



## Quick Start Guide

For MVX9000 AF Drives

March 2006

Supersedes November 2004



5011626001



EQ01

# Step 1 — Wiring

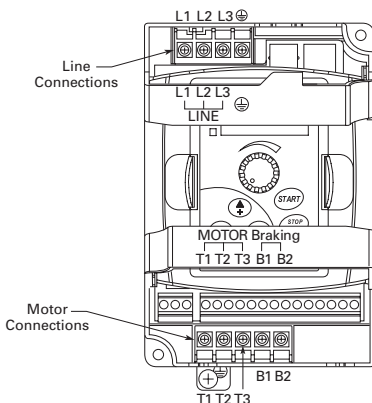
## Hazardous High Voltage



### HIGH VOLTAGE!

Motor control equipment and electronic controllers are connected to hazardous line voltages. When servicing drives and electronic controllers, there may be exposed components with housings or protrusions at or above line potential. Extreme care should be taken to protect against shock.

For the best results with the MVX9000 inverter, carefully read the manual and all of the warning labels attached to the inverter before installing and operating it, and follow the instructions exactly.



Wire Type: 75°C Copper Only

Catalog Number	Voltage Horsepower	Max. Current (A) (Input/Output)	Wire Gauge (AWG)	Torque Rating (kgf-cm)
MVXF25A0-1 (1-phase)	115V AC, 1/4 hp	6/1.6	12 – 14	14
MVXF50A0-1 (1-phase)	115V AC, 1/2 hp	9/2.5	12 – 14	
MVX001A0-1 (1-phase)	115V AC, 1 hp	16/4.2	12	
MVXF50A0-2 (1-phase)	240V AC, 1/2 hp	6.3/2.5	12 – 14	14
MVXF50A0-2 (3-phase)	240V AC, 1/2 hp	3.2/2.5	12 – 14	
MVX001A0-2 (1-phase)	240V AC, 1 hp	11.5/5	12 – 14	
MVX001A0-2 (3-phase)	240V AC, 1 hp	6.3/5	12 – 14	
MVX002A0-2 (1-phase)	240V AC, 2 hp	15.7/7	12	
MVX002A0-2 (3-phase)	240V AC, 2 hp	9/7	12 – 14	
MVX003A0-2 (1-phase)	240V AC, 3 hp	27/10	8	15
MVX003A0-2 (3-phase)	240V AC, 3 hp	15/10	8 – 12	
MVX005A0-2	240V AC, 5 hp	19.6/17	8 – 10	
MVX007A0-2	240V AC, 7-1/2 hp	28/25	8	14
MVX001A0-4	480V AC, 1 hp	4.2/3	12 – 14	
MVX002A0-4	480V AC, 2 hp	5.6/4	12 – 14	
MVX003A0-4	480V AC, 3 hp	6/5	12 – 14	15
MVX005A0-4	480V AC, 5 hp	8.5/8.2	8 – 14	
MVX007A0-4	480V AC, 7-1/2 hp	14/13	8 – 12	
MVX010A0-4	480V AC, 10 hp	23/18	8 – 10	

# Step 1 — Wiring (Continued)

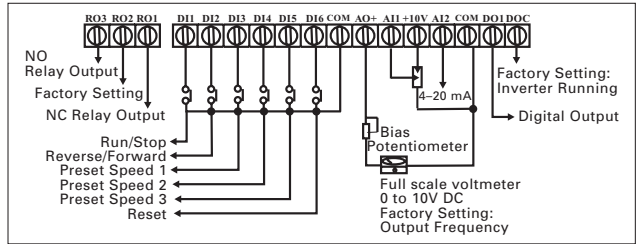
## Hazardous High Voltage, continued

Catalog Number	Voltage Horsepower	Max. Current (A) (Input/Output)	Wire Gauge (AWG)	Torque Rating (kgf-cm)
MVX001A0-5	575V AC, 1 hp	1.7A/2.4A	12 – 14	14
MVX002A0-5	575V AC, 2 hp	3.0A/4.2A	12 – 14	
MVX003A0-5	575V AC, 3 hp	4.2A/5.9A	12 – 14	
MVX005A0-5	575V AC, 5 hp	6.6A/7.0A	8 – 14	15
MVX007A0-5	575V AC, 7-1/2 hp	9.9A/10.5A	8 – 14	
MVX010A0-5	575V AC, 10 hp	12.2A/12.9A	8 – 12	

### Basic Wiring Diagram

Users must connect wiring according to the following circuit diagram.

### Control Terminal Wiring (Factory Settings)



### Terminal Symbols

Terminal Symbols	Terminal Name	Remarks
R01 - R02	Digital Output Relay	Refer to 40.04 Relay output contact R01 - R02 (NC Contact) R03 - R02 (NO Contact)
R03 - R02	Digital Output Relay	
D01 - DCM	Digital photocouple output	Refer to 40.03
RJ-12	Serial communication port	RS-485 serial communication interface
+10V - COM		Power Supply (+10V)
AI1 - COM	Analog voltage input	0 to +10V Input
AI2 - COM	Analog current input	0 to 20 mA or 4 to 20 mA Input
AO+ - COM	Analog frequency/current meter	0 to +10V Output
DI1 - COM	Digital input 1	Refer to 30.11
DI1 - COM to DI6 - GND	Digital input 1 to Digital input 6	

