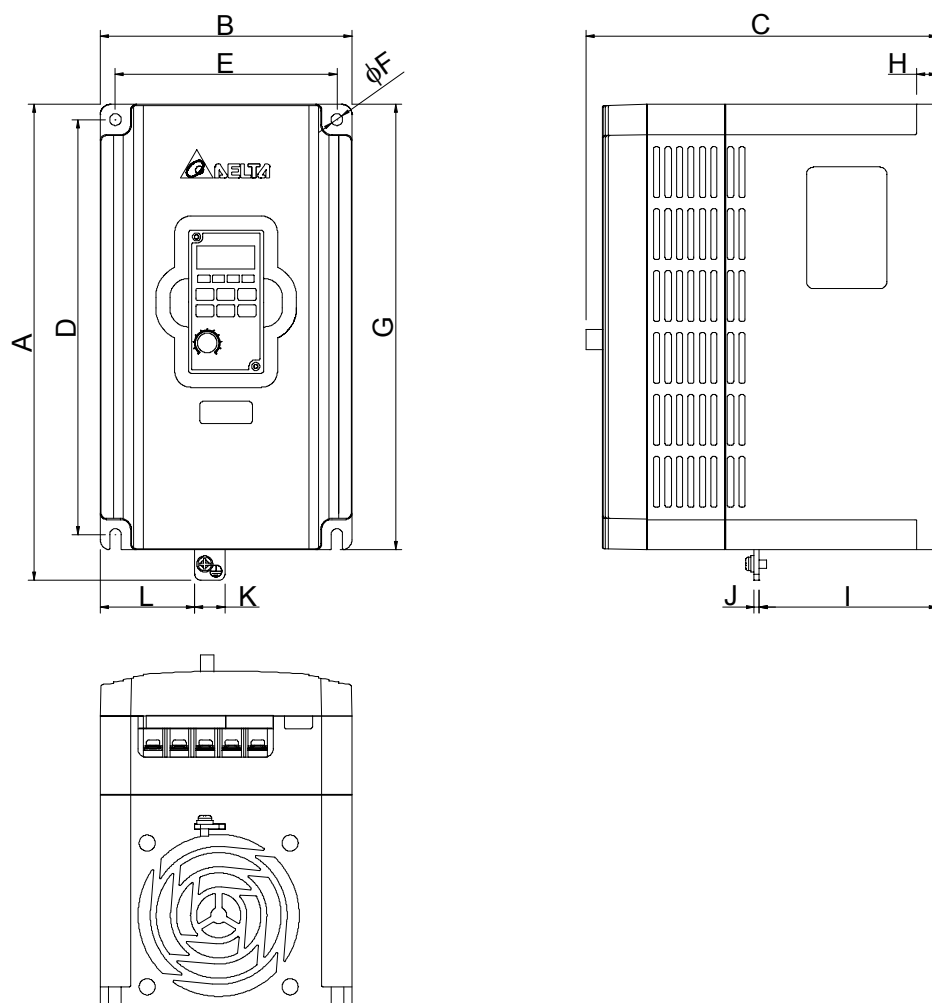
	Parameter	Explanation	Settings	Factory Setting	Customer
	Pr.82	Time Duration of 2nd Step Speed	00 to 9999 sec	00	
	Pr.83	Time Duration of 3rd Step Speed	00 to 9999 sec	00	
	Pr.84	Time Duration of 4th Step Speed	00 to 9999 sec	00	
	Pr.85	Time Duration of 5th Step Speed	00 to 9999 sec	00	
	Pr.86	Time Duration of 6th Step Speed	00 to 9999 sec	00	
	Pr.87	Time Duration of 7th Step Speed	00 to 9999 sec	00	
	Pr.88	Communication Address	01 to 254	01	
	Pr.89	Transmission Speed	00: 4800 bps 01: 9600 bps 02: 19200 bps 03: 38400 bps	01	
	Pr.90	Transmission Fault Treatment	00: Warn and Continue Operating 01: Warn and RAMP to Stop 02: Warn and COAST to Stop 03: Keep Operation without Warning	03	
	Pr.91	Time Out Detection	0.0: Disable 0.1 to 120.0 sec	0.0	
	Pr.92	Communication Protocol	00: MODBUS ASCII mode, <7,N,2> 01: MODBUS ASCII mode, <7,E,1> 02: MODBUS ASCII mode, <7,O,1> 03: MODBUS RTU mode, <8,N,2> 04: MODBUS RTU mode, <8,E,1> 05: MODBUS RTU mode, <8,O,1>	00	
	Pr.93	Accel 1 to Accel 2 Frequency Transition	0.01 to 400.0 0.00: Disable	0.00	
	Pr.94	Decel 1 to Decel 2 Frequency Transition	0.01 to 400.0 0.00: Disable	0.00	
	Pr.95	Auto Energy Saving	00: Disable auto energy saving 01: Enable auto energy saving	00	
	Pr.96	Counter Countdown Complete	00 to 9999	00	
	Pr.97	Preset counter countdown	00 to 9999	00	
	Pr.98	Total Time Count from Power On (Days)	00 to 65535 days	Read Only	
	Pr.99	Total Time Count from Power On (Minutes)	00 to 1440 minutes	Read Only	
	Pr.100	Software Version		##	
	Pr.101	Auto Adjustable Accel/Decel	00: Linear Accel/Decel 01: Auto Accel, Linear Decel 02: Linear Accel, Auto Decel 03: Auto Accel/Decel 04: Linear Accel/Decel Stall Prevention during Deceleration	00	

