

# F7 Drive Parameter Access Technical Manual

*This Manual  
also available on  
[www.drives.com](http://www.drives.com)*





# Warnings and Cautions

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*This Section provides warnings and cautions pertinent to this product, that if not heeded, may result in personal injury, fatality, or equipment damage. Yaskawa is not responsible for consequences of ignoring these instructions.*

## **WARNING**

YASKAWA manufactures component parts that can be used in a wide variety of industrial applications. The selection and application of YASKAWA products remains the responsibility of the equipment designer or end user. YASKAWA accepts no responsibility for the way its products are incorporated into the final system design. Under no circumstances should any YASKAWA product be incorporated into any product or design as the exclusive or sole safety control. Without exception, all controls should be designed to detect faults dynamically and to fail safely under all circumstances. All products designed to incorporate a component part manufactured by YASKAWA must be supplied to the end user with appropriate warnings and instructions as to that part's safe use and operation. Any warnings provided by YASKAWA must be promptly provided to the end user. YASKAWA offers an express warranty only as to the quality of its products in conforming to standards and specifications published in the YASKAWA manual. NO OTHER WARRANTY, EXPRESS OR IMPLIED, IS OFFERED. YASKAWA assumes no liability for any personal injury, property damage, losses, or claims arising from misapplication of its products.

## **WARNING**

- Read and understand this manual before installing, operating, or servicing this F7 drive. All warnings, cautions, and instructions must be followed. All activity must be performed by qualified personnel. The F7 drive must be installed according to this manual and local codes.
- Do not connect or disconnect wiring while the power is on. Do not remove covers or touch circuit boards while the power is on. Do not remove or insert the digital operator while power is on.
- Before servicing, disconnect all power to the equipment. The internal capacitor remains charged even after the power supply is turned off. Status indicator LEDs and Digital Operator display will be extinguished when the DC bus voltage is below 50 VDC. To prevent electric shock, wait at least 5 minutes after all indicators are OFF and measure DC bus voltage and verify that it is at a safe level.
- Do not perform a withstand voltage test on any part of the unit. This equipment uses sensitive devices and may be damaged by high voltage.
- The F7 drive is not suitable for circuits capable of delivering more than the specified RMS symmetrical amperes. Install adequate branch short circuit protection per applicable codes. Refer to the specification. Failure to do so may result in equipment damage and/or personal injury.
- Do not connect unapproved LC or RC interference suppression filters, capacitors, or over voltage protection devices to the output of the F7 drive. Capacitors may generate peak currents that exceed F7 drive specifications.
- To avoid unnecessary fault displays, caused by contactors or output switches placed between F7 drive and motor, auxiliary contacts must be properly integrated into the control logic circuit.
- YASKAWA is not responsible for any modification of the product made by the user, doing so will void the warranty. This product must not be modified.
- Verify that the rated voltage of the F7 drive matches the voltage of the incoming power supply before applying power.
- To meet CE directives, proper line filters and proper installation are required.
- Some drawings in this manual may be shown with protective covers or shields removed, to describe details. These must be replaced before operation.
- Observe Electrostatic Discharge Procedures when handling the F7 drive and F7 drive components to prevent ESD damage.
- The attached equipment may start unexpectedly upon application of power to the F7 drive. Clear all personnel from the F7 drive, motor and machine area prior to applying power. Secure covers, couplings, shaft keys, machine beds and all safety equipment before energizing the F7 drive.
- Do not attempt to disassemble this unit. There are no user serviceable parts. Disassembling this unit will void any and all warranties.

# Introduction

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This manual is intended as an overview of parameter access for the Yaskawa model F7 drive and describes how to connect the F7 drive to an RS232, RS422 or RS485. Refer to the ***F7 Drive Programming Manual*** for detailed parameter information.

This document pertains to the F7 drive. In this document, the word “inverter”, “ac drive” and “drive” may be used interchangeably.

For details on installation and operation of the F7 drive, refer to the ***F7 Drive User Manual***. All manuals and support files are available on the CD that came with the F7 drive and are also available for download at [www.drives.com](http://www.drives.com).

***F7 Drive User Manual*** document reference **TM.F7.01**

***F7 Drive Programming Manual*** document reference **TM.F7.02**

***F7 Drive Parameter Access Technical Manual*** document reference **TM.F7.11**

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# Chapter 1 Connections

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*This chapter describes how to connect the F7 drive to an RS232, RS422 or RS485 network*

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# Connection Check Sheet

The following is a quick reference guide to connect and configure the F7 drive for serial communications. Make a copy of this page and check-off each item as it is completed. For detailed information please refer to the detailed sections that follow.

- ☐ **1:** Unpack the F7 drive and verify that all components are present and undamaged.
- ☐ **2:** Connect power to the F7 drive and verify that the F7 drive functions correctly. This includes running the F7 drive from the operator keypad. Refer to the *F7 User Manual* for information on connecting and operating the F7 drive.
- ☐ **3:** Remove power from the F7 drive and wait for the charge lamp to be completely extinguished. Wait at least five additional minutes for the F7 drive to be completely discharged. Measure the DC bus voltage and verify that it is at a safe level.
- ☐ **4:** Connect the F7 drive to an RS232 network.
  - ☐ **4.1:** Remove the F7 drive's operator keypad.
  - ☐ **4.2:** Connect the RJ45 port on the front of the F7 drive to the controller serial port. Use a DB9 to RJ45 adapter with a standard Ethernet CAT-5 patch cable or use Yaskawa cables, part numbers UWR00468-1 or UWR00468-2. **Do NOT connect this cable to an Ethernet port** on the controller, as damage to the controller and/or F7 drive may result. Refer to *Figure 1.2 – RS232 Connections*.
  - ☐ **4.3:** Verify that the controller communications parameters match the F7 drive's communications parameters. Refer to *Table 1.1 – RS232 (RJ45 port) Communications Parameters* for a list of default F7 drive communications parameters.
  - ☐ **4.4:** Reapply power to the F7 drive.
- ☐ **5:** Connect the F7 drive to an RS422/485 network.
  - ☐ **5.1:** Remove the F7 drive's terminal cover.
  - ☐ **5.2:** Connect the controller to the S+/S- and R+/R- terminals on the F7 drive's terminal block as shown in *Figure 1.3 – RS422/485 Connections*.
  - ☐ **5.3:** If this device is either the first or last device on the network, set the network termination, S1, to the ON position.
  - ☐ **5.4:** Reapply power to the F7 drive.
  - ☐ **5.5:** Set the F7 drive communication parameters to match those of the controller. Refer to *Table 1.2 – Baud Rate*, *Table 1.3 – Parity* and *Table 1.4 – RTS*.
  - ☐ **5.6:** Set the node address of the F7 drive.
- ☐ **6:** Verify that the F7 drive and controller are communicating and that the exchanged data is valid.

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# Verify Operation

Connect power to the F7 drive and verify that the F7 drive functions properly. This includes running the F7 drive from the operator keypad. Refer to the *F7 Drive User Manual*, for information on connecting and operating the F7 drive.

Remove power from the F7 drive and wait for the charge lamp to be completely extinguished. Wait at least five additional minutes for the F7 drive to be completely discharged. Measure the DC bus voltage and verify that it is at a safe level.

Remove the operator keypad and terminal cover.

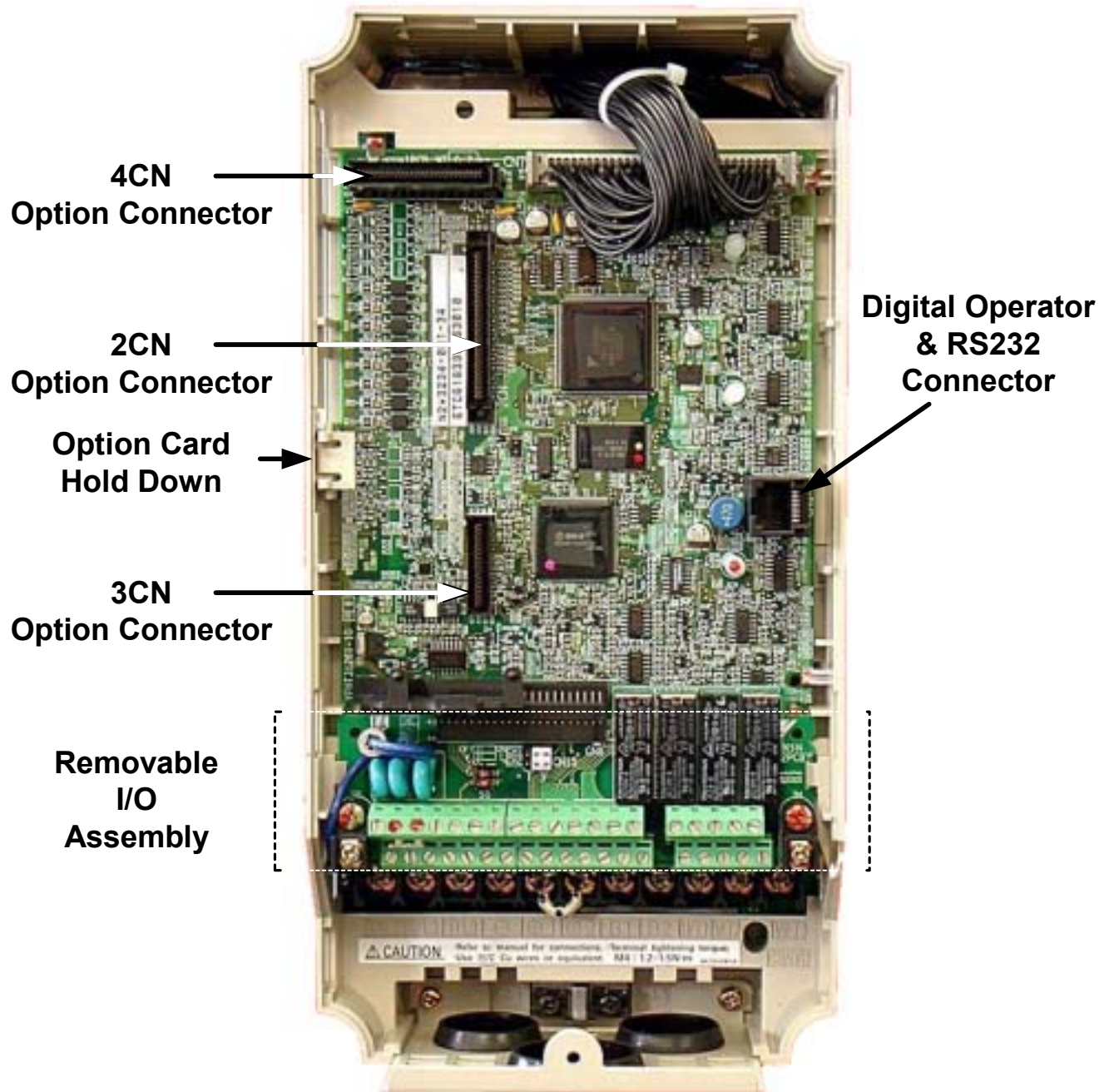


Figure 1.1 – Connector Diagram

# Serial Network Connections

The following describes how to connect the F7 drive to an RS232, RS422 and RS485 serial network. For detailed information please refer to the appropriate sections of this manual or the *F7 Drive User Manual*.

## ◆ RS232 Networks

The RS232 network is a single ended network with limited data transmission rates and cable lengths. The F7 drive RS232 data transmission is fixed at 9600bps, no parity, 8 data bits and 1 stop bit. The maximum cable length is 50 ft (16m). It is recommended that Yaskawa cables, UWR00468-1 or UWR00468-2 be used. The UWR00468-1 cable can be used for both standard RS232 communications and for downloading control software.

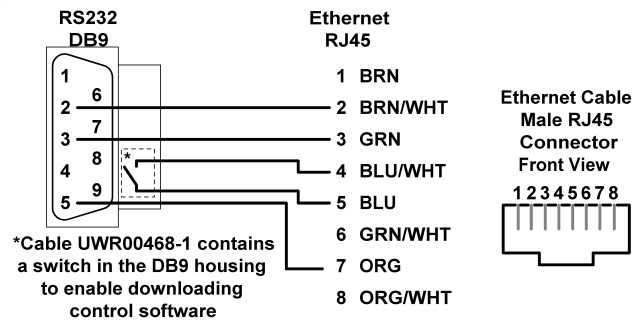


Figure 1.2 — RS232 Network Connection

## ◆ RS422/RS485 4-Wire Networks

RS422/RS485 4-wire networks allow for longer cable lengths, maximum 4000 ft (1200m), and are more immune to noise than RS232 networks. While RS422/RS485 4-wire may be used as multi-drop networks, however single-ended networking is recommended. All RS422/RS485 4-wire communication is half-duplex. Since each device is separately connected, set the Termination Resistor S1 to ON (slide the switch to the right) on each device.

