

**IMPULSE • G+/VG+  
SERIES 3  
EtherNet IP**

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**Drive Communication Instruction Manual**

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Part Number: 144-42576  
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# Introduction

This manual explains the specifications and handling of the Electromotive Systems *EtherNet/IP Option Card CM092* for the Electromotive Systems models Impulse•G+ Series, and Impulse•VG+ Series drives. The *EtherNet/IP Option Card CM092* connects the drive to an *EtherNet/IP* network and facilitates the exchange of data. In this document, the word “inverter”, “ac drive” and “drive” may be used interchangeably. To ensure proper operation of this product, read and understand this manual. For details on installation and operation of the drive, refer to the appropriate drive technical manual.

## Technical References

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Refer to the following publications for information about the IMPULSE SERIES 3:

- IMPULSE G+ SERIES 3<sup>®</sup> Technical Manual
- IMPULSE VG+ SERIES 3<sup>®</sup> Technical Manual

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## Technical Support

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Technical Support Service Center: 1-800-288-8178.

Provides telephone support to customers, relating to installation, start-up, programming, and troubleshooting of drives products.

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# Chapter 1 Installation

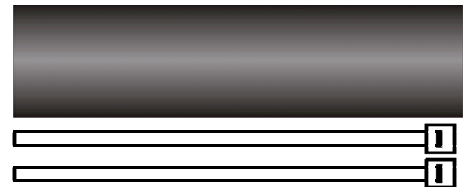
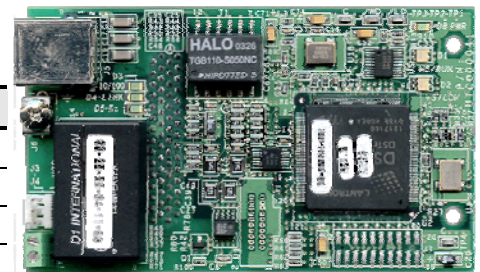
## Product Specification

Operating Temperature:	0 to 55°C
Storage Temperature:	-20 to 70°C
Humidity:	90% Relative Humidity (no condensing).
Vibration:	1G at less than 20Hz, up to 0.2G at 20 to 50Hz.
Altitude:	3300ft or less.

## Unpack & Inspect

Unpack the *EtherNet/IP Option Card CM092* Option kit and verify that all components are present and undamaged.

OPTION Kit Parts
EtherNet/IP Option Card CM092 Card (UTC000068)
Shielded RJ45 M-F Cable (UWR00574-1)
Ground Wire (UWR00575-1)
4"x1" Insulated Tubing (M45094075004)
Cable Ties (UWS-0137)
Installation Guide
MAC ID Label (Unique for each <i>EtherNet/IP Option Card CM092</i> )



MAC ID: 00-20-B5-24-11-13

Example Label:

## Installation & Wiring

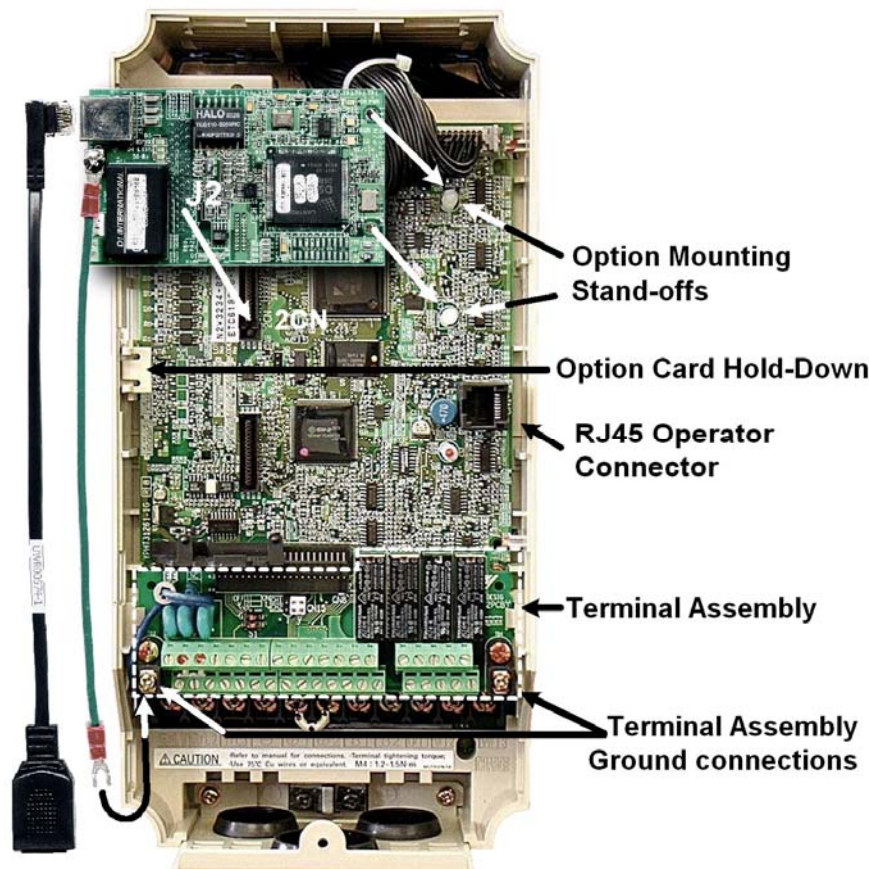
- ❑ Connect power to the drive and verify that the drive functions correctly. This includes running the drive from the operator keypad. Refer to the appropriate drive technical manual for information on connecting and operating the drive.
- ❑ Remove power from the drive and wait for the charge lamp to be completely extinguished. Wait at least five additional minutes for the drive to be completely discharged. Measure the DC BUS voltage and verify that it is at a safe level.
- ❑ Remove the operator keypad and drive cover.
  - Remove the operator keypad.
  - Remove the terminal and control covers.
 Remove the option card hold-down by carefully compressing the top and bottom until it becomes free of its holder. Lift it out.

- ❑ Mount the *EtherNet/IP Option Card CM092* on the drive.

Connect the ground cable supplied to ground terminal J6 on the *EtherNet/IP Option Card*

*CM092*. Connect the RJ45 M-F cable supplied in the option kit to the *EtherNet/IP Option Card*

- *CM092*. Align the J2 connector on the back of the *EtherNet/IP Option Card CM092* with its mating 2CN connector on the drive control card.
- Align the two standoffs on the front of the drive control board with the two holes on the right side of the *EtherNet/IP Option Card CM092*.
- Press the *EtherNet/IP Option Card CM092* firmly onto the drive 2CN connector and standoffs until the J2 connector is fully seated on 2CN and the drive standoffs have locked into their appropriate holes.
- Route the RJ45 M-F cable and the ground cable along the left-inside of the drive case.
- Replace the option card hold down.
- Connect the ground wire to the ground terminal on the terminal assembly.
- Adhere the supplied MAC ID Label on the side of the drive either above or below the drive nameplate.
- Apply power to the drive and verify that the drive functions correctly.
- Verify that the MS/RUN and PWR LEDs on the *EtherNet/IP Option Card CM092* are both GREEN. (Refer to the section on LEDs below)

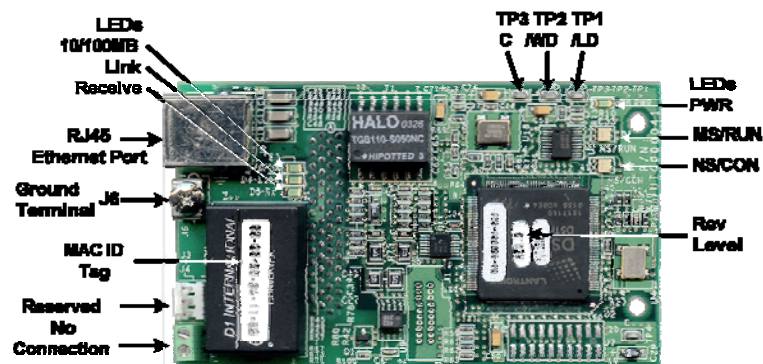


# Option LEDs

## LED Definitions

The states of the *EtherNet/IP Option Card CM092* card LEDs after the power up sequence has completed are described below. Please wait for at least five seconds for the loading process to complete before verifying the status of the LEDs.

Des	Label	Description
D1	MS/RUN	GREEN – Card Functioning Normally RED – Card Failure
D2	NS/CON	GREEN – Connection Made GREEN BLINK – Control Connection Active (500ms cycle) RED – Connection Fault
D3	10/100	GREEN – 100Mbs Connection Speed
D4	LINK	GREEN – Link Established
D5	Rx	GREEN - Message Received
D8	PWR	GREEN - Appropriate Power Supplied to Card



## EtherNet/IP Option Card CM092 Card LED States

LED	Indicator	Behavior	Description
MS/RUN	Steady OFF	No Power	No power is applied to the option card the LED remains OFF.
	Green Steady	Normal Operation	The option card is operating correctly with all initialization checks complete.
	Green Flash	Standby / Initializing	The option card is in process of configuring or waiting for configuration information.
	Red Flash	Minor Fault	The option card has detected a recoverable minor fault, such as incomplete configuration. Faults that are typically corrected by cycling power to the drive.
	Red Steady	Major Fault	The option card has detected a non-recoverable major fault, (Ram Error, corrupt storage, non - unique MAC address). All major faults will require more intervention than a power cycle to correct.
	Green/Red Flash	Option Card Test	Power-up sequence and tests.
NS/CON	OFF Steady	No Power or IP Address	The option card is powered OFF, or is not configured with an IP address and therefore cannot communicate on the network.
	Green Steady	Connected	The option card currently has one or more connections established to it.
	Green Flash	No Connections	The option card currently has no valid connections, but is correctly configured. The state is "waiting" for communication to assume.
	Red Flash	Connection Timeout	One or more of the established connections has timed out. The state will remain until all time-out connections have been re-established or a reset occurs. Recoverable minor fault
	Red Steady	Duplicate IP	A duplicate IP address has been discovered on the network or non-recoverable major network fault has occurred.
	Green/Red Flash	Network Test	Power-up sequence and tests.
10/100	OFF	10Mbps Connection	The network is operating at 10Mbps.
	Green	100Mbps Connection	The network is operating at 100Mbps.
Link	OFF	No Network Connection	The option card is not physically connected to the network. Check cable connections.
	Green	Network Connection	The option card is connected to a network.
Rx	OFF	No Message Received	No message to the option card is being received.
	Green	Message Received	A message to the option card is being received.
PWR	OFF	No Power	The drive is not powered or the option card is not securely connected to the drive.
	Green	Power Supplied	The option card has the appropriate power supplied.



# Chapter 2 Network Configuration

## Firmware Description

### Drive Status

The following Status Assembly information is available in the EtherNet/IP interface, which is implemented as the normal heartbeat information in CIP. The following states of the device along with the additional flags provide for monitoring the EtherNet/IP enabled Yaskawa drives.

Value	State	
0	Non-Existent	
1	Device Self-Test	
2	Standby	
3	Operational	
4	Major Fault – Recoverable	
5	Major Fault – Unrecoverable	
EV_	Event Flag	An Event has occurred
SF_	System Fault	Connection or BUS Fault.
UF_	User Fault	User Interaction Inhibited Operation
DF_	Device Fault	Drive or Hardware Fault

### Protocols

Standard TCP/IP and UDP/IP are implemented with the support of SNMP for network diagnostic features support. ARP, ICMP, and IGMP are supported for interoperable operation in IP networks.

### Ports

EtherNet/IP: Port 0xAF12 for encapsulation packets, services and CPF-session management  
Port 0x08AE for I/O connections supported with timeout configurations.  
Web: Port 80 (Http)  
Telnet: Port 23(Telnet)

### Connections

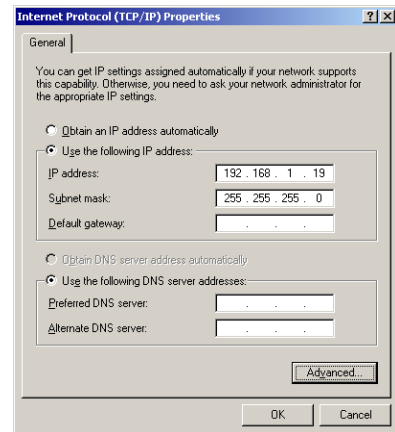
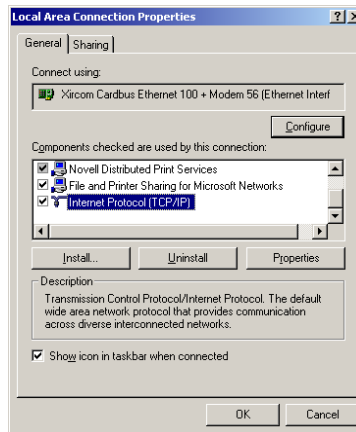
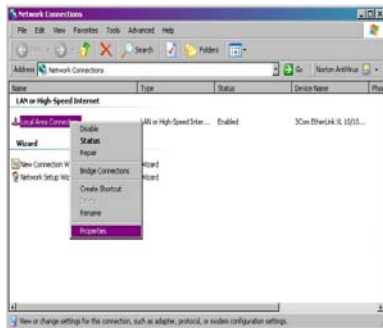
The maximum number of simultaneous connections is: 1 for I/O, 4 for Explicit.

### Cable Loss and Timeout

Timeout is calculated based on RPI configuration parameter on startup. It is specified in seconds. A setting of “0” disables the timeout. The default cable loss timeout is RPI\* 4.

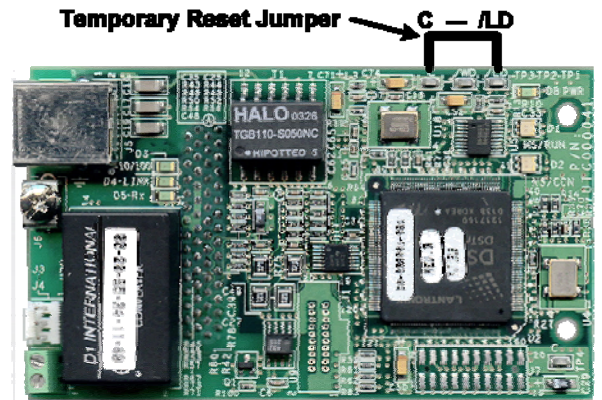
# Configure the PC Network Connection

- Select an existing or create a new network connection that will be used to communicate with the *EtherNet/IP Option Card CM092* card.
  - Select **Start** ⇒ **Settings** ⇒ **Network Connections** from the task bar
  - Select the network connection to be used
- Right click on the network connection and select properties from the menu
- Select **Internet Protocol (TCP/IP)** from the components displayed
  - If a TCP/IP selection is not available, it may be installed by selecting **Install**. Note that Administrator access is required and that the operating system installation CD may also be required. Consult with your IT department as needed.
- Select **Properties**
  - If the network connection already has an IP address assigned, ignore the following instructions
  - Select the **Use the following IP address** radio button
  - Enter the **IP address** as **192.168.1.19** and the **Subnet mask** as **255.255.255.0**. Check the system network schematic or with the IT department to make sure that the address does not already exist on the network.
  - Once the **IP address** and **Subnet mask** are entered select **OK**
- It may be necessary to reboot the PC in order for the changes to take affect.



# Reset the EtherNet/IP Option Card CM092 to the Default Address

- If the web page is not visible, check that the PC has been setup and connected properly. If the PC has been setup and connected properly and the web page is still not visible, the IP address of the *EtherNet/IP Option Card CM092* may not be set to its default IP address. To reset it to the default value,
  - Remove power from the drive and wait for the charge lamp to be completely extinguished. Wait at least five additional minutes for the drive to be completely discharged. Measure the DC BUS voltage and verify that it is at a safe level.
  - Place a jumper between test points **C** and **/LD** on the *EtherNet/IP Option Card CM092* card as shown in the figure to the right.
  - Reapply power to the drive and wait approximately 10 seconds for the power-up cycle to complete. You should now be able to connect to IP address 192.168.1.20 and open the main web page.
  - Remove the jumper between **C** and **/LD** on the *EtherNet/IP Option Card CM092* once the connection has been made and the web page visible.