**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.



### HIGH VOLTAGE!

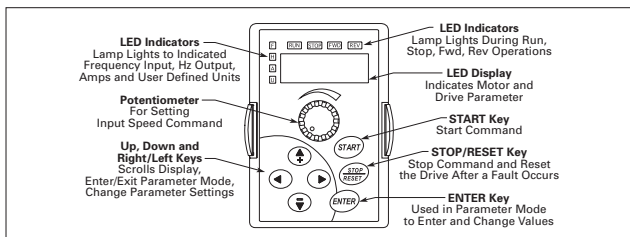
**Wiring work shall be carried out only by qualified personnel. Otherwise, there is a danger of electric shock or fire.**

## Step 2 — Keypad Operation

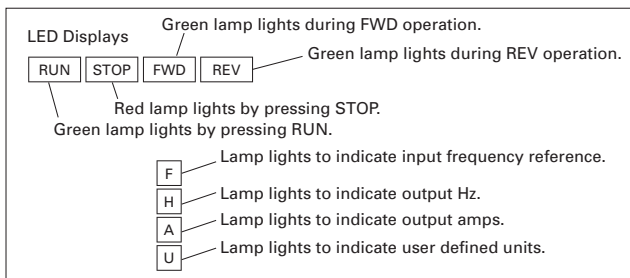
### Digital Keypad Operation

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

#### Description of Digital Keypad



#### Explanation of the LED Indicators








#### Keypad Operators







	<b>START</b> This button operates as Start button for normal operation <ul style="list-style-type: none"><li>Motor START from the panel; active control place has to be selected at "Panel"</li></ul>
	<b>ENTER</b> This button in the parameter edit mode is used to enter the programming mode and enter the parameter selection. <ul style="list-style-type: none"><li>used for parameter edit confirmation, acceptance (confirmation) of the edited parameter value with exit from parameter edit mode</li></ul>
	<b>STOP / RESET</b> This button has two integrated operations. The button operates as Stop button for normal operation. In the parameter edit mode it is used to cancel previous action and back-up one step, and in fault mode it is used to reset the fault. <b>STOP</b> <ul style="list-style-type: none"><li>motor STOP from the panel; active control place has to be selected at "Panel"</li></ul> <b>RESET</b> <ul style="list-style-type: none"><li>used for active fault resetting<ul style="list-style-type: none"><li>fault history is reset if ENTER is pressed on the "Fault History" menu group in "Main Menu" or</li><li>if ENTER is pressed while in the "Fault History" menu</li></ul></li><li>in programming mode press RESET key to cancel previous action and back up one step</li></ul>

## Step 2 — Keypad Operation (Continued)

### Keypad Operators, continued

	<b>LEFT Arrow</b> <ul style="list-style-type: none"> <li>• navigation button, movement to left</li> <li>• in display mode, enter parameter group mode</li> <li>• in parameter edit mode, exits mode, backs up one step</li> <li>• cancels edited parameter (exit from a parameter edit mode)</li> </ul>
	<b>RIGHT Arrow</b> <ul style="list-style-type: none"> <li>• navigation button, movement to right</li> <li>• enter parameter group mode</li> <li>• enter parameter mode from group mode</li> </ul>
 	<b>UP and DOWN Arrows</b> <ul style="list-style-type: none"> <li>• move either up or down the group list in order to select the desired group menu.</li> <li>• move either up or down the parameter list in order to select the desired parameter in the group.</li> <li>• increasing/decreasing of reference value on the keyboard (when selected).</li> </ul>
	<b>SPEED POT</b> <ul style="list-style-type: none"> <li>• increase/decrease reference value on the keypad (when selected)</li> </ul>

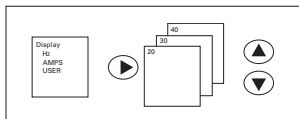
### Explanation of Display Messages

Displayed Message	Descriptions
 60.0	The AC drive Input Frequency Reference.
 60.0	The Actual Operation Frequency at the output terminals T1, T2 and T3.
 2.5	The output current present at the output terminals T1, T2 and T3.
 5.0	The value of the user defined units.
 u:20	The output voltage present at the output terminals T1, T2 and T3.
 t20.0	The temperature of the unit.
Frd	The AC drive forward run status.
rEv	The AC drive reverse run status.
20.	Parameter group selection.
20.05	The specific parameter selection.
End	"End" displays for approximately 1 second if input has been accepted. After a parameter value has been set, the new value is automatically stored in memory.
Err	"Err" displays, if the input is invalid.

## Step 3 — Parameter Navigation

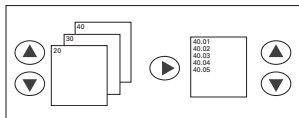
This page contains the descriptions of the MVX9000 parameters. Parameters are addressed and changed via the keypad for the MVX9000. For more information on keypad operation, see Keypad Operation located in Chapter 2 of the manual.

### Viewing and Changing Parameter Settings



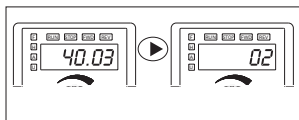
#### Page Groups

Parameters are grouped in a page arrangement. Each page will contain a list of the parameters associated with that group. Move into the page groups from the display menu by using the right arrow key.