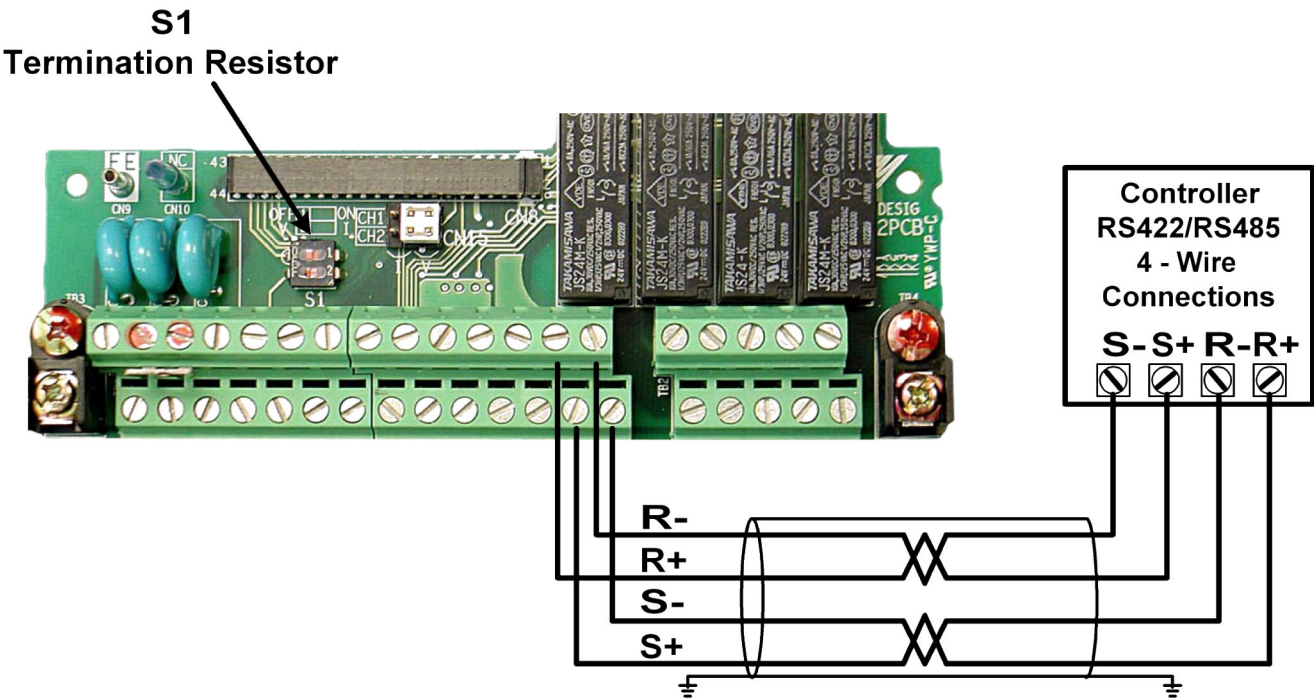


Figure 1.3 — RS422/RS485 4-Wire Network Connection

## ► RS485 2-Wire Networks

RS485 2-wire networks can be either single or multi-drop networks, with each slave device on the network assigned a unique node address. A maximum of 31 devices may reside on any network segment before a repeater is required. Terminating resistors must be installed on the first and last devices on each network segment. The maximum segment length is 4000ft (1200m). All RS485 communications are half-duplex.

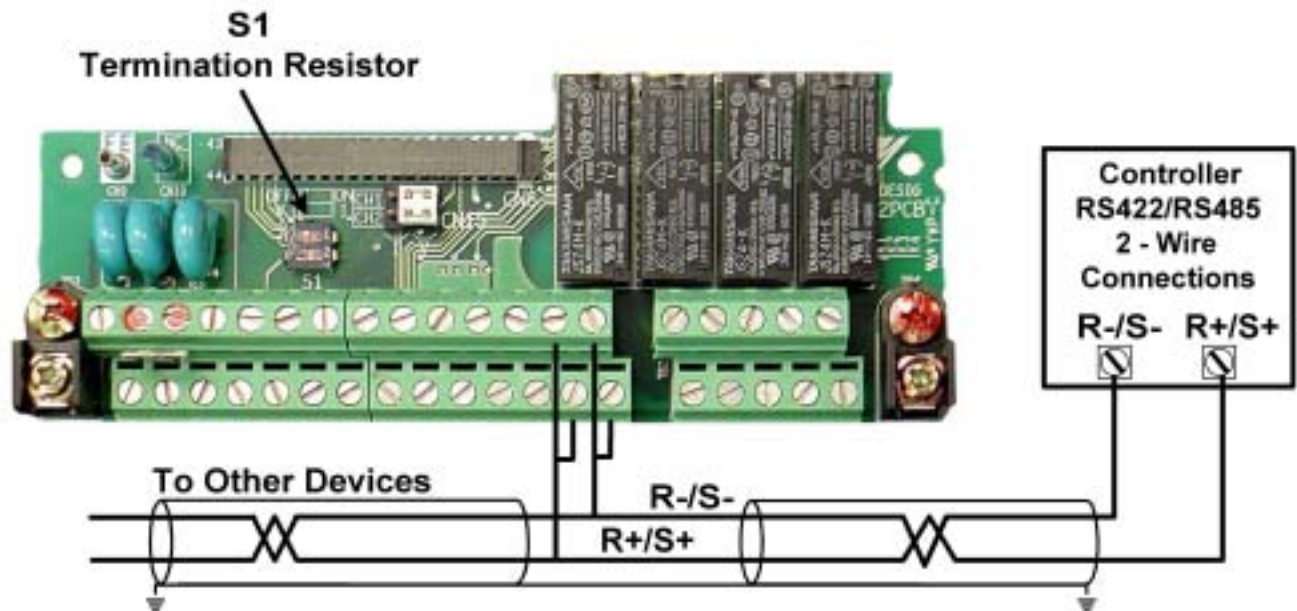


Figure 1.4 – RS485 2-Wire Network Connection

# Communications Parameters

These communications parameters affect serial communications through RS232, RS422 and RS485. The RS232 communications parameters cannot be changed. Also, the node address is ignored when communicating via RS232.

All serial communications parameters can only be changed via the operator keypad.

## ► RS232 Communications

The RS232 communications' parameters are fixed at the values shown below. Although the node address is ignored, a node address of 1 is typically used by the master when communicating to the F7 drive in this method.

Table 1.1 – RS232 (RJ45 port) Communications' Parameters	
Value	Description
Baud rate	9600
Parity	None
Stop Bits	1
Node Address	N/A

## ► RS422/RS485 Communications

### ■ Node Address – H5-01

The node address is set through F7 drive parameter H5-01. When communicating via RS422 or RS485, a unique node address between 0 and 20h (32 dec), inclusive, must be entered. The default F7 drive address is 1Fh (31 dec). The address is always entered as a hexadecimal number (refer to the conversion chart in Chapter 4). Address 0 is typically reserved for global messages.

### ■ Baud rate – H5-02

Select the baud rate that matches the controller's serial configuration. The default baud rate is 9600 (3).

Table 1.2 – Baud Rate – Parameter H5-02	
Value	Description
0	1200
1	2400
2	4800
3	9600
4	19200

### ■ Parity – H5-03

Select the parity that matches the controller's serial configuration. The default parity is None (0).

Table 1.3 – Parity – Parameter H5-03	
Value	Description
0	None
1	Even
2	Odd

### ■ Serial Communications Send Delay – H5-06

A delay can be inserted before the F7 drive responds to a command message. This allows for slower communications devices to switch transceiver state in order to get ready to receive a message. A value of 5 ~ 65 ms can be inserted, 5ms being the default.

■ RTS Control – H5-07

This parameter determines whether RTS is continually asserted (disabled) or asserted only during send (enabled). RTS must be enabled for use with RS422/485 communications. The default is disabled (0).

Table 1.4 – RTS – Parameter H5-07	
Value	Description
0	Disable (always ON)
1	Enable (ON only during send)

# Operation Method and Frequency Reference

The Run/Stop and Frequency Reference commands can originate from serial communication, the operator keypad, external terminals, or an option card. Parameter b1-01 (Operation Method Selection) allows the selection of the origin of the Run/Stop command. Parameter b1-02 (Reference Selection) allows the selection of the origin of the Frequency Reference command. The Run/Stop and Frequency Reference commands may have different origins. For example, the Run/Stop command may be set to External Terminals (b1-01 = 1) while the Frequency Reference command may be set Serial Communications (b1-02=2).

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## ► Operation Method

Table 1.5 – Operation Method Selection	
b1-01	Operation Method Selection (Run/Stop)
0	Operator keypad
1	External Terminals (Default setting is 1)
2	Serial Communication
3	Option Card
4	Pulse Input

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## ► Frequency Reference Source

Table 1.6 – Frequency Reference Source Selection	
b1-02	Frequency Reference Selection
0	Operator keypad
1	External Terminals (Default setting is 1)
2	Serial Communications (Parameter Access)
3	Option Card



# Verify Communications

The following is a quick reference guide for serial communications to the F7 drive. Make a copy of this page and check-off each item as it is completed. For detailed information please refer to the detailed sections that follow.

## ☐ 1: RS232 communication

☐ 1.1: Verify that the correct cable is used to connect the controller to the F7 drive.

☐ 1.2: Verify that the controller is set for RS232 communications and that the communications' cable is connected to the correct communications port.

☐ 1.3: Record the controller communications' parameters

Baud Rate \_\_\_\_\_ Parity \_\_\_\_\_ Data Bits \_\_\_\_\_ Stop Bits 1

☐ 1.4: Record the F7 drive communications' parameters (H5-02, H5-03, H5-07)

Baud Rate \_\_\_\_\_ Parity \_\_\_\_\_ Data Bits \_\_\_\_\_ Stop Bits 1

☐ 1.5: Verify that the communications' parameters match.

## ☐ 2: RS422/RS485 communications.

☐ 2.1: Verify that the F7 drive is connected correctly.

☐ 2.2: Verify that the controller is set for RS422/RS485 communications and that the communications' cable is connected to the correct communications' port.

☐ 2.3: Record the controller communications' parameters

Baud Rate \_\_\_\_\_ Parity \_\_\_\_\_ Data Bits \_\_\_\_\_ Stop Bits 1

☐ 2.4: Record the F7 drive communications' parameters (H5-01, H5-02, H5-03, H5-07)

Baud Rate \_\_\_\_\_ Parity \_\_\_\_\_ Data Bits \_\_\_\_\_ Stop Bits 1

☐ 2.5: Verify that the communications' parameters match.

☐ 2.6: Verify that parameter H5-07 (RTS) is set to enable.

☐ 2.7: Verify that parameter H5-01 (Node Address) is set to the correct, unique, hexadecimal value and that it matches the node address required by the controller.

Controller Node Address \_\_\_\_\_ F7 Drive Node Address \_\_\_\_\_



# Chapter 2 Message Formats

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*This chapter provides information on the message (telegram) contents and configuration.*

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# Protocol

The parameter access method supported by the Yaskawa F7 drive is a subset of the MODBUS<sup>®</sup> communication protocol. The F7 drive supports functions 3, 6, 8 and 10h. The message format varies depending upon the function code of the message. For each function code, there is a command message from the master and a response message from the slave. The following sections review the format of the command and response messages for each function.

## ► Message Functions Supported

The following table lists the function codes available and their minimum and maximum lengths.

Table 2.1 - Supported Function Codes					
Function Code	Function	Command Message		Response Message (Normal)	
		min. (bytes)	max. (bytes)	min. (bytes)	max. (bytes)
3h (3 dec)	Read Multiple Registers	8	8	7	21
6h (6 dec)	Write Single Register	8	8	8	8
8h (8 dec)	Loop-Back test	8	8	8	8
10h (16 dec)	Write Multiple Registers	11	25	8	8

# Read Multiple Registers – Function Code 03H

The Read Multiple Register message is used to read the contents of from one to eight consecutive registers. The formats of the read command and response messages are shown below.

## ► Read Multiple Registers Command Message

Table 2.2 - Read Command Message		
Description		Data
Slave Address		02h
Function Code		03h
Starting Register	Upper	00h
	Lower	20h
Quantity	Upper	00h
	Lower	04h
CRC-16	Upper	45h
	Lower	F0h

Each F7 drive slave address is set via. parameter H5-01. Valid slave addresses must be in the range of 1 to 20 hex (1 to 32 dec) and entered as a hexadecimal number. No two slaves may have the same address. The master addresses the slave by placing the slave address in the Slave Address field of the message. In the command message above, the slave is addressed at 02h. Broadcast address 0 is not valid for register read commands.

The function code of this message is 03h (read multiple registers).

The starting register is the address of the first register to be read. In the command message above the starting register address is 20h (0020h).

The quantity indicates how many consecutive registers are to be read. The quantity may range from 1 to 8 registers. If an invalid quantity is entered, error code 03h is returned in a fault response message. In this example, four consecutive registers are to be read: 20h, 21h, 22h and 23h.

A CRC-16 value is generated from a calculation including the message slave address, function code, starting register and quantity. The procedure for calculating a CRC-16 is described at the end of this chapter. When the slave receives the command message it calculates a CRC-16 value and compares it to the CRC-16 of the command message. If the two CRC-16 values are identical and the Slave Address is correct, the slave processes command message. If the two CRC-16 values are not identical, the slave will discard the command message and not respond.

If the command message has a valid slave address, function code, starting register, and quantity, the slave will respond with a normal response message. If the command message has an invalid function code, starting register, and/or quantity, the slave will respond with a fault response message. If the command message has an invalid slave address or CRC-16, no response will be returned.

## ► Read Multiple Registers Normal Response Message

Table 2.3 - Read Normal Response Message		
Description		Data
Slave Address		02h
Function Code		03h
Number of Data Bytes		08h
Starting Register	Upper	17h
	Lower	70h
Next Register	Upper	17h
	Lower	70h
Next Register	Upper	01h
	Lower	09h
Last Register	Upper	00h
	Lower	00h
CRC-16	Upper	38h
	Lower	ACH

The normal response message contains the same slave address and function code as the command message, indicating to the master, which slave is responding and to what type of function it is responding.

The Number Of Data Bytes is the number of data bytes returned in the response message. The number of data bytes is actually the number of registers read times 2, since there are two bytes of data in each register.

The starting register is the address of the first register read.

The data section of the response message contains the data for the registers requested read. In this case registers 20h, 21h, 22h and 23h. Their data is 20h = 1770h, 21h = 1770h, 22h = 0109h and 23h = 0h.