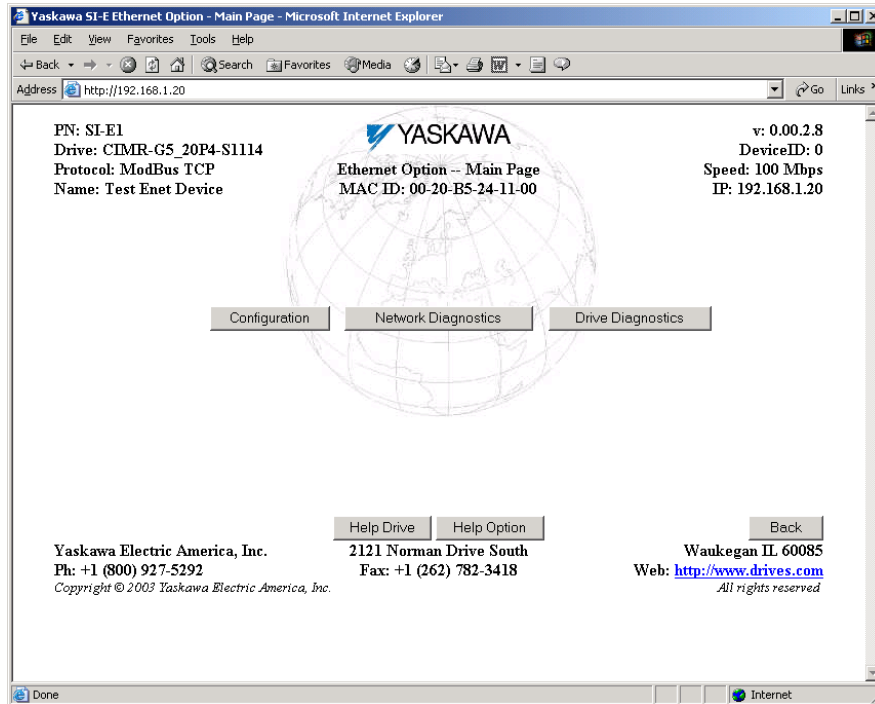


## Configure the EtherNet/IP Option Card CM092

- Select the **Configure** button from the main web page.
- Enter the desired IP address in the **IP** field and the desired Subnet Mask in the **Subnet** field. Check with the system schematic or network administrator to verify that the IP address and subnet mask entered are valid.
- Select the **Submit** button.
- A confirmation of the entered IP address and Subnet Mask will be displayed.
- Remove power from the drive and wait for the charge lamp to be completely extinguished. Wait at least five additional minutes for the drive to be completely discharged. Measure the DC BUS voltage and verify that it is at a safe level.
- If necessary, reconfigure the network connection of the configuration device to match the entered *EtherNet/IP Option Card CM092* configuration.
- Reapply power to the drive and connect to the desired network.

# Main Web Page

The main page is the first web page displayed. It displays the standard page header and footer along with links to the other web pages.



EtherNet/IP Option Card CM092 Main Web Page

- **Standard Header**

The standard heading displays information specific to the installed *EtherNet/IP Option Card CM092*.

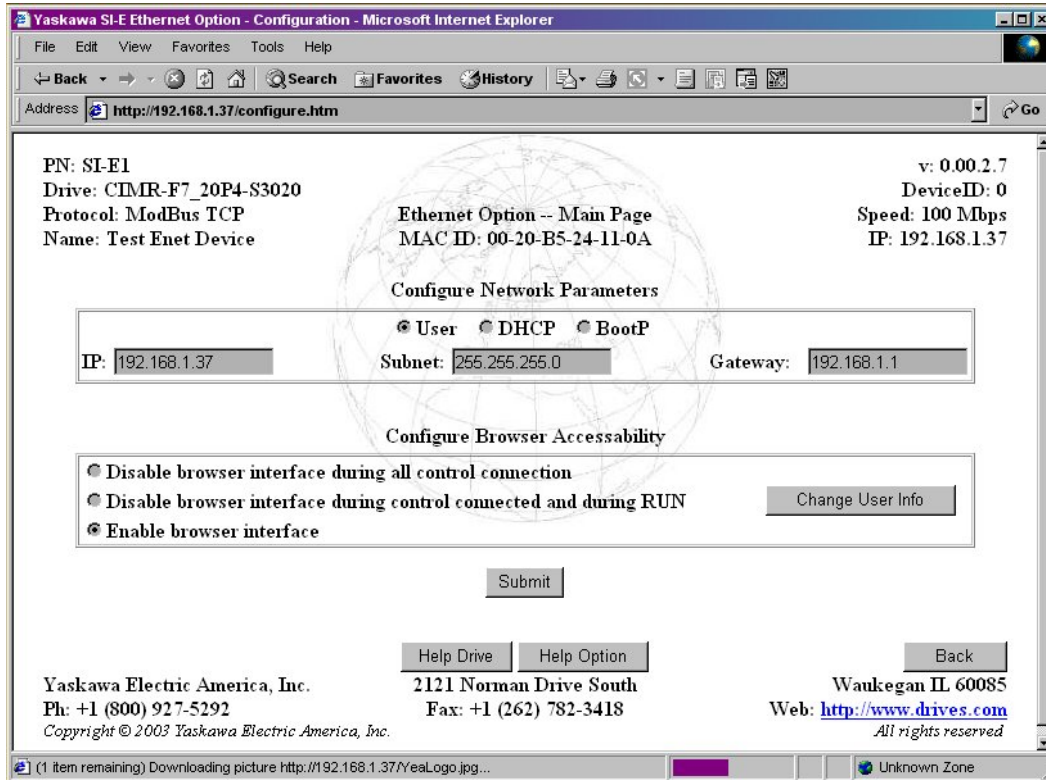
- **PN:** Part Number: Indicates the part number for the *EtherNet/IP Option Kit– CM092*
- **Drive Model and Software:** Indicates the drive family and model along with the drive control card software version. The software control card software version is represented by the last 4 digits preceded by ‘-S’.
- **Protocol Name:** Indicates the current protocol supported – EtherNet/IP
- **Serial Number:** Indicates the serial number of this particular *EtherNet/IP Option Card CM092*. Each card has a unique serial number.
- **MAC ID:** The MAC ID is unique to each *EtherNet/IP Option Card CM092*.
- **Option Software Version/Revision:** The first five (5) digits following “VST” represent the main *EtherNet/IP Option Card CM092* software version. The last digit represents the current revision level.
- **Config:** Server Configuration: Determines how and where the IP address is generated.
- **Speed:** Connection Speed: Current connection speed. Either 10 or 100 will be displayed.
- **IP Address:** The IP address of the current *EtherNet/IP Option Card CM092*.

- **Standard Footer**

The standard footer contains information on how to contact Yaskawa for technical support.

# Configuration Web Page

The configuration page contains the standard header and footer along with a method of configuring the EtherNet/IP server and web server interfaces of the *EtherNet/IP Option Card CM092*.



## • Web Server Configuration

The web server configuration allows for the setting of the IP Address, Subnet Mask, Gateway and EtherNet/IP server type. All octets must contain a valid number between 0 and 255. The **Submit** button must be pressed, the accepted page displayed and the drive power cycled before any changes are effective.

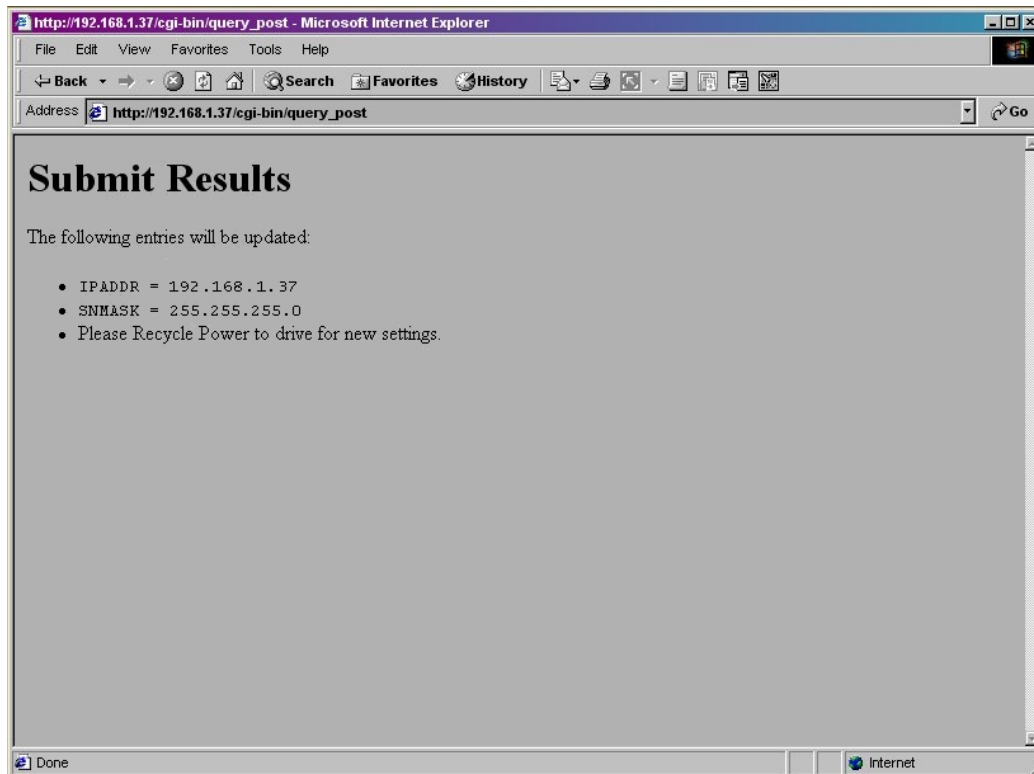
Configure Network Parameters

- **IP:** A series of four (4) octets separated by “.” that determines the interface address for the current *EtherNet/IP Option Card CM092*.
- **SubNet:** A series of four (4) octets separated by “.” that determines the local area network for the *EtherNet/IP Option Card CM092*.
- **Gateway:** A series of four (4) octets separated by “.” that determines the IP Address of the gateway server. If a gateway server is not used, select **Do not use default gateway in system**. The gateway field must contain a valid IP address whether it is used or not and must not be blank.
- Address Configuration Mode:
  - **USER:** The user enters The IP address via the web interface.
  - **DHCP:** The IP Address is set by a DHCP server and not by the user via the web interface.
  - **BootP:** The IP Address is set by a BootP server and not by the user via the web interface.

**Note:** Verify that a DHCP or BootP server determines the network address before selecting either.
- **Browser Access Configuration:** In order to view the web pages, **Enable browser interface** must be selected.

## Submit Web Page

After any of the configuration parameters shown above have been changed, the submit button must be pressed to store the changed data. The drive must then be power cycled for the new data to take affect. Verify that the data on the submit page is correct.

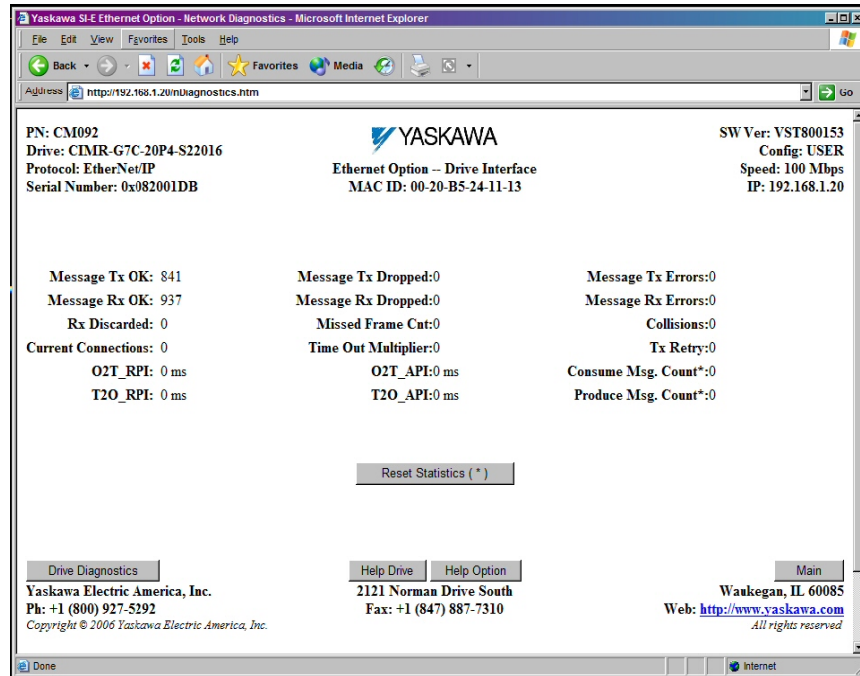


Submit page

After the data on the submit page has been verified and the drive power cycled, make sure to reset your network parameters and browser address accordingly.

# Network Diagnostics Web Page

The network diagnostics page displays the standard header and footer along with information relative to network and *EtherNet/IP Option Card CM092* performance.



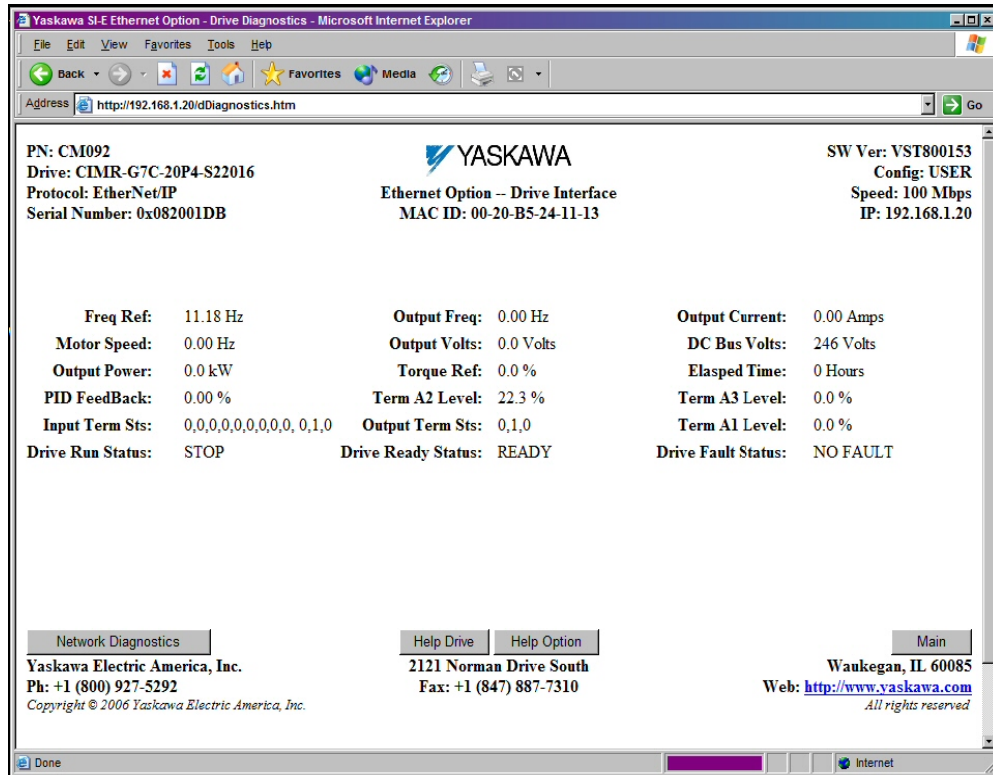
## Network Diagnostics Web Page

- Message Tx OK: Transmit Message Count: The number of messages sent from the *EtherNet/IP Option Card CM092*.
- Message Rx OK: Receive Message Count: The number of messages received by the *EtherNet/IP Option Card CM092*.
- Rx Discarded: Received Messages Discarded: The number of received messages discarded by the *EtherNet/IP Option Card CM092*.
- Current Connections: The number of established connections used on the *EtherNet/IP Option Card CM092*. This is the total of explicit, implicit and "DriveWizard" connections.
- O2T RPI: The time interval for Master to Slave messaging during I/O connection (mS).
- T2O RPI: The time interval for Slave to Master messaging during I/O connection (mS).
- Message Tx Dropped: Dropped Transmit Messages: The number of dropped transmit messages sensed on the *EtherNet/IP Option Card CM092*.
- Message Rx Dropped: Dropped Receive Messages: The number of dropped receive messages sensed on the *EtherNet/IP Option Card CM092*.
- Missed Frame Cnt: The number of missed frame errors sensed on the *EtherNet/IP Option Card CM092*.
- Time Out Multi: The current timeout multiplier for I/O messages received from the master controller, during the I/O connection.
- O2T API: The time interval for Master to slave setup messaging during I/O connection (mS).
- T2O API: The time interval for Slave to Master setup messaging during I/O connection (mS).
- Message Tx Errors: Transmit Message Errors: The number of error messages sent from the *EtherNet/IP Option Card CM092* due to not processing or incorrect processing.
- Message Rx Errors: Receive Message Errors: The number of error messages received on the *EtherNet/IP Option Card CM092* due to not processing or incorrect processing.
- Collisions: The number of collisions sensed on the *EtherNet/IP Option Card CM092*.
- Tx Retry: Transmit Retries: The number of transmit retries on the *EtherNet/IP Option Card CM092* due to media collisions or non granted access to the media.
- Consumed Message Cnt: The number of consumed messages.
- Produced Message Cnt: The number of produced messages.
- Reset Statistics Button: Reset counters.



## Drive Diagnostics Web Page

The drive diagnostics page contains the standard header and footer along with diagnostic information specific to the current drive.



Drive Diagnostics Web Page

- Freq Ref: Frequency Reference – Monitor Parameter U1-01.
- Motor Speed: Motor Speed – Monitor Parameter U1-05.
- Output Power: Output Power – Monitor Parameter U1-08.
- PID Feedback: PID Feedback in %
- Input Terminal Sts: The Digital Input status as bit field – Monitor Parameter U1-10.
- Drive Run Status: Indicates RUN/STOP state of the drive.
- Output Freq: Output Frequency – Monitor Parameter U1-02.
- Output Volts: Output Voltage – Monitor Parameter U1-06.
- Torque Ref: Torque Reference – Monitor Parameter U1-09.
- Term A2 Level: The analog input A1 Terminal A2 (14) monitor value U1-16.
- Output Terminal Sts: Digital Output status as bit field – Monitor Parameter U1-11.
- Drive Ready Status: Indicates the drive READY status.
- Output Current: Output Current – Monitor Parameter U1-03.
- DC Bus Volts: DC bus Voltage – Monitor Parameter U1-07.
- Elapsed Time: Elapsed Time – Monitor Parameter U1-13.
- Term A3 Level: The analog input Terminal A3 (16) monitor value U1-17.
- Term A1 Level: The analog input Terminal A1 monitor value U1-15.
- Drive Fault Status: Indicates drive FAULT status.