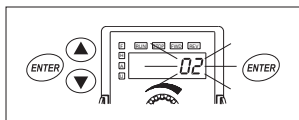
#### Parameter Groups

Select the desired parameter group by using the up and down keys. Once the parameter group is located, use the right arrow key to enter the group. Use the up and down keys to scroll the parameters on that page.



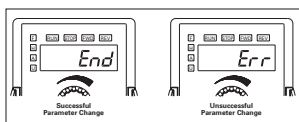
#### Parameters

Once the parameter has been located, use the right arrow key to view the parameter setting.



#### Programming Mode

Use the ENTER key to enter the programming mode. The displayed parameter will flash indicating the parameter can be changed.



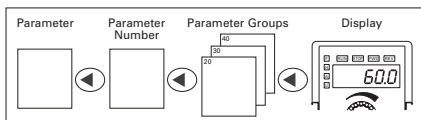
#### Parameter Changes

Use the up and down keys to change the parameter setting. Press ENTER to enter the new parameter setting.

If the parameter change is successful, the keypad will display the end (End)

message and return to the parameter number display. If the parameter change is unsuccessful the keypad will display an error (Err) message, the parameter will not be changed, and the parameter number will again be displayed.

**Note:** Some parameters cannot be changed while the unit is the RUN/START mode.



#### To Exit Programming Mode

Pressing left arrow backs out of Parameter Mode and returns you to Display Mode.

# Step 4 — Parameter Groups & Default Values

## Parameter Groups

The parameters are grouped according to the following descriptions:

10	Reserved (and not displayed)	
20	Basic Grouping	6
30	Inputs	7
40	Outputs	8
50	Drive Control	9
60	Motor Control	12
70	Protective Functions	13
80	Display	13
90	Communications	15

## MX9000 Parameter Listing

### 20 — BASIC GROUPING (Quick Start)

Modbus	Groups	Description	Range	Default	User Settings
0000H	20.01 50.05	Motor Nameplate Frequency	10.0 to 400.0 Hz	60.0	
0001H	20.02 50.06	Motor Nameplate Voltage	115/230V drives: 1.0 to 255V	230	
			460V drives: 1.0 to 510V	460	
			575V drives: 1.0 to 637V	575	
0002H	20.03 50.01	Source of Master Frequency	00: Master frequency determined by digital keypad up/down	01	
			01: Master frequency determined by keypad potentiometer		
			02: Master frequency determined by 0 to +10V input on AI terminal		
			03: Master frequency determined by 4 to 20 mA input on AI terminal		
			04: Master frequency determined by RS-485 communication interface		
0003H	20.04 50.02	Source of Operation command	00: Operation commands determined by digital keypad	00	
			01: Operation commands determined by external control terminals, keypad STOP is effective		
			02: Operation commands determined by external control terminals, keypad STOP is ineffective		
			03: Operation commands determined by RS-485 interface, keypad STOP is effective		
			04: Operation commands determined by RS-485 interface, keypad STOP is ineffective		
0004H	20.05 60.01	Motor Rated Current	30 to 120%	FLA	
0005H	20.06 50.09	Minimum Output Frequency	0.0 to 20.0 Hz	1.5	
0006H	20.07 50.04	Maximum Output Frequency	50.0 to 400.0 Hz	60.0	
0007H	20.08 50.12	Acceleration Time 1	0.01 to 600.0 sec	10.0	
0008H	20.09 50.13	Deceleration Time 1	0.01 to 600.0 sec	10.0	

## Step 4 — Parameter Groups & Default Values (Continued)

### 30 — INPUTS

Modbus	Groups	Description	Range	Default	User Settings
0100H	30.01	Minimum reference value (0 – 10V)	0.0 to 10.0V	0.0	
0101H	30.02	Maximum reference value (0 – 10V)	0.0 to 10.0V	10.0	
0102H	30.03	Invert reference signal (0 – 10V)	00: Not inverted 01: Inverted	00	
0103H	30.04	Minimum reference value (4 – 20 mA)	0.0 to 20.0 mA	4.0	
0104H	30.05	Maximum reference value (4 – 20 mA)	0.0 to 20.0 mA	20.0	
0105H	30.06	Invert reference signal (4 – 20 mA)	00: Not inverted 01: Inverted	00	
0106H	30.07	Potentiometer Offset	0.0 to 100.0%	0.0	
0107H	30.08	Potentiometer Bias Polarity	00: Positive, 01: Negative	00	
0108H	30.09	Potentiometer Slope	0.1 to 300.0%	100.0	
0109H	30.10	Potentiometer Direction	00: Forward Motion Only 01: Reverse Motion Enable	00	
010AH	30.11	Digital Input Terminal (DI1, DI2)	01: DI1-FWD / STOP, DI2-REV / STOP 02: DI1-RUN / STOP, DI2-REV / FWD 03: DI1 - RUN momentary (NO), DI2 - REV / FWD, DI3 - STOP momentary (NC)	02	
010BH	30.12	Digital Input Terminal (DI3)	00: Not used	05	
010CH	30.13	Digital Input Terminal (DI4)	01: External Fault (NO) 02: External Fault (NC)	06	
010DH	30.14	Digital Input Terminal (DI5)	03: External Reset (NO)	07	
010EH	30.15	Digital Input Terminal (DI6)	04: External Reset (NC) 05: Multi-Speed 1 06: Multi-Speed 2 07: Multi-Speed 3 08: Jog 09: Second Acceleration/Deceleration Time 10: Control Place: I/O Terminal 11: Control Place: Keypad 12: Control Place: Communication 13: Increase Speed during RUN command 14: Decrease Speed during RUN command 15: Forward/Reverse 16: Parameter Lock 17: Acceleration/Deceleration I Prohibit 18: Run Enable 19: Base Block (NO) 20: Base Block (NC) 21: PID Disable 22: Run PLC Program 23: Pause PLC Program 24: Counter Trigger signal 25: Counter Reset 26: First/second Source of Master Frequency 27: Increase speed during RUN or STOP state 28: Decrease speed during RUN or STOP state	03	