	Parameter	Explanation	Settings	Factory Setting	Customer
	Pr.102	Auto Voltage Regulation (AVR)	00: AVR function enabled 01: AVR function disabled 02: AVR function disabled when stops 03: AVR function disabled when decel	00	
	Pr.103	Auto tune Motor Parameters	00: Disable 01: Auto tune for R1 02: Auto tune for R1 + No Load testing	00	
	Pr.104	R1 value	00 to 65535 mΩ	00	
	Pr.105	Control Mode	00: V/F Control 01: Sensor-less Control	00	
	Pr.106	Rated Slip	0.00 to 10.00 Hz	3.00	
	Pr.107	Vector Voltage Filter	5 to 9999 (per 2ms)	10	
	Pr.108	Vector Slip Compensation Filter	25 to 9999 (per 2ms)	50	
	Pr.109	Selection for Zero Speed Control	00: No output 01: Control by DC voltage	00	
	Pr.110	Voltage of Zero Speed Control	0.0 to 20.0 % of Max. output voltage (Pr.05)	5.0	
	Pr.111	Decel S-curve	00 to 07	00	
	Pr.112	External Terminal Scanning Time	01 to 20	01	
	Pr.113	Restart Method after Fault (oc, ov, BB)	00: None speed search 01: Continue operation after fault speed search from speed reference 02: Continue operation after fault speed search from Minimum speed	01	
	Pr.114	Cooling Fan Control	00: Fan Off when the drive stop after 1 Min. 01: AC Drive Runs and Fan On, AC Drive Stops and Fan Off 02: Always Run 03: Reserved	02	
	Pr.115	PID Set Point Selection	00: Disable 01: Keypad (based on Pr.00 setting) 02: AVI (external 0-10V) 03: ACI (external 4-20mA) 04: PID set point (Pr.125)	00	
	Pr.116	PID Feedback Terminal Selection	00: Input positive PID feedback, PV from AVI (0 to 10V) 01: Input negative PID feedback, PV from AVI (0 to 10V) 02: Input positive PID feedback, PV from ACI (4 to 20mA) 03: Input negative PID feedback, PV from ACI (4 to 20mA)	00	
	Pr.117	Proportional Gain (P)	0.0 to 10.0	1.0	
	Pr.118	Integral Time (I)	0.00: Disable 0.01 to 100.0 sec	1.00	
	Pr.119	Differential Time (D)	0.00 to 1.00 sec	0.00	