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## ► Read Multiple Registers Fault Response Message

Table 2.4 - Read Fault Response Message		
Description		Data
Slave Address		02h
Function Code		83h
Error Code		02h
CRC-16	Upper	30h
	Lower	F1h

The fault response message contains the same slave address as the command message, indicating to the master, which slave is responding.

The function code of a fault response message is the logical OR of 80h and the original function code of 03h. This indicates to the master that the message is a fault response message, instead of a normal response message.

The error code indicates where the error occurred in the command message. The value of 02h in the error code field of this fault response message indicates that the command message requested data be read from an invalid register. Refer to section Error Codes, Table 2-14, for more information on returned error codes.

# Write Single Register – Function Code 06H

The Write Single Register function allows the writing of data to one register only.

## ► Write Single Register Command Message

Table 2.5 - Write Command Message		
Description		Data
Slave Address		01h
Function Code		06h
Register Address	Upper	00h
	Lower	01h
Data	Upper	00h
	Lower	03h
CRC-16	Upper	98h
	Lower	H0B

Each F7 drive slave address is set via parameter H5-01. Valid slave addresses must be in the range of 1 to 20 hex (1 to 32 dec) and entered as a hexadecimal number. No two slaves may have the same address. The master addresses the slave by placing the slave address in the Slave Address field of the message. In the command message above, the slave is addressed at 01h. Broadcast address 0 is valid for register write commands.

By setting the slave address to zero (0) in the command message, the master can send a message to all the slaves on the network simultaneously. This is called simultaneous broadcasting. In a simultaneous broadcast message there is no response message.

The function code of this message is 06h (write single register).

In the command message above the register address is 01h (0001h).

The data section contains the data to be that written.

A CRC-16 value is generated from a calculation including the message slave address, function code, starting register, quantity, number of data bytes and all register data. The procedure for calculating a CRC-16 is described at the end of this chapter. When the slave receives the command message it calculates a CRC-16 value and compares it to the CRC-16 of the command message. If the two CRC-16 values are identical and the slave address is correct, the slave processes command message. If the two CRC-16 values are not identical, the slave will discard the command message and not respond.

If the command message has a valid slave address, function code, register address and data, the slave will respond with a normal response message. If the command message has an invalid function code, register address and/or data, the slave will respond with a fault response message. If the command message has an invalid slave address or CRC-16, no response will be returned.



## ► Write Single Register Normal Response Message

Table 2.6 - Write Registers Normal Response Message		
Description		Data
Slave Address		01h
Function Code		06h
Register Address	Upper	00h
	Lower	01h
Data	Upper	00h
	Lower	03h
CRC-16	Upper	98h
	Lower	H0B

The normal response message contains the same slave address, function code, register address and data as the command message, indicating to the master, which slave is responding and to what type of function it is responding.

In the response message above the register address is 01h (0001h).

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## ► Write Single Register Fault Response Message

Table 2.7 - Write Registers Fault Response Message		
Description		Data
Slave Address		01h
Function Code		86h
Error Code		21h
CRC-16	Upper	82h
	Lower	78h

The fault response message contains the same slave address as the command message, indicating to the master which slave is responding.

The function code of a fault response message is the logical OR of 80h and the original function code of 06h. This indicates to the master that the message is a fault response message, instead of a normal response message.

The error code indicates where the error occurred in the command message. The value of 21h in the error code field of this fault response message indicates that the command message data to be written was invalid for that register. Refer to the section Error Codes, Table 2-14, for more information on returned error codes.

# Loop-Back Test – Function Code 08H

The Loop-Back Test is used to verify that the communications parameters for the F7 drive have been set correctly and that the connection is correct. The message should be constructed exactly as shown below. If everything is set and connected correctly, the received response will match the response shown below.

---

## ► Loop-Back Test - 08h

The Loop-Back test function (08h) is used for checking signal transmission between master and slaves. The command message format is shown below.

Table 2.8 - Loop-Back Command Message		
Description		Data
Slave Address		01h
Function Code		08h
Test Code	Upper	00h
	Lower	00h
Data	Upper	A5h
	Lower	37h
CRC-16	Upper	DAh
	Lower	8Dh

Each F7 drive slave address is set via. parameter H5-01. Valid slave addresses must be in the range of 1 to 20 hex (1 to 32 dec) and entered as a hexadecimal number. No two slaves may have the same address. The master addresses the slave by placing the slave address in the slave address field of the message. In the command message above, the slave is addressed at 01h. Broadcast address 0 is not valid for Loop-Back test commands.

The function code of this message is 08h (Loop-Back test).

The test code must be set to 0000h. This function specifies that the data passed in the command message is to be returned (looped back) in the response message.

The Data section contains arbitrary values.

A CRC-16 value is generated from a calculation including the message slave address, function code, test code, and data. The procedure for calculating a CRC-16 is described at the end of this chapter. When the slave receives the command message it calculates a CRC-16 value and compares it to the CRC-16 of the command message. If the two CRC-16 values are identical and the Slave Address is correct, the slave processes command message. If the two CRC-16 values are not identical, the slave will discard the command message and not respond.

If the command message has a valid slave address, function code, test code, data and CRC-16, the slave will respond with the normal response message. If the command message has an invalid function code, test code, and/or data, the slave will respond with a fault response message. If the command message has an invalid slave address or CRC-16, no response will be returned.

## ► Loop-Back Normal Response

The normal Loop-Back Test response is identical the command message.

Table 2.9 - Loop-Back Normal Response Message		
Description		Data
Slave Address		01h
Function Code		08h
Test Code	Upper	00h
	Lower	00h
Data	Upper	A5h
	Lower	37h
CRC-16	Upper	DAh
	Lower	8Dh

---

## ► Loop-Back Fault Response

Table 2.10 - Loop-Back Fault Response Message		
Description		Data
Slave Address		01h
Function Code		88h
Error Code		01h
CRC-16	Upper	87h
	Lower	C0h

The fault response message contains the same slave address as the command message, indicating to the master which slave is responding. The function code of a fault response message is the logical OR of 80h and the original function code of 08h. This indicates to the master that the message is a fault response message, instead of a normal response message.

The error code indicates where the error occurred in the command message. Refer to the section Error Codes, Table 2-14, for more information on returned error codes.

# Write Multiple Registers – Function Code 10H

The Write Multiple Register function allows the writing of data to from one to sixteen consecutive registers.

## ► Write Multiple Registers Command Message

Table 2.11 - Write Command Message		
Description		Data
Slave Address		01h
Function Code		10h
Starting Register	Upper	00h
	Lower	01h
Quantity	Upper	00h
	Lower	02h
Number of Data Bytes		04h
First Register Data	Upper	00h
	Lower	01h
Next Register Data	Upper	02h
	Lower	58h
CRC-16	Upper	63h
	Lower	39h

Each F7 drive slave address is set via. parameter H5-01. Valid slave addresses must be in the range of 1 to 20 hex (1 to 32 dec) and entered as a hexadecimal number. No two slaves may have the same address. The master addresses the slave by placing the slave address in the Slave Address field of the message. In the command message above, the slave is addressed at 01h. Broadcast address 0 is valid for register write commands.

By setting the slave address to zero (0) in the command message, the master can send a message to all the slaves on the network simultaneously. This is called simultaneous broadcasting. In a simultaneous broadcast message there is no response message.

The function code of this message is 10h (write multiple registers).

The starting register is the address of the first register to be written. In the command message above the starting register address is 01h (0001h).

The quantity indicates how many consecutive registers are to be written. The quantity may range from 1 to 16 registers. If an invalid quantity is entered, error code of 03h is returned in a fault response message. In this command message there are two consecutive registers to be written: 01h (Operation Command) and 02h (Frequency Reference).

The Number Of Data Bytes is the number of bytes of data to be written. The Number Of Data Bytes is actually the quantity multiplied by 2, since there are two bytes of data in each register.

The data section contains the data for each register to be that written in the order in which they are to be written.

A CRC-16 value is generated from a calculation including the message slave address, function code, starting register, quantity, number of data bytes and all register data. The procedure for calculating a CRC-16 is described at the end of this chapter. When the slave receives the command message it calculates a CRC-16 value and compares it to the CRC-16 of the command message. If the two CRC-16 values are identical and the slave address is correct, the slave processes command message. If the two CRC-16 values are not identical, the slave will discard the command message and not respond.

If the command message has a valid slave address, function code, starting register, quantity, number of data bytes and data, the slave will respond with a normal response message. If the command message has an invalid function code, starting register, quantity, number of data bytes and/or data, the slave will respond with a fault response message. If the command message has an invalid slave address or CRC-16, no response will be returned.

## ► Write Multiple Registers Normal Response Message

Table 2.12 - Write Registers Normal Response Message		
Description		Data
Slave Address		01h
Function Code		10h
Starting Register	Upper	00h
	Lower	01h
Quantity	Upper	00h
	Lower	02h
CRC-16	Upper	10h
	Lower	08h

The normal response message contains the same slave address, function code, starting register and quantity as the command message, indicating to the master which slave is responding and to what type of function it is responding.

The starting register is the address of the first register written. In the response message above the starting register address is 01h (0001h).

The quantity indicates how many consecutive registers were written. In this case the quantity is 2.

---

## ► Write Multiple Registers Fault Response Message

Table 2.13 - Write Registers Fault Response Message		
Description		Data
Slave Address		01h
Function Code		90h
Error Code		02h
CRC-16	Upper	CDh
	Lower	C1h

The fault response message contains the same slave address as the command message, indicating to the master which slave is responding.

The function code of a fault response message is the logical OR of 80h and the original function code of 10h. This indicates to the master that the message is a fault response message, instead of a normal response message.

The error code indicates where the error occurred in the command message. The value of 02h in the error code field of this fault response message indicates that the command message requested data to be written to an invalid register. Refer to the section Error Codes, Table 2-14, for more information on returned error codes.

# No Response

The slave disregards the command message and does not return a response message in the following cases:

1. In simultaneous broadcasting of data (slave address field is 0), all slaves execute.
2. When a communication error (overrun, framing, parity, or CRC-16) is detected in the command message.
3. When the slave address in the command message does not coincide with the address set in the slave.
4. When it takes longer than 2 seconds to send a message.
5. When the time interval between characters exceeds 3.5ms
6. When the command message data length is not proper.

## Error Codes

Table 2-14 – Fault Codes		
Code	Fault	Description
1	Function error	Invalid or unsupported function code in command message
2	Invalid Register	Invalid register address
3	Invalid Number of Registers	Invalid command message quantity
21	Data Limits Exceeded	The write command message data is out range for the requested register
22	Write Failure	The register to be written is write protected

# CRC-16 Calculations

The last two bytes of a message contain the CRC-16 (Cyclical Redundancy Check). The CRC-16 is one method for verifying the validity of the message contents and is part of the protocol. The CRC-16 field checks the contents of the entire message, regardless of any parity check method used for the individual characters of the message.

The CRC-16 field is a 16-bit binary value consisting of two 8 bit bytes. The CRC-16 value is calculated by the transmitting device, which appends the CRC-16 to the message. The receiving device recalculates a CRC-16 during receipt of the message, and compares this calculated value to the value received in the transmitted CRC-16 field. If the two values are not equal, the entire message is invalid.

Detailed examples of a CRC-16 generation using Quick Basic and C are shown below.

---

## ► CRC-16 Calculation Example in Basic

```
crcsum# = &HFFFF&
crcshift# = &H0&
crcconst# = &HA001&
CLS
PRINT "*****"
PRINT
PRINT "          CRC-16 calculator"
PRINT
PRINT "*****"
PRINT "If entering data in hex, preceed the data with '&H'"
PRINT "    Example: 32decimal = 20hex = &H20"
PRINT "*****"
PRINT
INPUT "Enter the number of bytes in the message: ", maxbyte
FOR bytenum = 1 TO maxbyte STEP 1
    PRINT "Enter byte ", bytenum, ":":
    INPUT byte&
    byte& = byte& AND &HFF&
    crcsum# = (crcsum# XOR byte&) AND &HFFFF&
    FOR shift = 1 TO 8 STEP 1
        crcshift# = (INT(crcsum# / 2)) AND &H7FFF&
        IF crcsum# AND &H1& THEN
            crcsum# = crcshift# XOR crcconst#
        ELSE
            crcsum# = crcshift#
        END IF
    NEXT shift
NEXT bytenum
lower& = crcsum# AND &HFF&
upper& = (INT(crcsum# / 256)) AND &HFF&

PRINT "Lower byte (1st) = ", HEX$(lower&)
PRINT "Upper byte (2nd) = ", HEX$(upper&)
```

Figure 2.1 – CRC-16 Calculation in Quick Basic

## ► CRC-16 Calculation Example - C

```

void    getMBCRC(char *, int, char *)           // function prototype
void    getMBCRC(char *buf, int bufLen, char *crc) { // Function name and parameter list returning a void
                                                // *buf      pointer to character array used to calculate CRC
                                                // bufLen    number of characters to calculate CRC for
                                                // *crc      pointer to the array that contains the calculated CRC

unsigned long crc_0 = 0xffff;                  // Declare and initialize variables
unsigned long crc_1 = 0x0000;                  // Declare and initialize variables
int i,j;                                       // Declare and initialize variables
    for (i=0; i<bufLen; i++) {                // Loop through characters of input array
        crc_0 ^= ((unsigned long)buf[i] & 0x00ff); // XOR current character with 0x00ff
        for (j=0;j<8;j++) {                    // Loop through characters bits
            crc_1 = (crc_0 >> 1) & 0x7fff;      // shift result right one place and store
            if (crc_0 & 0x0001)                 // if pre-shifted value bit 0 is set
                crc_0 = (crc_1 ^ 0xa001);       // XOR the shifted value with 0xa001
            else                                // if pre-shifted value bit 0 is not set
                crc_0 = crc_1;                  // set the pre-shifted value equal to the shifted value
        }                                       // End for loop - Loop through characters bits
    }                                           // End for loop - Loop through characters of input array
    crc[0] = (unsigned char)((crc_0/256) & 0x00ff); // Hi byte
    crc[1] = (unsigned char)(crc_0 & 0x00ff);     // Lo byte
return;                                       // Return to calling function
}                                           // End of CRC calculation function

```

Figure 2.2 – CRC-16 Calculation in C



# Chapter 3 Troubleshooting

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*This chapter describes some basic troubleshooting methods for serial communications*

<b>General Information .....</b>	<b>3 - 3</b>
<b>RS232 Communications.....</b>	<b>3 - 4</b>
<b>RS422/RS485 Communications.....</b>	<b>3 - 6</b>
<b>RS422/RS485 Self-Test .....</b>	<b>3 - 9</b>

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# General Information

Please fill-in the information on this and the following pages prior to contacting customer support. If customer support is necessary, please have the information below available.