## Step 4 — Parameter Groups & Default Values (Continued)

### 30 — INPUTS (Continued)

Modbus	Groups	Description	Range	Default	User Settings
010BH	30.12	Digital Input Terminal (DI3)	29: Output Shut Off (NO)	05	
010CH	30.13	Digital Input Terminal (DI4)	30: Output Shut Off (NC)	06	
010DH	30.14	Digital Input Terminal (DI5)	31: Auto Location – Operation & Frequency by First source (P50.01 & P50.02)	07	
010EH	30.15	Digital Input Terminal (DI6)	32: Hand Location – Operation & Frequency by Second source (P50.57 & P50.60)	03	
			33: LOC – Operation & Frequency by Second source (P50.57 & P50.60)		
010FH	30.16	Final Count Value	00 to 9999	00	
0110H	30.17	Intermediate Count Value	00 to 9999	00	
0111H	30.18	1st Preset Speed	0.0 to 400.0 Hz (100.0%)	0.0	
0112H	30.19	2nd Preset Speed	0.0 to 400.0 Hz (100.0%)	0.0	
0113H	30.20	3rd Preset Speed	0.0 to 400.0 Hz (100.0%)	0.0	
0114H	30.21	4th Preset Speed	0.0 to 400.0 Hz (100.0%)	0.0	
0115H	30.22	5th Preset Speed	0.0 to 400.0 Hz (100.0%)	0.0	
0116H	30.23	6th Preset Speed	0.0 to 400.0 Hz (100.0%)	0.0	
0117H	30.24	7th Preset Speed	0.0 to 400.0 Hz (100.0%)	0.0	
0118H	30.25	Display Hz or %	00: Frequency (Hz)	00	
			01: Percentage (%)		
			02: User Definition by 0.000 – max. unit		
0119H	30.26	Extension Input DI7	same 30.12 to 30.15	00	
011AH	30.27	Extension Input DI8	same 30.12 to 30.15	00	
011BH	30.28	User Definition Display Frequency Max Unit	0.000 – 1.000	1.000	

### 40 — OUTPUTS

Modbus	Groups	Description	Range	Default	User Settings
0200H	40.01	Analog Output Signal	00: Frequency Hz	00	
			01: Current A		
			02: Feedback signal 0 – 100		
			03: Output Power 0 – 100%		
0201H	40.02	Analog Output Gain	00 to 200%	100	
0202H	40.03	Digital Output Terminal (DO1-DCM)	00: Not used	02	
0203H	40.04	Relay Output Terminal (RO1, RO2, RO3)	01: Ready	03	
			02: Inverter Output is active		
			03: Inverter Fault		
			04: Warning (PID feedback loss, communication fault)		
			05: At speed		
			06: Zero speed		
			07: Above Desired Frequency (40.05)		
			08: Below Desired Frequency (40.05)		
			09: PID supervision		
			10: Over Voltage Warning		
			11: Over Heat Warning		
			12: Over Current Stall Warning		
			13: Over Voltage Stall Warning		
			14: Low voltage		
			15: PLC Program running		
			16: PLC Program Step completed		
			17: PLC Program completed		
			18: PLC Operation paused		

## Step 4 — Parameter Groups & Default Values (Continued)

### 40 — OUTPUTS (Continued)

Modbus	Groups	Description	Range	Default	User Settings
0202H	40.03	Digital Output Terminal (DO1-DCM) Relay Output Terminal (RO1, RO2, RO3)	19: Final count value attained	02	
0203H	40.04		20: Intermediate count value attained	03	
			21: Reverse direction notification		
			22: Under current detection		
			23: Inverter RUN command state		
0204H	40.05	Desired Frequency Attained	0.0 to 400.0 Hz	0.0	
0205H	40.06	Digital Output (RO4, RO5, RO6)	same as 40.03 to 40.04	0	
0206H	40.07	Digital Output (RO7, RO8, RO9)	same as 40.03 to 40.04	0	