## Drive Setup

- Remove power from the drive and wait for the charge lamp to be completely extinguished. Wait at least five additional minutes for the drive to be completely discharged. Measure the DC BUS voltage and verify that it is at a safe level.
- Reinstall all drive covers and the operator keypad. Apply power to the drive.
- Set parameters b3-01 and b3-02 to their appropriate values. Refer to the table to the right for available b3-01 and b3-02 values.

Param	Function	Data	+/- Limits – Description	Default
b3-01	Reference Selection	0	Digital Operator	1
		1	Terminals	
		2	Serial Communication	
		3	<b>Option PCB (EtherNet/IP Option Card CM092)</b>	
		4	Pulse Input (F7 and G7 Only)	
b3-02	Operation Method Selection	0	Digital Operator	1
		1	Terminals	
		2	Serial Communication	
		3	<b>Option PCB (EtherNet/IP Option Card CM092)</b>	

## Important Network Information

- It is strongly recommended that shielded CAT-5 cable be used for all network cables.
- A maximum of 10 simultaneous connections are allowed.
- The EtherNet I/P connection must be refreshed within 60 seconds. If it is not refreshed within 60 seconds, the connection will be closed.
- Refer to the appropriate programming or parameter access manual for a complete list of drive parameters available. A list of applicable manuals is available at the end of this document.

## EDS Files

### Installing the appropriate EDS file

The EDS files can be found on the CD supplied with the drive or can be downloaded from [www.yaskawa.com](http://www.yaskawa.com).

Select “Downloads”, “Browse”, “By Inverter Drives” and “By Product”.

Then select “Network Communications Options” and the appropriate EDS file of the latest version from those listed.

The EDS files are “zip” files. Each “zip” file contains the EDS files for the entire drive family for the listed revision. The “zip” file is named “EDS\_Drive Model\_UTC000068\_File Version.zip”.

Example: The current file containing all of the F7U EDS files is named EDS\_F7U\_UTC000068\_V1\_01.zip.

Extract the appropriate EDS file for the drive model. The current CIMR-F7U20P4 drive EDS file is named F7U20P4\_UTC000068\_V1\_01.eds

# Drive Fault Messages

## □ Drive EtherNet/IP Fault Messages

The table of *EtherNet/IP Option Card CM092* fault codes returned by the drive is shown below. Refer to the appropriate drive user and/or programming manual(s) for drive specific information on the fault returned.

Fault Code Conversion

Drive Fault Code [hex]	EtherNet/IP Fault Code [hex]	Description	Drive Fault Code [hex]	EtherNet/IP Fault Code [hex]	Description
0h	0000h	None	16h	9000h	External Fault 8 (EF8)
1h	5120h	DC Bus Fuse Open (PUF)	18h	7310h	Overspeed Detection (OS)
2h	3220h	DC Bus Undervoltage (UV1)	19h	7310h	Speed Deviation (DEV)
3h	5110h	CTL PS Undervoltage (UV2)	1Ah	7301h	PG Open (PGO)
4h	3222h	MC Answerback (UV3)	1Bh	3130h	Input Phase Loss (PF)
5h	2130h	Short Circuit (SC)	1Ch	3130h	Output Phase Loss (LF)
6h	2120h	Ground Fault (GF)	1Eh	5300h	Operator Disconnected (OPR)
7h	2300h	Overcurrent (OC)	1Eh	5300h	OPE Faults
8h	3210h	DC Bus Overvoltage (OV)	1Fh	6320h	EEPROM R/W Error (ERR)
9h	4200h	Heatsink Over-temperature (OH)	21h	7500h	EtherNet/IP Communication Error (BUS)
0Ah	4210h	Heatsink Maximum Temperature (OH1)	22h	7500h	SI-E Communications Error
0Bh	2220h	Motor Overload (OL1)	23h	7500h	SI-F/G Communications Error
0Ch	2200h	Inverter Overload (OL2)	24h	7500h	SI-F/G CPU error
0Dh	2221h	Overtorque Detection 1 (OL3)	25h	8321h	Out of Control (CF)
0Eh	2222h	Overtorque Detection 2 (OL4)	26h	8313h	Zero Servo Fault (SVE)
0Fh	7110h	Dynamic Braking Transistor (RR)	27h	9000h	External Fault 0 (EF0)
10h	7112h	Dynamic Braking Resistor (RH)	28h	2310h	High Slip Braking (OL7)
11h	9000h	External Fault 3 (EF3)	29h	8321h	Undertorque Detection 1 (UL3)
12h	9000h	External Fault 4 (EF4)	2Ah	8321h	Undertorque Detection 2 (UL4)
13h	9000h	External Fault 5 (EF5)	2Bh	8110h	Feedback Loss (FBL)
14h	9000h	External Fault 6 (EF6)	2Ch	4300h	Motor Overheat 1 (OH3)
15h	9000h	External Fault 7 (EF7)	2Dh	4310h	Motor Overheat 2 (OH4)

■ Drive Fault Operator Messages

The following is a table of faults that could be caused by the *EtherNet/IP Option Card CM092* that will display on the operator keypad only. For any fault displayed on the operator that is not listed in the following table, please see the appropriate drive technical manual.

Drive Faults (Displayed on the Drive Keypad)			
Fault	Content	Cause	Solution
BUS	EtherNet/IP Option Card CM092 communications error.	Communication is not established between EtherNet/IP Master and the drive.	<ul style="list-style-type: none"> <li>• Check EtherNet/IP Option Card CM092 communication LED display.</li> </ul>
EF0	EtherNet/IP Option Card CM092 external fault.	Drive received an external fault command from the EtherNet/IP Option Card CM092	<ul style="list-style-type: none"> <li>• Check multi-function input settings</li> <li>• Check PLC or controller program</li> <li>• Eliminate cause of fault (machine device in fault state)</li> </ul>
OPE05	Command selection fault.	Parameter b3-01 is set to EtherNet/IP Option Card CM092 and no card is detected.	<ul style="list-style-type: none"> <li>• Install EtherNet/IP Option Card CM092</li> <li>• Reprogram b3-01</li> <li>• Replace the EtherNet/IP Option Card CM092</li> </ul>
OPE06	Reference selection fault.	Parameter b3-02 is set to EtherNet/IP Option Card CM092 and no card is detected.	<ul style="list-style-type: none"> <li>• Install EtherNet/IP Option Card CM092</li> <li>• Reprogram b3-02</li> <li>• Replace the EtherNet/IP Option Card CM092</li> </ul>
CPF20	EtherNet/IP Option Card CM092 fault.	Faulty J1/2CN connection.	<ul style="list-style-type: none"> <li>• Power cycle the drive</li> <li>• Reseat the EtherNet/IP Option Card CM092</li> <li>• Replace the EtherNet/IP Option Card CM092</li> <li>• Replace the inverter</li> </ul>
CPF21	EtherNet/IP Option Card CM092 self-diagnostics fault.	Faulty EtherNet/IP Option Card CM092.	<ul style="list-style-type: none"> <li>• Replace the EtherNet/IP Option Card CM092</li> </ul>
CPF22	EtherNet/IP Option Card CM092 ID code fault.	Faulty EtherNet/IP Option Card CM092.	<ul style="list-style-type: none"> <li>• Replace the EtherNet/IP Option Card CM092</li> </ul>
CPF23	Watch dog timer fault.	Faulty EtherNet/IP Option Card CM092.	<ul style="list-style-type: none"> <li>• Replace the EtherNet/IP Option Card CM092</li> </ul>

# Chapter 3 EtherNet/IP Supported Objects

This section describes the EtherNet/IP Option Card CM092 supported objects.

## Supported Input Instances

### Basic Speed Control Input Instance 20 (14h)

Input	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Instance	0	-	-	-	-	-	Fault Reset	-	Run Forward
20	1	-							
	2	Speed Reference (Low Byte) [scaled by parameter o1-03]							
	3	Speed Reference (High Byte) [scaled by parameter o1-03]							

Run Forward: Forward RUN Command

Fault Reset: Fault Reset Command

Speed reference: RPM when o1-03 = (2 ~ 39)

### Extended Speed Control Input Instance 21 (15h)

Input	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Instance	0	-	Net Reference	Net Control	-	-	Fault Reset	Run Reverse	Run Forward
21	1	-							
	2	Speed Reference (Low Byte) [scaled by parameter o1-03]							
	3	Speed Reference (High Byte) [scaled by parameter o1-03]							

Run Forward: Forward RUN Command

Run Reverse: Reverse RUN Command

Fault Reset: Fault Reset Command

Net Control: Parameter b3-02

0 – 1 transition sets b3-02 = 3

1 – 0 transition sets b3-02 to previous value

Net Reference: Parameter b3-01

0 – 1 transition sets b3-01 = 3

1 – 0 transition sets b3-01 to previous value

Speed Reference: RPM when o1-03 = (2 ~ 39)

Basic Speed/Torque Control Input Instance 22 (16h)

Input	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Instance	0	-	-	-	-	-	Fault Reset	-	Run Forward
22	1	-							
	2	Speed Reference1 (Low Byte) [scaled by parameter o1-03]							
	3	Speed Reference1 (High Byte) [scaled by parameter o1-03]							
	4	Torque Reference2 (Low Byte) [0.1%]							
	5	Torque Reference2 (High Byte) [0.1%]							

Note: 1: Becomes torque limit in torque mode

2: VG+ Series 3 FVC mode only

Run Forward: Forward RUN Command

Run Reverse: Reverse RUN Command

Fault Reset: Fault Reset Command

Speed Reference: RPM when o1-03 = (2 ~ 39)

Torque Reference: Percent of rated torque - (VG+ Series 3 Closed-loop flux vector mode (FVC) only)

Basic Speed/Torque Control Input Instance 23 (16h)

Input	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Instance	0	-	Net Reference	Net Control	-	-	Fault Reset	Run Reverse	Run Forward
23	1	-							
	2	Speed Reference1 (Low Byte) [scaled by parameter o1-03]							
	3	Speed Reference1 (High Byte) [scaled by parameter o1-03]							
	4	Torque Reference2 (Low Byte) [0.1%]							
	5	Torque Reference2 (High Byte) [0.1%]							

Note: 1: Becomes torque limit in torque mode

2: VG+ Series 3 FVC mode only

Run Forward: Forward RUN Command

Run Reverse: Reverse RUN Command

Fault Reset: Fault Reset Command

Net Control: Parameter b3-02

0 – 1 transition sets b3-02 = 3

1 – 0 transition sets b3-02 to previous value

Net Reference: Parameter b3-01

0 – 1 transition sets b3-01 = 3

1 – 0 transition sets b3-01 to previous value

Speed Reference: RPM when o1-03 = (2 ~ 39)

Torque Reference: Percent of rated torque - (VG+ Series 3 Closed-loop flux vector mode (FVC) only)

# Magnetek Input Instances

Magnetek Standard Speed/Torque Control Input Instance 101 (65h)

Input	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Instance	0	Terminal S8	Terminal S7	Terminal S6	Terminal S5	Terminal S4	Terminal S3	Run Reverse	Run Forward
	1	External Base Block	Fault Log Clear	-	-	-	-	Fault Reset	External Fault
101	2	Speed Reference1 (Low Byte) [scaled by parameter o1-03]							
	3	Speed Reference1 (High Byte) [scaled by parameter o1-03]							
	4	Torque Reference2 (Low Byte) [0.1%]							
	5	Torque Reference2 (High Byte) [0.1%]							
	6	Torque Compensation2 (Low Byte) [0.1%]							
	7	Torque Compensation2 (High Byte) [0.1%]							

Note: 1: Becomes torque limit in torque mode

2: VG+ Series 3 FVC mode only

Run Forward: Forward RUN Command

Run Reverse: Reverse RUN Command

Terminal S3: Multi-function Digital Input 1 (H1-01)

Terminal S4: Multi-function Digital Input 2 (H1-02)

Terminal S5: Multi-function Digital Input 3 (H1-03)

Terminal S6: Multi-function Digital Input 4 (H1-04)

Terminal S7: Multi-function Digital Input 5 (H1-05)

Terminal S8: Multi-function Digital Input 6 (H1-06)

External Fault: External Fault (Setting of H1-01 ~ H1-06)

Fault Reset: Fault Reset Command

Terminal M1-M2: Multi-function Digital Output 1 (H2-01)

Terminal P1: Multi-function Digital Output 2 (H2-02)

Terminal P2: Multi-function Digital Output 3 (H2-03)

Speed Reference: RPM when o1-03 = (2 ~ 39)

Torque Reference: Percent of rated torque - (VG+ Series 3 Closed-loop flux vector mode (FVC) only)

Torque Compensation: Percent of rated torque - (VG+ Series 3 Closed-loop flux vector mode (FVC) only)

Magnetek Standard Speed/Torque Control Input Instance 115 (73h)

Input	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Instance	0	Terminal S8	Terminal S7	Terminal S6	Terminal S5	Terminal S4	Terminal S3	Run Reverse	Run Forward
115	1	External Base Block	Fault Log Clear	-	-	-	-	Fault Reset	External Fault
	2	Speed Reference1 (Low Byte) [scaled by parameter o1-03]							
	3	Speed Reference1 (High Byte) [scaled by parameter o1-03]							
	4	Torque Reference2 (Low Byte) [0.1%]							
	5	Torque Reference2 (High Byte) [0.1%]							
	6	Torque Compensation2 (Low Byte) [0.1%]							
	7	Torque Compensation2 (High Byte) [0.1%]							
	8	Not Used							
	9	Not Used							
	10 (0Ah)	Not Used							
	11 (0Bh)	Not Used							
	12 (0Ch)	Terminal A1 (Low Byte)							
	13 (0Dh)	Terminal A1 (High Byte)							
	14 (0Eh)	Terminal A2 (Low Byte)							
	15 (0Fh)	Terminal A2 (High Byte)							
	16 (10h)	Digital Output (Low Byte)							
	17 (11h)	Digital Output (High Byte)							
	18 (12h) – 39 (27h)	Not Used							

Note: 1: Becomes torque limit in torque mode

2: VG+ Series 3 FVC mode only

Run Forward: Forward RUN Command

Run Reverse: Reverse RUN Command

Terminal S3: Multi-function Digital Input 1 (H1-01)

Terminal S4: Multi-function Digital Input 2 (H1-02)

Terminal S5: Multi-function Digital Input 3 (H1-03)

Terminal S6: Multi-function Digital Input 4 (H1-04)

Terminal S7: Multi-function Digital Input 5 (H1-05)

Terminal S8: Multi-function Digital Input 6 (H1-06)

External Fault: External Fault (Setting of H1-01 ~ H1-06)

Fault Reset: Fault Reset Command

Terminal M1-M2: Multi-function Digital Output 1 (H2-01)

Terminal P1: Multi-function Digital Output 2 (H2-02)

Terminal P2: Multi-function Digital Output 3 (H2-03)

Speed Reference: RPM when o1-03 = (2 ~ 39)

Torque Reference: Percent of rated torque - (VG+ Series 3 Closed-loop flux vector mode (FVC) only)

Torque Compensation: Percent of rated torque - (VG+ Series 3 Closed-loop flux vector mode (FVC) only)

Terminal A1: Analog Input 1 (H3-04)

Terminal A2: Analog Input 2 (H3-08)

Digital Output: Digital Output as bit field



## Supported Output Instances

### Basic Speed Control Output Instance 70 (46h)

Output	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Instance	0	-	-	-	-	-	Running 1 (FWD)	-	Faulted
70	1	-							
	2	Speed Actual (Low Byte) [scaled by parameter o1-03]							
	3	Speed Actual (High Byte) [scaled by parameter o1-03]							

Faulted: Drive Fault

Running1 (Forward): Running in forward direction

Speed Actual: RPM if o1-03 = (2 ~ 39)

### Extended Speed Control Output Instance 71 (47h)

Output	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Instance	0	At Speed	Reference from Net	Control from Net	Ready	Running 2 (REV)	Running 1 (FWD)	Warning	Faulted
71	1	-							
	2	Speed Actual (Low Byte) [scaled by parameter o1-03]							
	3	Speed Actual (High Byte) [scaled by parameter o1-03]							

Faulted: Drive Fault

Warning: Drive Alarm

Running1 (FWD): Running in forward direction

Running1 (REV): Running in reverse direction

Ready: Drive Ready

Control from Net:

0 = Non-network control

1 = Control from network

Reference from Net:

0 = Reference not from network

1 = Reference from network

At Speed: Speed Agree

Speed Actual: RPM if o1-03 = (2 ~ 39)

### Basic Speed/Torque Control Output Instance 72 (48h)

Output	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Instance	0	At Speed	Reference from Net	Control from Net	Ready	Running 2 (REV)	Running 1 (FWD)	Warning	Faulted
72	1	-							
	2	Speed Actual (Low Byte) [scaled by parameter o1-03]							
	3	Speed Actual (High Byte) [scaled by parameter o1-03]							
	4	Torque Actual1 (Low Byte) [0.1%]							
	5	Torque Actual1 (High Byte) [0.1%]							

Note: 1 VG+ Series 3 FVC mode only

Running1 (Forward): Running in forward direction

Speed Actual: RPM if o1-03 = (2 ~ 39)