<input type="text"/>	1: F7 Drive Model	<input type="text"/>	5: Flash ID (U1-14)
<input type="text"/>	2: Input VAC Hz	<input type="text"/>	6: Initialization Type (2/3 wire control)
<input type="text"/>	3: Serial Number	<input type="text"/>	7: Specification Type (o2-09)
<input type="text"/>	4: Control Board ETC-	<input type="text"/>	8: Control Method (A1-02)

Please provide a sketch of the network connections in the space below.

Figure 3.2 - Connection Sketch

# RS232 Communications

The following is a quick reference guide for troubleshooting RS232 serial communications to the F7 drive. Make a copy of the following pages and check-off each item as it is completed. For detailed information on the RS232 standard please refer to *EIA RS-232-C*. or later revision For information on the F7 drive RS232 interface, refer to previous sections of this manual.

☐ **1:** For RS232 communications

☐ **1.1:** Verify that the correct cable is used to connect the controller to the F7 drive.

☐ **1.2:** Verify that the controller is set for RS232 communications and that the communications' cable is connected to the correct communications port.

☐ **1.3:** Record the controller communications' parameters

**Baud Rate** \_\_\_\_\_ **Parity** \_\_\_\_\_ **Data Bits** \_\_\_\_\_ **Stop Bits** 1

☐ **1.4:** Record the F7 drive communications' parameters (H5-02, H5-03, H5-07)

**Baud Rate** \_\_\_\_\_ **Parity** \_\_\_\_\_ **Data Bits** \_\_\_\_\_ **Stop Bits** 1

☐ **1.5:** Verify that the communications' parameters match.

☐ **2:** Check the controller RS232 wiring requirements

☐ **2.1:** CTS(Clear to Send)/RTS(Ready to Send) jumper required on the controller end?

☐ **2.2:** DTR(Data Terminal ready)/DSR(Data Set Ready)/RLSD(Receive Line Signal Detector) jumper required on the controller end?

☐ **2.3:** TxD(Transmit Data)/RxD(Receive Data) connections are made correctly.

☐ **3:** Send a message from the controller to the F7 drive.

☐ **3.1:** Connect an oscilloscope between the F7 drive RxD and GND.

☐ **3.1.1:** Verify that the message pulse train exists and contains the correct number of pulses. Refer to the chapter Message Formats for information on the message contents.

☐ **3.1.2:** Verify that the signal levels adhere to the RS232 standard.

☐ **3.2:** Insert a data analyzer in the RS232 circuit and capture the message sent by the controller in a hexadecimal format. Record the command message below.

[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

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☐ **3.3:** Verify that the contents of the message adheres to the protocol format as described previously.

☐ **3.3.1:** Verify that the node address is valid.

☐ **3.3.2:** Verify that the function code is valid

☐ **3.3.3:** Verify that the register address is valid

☐ **3.3.4:** Verify that the number of data bytes is correct is valid

☐ **3.3.5:** Verify that the CRC is correctly calculated.

☐ **3.3.6:** Verify that the message requires a response.

☐ **4:** Verify the contents of the response message.

☐ **4.1:** Connect an oscilloscope between the controller RxD and GND.

☐ **4.1.1:** Verify that the message pulse train exists and contains the correct number of pulses. Refer to the chapter Message Formats for information on the message contents.

☐ **4.1.2:** Verify that the signal levels adhere to the RS232 standard.

☐ **4.2:** Capture the response message sent by the controller in a hexadecimal format and record it below.

[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

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☐ **4.3:** Verify that the contents of the message adheres to the protocol format as described previously.

☐ **4.3.1:** Verify that the node address is valid.

☐ **4.3.2:** Verify that the function code is valid

☐ **4.3.4:** Verify that the number of data bytes is correct is valid

☐ **4.3.3:** Verify that the register address is valid

☐ **4.3.4:** Verify that the CRC is correctly calculated.

# RS422/RS485 Communications

The following is a quick reference guide for troubleshooting RS422/RS485 serial communications to the F7 drive. Make a copy of the following pages and check-off each item as it is completed. For detailed information on the RS422/RS485 standard please refer to *EIA RS-422-A* or later revision. For information on the F7 drive RS422/RS485 interface, refer to previous sections of this manual.

## ☐ 1: For RS422/RS485 communications

☐ 1.1: Verify that the correct cable is used to connect the controller to the F7 drive.

☐ 1.2: Verify that the controller is set for RS422 or RS485 communications and that the communications' cable is connected to the correct communications port.

☐ 1.3: Record the controller communications' parameters

☐ 1.4: Verify that the polarity of the signal wires is correct (+ to + and - to -).

Baud Rate \_\_\_\_\_ Parity \_\_\_\_\_ Data Bits \_\_\_\_\_ Stop Bits 1

☐ 1.5: Record the F7 drive communications parameters (H5-01, H5-02, H5-03, H5-07)

Baud Rate \_\_\_\_\_ Parity \_\_\_\_\_ Data Bits \_\_\_\_\_ Stop Bits 1

☐ 1.6: Verify that the communications' parameters match.

☐ 1.7: Verify that F7 drive parameter H5-07 (RTS) is set to Enable.

☐ 1.8: Verify that F7 drive parameter H5-01 (Node Address) is set to the correct, unique, hexadecimal value and that it matches the node address required by the controller.

## ☐ 2: Check the controller RS422/RS485 wiring requirements

☐ 2.1: The controller transmit terminals are connected to the F7 drive receive terminals and the receive terminals connected to the F7 drive transmit terminals.

☐ 2.2: The transmit and receive connection polarities are correct.

☐ 2.3: The controller either asserts RTS when transmitting or utilizes send detect circuitry.

☐ 2.4: The network is terminated only at the beginning and end of each network segment.

☐ 2.5: There are no more than 31 devices on any network segment, including the controller and repeater

## ☐ 3: Verify that the F7 drive passes the self-test as described in the following section.

- ☐ **4:** Send a message from the controller to the F7 drive.
- ☐ **4.1:** Connect an oscilloscope between the F7 drive's R+ and R- terminals for RS422/RS485 4-wire networks or between terminals R+/S+ and R-/S- for RS485 2-wire networks.
- ☐ **4.1.1:** Verify that the message pulse train exists and contains the correct number of pulses. Refer to the chapter Message Formats for information on the message contents.
- ☐ **4.1.2:** Verify that the signal levels adhere to the RS422/RS485 standard.
- ☐ **4.2:** Insert a data analyzer in the RS422/RS485 circuit and capture the message sent by the controller in a hexadecimal format. Record the command message below.
- [    ] [    ] [    ] [    ] [    ] [    ] [    ] [    ] [    ] [    ]
- [    ] [    ] [    ] [    ] [    ] [    ] [    ] [    ] [    ] [    ]
- [    ] [    ] [    ] [    ] [    ] [    ] [    ] [    ] [    ] [    ]
- [    ] [    ] [    ] [    ] [    ] [    ] [    ] [    ] [    ] [    ]
- ☐ **4.3:** Verify that the contents of the message adheres to the MODBUS format as described previously.
- ☐ **4.3.1:** Verify that the node address is valid.
- ☐ **4.3.2:** Verify that the function code is valid
- ☐ **4.3.3:** Verify that the register address is valid
- ☐ **4.3.4:** Verify that the number of data bytes is correct is valid
- ☐ **4.3.5:** Verify that the CRC is correctly calculated.
- ☐ **4.3.6:** Verify that the message requires a response.

☐ **5:** Verify the contents of the response message.

☐ **5.1:** Connect an oscilloscope between the controller R+ and R- terminals for RS422 and RS485 4-Wire networks or between terminals R+/S+ and R-/S- for RS485 2-wire networks.

☐ **5.1.1:** Verify that the message pulse train exists and contains the correct number of pulses. Refer to the chapter Message Formats for information on the message contents.

☐ **5.1.2:** Verify that the signal levels adhere to the RS422/RS485 standard.

☐ **5.2:** Capture the response message in hexadecimal format and record it below.

[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

[ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

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☐ **5.3:** Verify that the contents of the message adheres to the MODBUS format as described previously.

☐ **5.3.1:** Verify that the node address is valid.

☐ **5.3.2:** Verify that the function code is valid

☐ **5.3.3:** Verify that the register address is valid

☐ **5.3.4:** Verify that the number of data bytes is correct is valid

☐ **5.3.5:** Verify that the CRC is correctly calculated.



# RS422/RS485 Self-Test

The F7 drive can perform a self-test of the communications interface. To perform the self-test:

- Apply power to the F7 drive.
- Set parameter H1-01 to 67h (self-test).
- Remove power from the F7 drive and wait for the charge lamp to be completely extinguished. Wait at least five additional minutes for the F7 drive to be completely discharged. Measure the DC bus voltage and verify that it is at a safe level.
- Connect jumper wires to the F7 drive terminals as shown below.
- Reapply power to the F7 drive.

The frequency reference is displayed on the digital operator if the communications interface is functioning normally.

If “CE” is displayed on the digital operator, the F7 drive fault signal is ON and the F7 drive ready signal is OFF, the communications interface is not functioning.

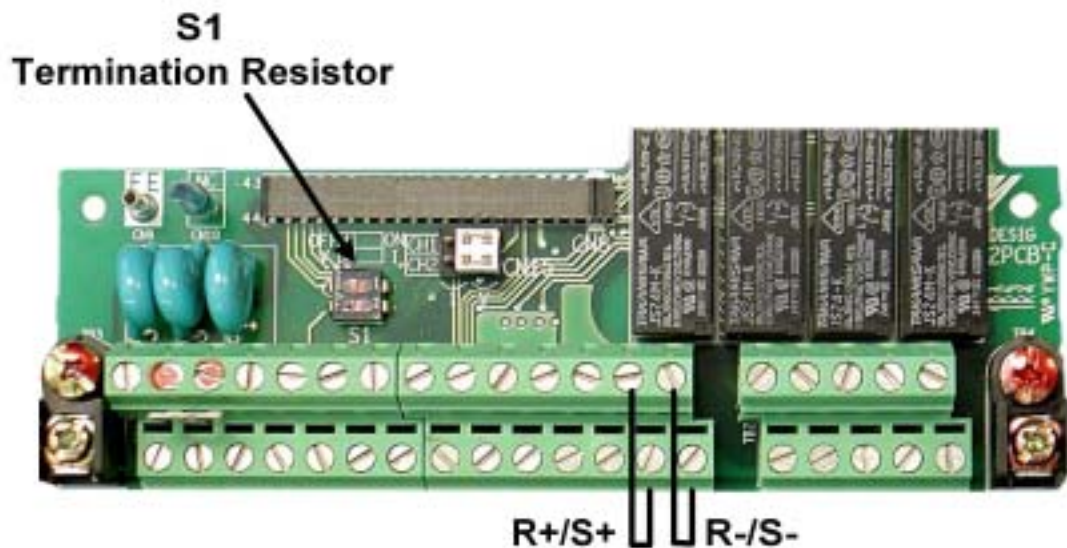


Figure 3.2 – RS422/RS485 Self-Test

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# Chapter 4 F7 Drive Parameters

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*This chapter describes the F7 drive parameters, their addressing, limits and dependencies*

<b>Command Registers (Read / Write) .....</b>	<b>4 – 3</b>
<b>Monitor Registers (Read only).....</b>	<b>4 – 4</b>
<b>Parameters (Read/Write) .....</b>	<b>4 – 7</b>
<b>ENTER/ACCEPT Command .....</b>	<b>4 – 33</b>
<b>Parameter Dependencies .....</b>	<b>4 – 34</b>

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# Command Registers (Read / Write)

Command registers are those registers used to control the operation of the F7 drive either through a network interface (option card) or via serial communications. These registers are available during an active Run command.

The “Addr” column contains the register address in hexadecimal format. F7 drive registers are always referred to in hexadecimal format. The “Function” column contains the register name. The “Bit” and “Description” columns contain the list of available bits for that register and a short description of each. If the “Bit” column is empty, the register contains word data and individual bits are meaningless.