### 50 — DRIVE CONTROL

Modbus	Groups	Description	Range	Default	User Settings
0300H	50.01	Source of Master Frequency	00: Master Frequency determined by digital keypad up/down	01	
			01: Master Frequency determined by keypad potentiometer		
			02: Master Frequency determined by 0 to +10V input on AI1 terminal		
			03: Master Frequency determined by 4 – 20 mA input on AI2 terminal		
			04: Master Frequency determined by RS-485 communication interface		
0301H	50.02	Source of Operation Command	00: Operation command determined by digital keypad	00	
			01: Operation command determined by external control terminals, keypad STOP is effective		
			02: Operation command determined by external control terminals, keypad STOP is ineffective		
			03: Operation command determined by RS-485 interface, keypad STOP is effective		
			04: Operation command determined by RS-485 interface, keypad STOP is ineffective		
0302H	50.03	Stop Methods	00: Ramp to Stop	00	
			01: Coast to Stop		
0303H	50.04	Maximum Output Frequency	50.0 to 400.0 Hz	60.0	
0304H	50.05	Motor Nameplate Frequency	10.0 to 400.0 Hz	60.0	
0305H	50.06	Motor Nameplate Voltage	115/230V 0.1 to 255.0V	230.0	
			460V 0.1 to 510.0V	460.0	
			575V 0.1 to 637.0V	575.0	
0306H	50.07	Mid-point Frequency	0.1 to 400.0 Hz	1.5	
0307H	50.08	Mid-point Voltage	115/230V 0.1 to 255.0V	10.0	
			460V 0.1 to 510.0V	20.0	
			575V 0.1 to 637.0V	26.1	
0308H	50.09	Minimum Output Freq	0.1 to 20.0 Hz	1.5	
0309H	50.10	Minimum Output Voltage	115/230V 0.1 to 50.0V	10.0	
			460V 0.1 to 100.0V	20.0	
			575V 0.1 to 637.0V	26.1	
030AH	50.11	Sensorless Vector Enable	00: Disable	00	
			01: Enable		

## Step 4 — Parameter Groups & Default Values (Continued)

### 50 — DRIVE CONTROL (Continued)

Modbus	Groups	Description	Range	Default	User Settings
030BH	50.12	Acceleration Time 1	0.01 to d 600.0 sec	10.00	
030CH	50.13	Deceleration Time 1	0.01 to d 600.0 sec	10.00	
030DH	50.14	Acceleration Time 2	0.01 to d 600.0 sec	10.00	
030EH	50.15	Deceleration Time 2	0.01 to d 600.0 sec	10.00	
030FH	50.16	Transition Point for Acceleration 1 to Acceleration 2	0.0:Disable	0.0	
			Above min freq.: Enable, 0.0 to 400.0 Hz		
0310H	50.17	Transition Point for Deceleration 1 to Deceleration 2	0.0:Disable	0.0	
			Above min freq.: Enable, 0.0 to 400.0 Hz		
0311H	50.18	Acceleration S-curve	00 to 07	00	
0312H	50.19	Deceleration S-curve	00 to 07	00	
0313H	50.20	Jog Acceleration / Deceleration Time	0.01 to d 600.0 sec	1.00	
0314H	50.21	Jog Frequency	0.1 to 400.0 Hz	6.0	
0315H	50.22	Reserve Operation Enable	00: Enable Reverse Operation	00	
			01: Disable Reverse Operation		
0316H	50.23	Momentary Power Loss (Ride Through)	00: Stop operation after momentary power loss	00	
			01: Continue operation after momentary power loss, speed search from Speed Reference		
			02: Continue operation after momentary power loss, speed search from Minimum Speed		
0317H	50.24	Maximum Allowable Power Loss Time	0.3 to 5.0 sec	2.0	
0318H	50.25	Pause Time after Momentary Power Loss	0.3 to 10.0 sec	0.5	
0319H	50.26	Maximum Speed Search Current Level	30 to 200%	150	
031AH	50.27	Upper Limit of Output Frequency	0.1 to 400.0 Hz	400.0	
031BH	50.28	Lower Limit of Output Frequency	0.0 to 400.0 Hz	0.0	
031CH	50.29	Skip Frequency 1	0.0 to 400.0 Hz	0.0	
031DH	50.30	Skip Frequency 2	0.0 to 400.0 Hz	0.0	
031EH	50.31	Skip Frequency 3	0.0 to 400.0 Hz	0.0	
031FH	50.32	Skip Frequency Bandwidth	0.1 to 20.0 Hz (0.0 = Disable)	0.0	
0320H	50.33	Auto Restart After Fault	00 to 10	00	
0321H	50.34	PID Set Point Location	00: Disable	00	
			01: Keypad (based on 20.03 setting)		
			02: AI1 (external 0 – 10V)		
			03: AI2 (external 4 – 20 mA)		
0322H	50.35	Feedback Signal Selection	00: Positive AI1 (0 – 10V)	00	
			01: Negative AI1 (0 – 10V)		
			02: Positive AI2 (4 – 20 mA)		
			03: Negative AI2 (4 – 20 mA)		
0323H	50.36	P Gain Adjustment	0.0 to 10.0	1.0	
0324H	50.37	I Gain Adjustment	0.00 to 100.0 sec	1.00	
0325H	50.38	D Gain Adjustment	0.00 to 1.0 sec	0.00	
0326H	50.39	Upper Limit of Integral Control	00 to 100%	100	
0327H	50.40	PID Output Delay Filter Time	0.0 to 2.5 sec	0.0	
0328H	50.41	4 – 20 mA Input Loss Detection Time	00: Disable 0.1 to 3600 sec	60	
0329H	50.42	4 – 20 mA Input Loss Operation	00: Warn and Inverter Stop	00	
			01: Warn and Continue Operation		