Torque Actual: Percent of rated torque

Extended Speed/Torque Control Output Instance 73 (49h)

Output	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Instance	0	-	-	-	-	-	Fault Reset	-	Run Forward
73	1	-							
	2	Speed Actual (Low Byte) [scaled by parameter o1-03]							
	3	Speed Actual (High Byte) [scaled by parameter o1-03]							
	4	Torque Actual1 (Low Byte) [0.1%]							
	5	Torque Actual1 (High Byte) [0.1%]							

Note: 1 VG+ Series 3 FVC mode only

Faulted: Drive Fault

Warning: Drive Alarm

Running1 (Forward): Running in forward direction

Running1 (Reverse): Running in reverse direction

Ready: Drive Ready

Control from Net:

0 = Non-network control

1 = Control from network

Reference from Net:

0 = Reference not from network

1 = Reference from network

At Speed: Speed Agree

Speed Actual: RPM if o1-03 = (2 ~ 39)

Torque Actual: Percent of rated torque

# Magnetek Output Instances

Magnetek Standard Speed/Torque Output Instance 151 (97h)

Output	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Instance	0	FAULT	ALARM	READY	SPEED AGREE	RESET	RUNNING REVERSE	ZSP	RUNNING FORWARD
	1	ZSV	MOTOR 2 SELECTED	MULTI-FUNCTION OUTPUT 3	MULTI-FUNCTION OUTPUT 2	MULTI-FUNCTION OUTPUT 1	LOCAL / REMOTE	UV	OPE
151	2	Output Frequency (Low Byte) [scaled by parameter o1-03]							
	3	Output Frequency (High Byte) [scaled by parameter o1-03]							
	4	Torque Reference1 (Low Byte) [0.1%]							
	5	Torque Reference1 (High Byte) [0.1%]							
	6	Output Current (Low Byte) [0.1A or 0.01A]							
	7	Output Current (High Byte) [0.1A or 0.01A]							

Note: 1 VG+ Series 3 FVC mode only

Running (Forward): Running in forward direction

ZSP: At Zero Speed

Running (Reverse): Running in reverse direction

Reset: Fault reset

Speed Agree: @ commanded speed

Ready: Drive Ready

Alarm: Drive Alarm

Fault: Drive Fault

OPE: Drive OPE Fault

UV: Drive Undervoltage Fault

Local/Remote:

0 = Drive is in Local Control

1 = Drive is in Remote Control

Terminal M0-M1: Multi-function Digital Output 1 (H2-01)

Terminal M2-M3,M2-M4: Multi-function Digital Output 2 (H2-02)

Terminal M5-M6: Multi-function Digital Output 3 (H2-03)

ZSV: Zero Servo (FVG+ Series 3 in Closed-loop flux vector mode (FVC) only)

Output Frequency: Output frequency of the drive

Torque Reference: Percent of rated torque

Output Current: Parameter o2-04 for kVA model - Scaling is 0.01A for kVA models 00h ~ 06h and 20h ~ 26h

Magnetek High Speed/Torque Status Output Instance 155 (9Bh)

Output	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
Instance	0	FAULT	ALARM	READY	SPEED AGREE	RESET	RUNNING REVERSE	ZSP	RUNNING FORWARD	
	1	ZSV	MOTOR 2 SELECTED	MULTI-FUNCTION OUTPUT 3	MULTI-FUNCTION OUTPUT 2	MULTI-FUNCTION OUTPUT 1	LOCAL / REMOTE	UV	OPE	
155	2	Output Speed (Low Byte) [scaled by parameter o1-03]					Monitor Parameter U1-05			
	3	Output Speed (High Byte) [scaled by parameter o1-03]								
	4	Torque Reference1 (Low Byte) [0.1%]					Monitor Parameter U1-09			
	5	Torque Reference1 (High Byte) [0.1%]								
	6	PG Count Value (PG-X2) (Low Byte)					Encoder pulse count from PG-X2 option when in flux vector mode. There is no associated drive parameter.			
	7	PG Count Value (PG-X2) (High Byte)								
	8	Frequency Command (Low Byte) [scaled by parameter o1-03]					Monitor Parameter U1-01			
	9	Frequency Command (High Byte) [scaled by parameter o1-03]								
	10 (0Ah)	Output Frequency (Low Byte) [scaled by parameter o1-03]					Monitor Parameter U1-02			
	11 (0Bh)	Output Frequency (High Byte) [scaled by parameter o1-03]								
	12 (0Ch)	Output Current (Low Byte) [0.1A or 0.01A]					Monitor Parameter U1-03			
	13 (0Dh)	Output Current (High Byte) [0.1A or 0.01A]								
	14 (0Eh)	Inverter Terminal A2 Output (Low Byte)					Monitor Parameter U1-16 Terminal A2			
	15 (0Fh)	Inverter Terminal A2 Output (High Byte)								
	16 (10h)	Main Circuit DC Voltage (Low Byte)					Monitor Parameter U1-07			
	17 (11h)	Main Circuit DC Voltage (High Byte)								
	18 (12h)	Error Alarm Signal 1 (Low Byte)					For details refer to the following section:			
	19 (13h)	Error Alarm Signal 1 (High Byte)								
	20 (14h)	Error Alarm Signal 2 (Low Byte)								
	21 (15h)	Error Alarm Signal 2 (High Byte)								
	22 (16h)	Error Alarm Signal 3 (Low Byte)								
	23 (17h)	Error Alarm Signal 3 (High Byte)								
	24 (18h)	Inverter Terminal A3 Input (Low Byte)					Monitor Parameter U1-17 Terminal A3			
	25 (19h)	Inverter Terminal A3 Input (High Byte)								
	26 (1Ah)	Inverter Terminals S1~S8 Input (Low Byte)					Monitor Parameter U1-10 VG+ Series 3 and G+ Series 3 Terminals S1-S8			
	27 (1Bh)	Inverter Terminals S1~S8 Input (High Byte)								
	28 (1Ch)	Inverter Terminal A1 Input (Low Byte)					Monitor Parameter U1-15 Terminal A1			
	29 (1Dh)	Inverter Terminal A1 Input (High Byte)								
30 (1Eh)	PG Counter (Ch2) (PG-W2) (Low Byte)					Encoder pulse count from PG-W2 option when in flux vector mode. Speed detection PG counter value.				
31 (1Fh)	PG Counter (Ch2) (PG-W2) (High Byte)									
32 (20h) - 39 (29h)	Not Used									

Magnetek High Speed/Torque Status Output Instance 155 (9Bh) - Word Details

Running Forward: Running in the forward direction ZSP: At Zero Speed Running Reverse: Running in the reverse direction Reset: Fault Reset Speed Agree: @ Commanded Speed Ready: Drive Ready Alarm: Drive Alarm Fault: Drive Fault OPE: Drive OPE Fault UV: Drive Undervoltage Fault Local/Remote: 0 = Drive is in Local Control 1 = Drive is in Remote Control Terminal M0-M1: Multi-function Digital Output 1 (H2-01) Terminal M2-M3,M2-M4: Multi-function Digital Output 2 (H2-02) Terminal M5-M6: Multi-function Digital Output 3 (H2-03) ZSV: Zero Servo (FVG+ Series 3 in Closed-loop flux vector mode (FVC) only)	Output Speed: RPM if o1-03 = (2 ~ 39) Torque Reference: Percent of Rated torque PG Count Value: PG-X2 pulse count Frequency Command: Frequency command Output Frequency: Output frequency of the drive Output Current: Parameter o2-04 for kVA model - Scaling is 0.01A for kVA models 00h ~ 06h and 20h ~ 26h Inverter Terminal A2 Input: Analog Input 2 Main Circuit DC Voltage: Monitor Parameter U1-07 Error Alarm Signal 1: Refer to: (Details for bytes 10 through 23, Error Alarm Signal 2: Alarm Signals 1, 2, and 3) Error Alarm Signal 3: Inverter Terminal A3 Input: Analog Input 3 Inverter Terminals S1~S8 Input: Digital Inputs as bit field (Terminals S1-S7) Inverter Terminal A1 Input: Analog Input 1 PG Counter (Ch2): Encoder pulse count from PG-W2 option.
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Magnetek High Speed/Torque Status Output Instance 155 (9Bh)  
 (Details for bytes 10 through 23, Error Alarm Signals 1, 2, and 3)

Bytes 18(Low) and 19(High) – Error Alarm Signal 1		Bytes 20(Low) and 21(High) – Error Alarm Signal 2		Bytes 22(Low) and 23(High) – Error Alarm Signal 3	
Bit	Fault	Bit	Fault	Bit	Fault
0h	PUF DC Bus Fuse Open	0h	EF3 External Fault - Terminal S3	0h	CE Modbus Communication Error
1h	UV1 DC Bus Undervoltage	1h	EF4 External Fault - Terminal S4	1h	BUS Bus Fault
2h	UV2 Control Circuit Undervoltage	2h	EF5 External Fault - Terminal S5	2h	Not Used
3h	UV3 Main Circuit Contactor Answerback Fault	3h	EF6 External Fault - Terminal S6	3h	Not Used
4h	Not Used	4h	EF7 External Fault - Terminal S7	4h	CF Out of Control Fault No Determination of Motor Speed
5h	GF Ground Fault	5h	EF8 External Fault - Terminal S8	5h	SVE Zero Servo Fault (VG+ Series in Closed-loop flux vector mode (FVC) only)
6h	OC Overcurrent Fault	6h	FAN Drive Cooling Fan Fault (models with internal cooling fans only)	6h	EF0 External Communications Fault
7h	OV Overvoltage Fault	7h	OS Overspeed Fault	7h	Not Used
8h	OH Heatsink Over temperature Fault	8h	DEV Speed Deviation Fault	8h	Not Used
9h	OH1 Drive Overheat Fault	9h	PGO PG Open, Encoder (Pulse Generator open circuit)	9h	Not Used
Ah	OL1 Motor Overload Fault	Ah	PF Input Phase Loss Fault	Ah	Not Used
Bh	OL2 Drive Overload Fault	Bh	LF Output Phase Loss	Bh	Not Used
Ch	OL3 Overtorque Fault 1 (L6-02)	Ch	Not Used	Ch	Not Used
Dh	OL4 Overtorque Fault 2 (L6-05)	Dh	OPR Operator Disconnected	Dh	Not Used
Eh	RR Dynamic Braking Transistor Failure	Eh	ERR EPROM R/W Error	Eh	Not Used
Fh	RH Dynamic Braking Resistor Overheat	Fh	Not Used	Fh	CPF Control Circuit Fault/Peripheral Fault

# CIP Supported Objects

## Class 01h – Identity Object

Service Code No. (hex)	Service Name
01h	Get Attribute All
05h	RESET
0Eh	Get Attribute Single

### Attributes

Instance ID (Hex)	Attribute (Hex)	Description	Get	Set	Size	Default Value
00h	01h	Object Software Revision	X		Word	1
	02h	Maximum Instances	X		Word	1
01h	01h	Vendor ID	X		Word	44 (YASKAWA)
	02h	Device Type	X		Word	2 (AC drives)
	03h	Product Code	X		Word	Product/Model Dependant Code- <i>For factory use</i> Refer to <b>Attribute 7-Product Name</b> , for drive family and model.
	04h	Revision	X		Word	Software Dependant
	05h	Status	X		Word	0
	06h	Serial Number	X		Word	Each product's serial number is unique Range is 0x8200000 ~0x82FFFFFF
	07h	Product Name	X		(14 Bytes)	Product Dependant*

- The product name is CIMR-[Drive Family][Drive Model].

## Class 06h – Connection Manager Object

Service Code No. (hex)	Service Name
0E	Get Attribute Single

### Attributes

Instance ID (Hex)	Attribute (Hex)	Description	Get	Set	Size	Default Value
00h	01h	Object Software Revision	X		Word	1

## Class 02h – Messenger Router Object

Service Code No. (hex)	Service Name
0Eh	Get Attribute Single

### Attributes

Instance ID(Hex)	Attribute (Hex)	Description	Get	Set	Size	Default Value
0h	01h	Object Software Revision	X		Word	1

## Class 01h – Assembly Object

Service Code No. (hex)	Service Name
0Eh	Get Attribute Single
10h	Set Attribute Single

### Attributes

Instance ID	Attribute (Hex)	Description	Get	Set	Size	Default Value
00h	01h	Object Software Revision	X		Word	1
14h	03h	Data	X	X	Array 4 Bytes	00 00 00 00
15h	03h	Data	X	X	Array 4 Bytes	00 00 00 00
16h	03h	Data	X	X	Array 6 Bytes	00 00 00 00 00
17h	03h	Data	X	-	Array 6 Bytes	00 00 00 00 00
46h	03h	Data	X	-	Array 4 Bytes	00 00 00 00
47h	03h	Data	X	-	Array 4 Bytes	00 00 00 00
48h	03h	Data	X	-	Array 6 Bytes	00 00 00 00 00
49h	03h	Data	X	-	Array 6 Bytes	00 00 00 00 00
65h	03h	Data	X	-	Array 8 Bytes	00 00 00 00 00 00
73h	03h	Data	X	X	Array 40 Bytes	00 00
97h	03h	Data	X	-	Array 8 Bytes	00 00 00 00 00 00
9Bh	03h	Data	X	-	Array 40 Bytes	00 00

## Class F5– TCP/IP

Service Code No. (hex)	Service Name
01h	Get Attribute All
0Eh	Get Attribute Single
10h	Set Attribute Single

### Attributes

Instance ID	Attribute (Hex)	Description	Get	Set	Size	Default Value
00h	01h	Object Software Revision	X		Word	1
	02h	Maximum Instances	X	-	Word	1
01h	01h	Status	X		Long	Bit 0: Not configured Bit 1: Configured Bit 2~31: Reserved
	02h	Configuration Capability	X		Long	Bit 0: BootP Client Bit 1: DHCP Client Bit 2: DNS Client Bit 3: DHCP-DNS update Bit 4: Configuration Settable Bit 5~31: Reserved
	03h	Configuration Control	X	X	Long	Bit 0~3: Start up Configuration Bit 4: DNS Enable Bit 5~31: Reserved
	04h	Physical Link	X	-	Struct	Path (Word): EPATH
	05h	Interface Configuration	X	X	Struct	IP Address (Long) Subnet Mask (Long) Gateway (Long) Name Server 1 (Long) Name Server 2 (Long) Domain Name (String)

## Class F6– EtherNet Link Object

Service Code No. (hex)	Service Name
01h	Get Attribute All
0Eh	Get Attribute Single
10h	Set Attribute Single
4Ch	Get and Clear

### Attributes

Instance ID (Hex)	Attribute (Hex)	Description	Get	Set	Size	Default Value
00h	01h	Object Software Revision	X	-	Word	1
	02h	Maximum Instances	X		Word	1
01h	01h	Interface Speed	X		Long	10
	02h	Interface Flags	X		Long	Bit 0: BootP Client Bit 1: DHCP Client Bit 2: DNS Client Bit 3: DHCP-DNS update Bit 4: Configuration Settable Bit 5~31: Reserved
	03h	Configuration Control	X	X	Long	Bit 0: Link Status Bit 1: 0: Half Duplex 1: Full Duplex Bit 2 ~ 31: Reserved
	04h	Physical Address (MAC ID)	X		Array 6 Word s	Unique per assembly
	05h	Interface Control	X	X	Struct	Control Bits: Word Forced Int Speed: Word



## Class 29h – Control Supervisor Object

Service Code No. (hex)	Service Name
0Eh	Get Attribute Single
10h	Set Attribute Single
05h	RESET

### Attributes

Instance ID	Attribute	Description	Get	Set	Size	Default Value
00h	01h	Object Software Revision	X	-	Word	1
01h	03h	Run 1 (Forward Run)	X	X	Byte	Forward Run Command
	04h	Run 2 (Reverse Run)	X	X	Byte	Reverse Run Command
	05h	Net Control	X	X	Byte	Net Control Command - Parameter b3-02
	06h	State	X	-	Byte	Inverter Status
	07h	Running 1 (Forward)	X	-	Byte	Forward Running
	08h	Running 2 (Reverse)	X	-	Byte	Reverse Running
	09h	Ready	X	-	Byte	Inverter Ready
	0Ah	Faulted	X	-	Byte	Inverter Fault
	0Bh	Warning	X	-	Byte	Inverter Alarm
	0Ch	Fault Reset	X	X		Fault Reset
	0Dh	Fault Code	X	-	Word	Current Fault
	0Eh	Warn Code	X	-	Word	Current Warning
	0Fh	Control from Net	X	-	Byte	Net Control Status - Parameter b3-02
	10h	CIP Fault Mode	X	-	Byte	Always "2"
11h	Force Fault	X	X	Byte	External Fault - EF0	
12h	Force Status	X	-	Byte	External Fault Status – EF0	

Note: See Fault Code Conversions Table for fault description.