Table 4.2 - Command Registers (Read / Write)			
Addr	Function	Bit	Description
001h	Operational Signals	0h	(2-wire control - 0 = Stop 1 = Run) – (3-wire control - 1 = Run Forward)
		1h	(2-wire control - 0 = Forward 1 = Reverse) – (3-wire control - 1 = Run Reverse)
		2h	External Fault
		3h	Fault Reset
		4h	Reserved
		5h	Reserved
		6h	Multi-Function Input 3 (Terminal S3)
		7h	Multi-Function Input 4 (Terminal S4)
		8h	Multi-Function Input 5 (Terminal S5)
		9h	Multi-Function Input 6 (Terminal S6)
		Ah	Multi-Function Input 7 (Terminal S7)
		Bh	Multi-Function Input 8 (Terminal S8)
		Ch	Reserved
		Dh	Reserved
		Eh	Reserved
		Fh	Reserved
002h	Frequency Reference / Output Frequency		Frequency
003h	V/F Gain		2.0% ~ 200.0%
004h-008h	Reserved	N/A	Reserved
009h	Multi-Function Outputs Settings	0h	Multi-Function Output 1
		1h	Multi-Function Output 2
		2h	Multi-Function Output 3
		3h	Reserved
		4h	Reserved
		5h	Reserved
		6h	Fault Relay
		7h	Fault Relay
		8h - Fh	Reserved
00Ah-00Fh	Reserved	N/A	Reserved

# Monitor Registers (Read only)

The following table lists monitor parameters for the F7 drive. These parameters are used to monitor F7 drive information and cannot be written.

- The “U-##” column contains the reference, if it exists, to the “U”, monitor, parameter displayed via the operator keypad.
- The “Addr” column contains the register addresses for that parameter in hexadecimal format. F7 drive registers are always referred to in hexadecimal format.
- The “Function” column contains the register name.
- The “Bit” column contains the list of available bits for that register. If the “Bit” column is empty, the register contains word data and the individual bits are meaningless.
- The “Description” column contains a short description of each register or register bit.
- The “Mode” columns describe the parameter’s accessibility under a given control mode (see A1-02 for control modes). Refer to parameter A1-02 in Table 4.4 for information on control modes. The column contains an “N” if the parameter is not accessible for that control mode.
- Reserved registers and data are meaningless and should be ignored

U-##	Addr	Function	Bit	Description	Mode			
					0	1	2	3
	0000h	Reserved		Reserved	N	N	N	N
	0001h	Command	0h	@ Forward Run				
			1h	@ Reverse Run				
			2h	@ External Fault				
			3h	Reserved				
			4h	Reserved				
			5h	@ Multi-Function Input 3				
			6h	@ Multi-Function Input 4				
			7h	@ Multi-Function Input 5				
			8h	@ Multi-Function Input 6				
			9h	@ Multi-Function Input 7				
			Ah	@ Multi-Function Input 8				
			Bh	Reserved				
			Ch	Reserved				
			Dh	Reserved				
			Eh	Reserved				
			Fh	Reserved				
	0002h	Frequency Reference		Dependent on setting of 03-02				
	0003h	Reserved		Reserved	N	N	N	N
	0004h	Reserved		Reserved	N	N	N	N
	0005h	Reserved		Reserved	N	N	N	N
	0006h	PID Setpoint						
	0007h	Analog Output 1 Setting		(-11 ~ 11)/726 Vdc				
	0008h	Analog Output 2 Setting		(-11 ~ 11)/726 Vdc				
	0009h	Outputs	0h	Multi-Function Output 1				
			1h	Multi-Function Output 2				
			2h	Multi-Function Output 3				
			3h	Reserved				
			4h	Reserved				
			5h	Reserved				
			6h	@ Fault Relay Output				
			7h	@ Fault Relay N.C.				
	8h-Fh	Reserved		Reserved				
	000Ah	Reserved		Reserved	N	N	N	N
	000Bh	Reserved		Reserved	N	N	N	N
	000Ch	Reserved		Reserved	N	N	N	N
	000Dh	Reserved		Reserved	N	N	N	N
	000Eh	Reserved		Reserved	N	N	N	N
	000Fh	Command Selection	0h	Reserved				
			1h	PID Value @ 0006h is used				
			2h-Bh	Reserved				
			Ch	@ Bulk Data Transfer Terminal 5				
			Dh	@ Bulk Data Transfer Terminal 6				
			Eh	@ Bulk Data Transfer Terminal 7				
			Fh	@ Bulk Data Transfer Terminal 8				

Table 4.3 - Monitor Registers (Read only)								
U-##	Addr	Function	Bit	Description	Mode			
					0	1	2	3
	0010h	Inverter Status	0h	@ RUN				
			1h	Reserved				
			2h	Reserved				
			3h	@ Reset Signal				
			4h	@ Speed Agree				
			5h	@ Inverter Ready				
			6h	@ Minor Fault				
			7h	@ Major Fault				
			8h-Dh	Reserved				
			Eh	@ ComRef				
			Fh	@ ComCtrl				
	0011h	Operator Status	0	@ OPE				
			1	@ ERR				
			2	@ PRG Mode				
			3	0: Operator 1: PC				
			4h-Fh	Reserved				
	0012h	OPE	0h	Reserved				
			1h	OPE1 @ F7 drive kVA Setting Error				
			2h	OPE2 @ Parameter Setting Out of Range				
			3h	OPE3 @ Multi-Function Input Selection				
			4h	Reserved				
			5h	OPE5 @ Run Command Selection Error - Option board missing				
			6h	OPE6 @ Control Method Selection Error - PG Opt Missing				
			7h	OPE7 @ Multi-Function Analog Input Select Error				
			8h	OPE8 @ Function Selection Error for current control mode				
			9h	OPE9 @ PID Control Setup Error				
			Ah	OPE10 @ V/F Parameter/Pattern Setting Error				
			Bh	OPE11 @ Carrier Frequency Parameter Setting Error				
			Ch	Reserved				
			Dh	Reserved				
			Eh	Reserved				
			Fh	Reserved				
	0013h	Inverter Product Code		0000: G5				
				1000: V7				
				2010: E7				
				2020: F7C (YEC)				
				2030: F7A (YEG)				
				2040: F7U (YEA)				
				2050: G7C (YEC)				
				2060: G7A (YEG)				
				2070: G7U (YEA)				
	2080: VG7							
	0014h	Fault Contents 1	0h	(PUF) @ Fuse				
			1h	(UV1) @ Main Circuit Undervoltage				
			2h	(UV2) @ Control Circuit Undervoltage				
			3h	(UV3) @ MC Error				
			4h	Reserved				
			5h	(GF) @ Ground Fault				
			6h	(OC) @ Over Current				
			7h	(OV) @ Overvoltage				
			8h	(OH) @ Inverter Overheat				
			9h	(OH1) @ Inverter Overheat Warning				
			Ah	(OL1) @ Motor Overload				
			Bh	(OL2) @ Inverter Overload				
			Ch	(OL3) @ Overtorque 1				
			Dh	(OL4) @ Overtorque 2				
			Eh	(RR) @ Braking Resistor Fault				
			Fh	(RH) @ Braking resistor Overheat				

U-##	Addr	Function	Bit	Description	Mode			
					0	1	2	3
0015h	Fault Contents 2		0h	(EF3) @ External Fault 3				
			1h	(EF4) @ External Fault 4				
			2h	(EF5) @ External Fault 5				
			3h	(EF6) @ External Fault 6				
			4h	(EF7) @ External Fault 7				
			5h	(EF8) @ External Fault 8				
			6h	Reserved				
			7h	(OS) @ Overspeed				
			8h	(DEV) @ Excessive Speed Bias				
			9h	(PGO) @ PG Line Interruption				
			Ah	(PF) @ Input Phase Fault				
			Bh	(LF) @ Output Phase Fault				
			Ch	(OH3) @ Overheat				
			Dh	(OPR) @ Operator Bypass Fault				
			Eh	(ERR) @ EEPROM Write Fault				
			Fh	(OH4) @ Motor Overheat Fault				
0016h	Fault Contents 3		0h	(CE) @ Communications Fault				
			1h	(BUS) @ Communications Option Fault				
			2h	(E-15) @ SI-F/G Communication Fault				
			3h	(E-10) @ SI-F/G Fault				
			4h	(CF) @ Control Fault				
			5h	(SVE) @ Zero Servo Fault				
			6h	(EF0) @ Communications Option External Fault				
			7h	(FBL) @ PID Feedback Error				
			8h	(UL3) @ Undertorque 1				
			9h	(UL4) @ Undertorque 2				
			Ah	(OL7) @ High Slip braking Overload				
			Bh	Reserved				
			Ch	Reserved				
			Dh	Reserved				
			Eh	Reserved				
			Fh	Reserved				
0017h	CPF Contents 1		0h	Reserved				
			1h	Reserved				
			2h	CPF02 @ Base Block Circuit Error				
			3h	CPF03 @ EEPROM Error				
			4h	CPF04 @ CPU Internal A/D Converter Error				
			5h	CPF05 @ CPU External A/D Converter Error				
			6h	CPF06 @ Option Card Connection Error				
0018h	CPF Contents 2		7h-Fh	Reserved				
			0h	CPF20 @ Option Card A/D Converter Error				
			1h	CPF21 @ Option Card Self-Diagnostic error				
			2h	CPF22 @ Option Card Option Code Error				
			3h	CPF23 @ Option Card DP-RAM Error				
0019h	Minor Fault Contents 1		4h-Fh	Reserved				
			0h	(UV) @ Undervoltage				
			1h	(OV) @ Overvoltage				
			2h	(OH) @ Inverter Overheat				
			3h	(OH2) @ Inverter Overheat Warning				
			4h	(OL3) @ Overtorque 1				
			5h	(OL4) @ Overtorque 2				
			6h	(EF) @ 2-wire Sequence Input Fault				
			7h	(BB) @ Baseblock				
			8h	(EF3) @ External Fault 3				
			9h	(EF4) @ External Fault 4				
			Ah	(EF5) @ External Fault 5				
			Bh	(EF6) @ External Fault 6				
			Ch	(EF7) @ External Fault 7				
			Dh	(EF8) @ External Fault 8				
			Eh	Reserved				
			Fh	(OS) @ Overspeed				



Table 4.3 - Monitor Registers (Read only)									
U-##	Addr	Function	Bit	Description	Mode				
					0	1	2	3	
	001Ah	Minor Fault Contents 2	0h	(DEV) @ Excessive Speed Bias					
			1h	(PGO) @ PG Line Interruption					
			2h	(OPR) @ Operator Bypass Fault					
			3h	(CE) @ Communications Fault					
			4h	(BUS) @ Communications Option Fault					
			5h	(CALL) @ Waiting for Communications					
			6h	(OL1) @ Motor Overload					
			7h	(OL2) @ Inverter Overload					
			8h	(E-15) @ SI-F/G Communication Fault					
			9h	(E-10) @ SI-F/G Fault					
			Ah	@ Motor Switch					
			Bh	(FBL) @ PID Feedback Error					
			Ch	(CALL) @ Waiting for Communications					
			Dh	(UL3) @ Undertorque 1					
			Eh	(UL4) @ Undertorque 2					
			Fh	@ Communication Test Fault					
	001Bh	Minor Fault Contents 3	0h	(OH3) @ Motor Overheat Alarm					
			1h	(DNE) @ F7 drive Not Enabled					
			2h	Reserved					
			3h	Reserved					
			4h	Reserved					
			5h-Fh	Reserved					
	001Ch	Reserved		Reserved	N	N	N	N	
	001Dh	Reserved		Reserved	N	N	N	N	
	001Eh	Reserved		Reserved	N	N	N	N	
	001Fh	Reserved		Reserved	N	N	N	N	
	0020h	Inverter Status	0h	@ RUN					
			1h	@ Reverse					
			2h	@ Inverter Ready					
			3h	@ Fault					
			4h	@ Data Setting Error					
			5h	Multi-Function Output 1					
			6h	Multi-Function Output 2					
			7h	Multi-Function Output 3					
			8h	Reserved					
			9h	Reserved					
			Ah-Fh	Reserved					
	0021h	Fault Contents	0h	(OC) or (GF) @ Overcurrent/Ground Fault					
			1h	(OV) @ Overvoltage					
			2h	(OL2) @ Inverter Overload					
			3h	(OH1) or (OH2) @ Overheat Fault					
			4h	(RR) or (RH) @ Braking Resistor Fault					
			5h	(PUF) @ Fuse Fault					
			6h	(FBL) @ PID Feedback Fault					
			7h	(EF#) @ External Fault					
			8h	(CPF) @ Hardware Fault					
			9h	(OL1) or (OL3) or (OL4) @ Overload/Overtorque					
			Ah	(PGO) or (OS) or (DEV) @ Excessive Speed Deviation					
			Bh	(UV) @ Undervoltage					
			Ch	(UV1) or (UV2) or (UV3) or Power Off					
			Dh	(SPI) or (SPO) @ Input/Output Phase Fault					
			Eh	(CE) @ Communications Error					
			Fh	(OPR) @ Operator Error					
	0022h	Data Link Status	0	@ Data Writing					
			1	Reserved					
			2	Reserved					
			3	@ Data Limit Fault					
			4	@ Data Compatibility fault					
			5h-Fh	Reserved					
	0023h	Frequency Reference		See U1-01					
	0024h	Output Frequency		See U1-02					
	0025h	Reserved		Reserved	N	N	N	N	
	0026h	Reserved		Reserved	N	N	N	N	
	0027h	Output Power		See U1-08					
	0028h	Torque Command		See U1-09	N	N	N	N	
	0029h	Reserved		Reserved	N	N	N	N	
	002Ah	Reserved		Reserved	N	N	N	N	