## Step 4 — Parameter Groups & Default Values (Continued)

### 50 — DRIVE CONTROL (Continued)

Modbus	Groups	Description	Range	Default	User Settings
032AH	50.43	PID Set Point	0.0 to 400.0 Hz (100.0%)	0.0	
032BH	50.44	PLC Operation Mode	00: Disable PLC performing	00	
			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		
032CH	50.45	PLC Forward/Reserve Motion	00 to 127	00	
032DH	50.46	Time Duration of 1st Preset Speed	0 to 9999	0	
032EH	50.47	Time Duration of 2nd Preset Speed	0 to 9999	0	
032FH	50.48	Time Duration of 3rd Preset Speed	0 to 9999	0	
0330H	50.49	Time Duration of 4th Preset Speed	0 to 9999	0	
0331H	50.50	Time Duration of 5th Preset Speed	0 to 9999	0	
0332H	50.51	Time Duration of 6th Preset Speed	0 to 9999	0	
0333H	50.52	Time Duration of 7th Preset Speed	0 to 9999	0	
0334H	50.53	Auto Acceleration/Deceleration	00: Linear Acceleration/Deceleration	00	
			01: Auto Acceleration, Linear Deceleration		
			02: Linear Acceleration/Auto Deceleration		
			03: Auto Acceleration/Deceleration		
			04: Auto Acceleration/Deceleration Stall Prevention (Limited by 50.12 to 50.15)		
0335H	50.54	Sleep Frequency	0.0: Disabled	0.0	
			0.1 to 400 Hz Enabled		
0336H	50.55	Wake Frequency	0.1 to 400 Hz (0.0 = Disable)	0.0	
0337H	50.56	Sleep Time Delay	0.0 to 600 sec.	1.0	
0338H	50.57	Second Source of Master Frequency	00: Master Frequency determined by digital keypad up/down	00	
			01: Master Frequency determined by keypad potentiometer		
			02: Master Frequency determined by 0 to +10V input on AI terminal with jumpers		
			03: Master Frequency determined by 4 to 20 mA input on AI terminal with jumpers		
			04: Master Frequency determined by RS-485 communication interface		
0339H	50.58	Zero Speed Output Selection	00: Standby	00	
			01: Zero Speed Output		
033AH	50.59	Zero Speed Holding Torque	0.0 to 30.0%	5.0%	

## Step 4 — Parameter Groups & Default Values (Continued)

### 50 — DRIVE CONTROL (Continued)

Modbus	Groups	Description	Range	Default	User Settings
033BH	50.60	Second Source of Operation Command	00: Operation determined by digital keypad	03	
			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 interface, keypad STOP is effective		
			04: Operation determined by RS-485 interface, keypad STOP is ineffective		
033CH	50.61	HOA and LOC/REM Stop Methods	00: Ramp to Stop	01	
			01: Coast to Stop		
033DH	50.62	OV Fault During Stop State	00: Disable	00	
			01: Enable		

### 60 — MOTOR CONTROL

Modbus	Groups	Description	Range	Default	User Settings
0400H	60.01	Motor Rated Current	30 to 120%	FLA	
0401H	60.02	Motor No-Load Current	00 to 99%	0.4* FLA	
0402H	60.03	Motor Auto Tuning	00: Disable	00	
			01: DC test		
			02: DC test and no load test		
0403H	60.04	Motor's Stator Resistance (calculated via auto tune or entered manually)	00 to 65535 m Ohms	00	
0404H	60.05	DC Braking Current Level	00 to 100%	00	
0405H	60.06	DC Braking Time upon Start-up	0.0 to 5.0 sec	0.0	
0406H	60.07	DC Braking Time upon Stopping	0.0 to 25.0 sec	0.0	
0407H	60.08	Frequency-point for DC Braking	0.0 to 60.0 Hz	0.0	
0408H	60.09	Torque Compensation	00 to 10	00	
0409H	60.10	Slip Compensation	0.00 to 10.00	0.0	
040AH	60.11	PWM Carrier Frequency	115V/230V/460V: 1 to 15 KHz	9	
			575V: 1 to 10 KHz	6	

## Step 4 — Parameter Groups & Default Values (Continued)

### 70 — PROTECTIVE

Modbus	Groups	Description	Range	Default	User Settings
0500H	70.01	Over-voltage Stall Prevention	00: Disable 01: Enable	01	
0501H	70.02	Over Current Stall Prevention during Acceleration	00: Disable 20 to 200%	150	
0502H	70.03	Over Current Stall Prevention during Operation	00: Disable 20 to 200%	150	
0503H	70.04	Over-Torque Detection Mode (OL2)	00: Disabled 01: Enabled during constant speed operation, drive halted after fault 02: Enabled during constant speed operation, operation continues after fault 03: Enabled during operation, drive halted after fault 04: Enabled during operation, operation continues after fault	00	
0504H	70.05	Over-Torque Detection Level	30 to 200%	150	
0505H	70.06	Over-Torque Detection Time	0.1 to 10.0 sec	0.1	
0506H	70.07	Electronic Thermal Overload Relay	00: Constant Torque 01: Variable Torque 02: Inactive	01	
0507H	70.08	Electronic Thermal Motor Overload Time	30 to 300 sec	60	
0508H	70.09	Auto Voltage Regulation (AVR)	00: AVR enabled 01: AVR disabled 02: AVR disabled during deceleration 03: AVR disabled during stop	00	
0509H	70.10	Auto Energy-Saving	00: Disable 01: Enable	00	
050AH	70.11	Under Current Detection Value	0.0 Disable 0.1 to No Load Amps	0.0	
050BH	70.12	Under current Detection Mode	0 or 1	0	
050CH	70.13	Under current Detection Time	0.0 to 20.0 sec.	1.0	