## Class 2Ah – AC Dive Object

Service Code No. (hex)	Service Name
0Eh	Get Attribute Single
10h	Set Attribute Single

### Attributes

Instance ID (Hex)	Attribute	Description	Get	Set	Size	Default Value
1	00h	Object Software Revision	X	-	Word	1
	03h	At Reference	X	-	Byte	Speed Agree
	04h	Net Reference	X	X	Byte	Net Reference Command - Parameter b3-01
	06h	Drive Mode	X	X	Byte	Control Method - Parameter A1-02
	07h	Speed Actual	X	-	Word	Output frequency – Monitor Parameter U1-02
	08h	Speed Reference	X	X	Word	Speed Command – Monitor Parameter U1-01
	09h	Current Actual	X	-	Word	Output Current – Monitor Parameter U1-03
	0Ah	Current Limit	X	X	Word	Motor Phase Current Limit
	0Bh	Torque Actual	X	-	Word	Actual Torque – Monitor Parameter U1-09 Converted Units: $NM/2 \wedge (Torque\ Scale)$
	0Ch	Torque Reference	X	X	Word	Torque Limit Converted Units: $NM/2 \wedge (Torque\ Scale)$
	0Fh	Power Actual	X	-	Word	Actual Power - Monitor Parameter U1-08 Power Actual = $[U1-08] * 100$
	10h	Input Voltage	X	-	Word	Input Voltage - Parameter E1-01
	11h	Output Voltage	X	-	Word	Output Voltage - Monitor Parameter U1-06 Output Voltage = $[U1-06] / 10$
	17h	Speed Scale (-15 ~ +15)	X	X	Byte	Must be stored to EEPROM on the <i>EtherNet/IP Option Card CM092</i> .
	18h	Current Scale (-15 ~ +15)	X	X	Byte	Must be stored to EEPROM on the <i>EtherNet/IP Option Card CM092</i> .
	19h	Torque Scale (-15 ~ +15)	X	X	Byte	Must be stored to EEPROM on the <i>EtherNet/IP Option Card CM092</i> .
	1Ah	Power Scale (-15 ~ +15)	X	X	Byte	Must be stored to EEPROM on the <i>EtherNet/IP Option Card CM092</i> .
	1Bh	Voltage Scale (-15 ~ +15)	X	X	Byte	Must be stored to EEPROM on the <i>EtherNet/IP Option Card CM092</i> .
1Ch	Time Scale (-15 ~ +15)	X	X	Byte	Must be stored to EEPROM on the <i>EtherNet/IP Option Card CM092</i> .	
1Dh	Reference from the Net (Status)	X	-	Byte	NetRef Status – Parameter b3-01	

## Class 28h – Assembly Object

Service Code No. (hex)	Service Name
0Eh	Get Attribute Single
10h	Set Attribute Single

### Attributes

Instance ID (Hex)	Attribute (Hex)	Description	Get	Set	Size	Default Value
00h	01h	Object Software Revision	X		Word	1
01h	03h	Motor 1 Type	X		Byte	7 (0 ~ 10)

# Magnetek Supported Objects

## Class 64h – Assembly Object

Service Code No. (hex)	Service Name
0Eh	Get Attribute Single
10h	Set Attribute Single

### Attributes

Instance ID (Hex)	Attribute (Hex)	Description	Get	Set	Size	Default Value
00h	01h	Object Software Revision	X		Word	1
01h	01h	Operation Command	X	X	Word	0
	02h	Frequency Reference (0.01Hz)	X	X	Word	0
	03h	Torque Reference (0.1%)	X	X	Word	1000
	04h	Torque Compensation (0.1%)	X	X	Word	0
	05h	Reserved				
	06h	Analog Output 1 (Terminal 21)	X	X	Word	0
	07h	Analog Output 2 (Terminal 23)	X	X	Word	0
	08h	Digital Output	X	X	Word	0
	FEh	Accept Command (FFDDh)	X	X	Word	0
	FFh	Enter Command (FFDh)	X	X	Word	0

Magnetek Command Object – Class 64h, Instance 1, Attribute 1 – Operation Command	
Bit	Description
0	Forward RUN (1) /Stop (0) Bits 1 and 2 may not be set simultaneously
1	Reverse RUN (1) /Stop (0) Bits 1 and 2 may not be set simultaneously
2	Terminal S3 – Multi-function Digital Input 1 – Parameter H1-01 setting
3	Terminal S4 – Multi-function Digital Input 2 – Parameter H1-02 setting
4	Terminal S5 – Multi-function Digital Input 3 – Parameter H1-03 setting
5	Terminal S6 – Multi-function Digital Input 4 – Parameter H1-04 setting
6	Terminal S7 – Multi-function Digital Input 5 – Parameter H1-05 setting
7	Terminal S8 – Multi-function Digital Input 6 – Parameter H1-06 setting
8	External Fault
9	Fault Reset
10	Reserved
11	Reserved
12	Reserved
13	Reserved
14	Speed/Torque Control (VG+ Series3 Closed-loop flux vector mode (FVC) only)
15	External Base Block

Magnetek Command Object – Class 64h, Instance 1, Attribute 8 – Digital Output	
Bit	Description
0	Relay Output (Term M0 –M1)
1	Relay Output (Term M2,M3, M4)
2	Relay Output (Term M5, M6)
3	Reserved
4	Reserved
5	Reserved
6	Fault Relay Enable (MA~MB)
7	Fault Relay Control (MA ~ MB)

Refer to the appropriate drive user, programming and/or technical manual for details on digital outputs.

## Class 65h – Status Object

Service Code No. (hex)	Service Name
0Eh	Get Attribute Single
10h	Set Attribute Single

### Attributes

Instance ID (Hex)	Attribute (Hex)	Description	Get	Set	Size	Default Value
00h	01h	Object Software Revision	X		Word	1
01h	01h	Drive Status	X		Word	0
	02h	Speed Feedback (o1-03 scaled)	X		Word	0
	03h	Torque Reference (0.1%)	X		Word	0
	04h	Speed Detection PG Count	X		Word	0
	05h	Speed Reference (o1-03 scaled)	X		Word	0
	06h	Output Frequency (o1-03 scaled)	X		Word	0
	07h	Output Current*	X		Word	0
	08h	Digital Output	X		Word	0
	09h	Analog Input Channel 2	X		Word	0
	0Ah	DC bus Voltage (1V)	X		Word	0
	0Bh	Fault Code 1	X		Word	0
	0Ch	Fault Code 2	X		Word	0
	0Dh	Fault Code 3	X		Word	0
	0Eh	Analog Input Channel 3	X		Word	0
0Fh	Analog Input Channel 1	X		Word	0	
	10h	Channel 2 PG Counter	X		Word	0

\* Parameter o2-04 for kVA model - Scaling is 0.01A for kVA models 00h ~ 06h and 20h ~ 26h

Class 65h, Instance 1, Attribute 1 – Drive Status Word	
Bit	Status
0h	Drive Running
01h	Zero Speed
02h	Reverse Running
03h	Reset Command Received
04h	Speed Agree
05h	Inverter Ready
06h	Alarm Condition
07h	Fault Condition
08h	Not Used
09h	Momentary Power Loss Ride Thru
0Ah	Local / Remote
0Bh	Digital Output 1
0Ch	Digital Output 2
0Dh	Digital Output 3
0Eh	Motor Selection
0Fh	Zero Servo Complete On (VG+ Series3 Closed-loop flux vector mode (FVC) only)

## Class 65h – Drive Status Words

Attribute 10 - Fault Code Word 1		Attribute 11 - Fault Code Word 1		Attribute 12 - Fault Code Word 3	
Bit	Fault	Bit	Fault	Bit	Fault
0h	PUF DC Bus Fuse Open	0h	EF3 External Fault - Terminal S3	0h	CE Modbus Communication Error
1h	UV1 DC Bus Undervoltage	1h	EF4 External Fault - Terminal S4	1h	BUS Bus Fault
2h	UV2 Control Circuit Undervoltage	2h	EF5 External Fault - Terminal S5	2h	Not Used
3h	UV3 Main Circuit Contactor Answerback Fault	3h	EF6 External Fault - Terminal S6	3h	Not Used
4h	Not Used	4h	EF7 External Fault - Terminal S7	4h	CF Out of Control Fault No Determination of Motor Speed
5h	GF Ground Fault	5h	EF8 External Fault - Terminal S8	5h	SVE Zero Servo Fault (VG+ Series in Closed-loop flux vector mode (FVC) only)
6h	OC Overcurrent Fault	6h	FAN Drive Cooling Fan Fault (models with internal cooling fans only)	6h	EF0 External Communications Fault
7h	OV Overvoltage Fault	7h	OS Overspeed Fault	7h	Not Used
8h	OH Heatsink Over temperature Fault	8h	DEV Speed Deviation Fault	8h	Not Used
9h	OH1 Drive Overheat Fault	9h	PGO PG Open, Encoder (Pulse Generator open circuit)	9h	Not Used
Ah	OL1 Motor Overload Fault	Ah	PF Input Phase Loss Fault	Ah	Not Used
Bh	OL2 Drive Overload Fault	Bh	LF Output Phase Loss	Bh	Not Used
Ch	OL3 Overtorque Fault 1 (L6-02)	Ch	Not Used	Ch	Not Used
Dh	OL4 Overtorque Fault 2 (L6-05)	Dh	OPR Operator Disconnected	Dh	Not Used
Eh	RR Dynamic Braking Transistor Failure	Eh	ERR Eprom R/W Error	Eh	Not Used
Fh	RH Dynamic Braking Resistor Overheat	Fh	Not Used	Fh	CPF Control Circuit Fault/Peripheral Fault

# Parameter Tables

## Class/Instance/Attribute Tables

The following tables list all the drive monitors and parameters that are supported by the CM092 *EtherNet/IP Option Card CM092*. Each drive has its own set of Classes (CLASS), Instances (INST), and Attributes (ATTR) for each monitor and parameter.

## Drive Parameter Attributes (U1-xx / Monitor Only)

### Class 66h, Instance 1 – Monitor Parameters 1

Monitor parameters all share the same service (GET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	BIT NO.	LIMITS / DESCRIPTION
41h	U1-01	Frequency Reference	Frequency Reference of drive (0.1 Hz) (1)		
42h	U1-02	Output Frequency	Output Frequency of drive (0.1 Hz) (1)		
43h	U1-03	Output Current	10V/Drive rated current (2)		
44h	U1-04	Control Method	0	V/f Control	
			1	V/f with PG Feedback	
			2	Open Loop Vector	
			3	Flux Vector	
45h	U1-05	Motor Speed	Motor Speed (in 0.1 Hz)		
46h	U1-06	Output Voltage	Output Voltage (in 0.1 V)		
47h	U1-07	DC Bus Voltage	DC Bus Voltage (in 1 V)		
48h	U1-08	Output Power	Output Power (in 0.1 kW)		
49h	U1-09	Torque Reference	Torque Reference (in 0.1%)		
4Ah	U1-10	Input Terminal Status	0	Input Terminal 1 closed	
			1	Input Terminal 2 closed	
			2	Input Terminal 3 closed	
			3	Input Terminal 4 closed	
			4	Input Terminal 5 closed	
			5	Input Terminal 6 closed	
			6	Input Terminal 7 closed	
			7	Input Terminal 8 closed	
4Bh	U1-11	Output Terminal Status	0	Control Circuit terminals M0, M1: "Closed"	
			1	Control Circuit terminals M2 ~ M4: "Closed"	
			2	Control Circuit terminals M5, M6: "Closed"	
			3-6	Not Used	
			7	Control Circuit terminals MA ~ MC: "Closed"	

Notes:

(1) Scaling depends on the setting of o1-03.

(2) Display unit = 0.01A for models IMPULSE Series 3 2003 thru 2025 and 4001 thru 4011; display unit = 0.1A for models 2033 - 2300 and 4014 - 4605.

## Drive Parameters (U1-xx / Monitor Only) – Continued

### Class 66h, Instance 1 – Monitor Parameters 1

Monitor parameters all share the same service (GET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	BIT NO.	LIMITS / DESCRIPTION
4Ch	U1-12	Operation Status		0	Run
				1	Zero-Speed
				2	Reverse Run
				3	Reset Signal Input
				4	Speed Agree
				5	Drive Operation Ready
				6	Minor Fault
				7	Major Fault
4Dh	U1-13	Elapsed Time			Hours
4Eh	U1-14	Software No. (CPU ID No.)			Software version number
4Fh	U1-15	Control Circuit Term A1 Input Voltage			Input voltage signal at terminal A1 (+10V / +100.0% ~ -10V / -100.0%)
5h	U1-16	Control Circuit Term A2 Input Voltage			Input voltage or mAmp signal at terminal A2 (+10V / +100.0% ~ -10V / -100.0%) or (4mA / 0.0% ~ 20mA / 100.0%)
51h	U1-17	Control Circuit Term A3 Input Voltage			Input voltage signal at terminal A3 (+10V / +100.0% ~ -10V / -100.0%)
52h	U1-18	Motor Secondary Current (Iq)			Motor Secondary Current-Iq (0.1%)
53h	U1-19	Motor Exciting Current (Id)			Motor Rated Primary Current-Id (0.1%)
54h	U1-20	Output Frequency after Soft-start			Max. Output Frequency (0.1 Hz)
55h	U1-21	Automatic Speed Regulator (ASR) Input			ASR Input (0.01%)
56h	U1-22	Automatic Speed Regulator (ASR) Output			ASR Output (0.01%)
57h	U1-23	PG-Z2 CH2 Detection Speed			PG-Z2 CH2 Detection Speed (0.01%)
58h	U1-24	PID Feedback Amount			PID Feedback Amount (0.01%)
59h	U1-25	G5 IN4 Reference			Input value according to the setting of F3-01
5Ah	U1-26	Output Voltage Reference Vq			Output Voltage-Vq (0.1V)
5Bh	U1-27	Output Voltage Reference Vd			Output Voltage-Vd (0.1V)
5Ch	U1-28	Software No. CPU			processor version number
5Dh	U1-29	Load Weight			Weight Measurement
5Fh	U1-30	SS Delta Speed			Snap Shaft Speed Difference

## Drive Parameters (U1-xx / Monitor Only) – Continued

### Class 66h, Instance 1 – Monitor Parameters 1

Monitor parameters all share the same service (GET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	BIT NO.	LIMITS / DESCRIPTION
060h	U1-32	ACR Output q Axis	ASR Output q Axis (0.1%)		
061h	U1-33	ACR Output d Axis	ASR Output d Axis (0.1%)		
062h	U1-34	OPE Detection	Parameter setting error		
063h	U1-35	Zero Servo Motion Pulse	Pulse Count During Zero Servo		
064h	U1-36	PID Input	PID Input (0.00%)		
065h	U1-37	PID Output	PID Output (0.00%)		
066h	U1-38	PID Setpoint	PID Setpoint (0.00%)		
067h	U1-39	Memobus Communication Error			
068h	U1-40	FAN Accumulated Operation Time			
069h	U1-41	Cooling Fin Temperature			
06Ah	Not Used				
06Bh	Not Used				
06Ch	U1-44	ASR Output	ASR Out No Filter		
06Dh	Not Used				
06Eh	Not Used				
06Fh	Not Used				
070h	Not Used				
071h	U1-49	CPU Occupation Rate	Amount of CPU Resources Being Used		
072h	U1-50	Hook Height	Calculated Height of Hook (0.00%) (Height Measurement)		
073h	U1-51	Motor Revolution	Number of Motor Revolutions Since Upper Limit (UL2) (Height Measurement)		
074h	U1-52	Maintenance Timer	Number of Hours Remaining Before Maintenance is Required		
075h	U1-53	Inch 2 Count	Number of Pulses Encoder has Moved Since Inch 2 Command		



## Drive Parameters (U2-xx Fault Trace)

### Class 73h, Instance 1 – Fault Monitors

Monitor parameters all share the same service (GET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	BIT NO.	LIMITS / DESCRIPTION
01h	U2-01	Current Fault	Code of current fault (1)		
02h	U2-02	Last Fault	Code of second to current fault (1)		
03h	U2-03	Frequency Ref. at Fault	Frequency Reference at the time of the current fault (0.0 to 400.0 Hz)		
04h	U2-04	Output Frequency at Fault	Output Frequency at the time of current fault (0.0 to 400.0 Hz)		
05h	U2-05	Output Current at Fault	Output Current at the time of current fault (drive rating /8192)		
06h	U2-06	Motor Speed at Fault	Motor Speed at the time of current fault (in 0.1 Hz)		
07h	U2-07	Output Voltage at Fault	Output Voltage at the time of current fault (in 0.1 V)		
08h	U2-08	DC Bus Voltage at	Output Voltage at the time of current fault (in 1 V)		
09h	U2-09	Output kWatts at Fault	Output Power at the time of current fault (in 0.1 kW)		
0Ah	U2-10	Torque Reference at Fault	Torque Reference at the time of current fault (in 0.1%)		
0Bh	U2-11	Input Terminal Status at Fault	0	Input Terminal 1 closed at time of fault	
			1	Input Terminal 2 closed at time of fault	
			2	Input Terminal 3 closed at time of fault	
			3	Input Terminal 4 closed at time of fault	
			4	Input Terminal 5 closed at time of fault	
			5	Input Terminal 6 closed at time of fault	
			6	Input Terminal 7 closed at time of fault	
			7	Input Terminal 8 closed at time of fault	

## Drive Parameters (U2-xx Fault Trace)

### Class 73h, Instance 1 – Fault Monitors

Monitor parameters all share the same service (GET), data type (Word) and number of bytes (2)

0Ch	U2-12	Output Terminal Status at Fault	0	Control Circuit terminals 9 & 10: "Closed"
			1	Control Circuit terminals 25 & 27: "Closed"
			2	Control Circuit terminals 26 & 27: "Closed"
			3-6	not used
			7	Control Circuit terminals 18 & 20: "Closed"
0Dh	U2-13	Drive Status at Fault	0	Running at the time of fault
			1	Zero-Speed at the time of fault
			2	Reverse Running at the time of fault
			3	Reset Signal Input at the time of fault
			4	Speed Agree at the time of fault
			5	Drive Operation Ready at the time of fault
			6	Minor Fault
			7	Major Fault
0Eh	U2-14	Elapsed Time at Fault	Elapsed Time at the time of fault (in hrs.)	