Table 4.3 - Monitor Registers (Read only)								
U-##	Addr	Function	Bit	Description	Mode			
					0	1	2	3
	002Bh	Sequence Input Status	0h	Terminal 1 Closed				
			1h	Terminal 2 Closed				
			2h	Terminal 3 Closed				
			3h	Terminal 4 Closed				
			4h	Terminal 5 Closed				
			5h	Terminal 6 Closed				
			6h	Terminal 7 Closed				
			7h	Terminal 8 Closed				
			8h	Reserved				
			9h	Reserved				
			Ah	Reserved				
			Bh	Reserved				
			Ch-Fh	Reserved				
	002Ch	Inverter Status	0h	@ RUN				
			1h	@ Zero Speed				
			2h	@ Speed Agree				
			3h	@ Random Speed Agree				
			4h	@ Frequency Detect 1				
			5h	@ Frequency Detect 2				
			6h	@ Inverter Ready				
			7h	@ Undervoltage				
			8h	@ Baseblock				
			9h	@ Frequency Reference Not From Communications				
			Ah	@ Command Reference Not From Communications				
			Bh	@ Overtorque				
			Ch	@ Loss of Frequency reference				
			Dh	@ Fault Retry				
			Eh	@ Fault				
			Fh	@ Communications Timeout				
	002Dh	Multi-Function Output Status	0h	Multi-Function Output 1				
			1h	Multi-Function Output 2				
			2h	Multi-Function Output 3				
			3h	Reserved				
			4h	Reserved				
			5h-Fh	Reserved				
	002Eh	Reserved		Reserved	N	N	N	N
	002Fh	Reserved		Reserved	N	N	N	N
	0030h	Reserved		Reserved	N	N	N	N
	0031h	Main Circuit DC Voltage						
	0032h	Torque			N	N	N	
	0033h	Output Power		See U1-08				
	0034h	Reserved		Reserved	N	N	N	N
	0035h	Reserved		Reserved	N	N	N	N
	0036h	Reserved		Reserved	N	N	N	N
	0037h	Reserved		Reserved	N	N	N	N
	0038h	PID Feedback Level						
	0039h	PID Input Level						
	003Ah	PID Output Level						
	003Bh	CPU		CPU Revision				
	003Ch	Flash ID		Software Revision				
	003Dh	Communications Error	0h	@ CRC Error				
			1h	@ Data Length Error				
			2h	Reserved				
			3h	@ Parity Error				
			4h	@ Overrun Error				
			5h	@ Framing Error				
			6h	@ Timeout				
7h-Fh	Reserved							
	003Eh	kVA Setting		See Parameter o2-04				
	003Fh	Control Mode		See Parameter A1-02				
U1-01	0040h	Frequency Reference		Units 0.01Hz				
U1-02	0041h	Output Frequency		Units 0.01Hz				
U1-03	0042h	Output Current		Units 0.1A				
U1-04	0043h	Control Method		Control method set in A1-02. 0 = V/F without PG 1 = V/F with PG 2 = Open Loop Vector 3 = Flux Vector				
U1-05	0044h	Motor Speed		Units 0.01Hz	N			
U1-06	0045h	Output Voltage		Units 0.1Vac				
U1-07	0046h	DC Bus Voltage		Units 1.0Vdc				
U1-08	0047h	Output Power		Units 0.1kW				
U1-09	0048h	Torque Reference		Units 0.1%	N	N	N	

Table 4.3 - Monitor Registers (Read only)									
U-##	Addr	Function	Bit	Description	Mode				
					0	1	2	3	
U1-10	0049h	Input Terminal Status	0h	Fwd Run (Terminal S1)					
			1h	Rev Run (Terminal S2)					
			2h	Terminal S3					
			3h	Terminal S4					
			4h	Terminal S5					
			5h	Terminal S6					
			6h	Terminal S7					
			7h	Terminal S8					
			8h	Reserved					
			9h	Reserved					
			Ah	Reserved					
			Bh	Reserved					
			Ch-Fh	Reserved					
			0h	Multi-function Output 1					
U1-11	004Ah	Output Terminal Status	1h	Multi-function Output 2					
			2h	Multi-function Output 3					
			3h	Reserved					
			4h	Reserved					
			5h	Reserved					
			6h	Reserved					
			7h	Fault Output					
			8h - Fh	Reserved					
U1-12	004Bh	F7 drive Operation Status	0h	@ FWD RUN					
			1h	@ Zero Speed					
			2h	@ REV RUN					
			3h	@ Reset					
			4h	@ Speed Agree					
			5h	@ F7 drive Ready					
			6h	@ Minor Fault					
			7h	@ Major Fault					
			8h - Fh	Reserved					
U1-13	004Ch	Elapsed Time		Units 1.0hr					
U1-14	004Dh	Flash ID		Software Revision					
U1-15	004Eh	Terminal A1 Input Voltage		Units 0.1%					
U1-16	04Fh	Terminal A2 Input Voltage		Units 0.1%					
U1-17	0050h	Terminal A3 Input Voltage		Units 0.1%					
U1-18	0051h	Motor Secondary Current (Iq)		Units 0.1%					
U1-19	0052h	Motor Excitation Current (Id)		Units 0.1%	N	N	N		
U1-20	0053h	Output Frequency After Soft Start		Units 0.01Hz					
U1-21	0054h	ASR Input		Units 0.01%	N	N	N		
U1-22	0055h	ASR Output		Units 0.01%	N	N	N		
	0056h	Reserved		Reserved	N	N	N	N	
U1-24	0057h	PID Feedback Value		Units 0.01%					
U1-25	0058h	DI-16H2 Input Status DI-16H2 option card required	0h	DI-16 Terminal 1					
			1h	DI-16 Terminal 2					
			2h	DI-16 Terminal 3					
			3h	DI-16 Terminal 4					
			4h	DI-16 Terminal 5					
			5h	DI-16 Terminal 6					
			6h	DI-16 Terminal 7					
			7h	DI-16 Terminal 8					
			8h	DI-16 Terminal 9					
			9h	DI-16 Terminal 10					
			Ah	DI-16 Terminal 11					
			Bh	DI-16 Terminal 12					
			Ch	DI-16 Terminal 13					
			Dh	DI-16 Terminal 14					
			Eh	DI-16 Terminal 15					
			Fh	DI-16 Terminal 16					
U1-26	0059h	Output Voltage Reference (Vq)		Units 0.1 Vac	N	N	N		
U1-27	005Ah	Output Voltage Reference (Vd)		Units 0.1 Vac	N	N	N		
U1-28	005Bh	CPU Number		CPU Revision					
U1-29	005Ch	kWh		Units 1.0kWh					
U1-30	005Dh	MWh		Units 1.0MWh					
	005Eh	Reserved		Reserved					
U1-32	005Fh	ACR Output of q Axis		Units 0.1%	N	N	N		
U1-33	0060h	ACR Output of d Axis		Units 0.1%	N	N	N		
U1-34	0061h	First Parameter Causing an OPE Fault							
U1-35	0062h	Zero Servo Pulse Count		Pulses	N	N	N		
U1-36	0063h	PID Input		Units 0.1%					
U1-37	0064h	PID Output		Units 0.1%					
U1-38	0065h	PID Setpoint		Units 0.1%					

Table 4.3 - Monitor Registers (Read only)									
U-##	Addr	Function	Bit	Description	Mode				
					0	1	2	3	
U1-39	0066h	Communication Error Code	0	CRC Error					
			1	Data Length Error					
			2	Reserved					
			3	Parity Error					
			4	Over-run Error					
			5	Framing Error					
			6	Timeout Error					
			7h - Fh	Reserved	N	N	N	N	
U1-40	0067h	Heatsink Cooling Fan Operation Time		Units 1.0hr					
U1-41	0068h	Heatsink Temperature		Units 1.0°C					
	0069h	Reserved		Reserved	N	N	N	N	
	006Ah	Reserved		Reserved	N	N	N	N	
U1-44	006Bh	ASR Output without Filter		Units 0.01%	N	N	N		
U1-45	006Ch	Feed Forward Control		Units 0.01%	N	N	N		
U1-46	006Dh	Feed Forward Control Speed		Units 0.01Hz	N	N	N		
	006Eh	Reserved		Reserved	N	N	N	N	
	006Fh	Reserved		Reserved	N	N	N	N	
U1-49	0070h	CPU Resources Used		Units 0.01%					
	0071h	Reserved		Reserved	N	N	N	N	
	0072h	Reserved		Reserved	N	N	N	N	
	0073h	Reserved		Reserved	N	N	N	N	
	0074h	Reserved		Reserved	N	N	N	N	
	0075h	Reserved		Reserved	N	N	N	N	
	0076h	Reserved		Reserved	N	N	N	N	
U2-01	0080h	Current Fault							
U2-02	0081h	Previous Fault							
U2-03	0082h	Frequency Reference @ Previous Fault		Units 0.01Hz					
U2-04	0083h	Output Frequency @ Previous Fault		Units 0.01Hz					
U2-05	0084h	Output Current @ Previous Fault		Units 0.1A					
U2-06	0085h	Motor Speed @ Previous Fault		Units 0.01Hz					
U2-07	0086h	Output Voltage @t Previous Fault		Units 0.1V					
U2-08	0087h	DC Bus Voltage @ Previous Fault		Units 1.0Vdc					
U2-09	0088h	Output Power @ Previous Fault		Units 0.1kW					
U2-10	0089h	Torque Reference @ Previous Fault		Units 0.1%	N	N	N		
U2-11	008Ah	Input Terminal Status @ Previous Fault		(See U1-10 Description)					
U2-12	008Bh	Output Terminal Status @ Previous Fault		(See U1-11 Description)					
U2-13	008Ch	F7 drive Operation Status @ Previous Fault		(See U1-12 Description)					
U2-14	008Dh	Elapsed Time @ Previous Fault		Units 1.0hr					
	008Eh	Reserved		Reserved	N	N	N	N	
	008Fh	Reserved		Reserved	N	N	N	N	
U3-01	0800h	Most Recent Fault		See o2-09					
U3-02	0801h	2nd Most Recent Fault		See o2-09					
U3-03	0802h	3rd Most Recent Fault		See o2-09					
U3-04	0803h	4th Most Recent Fault		See o2-09					
U3-05	080Ah	Elapsed Time @ Most Recent Fault		Units 1.0hr					
U3-06	080Bh	Elapsed Time @ 2nd Most Recent Fault		Units 1.0hr					
U3-07	080Ch	Elapsed Time @ 3rd Most Recent Fault		Units 1.0hr					
U3-08	080Dh	Elapsed Time @ 4th Most Recent Fault		Units 1.0hr					
U3-09	0804h	5th Most Recent Fault		See o2-09					
U3-10	0805h	6th Most Recent Fault		See o2-09					
U3-11	0806h	7th Most Recent Fault		See o2-09					
U3-12	0807h	8th Most Recent Fault		See o2-09					
U3-13	0808h	9th Most Recent Fault		See o2-09					
U3-14	0809h	10th Most Recent Fault		See o2-09					
U3-15	080Eh	Elapsed Time @ 5th Most Recent Fault		Units 1.0hr					
U3-16	080Fh	Elapsed Time @ 6th Most Recent Fault		Units 1.0hr					
U3-17	0810h	Elapsed Time @ 7th Most Recent Fault		Units 1.0hr					
U3-18	0811h	Elapsed Time @ 8th Most Recent Fault		Units 1.0hr					
U3-19	0812h	Elapsed Time @ 9th Most Recent Fault		Units 1.0hr					
U3-20	0813h	Elapsed Time @ 10th Most Recent Fault		Units 1.0hr					

# Parameters (Read/Write)

The following table lists user accessible parameters for the F7 drive.

- The “Prm” column contains the parameter name.
- The “Addr” column contains the register address in hexadecimal format. F7 drive registers are always referred in hexadecimal format.
- If the parameter values are chosen from a list of possible values, the list of choices can be found in the “Data” column. Parameter limits and a short description of the parameter function is contained in the “+/- Limits - Description” column.
- The “RUN” column describes whether the parameter is able to be written while the RUN command is active.
  - “Y” - the parameter is writable during RUN
  - “N” - the parameter is Read Only during RUN.
- The “Mode” columns describe the accessibility and access level for a given control mode (see A1-01 for access levels and A1-02 for control modes).
  - “A” - the parameter requires Advanced access (A1-01 = 2)
  - “Q” - the parameter has Quick access
  - “F” – the parameter requires factory access
  - “N” – the parameter is not accessible
- The “Dep” column shows whether the value, definition or function of the selected parameter is dependent on the setting of another parameter. If there is an “\*” in the “Dep” column, refer to the appropriate table at the end of this section.