### 80 — KEYPAD/DISPLAY

Modbus	Groups	Description	Range	Default	User Settings
0600H	80.01	Software Version			
0601H	80.02	AC Drive Rated Current Display		##.#	
0602H	80.03	Manufacturer Model Information	00: MVXF50#0-2 (230V 1ph/3ph 1/2 hp) 01: MVX001#0-2 (230V 1ph/3ph 1 hp) 02: MVX002#0-2 (230V 1ph/3ph 2 hp) 03: MVX003#0-2 (230V 1ph/3ph 3 hp) 04: MVX005#0-2 (230V 3ph 5 hp) 05: MVX007#0-2 (230V 3ph 7-1/2 hp) 06: Reserved 07: Reserved	##	

## Step 4 — Parameter Groups & Default Values (Continued)

### 80 — KEYPAD/DISPLAY (Continued)

Modbus	Groups	Description	Range	Default	User Settings
0602H	80.03	Manufacturer Model Information	08: MVX001#0-4 (460V 3ph 1 hp)	##	
			09: MVX002#0-4 (460V 3ph 2 hp)		
			10: MVX003#0-4 (460V 3ph 3 hp)		
			11: MVX005#0-4 (460V 3ph 5 hp)		
			12: MVX007#0-4 (460V 3ph 7-1/2 hp)		
			13: MVX010#0-4 (460V 3ph 10 hp)		
			14 – 19: Reserved		
			20: MVXF25#0-1 (115V 1ph 1/4 hp)		
			21: MVXF50#0-1 (115V 1ph 1/2 hp)		
			22: MVX001#0-1 (115V 1ph 1 hp)		
			23 – 49: Reserved		
			50: MVX001#0-5 (575V 3ph 1 hp)		
			51: MVX002#0-5 (575V 3ph 2 hp)		
			52: MVX003#0-5 (575V 3ph 3 hp)		
			53: MVX005#0-5 (575V 3ph 5 hp)		
			54: MVX007#0-5 (575V 3ph 7-1/2 hp)		
			55: MVX010#0-5 (575V 3ph 10 hp)		
0603H	80.04	Present Fault Record	00: No Fault occurred	00	
0604H	80.05	Second Most Recent Fault Record	01: Over-current (oc)	00	
0605H	80.06	Third Most Recent Fault Record	02: Over-voltage (ov)	00	
			03: Overheat (oH)		
			04: Overload (oL)		
			05: Overload 1 (oL1)		
			06: Overload 2 (oL2)		
			07: External Fault (EF)		
			08: CPU Failure 1 (CF1)		
			09: CPU Failure 2 (CF2)		
			10: CPU Failure 3 (CF3)		
			11: Hardware Protection Failure (hpF)		
			12: Over-current During Accel (OCA)		
			13: Over-current During Accel (OCd)		
			14: Over-current During Steady State (OCn)		
			15: Ground Fault or Fuse Failure (GFF)		
			16: Reserved		
			17: 3 Phase Input Power Loss		
			18: External Pause Function (bb)		
			19: Auto Adjust Accel/Decel Failure (cFA)		
			20: Software Protection Code (codE)		

## Step 4 — Parameter Groups & Default Values (Continued)

### 80 — KEYPAD/DISPLAY (Continued)

Modbus	Groups	Description	Range	Default	User Settings
0606H	80.07	Keypad Display selection (also order of appearance when scrolling through display modes)	00: Command Frequency ("F")	00	
			01: Output Frequency ("H")		
			02: Output Current ("A")		
			03: User Defined ("U")		
			04: Output Voltage (u)		
			05: Unit Temperature (t)		
			06: Forward/Reverse Direction ("Frd / rEv")	xx	
			display only when enabled: Counter ("c")		
			display only when enabled: PLC steps		
			display only when enabled: PID Feedback		
0607H	80.08	User Defined Multiplier	0.01 to 160.00	1.00	
0608H	80.09	External Terminal Scan Time	01 to 20	01	
0609H	80.10	Parameter Lock and Configuration	00: All parameters can be set and read	00	
			01: All parameters are read only		
			10: Reset all parameters to the factory defaults		
060AH	80.11	Elapsed Time (Run): Day	0 to 65535 (show 6553.)	0	
060BH	80.12	Elapsed Time (Run): Minutes	0 to 65535 (show 6553.)	0	
060CH	80.13	Elapsed Time (Power on): Day	0 to 65535 (show 6553.)	0	
060DH	80.14	Elapsed Time (Power on): Minutes	0 to 65535 (show 6553.)	0	
060EH	80.15	Automatic Display Scroll	00: Disable	00	
			01: Scroll every 5 seconds after 1 minute delay		
			02: Scroll every 15 seconds after 1 minute delay		

### 90 — COMMUNICATION PARAMETERS

Modbus	Groups	Description	Range	Default	User Settings
0700H	90.01	Communication Protocol	00: MODBUS ASCII mode < 7 data bits, no parity, 2 stop bits >	00	
			01: MODBUS ASCII mode < 7 data bits, even parity, 1 stop bit >		
			02: MODBUS ASCII mode < 7 data bits, odd parity, 1 stop bit >		
			03: MODBUS RTU mode < 8 data bits, no parity, 2 stop bits >		
			04: MODBUS RTU mode < 8 data bits, even parity, 1 stop bit >		
			05: MODBUS RTU mode < 8 data bits, odd parity, 1 stop bit >		
0701H	90.02	RS-485 Communication	01 to d 254	01	
0702H	90.03	Transmission Speed	00: 4800 baud	01	
			01: 9600 baud		
			02: 19200 baud		
			03: 38400 baud		



# Step 5 — Troubleshooting Information

The AC drive has a comprehensive fault diagnostic system that includes several different alarms and fault messages. Once a fault is detected, the corresponding protective functions will be activated. The following faults are displayed as shown on the AC drive digital keypad display. The three most recent faults can be read on the digital keypad display by viewing 80.04 through 80.06.