Notes:

(1) List of Drive Error Codes can be found in chapter 8, Error Codes and Troubleshooting.

## Drive Parameters (U3-xx Extended Fault History)

### Class 74h, Instance 1 – Extended Fault History

Monitor parameters all share the same service (GET), data type (Word) and number of bytes (2)

ATTRIBUTE S (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	BIT NO.	LIMITS / DESCRIPTION
01h	U3-01	Last Fault	Code of the most recent fault (1)		
02h	U3-02	Fault Message 2	Code of the second to most recent fault (1)		
03h	U3-03	Fault Message 3	Code of the third to most recent fault (1)		
04h	U3-04	Fault Message 4	Code of the fourth to most recent fault (1)		
05h	U3-05	Elapsed Time 1	Elapsed Time at the most recent fault occurrence		
06h	U3-06	Elapsed Time 2	Elapsed Time at the second to most recent fault occurrence		
07h	U3-07	Elapsed Time 3	Elapsed Time at the third to most recent fault occurrence		
08h	U3-08	Elapsed Time 4	Elapsed Time at the fourth to most recent fault occurrence		
09h	U3-09	Fault Message 5	Code of the fifth to most recent fault (1)		
0Ah	U3-10	Fault Message 6	Code of the sixth to most recent fault (1)		
0Bh	U3-11	Fault Message 7	Code of the seventh to most recent fault (1)		
0Ch	U3-12	Fault Message 8	Code of the eighth to most recent fault (1)		
0Dh	U3-13	Fault Message 9	Code of the ninth to most recent fault (1)		
0Eh	U3-14	Fault Message 10	Code of the tenth to most recent fault (1)		
0Fh	U3-15	Elapsed Time 5	Elapsed Time at the fifth to most recent fault occurrence		
10h	U3-16	Elapsed Time 6	Elapsed Time at the sixth to most recent fault occurrence		
11h	U3-17	Elapsed Time 7	Elapsed Time at the seventh to most recent fault occurrence		
12h	U3-18	Elapsed Time 8	Elapsed Time at the eighth to most recent fault occurrence		
13h	U3-19	Elapsed Time 9	Elapsed Time at the ninth to most recent fault occurrence		
14h	U3-20	Elapsed Time 10	Elapsed Time at the tenth to most recent fault occurrence		
15h	U3-21	Accumulated Operations	Accumulated Operations		
16h	U3-22	U3-21 Rollover	Increments each time U3-21 reaches 65535. U3-21 is set to 0		
17h	U3-23	OL / LC Count	OverLoad / Load Check Count		

Notes:

(1) List of Drive Error Codes can be found in chapter 8, Error Codes and Troubleshooting.

# Drive Parameters (Read/Write)

## Class 67h, Instance 1 – A1-XX Initialize Parameters / A2-XX User Parameters

AX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTE S (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
01h	A1-00	Language Selection	0	English	0
			1	French	
			2	Spanish	
02h	A1-01	Parameter Access Level	0	Operation Only	2
			1	User Program	
			2	Advanced	
			3	Factory	
03h	A1-02	Control Method Selection	0	V/f Control	2
			1	V/f Control w/ PG (Factory Access Only)	
			2	Open Loop Vector	
			3	Flux Vector	
04h	A1-03	Motion Select	0	Traverse	1
			1	Standard Hoist	
			2	No-Load Brake Hoist	
			3	Bucket Hoist	
05h	A1-04	Speed Reference	0	2-Spd Multi-Step	6
			1	3-Spd Multi-Step	
			2	5-Spd Multi-Step	
			3	2-Step Infinitely Variable	
			4	3-Step Infinitely Variable	
			5	Uni-Polar Analog	
			6	Bi-Polar Analog	
			7	G5IN4 Option Card	
			8	Serial Opt Card	
06h	A1-05	Initialize Parameters	0000	No Initialize	0
			1110	User Initialize	
			2220	2-wire Initialize	
07h	A1-06	User Password 1	0000 ~ 9999		0
09h	A1-07	Factory Password 2	0000 ~ 9999		0
01h ~ 2Bh	A2-01 ~ A2-32	User Selected Parameter 1 Through User Selected Parameter 32	Setting B1-01 ~ 04-02		0

## Drive Parameter (Read/Write) – continued

### Class 68h, Instance 1 – Application Parameters

BX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTE S (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
01h	B1-01	Frequency Reference 1		0.00 to 400.00 Hz (1)	15.00
02h	B1-02	Frequency Reference 2		0.00 to 400.00 Hz (1)	30.00
03h	B1-03	Frequency Reference 3		0.00 to 400.00 Hz (1)	60.00
04h	B1-04	Frequency Reference 4		0.00 to 400.00 Hz (1)	45.00
05h	B1-05	Frequency Reference 5		0.00 to 400.00 Hz (1)	60.00
06h	B1-06	Frequency Reference 6		0.00 to 400.00 Hz (1)	0.00
07h	B1-07	Frequency Reference 7		0.00 to 400.00 Hz (1)	0.00
08h	B1-08	Frequency Reference 8		0.00 to 400.00 Hz (1)	0.00
09h	B1-09	Frequency Reference 9		0.00 to 400.00 Hz (1)	0.00
0Ah	B1-10	Frequency Reference 10		0.00 to 400.00 Hz (1)	0.00
0Bh	B1-11	Frequency Reference 11		0.00 to 400.00 Hz (1)	0.00
0Ch	B1-12	Frequency Reference 12		0.00 to 400.00 Hz (1)	0.00
0Dh	B1-13	Frequency Reference 13		0.00 to 400.00 Hz (1)	0.00
0Eh	B1-14	Frequency Reference 14		0.00 to 400.00 Hz (1)	0.00
0Fh	B1-15	Frequency Reference 15		0.00 to 400.00 Hz (1)	0.00
10h	B1-16	Frequency Reference 16		0.00 to 400.00 Hz (1)	0.00
11h	B1-17	Jog Frequency Reference		0.00 to 400.00 Hz (1)	6.00
12h	B1-18	Reference Priority <sup>1</sup>	0	Digital Reference Only	0
			1	Analog Reference Only	
			2	Higher Reference Select	
13h	B2-01	Frequency Reference Upper Limit		0.0 to 110.0%	100.0
14h	B2-02	Frequency Reference Lower Limit		0.0 to 110.0%	0.0
15h	B2-03	Master Speed Ref Lower Limit		0.0 to 110.0%	2
16h	B2-04	Alternate Upper Limit		0.0 to 110.0%	100
17h	B3-01	Reference Selection	0	Digital Operator	1
			1	Terminal	
			2	Serial Communication	
			3	Option PCB	
18h	B3-02	Operation Method Selection	0	Digital Operator	1
			1	Terminal	
			2	Serial Communication	
			3	Option PCB	

## Drive Parameter (Read/Write) – continued

### Class 68h, Instance 1 – Application Parameters

BX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
19h	B3-03	Stopping Method Selection	0	Ramp to Stop	Determined by A1-03 (Motion)
			1	Coast to Stop	
			2	DC Injection to Stop	
			3	Coast with Timer	
			4	Ramp with Timer	
			5	Hoist 2 Stop	
			6	No Load Brake	
1Bh	B3-05	Zero Speed Operation (level determined by E1- 09)	0	Run at Frequency Reference	0
			1	Stop	
			2	Run at Min. Frequency (E1- 09)	
			3	Run at Zero Speed	
1Ch	B3-06	Logic Input Scan Rate	0	2ms - 2 scans	1
			1	5ms - 2 scans	
1Dh	B3-07	Local / Remote RUN Selection	0	Cycle External Run	0
			1	Accept External Run	
1Dh	B3-08	Run Command Selection @ Program Mode	0	Disabled	0
			1	Enabled	
1Fh	B3-10	Allow Run @ Power Up	0	Disabled	0
			1	Enabled	
20h	B4-01	Frequency reference Hold Function	0	Disabled: Operates at Zero when restarting	0
			1	Enabled: Operates at previously held frequency	
21h	B4-02	Trim Control Level	0 to 100%		10
22h	B5-01	Acceleration Time 1	0.0 to 25.5 seconds		5.0
23h	B5-02	Deceleration Time 1	0.0 to 25.5 seconds		3.0
24h	B5-03	Acceleration Time 2	0.0 to 6000.0 seconds		2.0
25h	B5-04	Deceleration Time 2	0.0 to 6000.0 seconds		2.0
26h	B5-05	Acceleration Time N Chg	0.0 to 25.5 seconds		2.0
27h	B5-06	Deceleration Time N Chg	0.0 to 25.5 seconds		2.0
29h	B5-08	Fast Stop Time	0.0 to 25.5 seconds		0.5
2Ah	B5-09	Accel / Decel Time Setting Unit	0	0.01 seconds	1
			1	0.1 seconds	
2Bh	B5-10	Accel / Decel Time Switching Freq.	0.0 to 400.0 Hz	60.00	60
2Dh	B5-12	Acceleration Time 3	0.0 to 6000.0 seconds	3.0	3

## Drive Parameter (Read/Write) – continued

### Class 68h, Instance 1 – Application Parameters

BX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
2Eh	B5-13	Deceleration Time 3	0.0 to 6000.0 seconds	3.0	3
2Fh	B5-14	Acceleration Time 4	0.0 to 6000.0 seconds	3.0	3
30h	B5-15	Deceleration Time 4	0.0 to 6000.0 seconds	3.0	3
31h	B6-01	Speed Search @ Start	0	Disabled	2
			1	Enabled: Speed Estimation Type	
			2	Disabled	
			3	Enabled: Current Detection Type	
32h	B6-02	Speed Search Operation Current	0.0 to 200.0%	120	120
33h	B6-03	Speed Search Deceleration Time	0.1 to 10.0 seconds	2.0	2
35h	B6-05	Search Delay Time	0.0 to 20.0 seconds	0.2	0.2
3Ah	B6-10	Speed Detect Comp Gain	1.00 to 1.50		1.10
3Dh	B8-01	Jump Frequency 1	0.0 to 400.0 Hz		0.0
3Eh	B8-02	Jump Frequency 2	0.0 to 400.0 Hz		0.0
3Fh	B8-03	Jump Frequency 3	0.0 to 400.0 Hz		0.0
40h	B8-04	Jump Bandwidth	0.0 to 20.0 Hz		1.0

## Drive Parameter (Read/Write) – continued

### Class 68h, Instance 1 – Special Function Parameters

CX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
45h	C1-01	Quick Stop 0/1	0	Disabled	0
			1	Enabled	
46h	C1-02	Quick Stop Time	0.0 to 25.5 seconds		1.0
47h	C1-03	Plug Reverse 0/1	0	Disabled	0
			1	Enabled	
48h	C1-04	Plug Reverse Decel Time	0.0 to 25.5 seconds		2.0
49h	C1-05	Plug Reverse Accel Time	0.0 to 25.5 seconds		2.0
4Ah	C2-01	Micro Speed Gain 1	0.00 to 2.55		1.0
4Bh	C2-02	Micro Speed Gain 2	0.00 to 2.55		1.0
4Ch	C3-01	Upper Limit 1 Speed	0.00 to 400.00 Hz		6.00
4Dh	C3-02	Upper Limit 1 Decel Time	0.0 to 25.5 sec		1.0
4Eh	C3-03	Upper Limit 2 Stop Time	0.0 to 25.5 sec		0.5
4Fh	C3-04	Lower Limit 1 Speed	0.00 to 400.00 Hz		6.00
50h	C3-05	Lower Limit 1 Decel Time	0.0 to 25.5 sec		1.0
51h	C3-06	Lower Limit 2 Stop Time	0.0 to 25.5 sec		1.0
52h	C3-07	Limit Stop Method	0	Decel to Stop	2
			1	BB to Stop	
			2	Use B3-03 Method	
53h	C3-08	UL3 Stop Method	0	Decel/Alarm(No further raise allowed)	4
			1	Coast/Alarm (No further raise allowed)	
			2	Use B3-03/Alarm (No further raise allowed)	
			3	Decel/Fault	
			4	Coast/Fault	
			5	Use B3-03/Fault	
54h	C3-09	Phantom Stop Met	0	Decel To stop	1
			1	Coast to Stop	
			2	Use B3-03 Method	
55h	C4-01	Load Float Time 2	0 to 255 Sec		10
56h	C4-02	Load Float Gain	0 to 100		10/20
57h	C4-03	Load Float Count	0 to 16383		10



## Drive Parameter (Read/Write) – continued

### Class 68h, Instance 1 – Special Function Parameters

CX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
58h	C5-01	Load Check 0 / 1	0	Disabled	0
			1	Enabled	
59h	C5-02	Load Check Alarm Action	0	Alarm Only	1
			1	Decel to Stop	
			2	Coast to Stop	
			3	Fault Stop	
			4	Use B3-03 Method – Can lower only (Alarm)	
5Ah	C5-03	Minimum Torque Reference	0 to 100%		60
5Bh	C5-04	Look Speed 1	0 to 400 Hz		6
5Dh	C5-05	I Ref for LS 1 (V/F or OLV)	1 to 300 % IRC		160
5Eh	C5-07	Look Speed 2	0 to 400 Hz		20
5Fh	C5-08	I Ref for LS 2 (V/F or OLV)	1 to 300 % IRC		160
60h	C5-09	Look Speed 3	0 to 400 Hz		40
61h	C5-10	I Ref for LS 3 (V/F or OLV)	1 to 300 % IRC		160
62h	C5-11	I Ref for > LS 3	1 to 300 %		160
63h	C5-12	Load Check Setting Time	0.00 to 2.55 sec	1.00	
64h	C5-13	Load Check Test Time	0.00 to 2.55 sec	0.25	
65h	C5-14	Load Check Alarm Speed	0.0 to 30.0 Hz	6.0	
66h	C6-01	Ultra / Swift Lift 0 / 1	0	Disabled	0
			1	Enabled Automatic	
			2	Enabled by MFI	
67h	C6-02	Ultra / Swift Lift Forward Speed	0 to 400 Hz		60
68h	C6-03	Ultra / Swift Lift Reverse Speed	0 to 400 Hz		60
69h	C6-04	Ultra / Swift Lift Forward Torque	0 to 100 %		50
6Ah	C6-05	Ultra / Swift Lift Reverse Torque	0 to 100 %		30
6Bh	C6-06	Ultra / Swift Lift Enabling Speed	0.0 to 400.0 Hz		59.0
6Ch	C6-07	Ultra / Swift Lift Delay Time	0.0 to 25.5 sec		2.0

## Drive Parameter (Read/Write) – continued

### Class 68h, Instance 1 – Special Function Parameters

CX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
6Dh	C6-08	SFS Acc Gain		0.1 to 9.9	1.0
6Eh	C7-01	Forward Torque Limit		0 to 300%	150
6Fh	C7-02	Reverse Torque Limit		0 to 300%	150
70h	C7-03	Forward Regenerative Torque Limit		0 to 300%	180
71h	C7-04	Reverse Regenerative Torque Limit		0 to 300%	180
73h	C7-05	Torque Limit Gain MFI		0 to 2.55	1.25
74h	C8-01	Torque Compensation Time		0.00 to 2.55 Sec	1.00 / 2.00
75h	C8-02	IFB OK Time		0.00 to 2.55 Sec	1.00 / 2.00
76h	C8-03	Minimum Brake		0 to 300 %	10/100
77h	C8-04	Roll Back Timer / BE4 Timer		0.00 to 2.55 Sec	0.30
78h	C8-05	Roll Back Count		0 to 16536 Pulses	800
79h	C8-06	BE3 / Alternate Torque Timer		0.00 to 2.55 Sec	0.30
7Ah	C8-07	BE3 Detection Count		0 to 16536 Pulses	25
7Bh	C8-08	Alternate Reverse Torque Limit		0 to 300 %	25
7Ch	C8-09	Zero Speed Level		0.0 to 10.0 Hz	1
7Dh	C8-10	Load Float Time		0 to 255 Sec	10
7Eh	C8-11	Brake Set Delay Time		0.00 to 25.5 Sec	0.7
7Fh	C8-12	BE6 Detect Timer		0.00 to 25.5 Sec	5.0
80h	C8-13	BE6 Max Count		0 to 16536 Pulses	250