Factory parameters are shown shaded and are included here for information purposes only

Table 4.4 - Parameters (Read/Write) - Initialization											
Prm	Addr	Function	Data	+/- Limits - Description	RUN	Mode				Dep	Default
						0	1	2	3		
A1-00	100h	Language	0	English	Y	A	A	A	A		0
			1	Japanese							
			2	German							
			3	French							
			4	Italian							
			5	Spanish							
			6	Portuguese							
A1-01	101h	Access Level	0	Monitor only	Y	A	A	A	A		2
			1	User							
			2	Advanced (A)							
			616	Factory (F)							
A1-02	102h	Control Method	0	V/f	N	Q	Q	Q	Q		0
			1	V/f w/ Feedback (PG Option)							
			2	Open loop vector							
			3	Closed Loop (flux) Vector							
A1-03	103h	Initialize Parameters	0	No initialization	N	A	A	A	A	o2-03	0
			1110	User initialize (Set A2-01 ~ A2-32 then set o2-03 to store)							
			2220	2-wire initialize							
			3330	3-wire initialize							
A1-04	104h	Enter Password		0 ~ 9999	N	A	A	A	A		0
A1-05	105h	Set Password		0 ~ 9999	N	A	A	A	A		0

Table 4.5 - Parameters (Read/Write) - User											
Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
A2-01	106h	User Parameter #1		Parameters utilized by user initialization (A1-01 = 1) Select a parameter address from an accessible parameter between b1-01 (180h) and o3-02 (507h)	N	A	A	A	A		0
A2-02	107h	User Parameter #2									
A2-03	108h	User Parameter #3									
A2-04	109h	User Parameter #4									
A2-05	10Ah	User Parameter #5									
A2-06	10Bh	User Parameter #6									
A2-07	10Ch	User Parameter #7									
A2-08	10Dh	User Parameter #8									
A2-09	10Eh	User Parameter #9									
A2-10	10Fh	User Parameter #10									
A2-11	110h	User Parameter #11									
A2-12	111h	User Parameter #12									
A2-13	112h	User Parameter #13									
A2-14	113h	User Parameter #14									
A2-15	114h	User Parameter #15									
A2-16	115h	User Parameter #16									
A2-17	116h	User Parameter #17									
A2-18	117h	User Parameter #18									
A2-19	118h	User Parameter #19									
A2-20	119h	User Parameter #20									
A2-21	11Ah	User Parameter #21									
A2-22	11Bh	User Parameter #22									
A2-23	11Ch	User Parameter #23									
A2-24	11Dh	User Parameter #24									
A2-25	11Eh	User Parameter #25									
A2-26	11Fh	User Parameter #26									
A2-27	120h	User Parameter #27									
A2-28	121h	User Parameter #28									
A2-29	122h	User Parameter #29									
A2-30	123h	User Parameter #30									
A2-31	124h	User Parameter #31									
A2-32	125h	User Parameter #32									

Table 4.6 - Parameters (Read/Write) - Sequencer											
Prm	Addr	Function	Data	+/- Limits - Description	RUN	Mode				Dep	Default
						0	1	2	3		
b1-01	180h	Frequency Reference Source	0	F7 drive operator	N	Q	Q	Q	Q		1
			1	External terminals							
			2	Serial communications							
			3	Option PCB							
			4	Pulse input							
b1-02	181h	Run Command Source	0	F7 drive operator	N	Q	Q	Q	Q		1
			1	External terminals							
			2	Serial communications							
			3	Option PCB							
b1-03	182h	Stopping Method	0	Ramp to Stop	N	Q	Q	Q	Q		0
			1	Coast to Stop							
			2	DC Inj Braking							
			3	Coast with timer							
b1-04	183h	Reverse Operation	0	Enabled	N	Q	Q	Q	Q		0
			1	Disabled							
			2	Phase order switched							
b1-05	184h	Minimum Output Frequency	0	Operates according to frequency reference	N	N	N	N	A		0
			1	Coast to stop if output is less than E1-09							
			2	Frequency reference set to E1-09							
			3	Frequency reference set to 0 if less than E1-09							
b1-06	185h	Digital Input Scan Time	0	2ms	N	A	A	A	A		0
			1	5ms							
b1-07	186h	Local/Remote Run	0	RUN command must be toggled	N	A	A	A	A		0
			1	RUN command does not need to be toggled							
b1-08	187h	Run Command @ Program	0	Disable	N	A	A	A	A		0
			1	Enable							
b1-09	188h	Run Mode Switchover	0	Local/remote key disabled during RUN	N	F	F	F	F		0
			1	Local/remote key enabled during RUN							

Table 4.7 - Parameters (Read/Write) – DC Braking

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
b2-01	189h	DC Injection Freq @ Start		0.0 ~ 10.0Hz	N	A	A	A	A		0.5Hz
b2-02	18Ah	DC Injection Current		0 ~ 100%	N	A	A	A	N		50%
b2-03	18Bh	DC Injection Brake Time @ Start		0.00 ~ 10.00sec	N	A	A	A	A		0sec
b2-04	18Ch	DC Injection Brake Time @ Stop		0.00 ~ 10.00sec	N	A	A	A	A	o2-09*	0.00sec
b2-05	18Dh	DC Proportional Gain		0.00 ~ 1.00	N	F	F	F	F		0.05
b2-06	18Eh	DC Injection Brake Integral Time		0 ~ 1000ms	N	F	F	F	F		100ms
b2-07	18Fh	DC Injection Limit		0.0 ~ 30.0%	N	F	F	F	F		15.0%
b2-08	190h	Field Compensation		0 ~ 1000%	N	N	N	A	N		0%

Table 4.8 - Parameters (Read/Write) – Speed Search

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
b3-01	191h	Speed Search @ Start	0	Disabled (speed estimation)	N	A	A	A	N	A1-02*	2
			1	Enable (speed estimation)							
			2	Disable (current detection)							
			3	Enable (current detection)							
b3-02	192h	Speed Search Current		0.0 ~ 10.0%	N	A	N	A	N	A1-02*	10.0%
b3-03	193h	Speed Search Deceleration Time		0.1 ~ 2.0sec (b3-01 = 2,3)	N	A	N	A	N	b3-01	2.0sec
b3-04	194h	V/f @ Speed Search		10 ~ 100%	N	F	N	N	N	kVA*	100%
b3-05	195h	Speed Search Delay Time		0.0 ~ 20.0sec	N	A	A	A	A		0.2sec
b3-06	196h	Speed Search Output Current 1		0.0 ~ 1.0	N	F	F	F	N	kVA*	0.5
b3-07	197h	Speed Search ACR Gain		0.0 ~ 3.0	N	F	F	F	N		1.0
b3-08	198h	Speed Search ACR P Gain		0.00 ~ 6.00	N	F	F	F	F	kVA*	0.50
b3-09	199h	Speed Search ACR I Time		0.0 ~ 1000.0ms	N	F	F	F	F		2.0ms
b3-10	19Ah	Speed Search Comp Gain		1.00 ~ 1.50 (b3-01 = 0,1)	N	F	N	F	N	b3-01	1.10%
b3-11	19Bh	Speed Search Switchover Level		0.55 ~ 100.0%	N	F	F	F	F		5.0%
b3-12	19Ch	Speed Search Dead band		2.0 ~ 5.0	N	F	F	F	N		2.5
	19Dh	Reserved		Reserved	N	N	N	N	N		
b3-14	19E	Bi-Directional Speed Search	0	Disable	N	A	A	A	N		1
			1	Enable							

Table 4.9 - Parameters (Read/Write) – Delay Timers

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
b4-01	1A3h	On-Delay Time		0.0 ~ 3000.0sec	N	A	A	A	A	o2-09*	0.0sec
b4-02	1A4h	Off-Delay Time		0.0 ~ 3000.0sec	N	A	A	A	A	o2-09*	0.0sec

Table 4.10 - Parameters (Read/Write) – PID Control

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
b5-01	1A5h	PID Mode	0	Disabled	N	A	A	A	A		0
			1	Enabled (D = Feedback)							
			2	Enabled (D = Feed Forward)							
			3	Enabled (Freq Ref + PID Output (D = Feedback))							
			4	Enabled (Freq Ref + PID Output (D = Feed Forward))							
b5-02	1A6h	P Gain		0.00 ~ 25.00	Y	A	A	A	A		1.00
b5-03	1A7h	I Time		0.0 ~ 360.0 sec	Y	A	A	A	A		1.0sec
b5-04	1A8h	I Limit		0.0 ~ 100.0%	Y	A	A	A	A		100.0%
b5-05	1A9h	D Time		0.00 ~ 10.00sec	Y	A	A	A	A		0.00sec
b5-06	1AAh	PID High Limit		0.0 ~ 100.0%	Y	A	A	A	A		100.0%
b5-07	1ABh	PID Offset		-100.0 ~ +100.0%	Y	A	A	A	A		0.0%
b5-08	1ACh	PID Primary Delay Time		0 ~ 10.00sec	Y	A	A	A	A		0.00sec
b5-09	1ADh	PID Output	0	PID Forward	N	A	A	A	A		0
			1	PID Reverse							
b5-10	1AEh	PID Output Gain		0.0 ~ 25.0	N	A	A	A	A		1.0
b5-11	1AFh	PID Reverse	0	Disable	N	A	A	A	A		0
			1	Enable							
b5-12	1B0h	PID Feedback Missing	0	Disable	N	A	A	A	A		0
			1	Enable (Fbl Alarm)							
			2	Enable (Fbl Fault)							
b5-13	1B1h	PID Feedback Missing Detect Level		0 ~ 100%	N	A	A	A	A		0%
b5-14	1B2h	PID Feedback Missing Detect Time		0.0 ~ 25.5sec	N	A	A	A	A		1.0sec
b5-15	1B3h	PID Sleep Function Level		0.0 ~ 400.0Hz	N	A	A	A	A	o2-09*	0.0Hz
b5-16	1B4h	PID Sleep Delay Time		0.0 ~ 25.5sec	N	A	A	A	A		0.0sec
b5-17	1B5h	PID Accel/Decel Time		0.0 ~ 25.5sec	N	A	A	A	A		0.0sec
b5-18	1DCh	PID Set Point	0	Disable	N	A	A	A	A	o2-09*	0
			1	Enable							
b5-19	1DDh	PID Set Point Scaling		0.0 ~ 100.0% (b5-18 = 1)	N	A	A	A	A	b5-18	0.0%

Table 4.11 - Parameters (Read/Write) – Reference Hold

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
b6-01	1B6h	Dwell Freq @ Start		0.0 ~ 400.0Hz	N	A	A	A	A		0.0Hz
b6-02	1B7h	Dwell Time @ Start		0.0 ~ 10.0sec	N	A	A	A	A		0.0sec
b6-03	1B8h	Dwell Freq @ Stop		0.0 ~ 400.0Hz	N	A	A	A	A		0.0Hz
b6-04	1B9h	Dwell Time @ Stop		0.0 ~ 10.0sec	N	A	A	A	A		0.0sec

Table 4.12 - Parameters (Read/Write) – Droop Control

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
b7-01	1CAh	Droop Control Level		0.0 ~ 100.0%	Y	N	N	N	A		0.0%
b7-02	1CBh	Droop Control Delay		0.03 ~ 2.0sec	Y	N	N	N	A		0.05sec

Table 4.13 - Parameters (Read/Write) – Energy Saving

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
b8-01	1CCh	Energy Saving Control	0	Disabled	N	A	A	A	A		0
			1	Enabled							
b8-02	1CDh	Energy Save Gain		0.0 ~ 100.0	Y	N	N	A	A	A2-01*	0.7
b8-03	1CEh	Energy Save Control Filter Time		0.00 ~ 10.00sec	Y	N	N	A	A	A1-02* kVA*	0.50sec
b8-04	1CFh	Energy Save Coefficient		0.00 ~ 655.00	N	A	A	A	A	kVA*	0.00
b8-05	1D0h	Power Detect Filter Time		0 ~ 2000ms	N	A	A	A	A		20ms
b8-06	1D1h	Search Operation Voltage Limit		0 ~ 100%	N	A	A	A	A		0%
b8-07	1D2h	Energy Save Voltage Low Limit @ 60hz		0 ~ 100%	N	F	F	N	N		50%
b8-08	1D3h	Energy Save Voltage Low Limit @ 6hz		0 ~ 25%	N	F	F	N	N		12%
b8-09	1D4h	Energy Save Voltage High Limit @ 60hz		0 ~ 120%	N	F	F	N	N		120%
b8-10	1D5h	Energy Save Voltage High Limit @ 6hz		0 ~ 25%	N	F	F	N	N		16%
b8-11	1D6h	Search Voltage Step @ 100%		0.1 ~ 10.0%	N	F	F	N	N		0.5%
b8-12	1D7h	Search Voltage Step @ 5%		0.1 ~ 10.0%	N	F	F	N	N		0.2%
b8-13	1D8h	Search Control Cycle		1 ~ 5000ms	N	F	F	N	N		25ms
b8-14	1D9h	Search Power Detect Hold Width		0 ~ 100%	N	F	F	N	N		10%

Table 4.14 - Parameters (Read/Write) – Zero Servo

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
b9-01	1DAh	Zero Servo Gain		0 ~ 100	N	A	A	N	N		5
b9-02	1DBh	Zero Servo Completion Width		0 ~ 16383	N	A	A	N	N		10

Table 4.15 - Parameters (Read/Write) – Accel/Decel

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
C1-01	200h	Acc Time 1		0.00~ 600.00sec (C1-10 = 0) or 0.0 ~ 6000.0sec (C1-10 = 1)	Y	Q	Q	Q	Q	C1-10	10.0sec
C1-02	201h	Dec Time 1									
C1-03	202h	Acc Time 2									
C1-04	203h	Dec Time 2									
C1-05	204h	Acc Time 3		0.00~ 600.00sec (C1-10 = 0) or 0.0 ~ 6000.0sec (C1-10 = 1)	N	A	A	A	A	C1-10	10.0ses
C1-06	205h	Dec Time 3									
C1-07	206h	Acc Time 4									
C1-08	207h	Dec Time 4									
C1-09	208h	Emergency Stop Time									
C1-10	209h	Acc/Dec Time Units	0	Acc/Dec units are 0.01sec	N	A	A	A	A		1
			1	Acc/Dec units are 0.1sec							
C1-11	20Ah	Acc/Dec Time Switchover Freq		0.0 ~ 400.0Hz	N	A	A	A	A		0.0Hz

Table 4.16 - Parameters (Read/Write) – S-Curve Acc/Dec

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
C2-01	20Bh	S-Curve Time @ Acc Start		0.00 ~ 2.50sec	N	A	A	A	A		0.20sec
C2-02	20Ch	S-Curve Time @ Acc End		0.00 ~ 2.50sec	N	A	A	A	A		0.20sec
C2-03	20Dh	S-Curve Time @ Dec Start		0.00 ~ 2.50sec	N	A	A	A	A		0.20sec
C2-04	20Eh	S-Curve Time @ Dec End		0.00 ~ 2.50sec	N	A	A	A	A		0.00sec