**Note:** Faults can be cleared by resetting at the keypad or with the Input Terminal.

## Common Problems and Solutions

Fault Name	Fault Descriptions	Corrective Actions
<i>OC</i>	The AC drive detects an abnormal increase in current.	<ol style="list-style-type: none"><li>1. Check that the motor horsepower corresponds to the AC drive output power.</li><li>2. Check the wiring connections between the AC drive and motor for possible short circuits.</li><li>3. Increase the acceleration time (20.08).</li><li>4. Check for possible excessive loading conditions at the motor.</li><li>5. If there are any abnormal conditions when operating the AC drive after a short circuit is removed, it should be sent back to manufacturer.</li></ol>
<i>OU</i>	The AC drive detects that the DC bus voltage has exceeded its maximum allowable value.	<ol style="list-style-type: none"><li>1. Check that the input voltage falls within the rated AC drive input voltage.</li><li>2. Check for possible voltage transients.</li><li>3. Bus over-voltage may also be caused by motor regeneration. Either increase the deceleration time or add an optional braking resistor.</li><li>4. Check whether the required braking power is within the specified limits.</li></ol>
<i>OH</i>	The AC drive temperature sensor detects excessive heat.	<ol style="list-style-type: none"><li>1. Make sure that the ambient temperature falls within the specified temperature range.</li><li>2. Make sure that the ventilation holes are not obstructed.</li><li>3. Remove any foreign objects from the heatsink and check for possible dirty heatsink fins.</li><li>4. Provide enough spacing for adequate ventilation.</li></ol>
<i>Lu</i>	The AC drive detects that the DC bus voltage has fallen below its minimum value.	Check that the input voltage falls within the rated AC drive's input voltage.
<i>OL</i>	The AC drive detects excessive drive output current. Note: The AC drive can withstand up to 150% of the rated current for a maximum of 60 seconds.	<ol style="list-style-type: none"><li>1. Check if the motor is overloaded.</li><li>2. Reduce the torque compensation setting in 60.09.</li><li>3. Replace the AC drive with one that has a higher output capacity (next hp size).</li></ol>
<i>oLI</i>	Internal electronic overload trip	<ol style="list-style-type: none"><li>1. Check for possible motor overload.</li><li>2. Check electronic thermal overload setting.</li><li>3. Increase motor capacity.</li><li>4. Reduce the current level so that the drive output current does not exceed the value set by the Motor Rated Current (60.01).</li></ol>
<i>oL2</i>	Motor overload. Check the parameter settings (70.04 through 70.06)	<ol style="list-style-type: none"><li>1. Reduce the motor load.</li><li>2. Adjust the over-torque detection setting to an appropriate setting.</li></ol>

## Step 5 — Troubleshooting Information (Continued)

### Common Problems and Solutions (Continued)

Fault Name	Fault Descriptions	Corrective Actions
<i>ocA</i>	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 60.09. 3. Increase the acceleration time. 4. Replace the AC drive with one that has a higher output capacity (next hp size).
<i>ocd</i>	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 the AC drive with one that has a higher output capacity (next hp size).
<i>ocn</i>	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).
<i>cF1</i>	Internal memory cannot be programmed.	1. Switch off power supply. 2. Check whether the input voltage falls within the rated AC drive input voltage. Switch the AC drive back on.
<i>cF2</i>	Internal memory cannot be read.	1. Check the connections between the main control board and the power board. 2. Reset the drive to factory defaults.
<i>HPF</i>	Hardware protection failure	Return the drive to the factory.
<i>code</i>	Software protection failure	Return the drive to the factory.
<i>cF3</i>	Drive's internal circuitry is abnormal.	1. Switch off power supply. 2. Check whether the input voltage falls within the rated AC drive input voltage. Switch on the AC drive.
<i>EF</i>	The external terminal DI1-COM goes from OFF to ON.	When external terminal DI1-COM is closed, the drive's output will be turned off and will display EF.
<i>cFA</i>	Auto acceleration/deceleration failure	Don't use the auto acceleration/ deceleration function.
<i>GFF</i>	Ground fault: The AC drive output is abnormal. When the output terminal is grounded (short circuit current is 50% more than the AC drive rated current), the AC drive power module may be damaged. The short circuit protection is provided for AC drive protection, not user protection.	Ground fault: 1. Check whether the IGBT power module is damaged. 2. Check for possible poor insulation on the output wires or on the motor.
<i>bb</i>	External Pause. AC drive output is turned off.	1. When the external input terminal (pause) is active, the AC drive output will be turned off. 2. Disable this (pause) and the AC drive will begin to work again.