## Drive Parameter (Read/Write) – continued

### Class 69h, Instance 1 – Special Function Parameters

CX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
01h	C8-14	Brake Hold Speed	B2-02 + 0.1 to 25.5 %		5.0
02h	C8-15	Load Float Extension timer	0 to 255 Sec		10
03h	C8-16	Initial Brake Release Torque	0 to 300 %		100
04h	C8-17	BE6 Up Speed Limit	0.00 to 400.00 Hz		6.00
06h	C8-19	Brake Test Torque	0 to 300%		125
07h	C8-20	Brake Test Speed	0 to 10Hz		6
08h	C8-21	Height Measure	0 to 65535		250
09h	C9-01	G5IN4 Option Enable	0	Disabled	0
			1	Enabled	
0Ah	C9-02	G5IN4 Option Setup	0000 to FFFF		0
0Bh	C10-01	Load Weight 0 / 1	0	Disabled	0
			1	Enabled at C5-04	
			2	Enabled by MFI	
			3	Both Auto & MFI	
			4	Analog Input (Load Cell) Data "16"	
0Ch	C10-02	Torque Primary Delay	0 to 1000 ms		200
0Dh	C10-03	Load Weight Display	0	Hold Display	0
			1	Hold Display for 3 Seconds	
0Eh	C10-04	Load Weight Conversion	00000 to 39999		0
0Fh	C10-05	Full Load Torque	0.0 to 200.0 %		100.0
10h	C10-06	No Load Torque	0.0 to 200.0 %		20.0
11h	C10-07	Unit Displayed	0	Tons	0
			1	Pounds	
			2	Kilograms	
			3	Metric Tons	
			4	Percent load	
12h	C10-08	Weight Limit Output	0.0 to 200.0%		125.0%
13h	C11-01	Slack Cable 0 / 1	0	Disabled	0
			1	Enabled	

## Drive Parameter (Read/Write) – continued

### Class 69h, Instance 1 – Special Function Parameters

CX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
14h	C11-02	Action at Slack Cable	0	No Action	2
			1	No Action / C3-04	
			2	Decel / C3-04	
			3	Decel / No Operation	
			4	Decel to Stop / C3-04	
			5	Decel to Stop / No Operation	
15h	C11-03	Slack Cable Detect Torque	0 to 100 %		30
16h	C11-04	Slack Cable Detect Speed 1	0 to 150 Hz		2
17h	C11-05	Slack Cable Delay Time 1	0.00 to 2.55 Sec		0.50
18h	C11-06	Slack Cable Detect Speed 2	0 to 150 Hz		60
19h	C11-07	Slack Cable Delay Time 2	0.00 to 2.55 Sec		0.10
1Ah	C11-08	Snap Shaft Detection	0	Disabled	0
			1	Enabled	
1Bh	C11-09	Drive Train Discontinue (Action @ Snap Shaft)	0	Brake / Fault Out	0
			1	Alarm Only	
1Ch	C11-10	SS Delta Speed	0.0 to 400.0 Hz		1.0
1Dh	C11-11	SS Delay Time	0 to 2000 mSec		250
1Eh	C11-12	Gear Ratio Numerator	1 to 65535		10000
1Fh	C11-13	Gear Ratio Denominator	1 to 65535		10000
27h	C13-02	Inch Repeat Delay Time	0.00 to 2.55 Sec		1.00
28h	C13-03	Index Run Reference	0.01 to 60.00 Hz		0.10
29h	C13-04	Index Revolutions	0 to 65535 Revs		0
2Ah	C13-05	Index Count	0 to 65535 PLS		100
2Bh	C13-06	Index Repeat Delay	0.00 to 60.00 Sec		0.00
2Ch	C13-07	Index Complete	0 to 32767		10

## Drive Parameter (Read/Write) – continued

### Class 69h, Instance 1 – Tuning Parameters

DX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
3Ch	D1-01	DC Injection Start Frequency	0.0 to 10.0 Hz		0.5
3Dh	D1-02	DC Injection Current	0 - 100%		50
3Eh	D1-03	DC Injection Time at Start	0.00 - 10.00 seconds		0.00
3Fh	D1-04	DC Injection Time at Stop	0.00 - 10.00 seconds		0.05
44h	D2-01	Slip Compensation Gain	0.0 to 2.5		0.0 / 1.0
45h	D2-02	Slip Comp Primary Delay Time	0 to 10000 msec.		200 / 2000
46h	D2-03	Slip Compensation Limit	0 to 250%		200
47h	D2-04	Slip Compensation Selection during Regeneration	0	Disabled	0
			1	Enabled	
48h	D2-05	V/f Slip Comp Select	0	Disabled	0
			1	Enabled	
49h	D2-06	Output V Limit Select	0	Magnetek Flux is calculated by output frequency after compensation	0
			1	Magnetek Flux is calculated by output frequency before compensation	
4Ah	D3-01	Torque Compensation Gain	0.00 to 2.50		1.00
4Bh	D3-02	Torque Compensation Time	0.00 to 10000 ms		20 / 200
4Ch	D3-03	Torque Compensation for Forward	0.0 to 200.0%		0.0
4Dh	D3-04	Torque Compensation for Reverse	-200.0 to 0.0%		0.0
4Fh	D3-05	Torque Compensation Time Const @ Start	0 to 200 ms		10
50h	D4-01	ASR Proportional Gain 1	0.00 to 300.00		30.00 / 0.30
51h	D4-02	ASR Integral Time 1	0.000 to 10.000 seconds		0.500 / 0.20

## Drive Parameter (Read/Write) – continued

### Class 69h, Instance 1 – Tuning Parameters

DX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
52h	D4-03	ASR Proportional Gain 2		0.00 to 300.00	30.00
53h	D4-04	ASR Integral Time 2		0.000 to 10.000 seconds	0.100 / 0.050
54h	D4-05	ASR Limit		0.0 to 20.0%	5.0
55h	D4-06	ASR Primary Delay Time		0.000 TO 0.500 seconds	0.004
56h	D4-07	ASR Gain Switching Frequency		0.0 to 400.0 Hz	0.0
57h	D4-08	ASR Integral Limit		0 to 400 %	400
58h	D5-01	Torque Control	0	Speed Control (Controlled by D4-01 ~ 07)	0
			1	Torque Control	
59h	D5-02	Torque Ref Filter		0 to 1000 ms	0
5Ah	D5-03	Speed Limit Select	1	Limited by Frequency Reference (B3-01)	2
			2	Programming Setting (D5-04)	
5Bh	D5-04	Speed Limit Value		-120 to +120%	100
5Ch	D5-05	Speed Limit Bias		0 to 120%	0
5Dh	D5-06	Ref Hold Time		0 to 1000 ms	0
5Eh	D6-01	Droop Control Gain		0.0 to 100.0 ms	0.0
71h	D8-01	Dwell Frequency at Start		0.0 to 400.0 Hz	0.0
72h	D8-02	Dwell Time at Start		0.0 to 10.0 seconds	0.0
73h	D8-03	Dwell Frequency at Stop		0.0 to 400.0 Hz	0.0
74h	D8-04	Dwell Time at Stop		0.0 to 10.0 seconds	0.0
75h	D9-01	S-curve Characteristic at Accel Start		0.0 to 2.50 seconds	0.20
76h	D9-02	S-curve Characteristic at Accel End		0.0 to 2.50 seconds	0.20
77h	D9-03	S-curve Characteristic at Decel Start		0.0 to 2.50 seconds	0.20
78h	D9-04	S-curve Characteristic at Decel End		0.0 to 2.50 seconds	0.20

## Drive Parameter (Read/Write) – continued

### Class 6Ah, Instance 1 – Application Parameters

BX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTE S (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
1Bh	B3-04	Motor Rotation	0	Normal Rotation	0
			1	Exchange Phases	
6Ah	B6-14	Bi-directional Search	0	Disabled: Drive uses frequency reference det	1
			1	Enabled: Drive uses detected direction	

## Drive Parameter (Read/Write) – continued

### Class 6Ah, Instance 1 – Special Function Parameters

CX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

07h	C6-09	Normal OS Level	40.0 to 400.0 Hz	60.0
09h	C13-08	Index Zero Servo Gain	0 to 100	10
0Ah	C13-09	Index ASR P Gain	0.00 to 300.00	30
0Bh	C13-11	Index Gain	0.0 to 20.0	5

## Drive Parameter (Read/Write) – continued

### Class 6Ah, Instance 1 – Tuning Parameters

DX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

03h	D11-01	Hunting Prevention Select	0	Disabled	1
			1	Enabled	
04h	D11-02	Hunting Prevention Gain	0.00 to 2.50		1.00

## Drive Parameter (Read/Write) – continued

### Class 6Bh, Instance 1 – Motor Parameters

EX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTE S (in hex)	PARAMETER R	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
01h	E1-01	Input Voltage Setting		155 to 255V (230V unit) 310 to 510V (460V unit)	230 460
03h	E1-03	V/f Pattern Selection	0 to E	15 preset V/f patterns	(1)
			F	Custom Pattern (using E1-04 to E1-10)	
04h	E1-04	Maximum Output Frequency		40.0 to 300.0 Hz <b>CT</b> 40.0 to 400.0 Hz <b>VT</b>	60.0
5h	E1-05	Maximum Voltage		0.0 to 255.0V (230V unit) 0.0 to 510.0V (460V unit)	230.0 460.0
06h	E1-06	Base Frequency		0.0 to 400.0 Hz	60.0
07h	E1-07	Mid. Output Frequency A		0.0 to 400.0 Hz	(1)
08h	E1-08	Mid Output Voltage A		0.0 to 255.0V (230V unit) 0.0 to 510.0V (460V unit)	(1)
09h	E1-09	Min. Output Frequency		0.0 to 400.0 Hz	(1)
0Ah	E1-10	Min. Output Voltage		0.0 to 255.0V (230V unit) 0.0 to 510.0V (460V unit)	(1)
0Bh	E1-11	Mid Frequency B		0.0 to 400.0 Hz	0.0
0Ch	E1-12	Mid Voltage B		0.0 to 255.0 VAC	0.0
0Dh	E1-13	Base Voltage		0.0 to 255.0 VAC	0.0
0Eh		Reserved			
0Fh	E2-01	Motor Rated Current		0.32 to 6.40 A	(2)
10h	E2-02	Motor Rated Slip		0.00 to 20.00 Hz	(2)
11h	E2-03	Motor No-Load Current		0.00 to 1.89 Amps	(2)
12h	E2-04	Number of Motor Poles		2 to 48 poles	4
13h	E2-05	Motor Terminal Resistance		0.000 to 65.000 Ohms	(2)
14h	E2-06	Motor Leakage Inductance		0.0 to 40.0%	(2)
15h	E2-07	Motor Iron-core Saturation Coefficient 1		0.00 to 0.50	.50
16h	E2-08	Motor Iron-core Saturation Coefficient 2		E2-07 to 0.75	0.75
17h	E2-09	Motor Mechanical Loss		0.0 to 10.0%	0.0
18h	E2-10	Tcomp Iron Loss		0 ~ 65535 W	(1)
19h	E2-11	Rated Horsepower		0.00 ~ 650.00	(1)

Notes (for this page only):

- (1) Initial Value differs depending on the control method (A1-02).
- (2) Values differs depending on the drive capacity.



## Drive Parameter (Read/Write) – continued

### Class 6Ch, Instance 1 – Option Parameters

FX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
01h	F1-01	Encoder (PG) Constant	0 to 60000 ppr		1024
02h	F1-02	Operation Selection at PG Open Circuit	0	Ramp to stop	1
			1	Coast to stop	
			2	Fast-stop	
			3	Alarm only	
03h	F1-03	Operation Selection at Overspeed	0	Ramp to stop	1
			1	Coast to stop	
			2	Fast-stop	
			3	Alarm only	
04h	F1-04	Operation Selection at Speed Deviation	0	@Speed Agree- Ramp to stop(B5-02)	1
			1	@Speed Agree- Coast to stop	
			2	@Speed Agree_Fast- stop(B5-08)	
			3	@Speed Agree- Alarm only	
			4	@Run-Decel(B5-02)	
			5	@Run-Coast to Stop	
			6	@Run-Fast Stop(B5- 08)	
			7	@Run-Alarm Only	
05h	F1-05	PG Rotation	0	FWD:Counter- clockwise	0
			1	FWD:Clockwise	
06h	F1-06	PG Division Rate (PG Pulse Monitor)	1 to 132 (effective only with PG-B2 control board)		1
07h	F1-07	Integral Value during Accel/Decel Selection	0	Disabled	0
			1	Enabled	
08h	F1-08	Overspeed Detection Level	0 to 120%		115
09h	F1-09	Overspeed Detection Delay Time	0.0 to 2.0 seconds		0.0

## Drive Parameter (Read/Write) – continued

### Class 6Ch, Instance 1 – Option Parameters

FX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
0Ah	F1-10	Excessive Speed Deviation Detection Level	0 to 50%		10
0Bh	F1-11	Excessive Speed Deviation Detection Delay Time	0.0 to 10.0 seconds		0.3
0Ch	F1-12	Number of PG Gear Teeth 1	0 to 1000		0
0Dh	F1-13	Number of PG Gear Teeth 2	0 to 1000		0
0Eh	F1-14	PG-O Ch1 Software Detection Time	0 ~ 10.0 Sec		0.5
10h	F1-16	PG CH2 PPR	1 to 60000 PPR		1024
11h	F1-17	PG CH2 Rotation	0	0: FWD = C.C.W	0
			1	1: FWD = C.W.	
12h	F1-18	PG-O Ch2 Software Detection Time	0 ~ 10 Sec		0.5
13h	F1-19	PG-Z2 Output Select	0	Select by MFI 41 (Motor 2 Select)	2
			1	Channel 1	
			2	Channel 2	
			3	Select by MFI 64	
14h	F1-20	PGO-1-H	0	Disabled	1
			1	Enabled	
15h	F1-21	PGO-2-H	0	Disabled	0
			1	Enabled	
16h	F1-22	PG-Z2 Input Sel	0	Motor 1 = CH1 (Motor 2 = CH2)	0
			1	Motor 1 = CH2 (Motor 2 = CH1)	
17h	F2-01	AI-14 Bi-polar or Uni-polar Input Selection	0	3-channel Individual	0
			1	3-channel Addition	
18h	F3-01	DI-16 Digital Input Option	0	BCD 1%	0
			1	BCD 0.1%	
			2	BCD 0.01%	
			3	BCD 1 Hz	
			4	BCD 0.1 Hz	
			5	BCD 0.01 Hz	
			6	BCD (5DG) 0.01 Hz	
7	Binary				

## Drive Parameter (Read/Write) – continued

### Class 6Ch, Instance 1 – Option Parameters

FX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
19h	F4-01	AO-08/AO-12 Channel 1 Monitor Select.	1 to 50		2
1Ah	F4-02	AO-08/AO-12 Channel 1 Gain	0.00 to 1000.0%		100.0
1Bh	F4-03	AO-08/AO-12 Channel 2 Monitor Select.	1 to 50		3
1Ch	F4-04	AO-08/AO-12 Channel 2 Gain	0.00 to 1000.0%		100.0
1Dh	F4-05	CH1 AO Bias	-110.0 ~ 110.0%		0.0
1Eh	F4-06	CH2 AO Bias	-110.0 ~ 110.0%		0.0
1Fh	F4-07	Analog Output Signal Level CH1	0	0 ~ 10VDC	0
			1	-10 ~ +10VDC	
20h	F4-08	Analog Output Signal Level CH2	0	0 ~ 10VDC	0
			1	-10 ~ +10VDC	
21h	F5-01	DO-02 Channel 1 Output Selection	00 to FF	F	
22h	F5-02	DO-02 Channel 2 Output Selection	00 to FF	F	
23h	F5-03	DO-02 Channel 3 Output Selection	00 to FF	F	
24h	F5-04	DO-02 Channel 4 Output Selection	00 to FF	F	
25h	F5-05	DO-02 Channel 5 Output Selection	00 to FF	F	
26h	F5-06	DO-02 Channel 6 Output Selection	00 to FF	F	
27h	F5-07	DO-02 Channel 7 Output Selection	00 to FF	F	
28h	F5-08	DO-02 Channel 8 Output Selection	00 to FF	F	

## Drive Parameter (Read/Write) – continued

### Class 6Ch, Instance 1 – Option Parameters

FX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
29	F5-09	DO-08 Output Mode Selection	0	8-channel Individual	0
			1	Binary Output	
			2	8CH Sel-Outputs according to F5-01 ~ 08	
			3	Serial Com Output – Serial Communication	
2Ah	F6-01	Communication Error Detection Operation Selection	0	Deceleration To Stop (B5-02)	1
			1	Coast To Stop	
			2	Fast Stop (B5-08)	
			3	Use B3-03 Method	
			4	Alarm Only (Operation Continues)	
2Bh	F6-02	EFO Detection	0	Always Detected	0
			1	Detected Only During Run	
2Ch	F6-03	EFO Fault Action	0	Deceleration To Stop (B5-02)	1
			1	Coast To Stop	
			2	Fast Stop (B5-08)	
			3	Use B3-03 Method	
			4	Alarm Only (Operation Continues)	
2Eh	F6-05	Current Monitor Display Unit Selection	0	Amp Display	0
			1	100%/8192	
2Fh	F6-06	Torque Reference/Torque Limit	0	Disabled-Torque Ref/Limit From Communication is Disabled	0
			1	Enabled – Torque Reference/Limit From Communication is Enabled	