	Parameter	Explanation	Settings		Factory Setting	Customer
	Pr.120	Integration's Upper Bound Frequency	00 to 100 %		100 %	
	Pr.121	One-Time Delay	0.0 to 2.5 sec		0.0	
	Pr.122	PID Frequency Output Command Limit	00 to 110 %		100	
	Pr.123	Feedback Signal Detection Time	0.0: Disable 0.1 to 3600 sec		60.0	
	Pr.124	Feedback Signal Fault Treatment	00: Warning and RAMP to stop 01: Warning and COAST to stop		00	
	Pr.125	Source of PID Set Point	0.00 to 400.0Hz		0.00	
	Pr.126	PID Offset Level	1.0 to 50.0 %		10.0	
	Pr.127	Detection Time of PID Offset	0.1 to 300.0 sec		5.0	
	Pr.128	Minimum Reference Value	0.0 to 10.0 V		0.0	
	Pr.129	Maximum Reference Value	0.0 to 10.0 V		10.0	
	Pr.130	Invert Reference Signal AVI (0-10V)	00: Not inverted 01: Inverted		00	
	Pr.131	Minimum Reference Value (4-20mA)	0.0 to 20.0mA		4.0	
	Pr.132	Maximum Reference Value (4-20mA)	0.0 to 20.0mA		20.0	
	Pr.133	Invert Reference Signal (4-20mA)	00: Not inverted 01: Inverted		00	
	Pr.134	Analog Input Delay Filter for Set Point	00 to 9999 (per 2ms)		50	
	Pr.135	Analog Input Delay Filter for Feedback Signal	00 to 9999 (per 2ms)		5	
	Pr.136	Sleep Period	0.0 to 6550. sec		0.0	
	Pr.137	Sleep Frequency	0.00 to 400.0 Hz		0.00	
	Pr.138	Wake Up Frequency	0.00 to 400.0 Hz		0.00	
	Pr.139	Treatment for Counter Attained	00: Continue operation 01: Stop Immediately and display E.F.		00	
	Pr.140	External Up/Down Selection	00: Fixed Mode (keypad) 01: By Accel or Decel Time 02: Reserved		00	
	Pr.141	Save Frequency Set Point	00: Not Save 01: Save		01	
	Pr.142	Second Source of Frequency Command	00: Keypad Up/Down 01: AVI (0-10V) 02: ACI (4-20mA) 03: Communication 04: Keypad potentiometer		00	
	Pr.143	Software Braking Level	230V	370-450 Vdc	380.0	
			460V	740-900 Vdc	760.0	

	Parameter	Explanation	Settings	Factory Setting	Customer
	Pr.144	Total operation time (Day)	Read Only		
	Pr.145	Total operation time (Minutes)	Read Only		
	Pr.146	Line start Lockout	00: Disable 01: Enable	00	
	Pr.147	Decimal Number of Accel / Decel Time	00: One decimal 01: Two decimals	00	
	Pr.148	Number of Motor Poles	02 to 20	04	
	Pr.149	Gear Ratio for Simple Index Function	4 to 1000	200	
	Pr.150	Index Angle for Simple Index Function	00.0 to 360.0	180.0	
	Pr.151	Deceleration Time for Simple Index Function	0.00 to 100.00 sec	0.00	
	Pr.152	Skip Frequency Width	0.00 to 400.0Hz	0.00	
	Pr.153	Bias Frequency Width	0.00 to 400.0Hz	0.00	
	Pr.154	Reserved			
↗	Pr.155	Compensation Coefficient for Motor Instability	0.0: Disable 0.1 to 5.0 (recommended setting d2.0)	0.0	
↗	Pr.156	Communication Response Delay Time	0 to 200 (x500us)	0	
↗	Pr.157	Communication Mode Selection	0: Delta ASCII 1: Modbus	1	

## Dimension: mm [inch]



Model Name	A	B	C	D	E	F	G	H	I	J	K	L
004M21A/23A, 007M21A/23A, 015M21A/23A	151.5 [5.96]	85.0 [3.35]	113.0 [4.45]	130.5 [5.14]	74.0 [2.91]	5.0 [0.2]	141.5 [5.57]	10.0 [0.39]	49.0 [1.93]	2.0 [0.08]	14.0 [0.55]	30.5 [1.20]
002M11A, 004M11A/21B, 007M11A/21B/43B, 015M21B/43B, 022M23B/43B	161.0 [6.33]	100.0 [3.94]	116.5 [4.59]	140.0 [5.51]	89.0 [3.50]	4.5 [0.18]	151.0 [5.94]	10.0 [0.39]	45.0 [1.77]	2.0 [0.08]	14.0 [0.55]	23.0 [0.91]
022M21A, 037M23A/43A, 055M23A/43A, 075M43A	235.0 [9.25]	125.0 [4.92]	166.3 [6.55]	205.0 [8.07]	110.0 [4.33]	5.8 [0.23]	220.0 [8.66]	10.5 [0.41]	88.5 [3.48]	2.5 [0.10]	15.0 [0.55]	46.9 [1.85]