## Drive Parameter (Read/Write) – continued

### Class 6Dh, Instance 1 – Terminal Parameters

HX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTE S (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
01h	H1-01	Multi-function Input (terminal 3)	0 to 6Dh		0
02h	H1-02	Multi-function Input (terminal 4)	0 to 6D h		1
03h	H1-03	Multi-function Input (terminal 5)	0 to 6D h		F
04h	H1-04	Multi-function Input (terminal 6)	0 to 6D h		F
05h	H1-05	Multi-function Input (terminal 7)	0 to 6D h		F
06h	H1-06	Multi-function Input (terminal 8)	0 to 6D h		F
0Ch	H2-01	Multi-function Output (term. M1 - M2)	0 to FF h		0
0Dh	H2-02	Multi-function Output (term. M3 – M4)	0 to FF h		0
0Eh	H2-03	Multi-function Output (term. M5 – M6)	0 to FFh		7F
11h	H3-01	Terminal A1 Signal Voltage	0	0 to 10 V DC	0
			1	-10 to +10 V DC	
12h	H3-02	Terminal A1 Gain	0.0 to 1000.0%		100.0
13h	H3-03	Terminal A1 Signal Bias	-100.0 to +100.0%		0.0
14h	H3-04	Terminal A3 Signal Voltage	0	0 to 10 V DC	0
			1	-10 to +10 V DC	
15h	H3-05	Multi-function Analog Input Term A3 Select	0 to 1F		1F
16h	H3-06	Multi-function Analog Input Term A3 Gain	0.0 to 1000.0%		100.0
17h	H3-07	Multi-function Analog Input Term A3 Bias	-100.0 to +100.0%		0.0
18h	H3-08	Terminal A2 Signal Voltage	0	0 to 10 V DC	2
			1	-10 to +10 V DC	
			2	4 to 20 mA	
19h	H3-09	Multi-function Analog Input Term A2 Select	1 to 1F		0

## Drive Parameter (Read/Write) – continued

### Class 6Dh, Instance 1 – Terminal Parameters

HX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING		LIMITS / DESCRIPTION	INITIAL VALUE
1Ah	H3-10	Multi-function Analog Input Term A2 Gain	0.0 to 1000.0%			100.0
1Bh	H3-11	Multi-function Analog Input Term A2 Bias	-100.0 to +100.0%			0.0
1Dh	H3-12	Analog Input Filter Time Constant	0.00 to 2.00 seconds			0.00
1Eh	H4-01	Multi-function Analog Output 1 Selection (Terminal FM)	1 to 67H			2
1Fh	H4-02	Multi-function Analog Output 1 Gain	0.00 to 1000.0%			100.0
20h	H4-03	Multi-function Analog Output 1 Bias	-110.0 to +110.0%			0.0
21h	H4-04	Multi-function Analog Output 2 Selection (Terminal AM)	1 to 67H			3
22h	H4-05	Multi-function Analog Output 2 Gain	0.00 to 1000.0%			50.0
23h	H4-06	Multi-function Analog Output 2 Bias	-110.0 to +110.0%			0.0
24h	H4-07	Multi-function Analog Output 1 Signal Level Selection (Terminal FM)	0	0 to 10 V DC	0	
			1	-10 to +10 V DC		
			2	4 to 20 mA		
25h	H4-08	Multi-function Analog Output 2 Signal Level Selection (Terminal AM)	0	0 to 10 V DC	0	
			1	-10 to +10 V DC		
			2	4 to 20 mA		
26h	H5-01	Serial Communication Address	0 to 20H			1F
27h	H5-02	Serial Communication Baud Rate	0	1200 bps	3	
			1	2400 bps		
			2	4800 bps		
			3	9600 bps		
			4	19200 bps		
28h	H5-03	Serial Communication Parity Selection	0	No Parity	0	
			1	Even Parity		
			2	Odd Parity		
29h	H5-04	Stopping Method after Serial Communication Error	0	Ramp to Stop	1	
			1	Coast to Stop		
			2	Fast-Stop		
			3	Alarm Only		

## Drive Parameter (Read/Write) – continued

### Class 6Dh, Instance 1 – Terminal Parameters

HX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
29h	H5-04	Stopping Method after Serial Communication Error	0	Ramp to Stop	1
			1	Coast to Stop	
			2	Fast-Stop	
			3	Alarm Only	
2Ah	H5-05	Communication Error (CE) Detection Selection	0	Disabled	1
2Bh	H5-06	Send Waiting Time	5 ~ 65 mSec		5
2Ch	H5-07	RTS Control Select	0	Disabled (RTS is always on)	1
			1	Enabled (RTS is on only when sending)	
2Dh	H6-01	Pulse Input Function Select	0	Frequency Reference (B3-01)	0
			1	PID Feedback	
			2	PID Set Point	
2Eh	H6-02	Pulse Input Scaling	1000 ~ 32000 Hz		1440
2Fh	H6-03	Pulse Input Gain	0.0 ~ 1000.0%		100.0
30h	H6-04	Pulse Input Bias	-100.0 ~ 110.0%		0.0
31h	H6-05	Pulse Input Filter Time	0.00 ~ 2.00 Sec		0.10
32h	H6-06	Pulse Output Selection	1,2,5,20,24		2
33h	H6-07	Pulse Output Scaling	0 ~ 32000 Hz		1440

## Drive Parameter (Read/Write) – continued

### Class 6Eh, Instance 1 – Protection Parameters

LX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
01h	L1-01	Motor Overload Protection Selection	0	Disabled	3
			1	Std Fan Cooled	
			2	Std Blower Cooled	
			3	Vector Motor	
02h	L1-02	Motor Overload Protection Time Constant	0.1 to 20.0 Minutes		8.0
03h	L1-03	Motor Overheat Alarm Operation Selection	0	Alarm: Decel to Stop	3
			1	Alarm: Coast To Stop	
			2	Alarm: Fast-Stop (B5-08)	
			3	Alarm: Alarm Only OH3 Flashes on D.O.	
			4	Alarm: Stop by B3-03 Method	
04h	L1-04	Motor Overheat Operation Selection	0	Decel To Stop	2
			1	Coast To Stop	
			2	Fast Stop by B5-08 Deceleration Time	
05h	L1-05	Motor Temp Input Filter Time Constant	0.00 ~ 10.00 Sec		0.20
06h	L2-01	Momentary Power Loss Detection	0	Disabled	0
			1	Powerloss Ride Thru Time	
			2	While CPU Power Active	
07h	L2-02	Momentary Powerloss Ride Through Time	0.0 ~ 25.5 Sec		(1)
08h	L2-03	Minimum Base Block Time	0.1 ~ 5.0 Seconds		(1)
09h	L2-04	Pwrl V/F Ramp Time	0.0 ~ 5.0 Seconds		0.3
0Ah	L2-05	Undervoltage Detection Level	230VAC: 150 ~ 210 VDC 460VAC: 300 ~ 410 VDC		190 380
10h	L3-01	Stall Prevention Selection during Acceleration	0	Disabled	1
			1	General-purpose	
			2	Intelligent (2)	
11h	L3-02	Stall Prevention Level during Accel	0 to 200%		150 (1)
12h	L3-03	Stall Prevention Level during Accel (CHP)	0 to 100%		50



## Drive Parameter (Read/Write) – continued

### Class 6Eh, Instance 1 – Protection Parameters

LX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
13h	L3-04	Stall Prevention Selection during Deceleration	0	Disabled	0
			1	General-purpose	
			2	Intelligent (2)	
			3	Stall Prevent with Braking Resistor	
14h	L3-05	Stall Prevention Selection during Running	0	Disabled	1
			1	Decel time 1	
			2	Decel time 2	
15h	L3-06	Stall Prevention Level during Running	30 to 200%		150(1)
1Ah	L4-01	Speed Agree 1 Level	0.0 ~ 300.0 CT 0.0 ~ 400.0 VT		0.0
1Bh	L4-02	Speed Agree 1 Width	0.0 to 20.0 Hz		2.0
1Ch	L4-03	Speed Agree 2 Level (+/-)	-400.0 to +400.0 Hz		0.0
1Dh	L4-04	Speed Agree 2 Width	0.0 to 20.0 Hz		2.0
0Fh	L4-05	Frequency Reference Loss Detection	0	Stop	0
			1	Run at 80% of Frequency Reference	
22h	L6-01	Torque Detection Selection 1	0	Disabled	0
			1	Alarm: OT @ Spd Agree	
			2	Alarm: OT @ Run	
			3	Fault: OT @ Spd Agree	
			4	Fault: OT @ Run	
			5	Alarm: UT @ Spd Agree	
			6	Alarm: UT @ Run	
			7	Fault: UT @ Spd Agree	
8	Fault: UT @ Run				
23h	L6-02	Torque Detection Level 1	0 to 300%		150
24h	L6-03	Torque Detection Time 1	0.0 to 10.0 seconds		0.1

## Drive Parameter (Read/Write) – continued

### Class 6Eh, Instance 1 – Protection Parameters

LX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
25h	L6-04	Torque Detection Selection 2	0	Disabled	0
			1	Alarm: OT @ Spd Agree	
			2	Alarm: OT @ Run	
			3	Fault: OT @ Spd Agree	
			4	Fault: OT @ Run	
			5	Alarm: UT @ Spd Agree	
			6	Alarm: UT @ Run	
			7	Fault: UT @ Spd Agree	
8	Fault: UT @ Run				
26h	L6-05	Torque Detection Level 2	0 to 300%		150
27h	L6-06	Torque Detection Time 2	0.0 to 10.0 seconds		0.1
2Fh	L8-02	oH (Overheat) Protection Alarm LvL	50 to 110 °C		95 (1)
30h	L8-03	Operation Selection after oH (Overheat) Pre-alarm	0	Ramp to Stop	3
			1	Coast to Stop	
			2	Fast-stop	
			3	Alarm Only	
32h	L8-05	Input Phase Loss Protection	0	Disabled	1
			1	Enabled	
34h	L8-07	Output Phase Loss Protection	0	Disabled	2
			1	Enabled: 1 PH Loss Det	
			2	Enabled: 2/3 Loss Det	
36h	L8-09	Ground Fault Detection	0	Disabled	1
			1	Enabled	
37h	L8-10	Cooling Fan Operation Select	0	Fan On-Run Mode	0
			1	Fan Always On	
38h	L8-11	Coolinf Fan On/Off Delay Time	0 ~ 300 Seconds		60
39h	L8-12	Ambient Temperature	45 ~ 60 Deg C		45
3Ch	L8-15	OL2 Select @ Low Speed	0	Disabled: OL Disabled @ Low Speed	1 (1)
			1	Enabled	
3Fh	L8-18	Soft CLA Selection	0	Disabled	0
			1	Enabled	

## Drive Parameter (Read/Write) – continued

### Class 6Eh, Instance 1 – Protection Parameters

LX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
40h	L9-01	Auto Restart Operation Selection	0	Disabled	1
			1	Enabled	
41h	L9-02	Number of Auto Restart Attempts	0 to 10		3
42h	L9-03	Reset Time	0.0 to 180.0 Seconds		0.5
43h	L9-04	Reset Fault Select 1	0000 to FFFF		0001
44h	L9-05	Reset Fault Select 2	0000 to FFFF		E000
45h	L9-06	Fault Contact Select	0	Disabled: Fault Contact Not Operated	0
			1	Enabled: Fault Contact is Operated	

Notes (for this page only):

- (1) Setting depends on D10-01. When D10-01 = 0, L8-15 will change to 0. When D10-01 = 1 or 2, it will change to 1

## Drive Parameter (Read/Write) – continued

### Class 6Fh, Instance 1 – Operator Parameters

OX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
01h	O1-01	Monitor Selection		4 to 52	6
02h	O1-02	Monitor Selection after Power-up	1	Frequency Reference	1
			2	Output Frequency	
			3	Output Current	
			4	Monitor item Set by O1- 01	
03h	O1-03	Digital Operator Display Scaling		0 ~ 39999	0
04h	O1-04	Digital Operator Display Units	0	Hz	0
			1	RPM	
05h	O1-05	LCD Brightness Adjust		0 ~ 5	3
06h	O2-01	Mode Service Key Select	0	Mode/Service	0
			1	Local/Remote	
07h	O2-02	Stop Key Function Selection	0	Coast To Stop	0
			1	Decel To Stop	
			2	Use B3-03 Method	
08h	O2-03	User Parameter Initialization Selection	0	No Change	0
			1	Set Defaults	
			2	Clear All	
09h	O2-04	KVA Selection		0 ~ FF	0
0Ah	O2-05	Operator M.O.P.	0	Disabled: Enter Key Required	0
			1	Enabled: Enter Key is not Required	
0Bh	O2-06	Digital Operator Detection	0	Disabled	1
			1	Enabled	
0Ch	O2-07	Elapsed Timer Setting		0 ~ 65535 Hour	0
0Dh	O2-08	Elapsed Timer Selection	0	Power On Time	1
			1	Running Time	
0Fh	O2-10	Fan Operating Time Setting		0 ~ 65535 Hour	0
16h	O3-01	Clear Fault history	0	Not Clear U2/U3	0
			1	Clear U2/U3	
17h	O3-02	Clear Count History	0	Not Clear	0
			1	Accumulated Operation Clear (U3-21 ~ 22)	
			2	Overload Load Check Clear (U3-23)	
			3	Both 1 and 2 Cleared	

## Drive Parameter (Read/Write) – continued

### Class 6Fh, Instance 1 – Operator Parameters

OX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

18h	O4-01	Copy Function Select	0	Copy Select	0
			1	Read: Inverter → Operator	
			2	Operator → Inverter	
			3	OP → Inverter Verify	
19h	O4-02	Read Selection	0	Disabled	1
			1	Enabled	

## Drive Parameter (Read/Write) – continued

### Class 70h, Instance 1 – Factory Adjustment Parameters

CX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

05h	N2-01	AFR Gain	0.00 ~ 10.00	1.00
06h	N2-02	AFR Time	0 ~ 2000 mSeconds	50
07h	N2-03	AFR Time 2	0 ~ 2000 mSeconds	750
08h	N2-04	AFR Limit	0.0 ~ 60.0 Hz	5.0

## Drive Parameter (Read/Write) – continued

### Class 71h, Instance 1 – Tuning Parameters

CX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

01h	C3-10	Load Share Limit	0	Disabled	0
			1	Enabled	
02h	C8-22	Brake Slip Detect	0	Disabled	0
			1	Enabled	
03h	C8-23	Brake Slip Detect Speed	0.0 to 10.0 Hz		1.0

## Drive Parameter (Read/Write) – continued

### Class 72h, Instance 1 – Auto-tune Parameters

CX-XX parameters all share the same service (GET/SET), data type (Word) and number of bytes (2)

ATTRIBUTES (in hex)	PARAMETER	PARAMETER FUNCTION	PARAMETER SETTING	LIMITS / DESCRIPTION	INITIAL VALUE
11h	T1-00	Motor Selection 1/2	0	1 <sup>st</sup> Motor	0
			1	2 <sup>nd</sup> Motor	
12h	T1-01	Tuning Mode Selection	0	Rotational Tune	0
			1	Stationary Auto Tune	
			2	Terminal Resistance	
			3	On-Dly Comp Tune	
13h	T1-02	Motor Output Power	0.4 ~ 650.0 HP		0.40
14h	T1-03	Motor Rated Voltage	0 ~ 255.5		230.0 (1)
15h	T1-04	Motor Rated Current	(2)		(3)
16h	T1-05	Base frequency	0 ~ 400.00Hz		60.00
17h	T1-06	Number of Motor Poles	2 ~ 48 Pole		4
18h	T1-07	Rated Motor Speed	0 ~ 24000 RPM		1750
19h	T1-08	PG Pulses/Rev	0 ~ 60000 RPM		1024

Notes (for this page only):

- (1) For 400V class, the value is twice that for the 200V class
- (2) Setting Range is 10 ~ 200% of inverter rated output current
- (3) Initial value differs depending upon inverter capacity

# Memory Registers

The drive has two types of memory, Volatile and Non-Volatile. Data held in Volatile memory will be lost when power is removed from the drive. Data held in Non-Volatile memory will be retained when power is removed from the drive. The drive also has active and inactive areas of memory. The different registers are saved and activated differently, as described below.

## Command Registers:

The command registers are stored in Volatile Memory. When writing to a command register the new data becomes inactive immediately. In the case of power loss, all data stored in these registers will not be retained.

## Monitor Registers:

The monitor registers are stored in Volatile Memory. These registers cannot be written to (read only registers). Any data read from the monitor registers will not be retained during a power loss situation.

## Parameter Registers:

The parameter registers are stored in Non-Volatile memory. When writing new data to parameter registers, the new data is not active.

Sending the ACCEPT command will cause the new data to become active. The ACCEPT command is accomplished by Setting a value of 0 into Accept Command Register at Class 64h, Instance 1, Attribute FEh. The accept command allows the drive to run with these changed parameters. It also allows parameters to again be changed from the drive keypad. The data is not saved to Non-Volatile Memory.

Sending the ENTER command will cause the new data to become active and to be saved in Non-Volatile Memory. The ENTER command is accomplished by Setting a value of 0 into Enter Command CIP Register at Class 64h, Instance 1, Attribute FFh. If power loss occurs after the new data has been saved (by using the ENTER command) into Non-Volatile Memory, the data will be retained.

## Special Registers:

The special registers are in Volatile Memory. These registers will not be retained during a power loss situation. When writing to a special register, the new data becomes active immediately.



### **CAUTION**

#### **USE THE ENTER AND ACCEPT COMMAND ONLY WHEN NECESSARY!**

The Life of the Non-Volatile EEPROM on the drive will support a finite number of operations. This means that the ENTER command can only be used a maximum of 100,000 times to store data in the EEPROM. After the specified number of operations, the EEPROM may fault (ERR), requiring the drive control board to be replaced.

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