Table 4.17 - Parameters (Read/Write) – Motor Slip Comp

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
C3-01	20Fh	Slip Comp Gain		0.0 ~ 2.5	Y	A	N	A	A	A1-02*	1.0
C3-02	210h	Slip Comp Primary Delay Time		0 ~ 10000ms	N	A	N	A	N	A1-02*	2000ms
C3-03	211h	Slip Comp Limit		0 ~ 250%	N	A	N	A	N		200%
C3-04	212h	Slip Comp @ Regeneration	0	Disable	N	A	N	A	N		0
			1	Enable							
C3-05	213h	Slip Comp Output Voltage Limit	0	Disable	N	A	N	A	A		0
			1	Enable							
C3-06	214h	Magnetic Flux Characteristics	0	Magnetic Flux calculated after comp	N	N	N	F	N		0
			1	Magnetic Flux calculated before comp							

Table 4.18 - Parameters (Read/Write) – Torque Comp

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
C4-01	215h	Torque Comp Gain		0.00 ~ 2.50	Y	A	A	A	N		1.00
C4-02	216h	Torque Comp Delay Time 1		0 ~ 10000ms	N	A	A	A	N	A1-02*	200ms
C4-03	217h	Torque Comp @ Forward		0.0 ~ 200.0%	N	N	N	A	N	o2-09*	0.0%
C4-04	218h	Torque Comp @ Reverse		-2000 ~ 0.0%	N	N	N	A	N	o2-09*	0.0%
C4-05	219h	Torque Comp Time Const		0 ~ 200ms	N	N	N	A	N	o2-09*	10ms
C4-06	21Ah	Torque Comp Delay Time 2		0 ~ 10000ms	N	N	N	F	N		150ms

Table 4.19 – Parameters (Read/Write) – ASR

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
C5-01	21Bh	ASR P Gain		0.00 ~ 300.00	Y	N	A	N	A	A1-02*	0.20
C5-02	21Ch	ASR I Time		0.000 ~ 10.000sec	Y	N	A	N	A	A1-02*	0.200sec
C5-03	21Dh	ASR P Gain 2		0.00 ~ 300.00	Y	N	A	N	A	A1-02*	0.02
C5-04	21Eh	ASR I Time 2		0.000 ~ 10.000sec	Y	N	A	N	A	A1-02*	0.050sec
C5-05	21Fh	ASR Limit		0.0 ~ 20.0%	N	N	A	N	N		5.0%
C5-06	220h	ASR Primary Delay Time		0.000 ~ 0.500sec	N	N	N	N	A	A1-02*	0.004sec
C5-07	221h	ASR Gain Switching Frequency		0.0 ~ 400.0%	N	N	N	N	A		0.0Hz
C5-08	222h	ASR I Limit		0 ~ 400%	N	N	N	N	A		400%

Table 4.20 - Parameters (Read/Write) – Carrier Frequency

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
C6-01	223h	Heavy/Normal Duty	0	Heavy Duty	N	Q	Q	Q	Q	kVA*	1
			1	Normal Duty 1							
			2	Normal Duty 2							
C6-02	224h	Carrier Frequency	0h	Low Noise (C6-01 = 0,1)	N	A	A	A	A	C6-01 kVA*	6
			1h	Fc = 2.0kHz (C6-01 = 0,1)							
			2h	Fc = 5.0kHz (C6-01 = 0 ~ Fh)							
			3h	Fc = 8.0kHz (C6-01 = 0 ~ Fh)							
			4h	Fc = 10.0kHz (C6-01 = 0 ~ Fh)							
			5h	Fc = 12.5kHz (C6-01 = 0 ~ Fh)							
			6h	Fc = 15.0kHz (C6-01 = 0 ~ Fh)							
			7h - Eh	Reserved							
			Fh	User set (parameters C6-03 through C6-07)							
C6-03	225h	Carrier Frequency Upper Limit		2.0 ~ 15.0 kHz	N	A	A	A	A		15.0kHz
C6-04	226h	Carrier Frequency Lower Limit		0.4 ~ 15.0 kHz	N	A	A	N	N		15.0kHz
C6-05	227h	Carrier Frequency Proportional Gain		0 ~ 99	N	A	A	N	N		0
C6-06	228h	PWM Modulation Method	0	2phase/3 phase switchover	N	F	F	F	F	A1-02*	0
			1	2 phase modulation							
			2	Low Carrier (pattern 1)							
			3	Low Carrier (pattern 2)							
			4	Low Carrier (pattern 3)							
			5	Low Carrier (pattern 4)							
			6	Low Carrier (pattern 5)							
C6-07	229h	PWM 2/3 Phase Switchover Level		0.5 ~ 3.0	N	F	F	F	F		15
C6-08	22Ah	PWM Minimum On Time		1.0 ~ 5.0	N	F	F	F	F		30
C6-09	22Bh	Carrier Freq @ Auto Tuning	0	Carrier Frequency @ 5kHz	N	N	N	F	F		0
			1	C6-03							
C6-10	22Ch	Carrier Frequency @ Auto tune (Stopping)	0	0.5kHz	N	N	N	F	F		1
			1	1.0kHz							
			2	1.5kHz							
			3	2.0kHz							

Table 4.21 - Parameters (Read/Write) – Preset Reference

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
d1-01	280h	Frequency Reference 1		Motor 1 Selected E1-09 ~ E1-04 Motor 2 Selected E3-07 ~ E3-02  Motor can be selected through setting F5-01 ~ F5-08 H1-01 ~ H1-06 T1-01	Y	A	A	A	A	E1-04 E1-09 E3-02 E3-07 o1-03*	0.00Hz
d1-02	281h	Frequency Reference 2									
d1-03	282h	Frequency Reference 3									
d1-04	283h	Frequency Reference 4									
d1-05	284h	Frequency Reference 5									
d1-06	285h	Frequency Reference 6									
d1-07	286h	Frequency Reference 7									
d1-08	287h	Frequency Reference 8									
d1-09	288h	Frequency Reference 9									
d1-10	28Bh	Frequency Reference 10									
d1-11	28Ch	Frequency Reference 11									
d1-12	28Dh	Frequency Reference 12									
d1-13	28Eh	Frequency Reference 13									
d1-14	28Fh	Frequency Reference 14									
d1-15	290h	Frequency Reference 15									
d1-16	291h	Frequency Reference 16									
d1-17	292h	Jog Frequency		0.00 ~ 400.00Hz	Y	Q	Q	Q	Q	o1-03*	6.00Hz

Table 4.22 - Parameters (Read/Write) – Reference Limits

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
d2-01	289h	Frequency Reference Upper Limit		0.0 ~ 110.0%	N	A	A	A	A		100.0%
d2-02	28Ah	Frequency Reference Lower Limit		0.0 ~ 110.0%	N	A	A	A	A		0.0%
d2-03	293h	Master Speed Reference Lower Limit		0.0 ~ 110.0%	N	A	A	A	A		0.0%

Table 4.22 - Parameters (Read/Write) – Jump Frequency

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
d3-01	294h	Jump Frequency 1		Motor 1 Selected E1-09 ~ E1-04 Motor 2 Selected E3-07 ~ E3-02  Motor can be selected through setting F5-01 ~ F5-08 H1-01 ~ H1-06 T1-01	N	A	A	A	A	E1-04 E1-09 E3-02 E3-09 o1-03*	0.0Hz
d3-02	295h	Jump Frequency 2									
d3-03	296h	Jump Frequency 3									
d3-04	297h	Jump Frequency Bandwidth		0.0 ~ 20.0Hz	N	A	A	A	A		1.0Hz

Table 4.23 - Parameters (Read/Write) – Sequence

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
d4-01	298h	Frequency Reference Hold Function	0	Disable	N	A	A	A	A		0
			1	Enable							
d4-02	299h	Trim Control Level		0 ~ 100%	N	A	A	A	A		10%

Table 4.24 - Parameters (Read/Write) – Torque Control

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
d5-01	29Ah	Torque Control	0	Speed Control	N	N	N	N	A		0
			1	Torque Control							
d5-02	26Bh	Torque Reference Delay Time		0 ~ 1000ms	N	N	N	N	A	A1-02*	0ms
d5-03	29Ch	Speed Limit	1	Analog Input	N	N	N	N	A		1
			2	d5-04 setting							
d5-04	29Dh	Speed Limit		-120% ~ 120%	N	N	N	N	A		0%
d5-05	29Eh	Speed Limit Bias		0 ~ 120%	N	N	N	N	A		10%
d5-06	29Fh	Speed/Torque Switchover Time		0 ~ 1000ms	N	N	N	N	A		0ms

Table 4.25 - Parameters (Read/Write) – Field Weakening

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
d6-01	2A0h	Magnetic Field Weakening Level		0 ~ 100%	N	A	A	N	N		80%
d6-02	2A1h	Magnetic Field Freq		0.0 ~ 300.0Hz	N	A	A	N	N		0.0Hz
d6-03	2A2h	Magnetic Field Force Function	0	Disable	N	N	N	A	A		0
			1	Enable							
d6-06	2A5h	Magnetic Field Force Limit		100 ~ 400%	N	N	A	A	A		400%

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
E1-01	300h	Input Voltage		155 ~ 255Vac (200Vac Class) or 310 ~ 510Vac (400Vac Class)	N	Q	Q	Q	Q	kVA o2-09*	230Vac
E1-03	302h	V/F Pattern	0	50Hz	N	Q	Q	Q	N	o2-09*	Fh
			1	60Hz Saturation							
			2	50Hz Saturation							
			3	72Hz							
			4	50Hz VT1							
			5	50Hz VT2							
			6	60Hz VT1							
			7	60Hz VT2							
			8	50Hz HST1							
			9	50Hz HST2							
			Ah	60Hz HST1							
			Bh	60Hz HST2							
			Ch	90Hz							
			Dh	120Hz							
			Eh	180Hz							
			Fh	Custom V/f pattern (Settings E1-04 through E1-10)							
			FFh	Custom w/o Limit							
E1-04	303h	Maximum Output Frequency		40.0 ~ 400.0Hz (E1-04 > E1-09)	N	Q	Q	Q	Q	E1-09 A1-02*	60.0Hz
E1-05	304h	Maximum Output Voltage		0.0 ~ 255.0Vac (200Vac Class) 0.0 ~ 510.0Vac (400Vac Class)	N	Q	Q	Q	Q	KVA A1-02* o2-09*	230.0Vac
E1-06	305h	Base Output Frequency		0.0 ~ 400.0Hz	N	Q	Q	Q	Q	A1-02* o2-09*	60.0Hz
E1-07	306h	Mid Output Frequency A		0.0 ~ 400.0Hz (E1-09 <= E1-07 <= E1-04)	N	A	A	A	F	E1-04 E1-09 A1-02*	3.0Hz
E1-08	307h	Voltage @ Mid Output Frequency		0.0 ~ 255.0Vac (200Vac Class) 0.0 ~ 510.0Vac (400Vac Class)	N	A	A	A	F	KVA A1-02* o2-09*	17.2Hz
E1-09	308h	Minimum Output Frequency		0.0 ~ 400.0Hz (E1-09 >= E1-06)	N	Q	Q	Q	A	E1-06 A1-02* o2-09*	1.5Hz
E1-10	309h	Voltage @ Minimum Output Frequency		0.0 ~ 255.0Vac (200Vac Class) 0.0 ~ 510.0Vac (400Vac Class)	N	A	A	A	F	KVA A1-02* o2-09*	10.3Vac
E1-11	30Ah	Mid Output Frequency B		0.0 ~ 400.0Hz (E1-09 <= E1-07 <= E1-04)	N	A	A	A	A	E1-04 E1-09	0.0Hz
E1-12	30Bh	Voltage @ Mid Output Frequency B		0.0 ~ 255.0Vac (200Vac Class) 0.0 ~ 510.0Vac (400Vac Class)	N	A	A	A	A	kVA o2-09*	0.0Vac
E1-13	30Ch	Voltage @ Base Output Frequency		0.0 ~ 255.0Vac (200Vac Class) 0.0 ~ 510.0Vac (400Vac Class)	N	A	A	Q	Q	kVA o2-09*	0.0Vac

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
E2-01	30Eh	Motor 1 Rated Current		0.32 ~ 6.40 amps	N	Q	Q	Q	Q	kVA* o2-09*	1.90A
E2-02	30Fh	Motor 1 Rated Slip		0.00 ~ 20.00Hz	N	A	A	A	A	kVA* o2-09*	2.90Hz
E2-03	310h	Motor 1 No-Load Current		0.00 ~ 1.89 amps	N	A	A	A	A	kVA* o2-09*	1.20A
E2-04	311h	Motor 1 Number of Motor Poles		2 ~ 48 poles	N	N	Q	N	Q		4poles
E2-05	312h	Motor 1 Terminal Resistance		0.000 ~ 6.500 ohms	N	A	A	A	A	kVA*	9.842ohms
E2-06	313h	Motor 1 Leakage Inductance		0.0 ~ 40.0%	N	N	N	A	A	kVA*	18.2%
E2-07	314h	Motor 1 Iron Core Saturation Coef 1		0.00 ~ 0.50	N	N	N	A	A		0.50
E2-08	315h	Motor 1 Iron Core Saturation Coef 2		0.00 ~ 0.75	N	N	N	A	A		0.75
E2-10	317h	Motor 1 Iron Loss of Torque Comp		0.0 ~ 65535 W	N	A	A	N	N	kVA*	14W
E2-11	318h	Motor 1 Rated Output		0.00 ~ 650.00 kw	N	Q	Q	Q	Q		0.40kW
E2-12	328h	Motor Iron Core Saturation 3		1.30 ~ 1.60	N	N	N	A	A		1.30

Table 4.28 - Parameters (Read/Write) – V/F Pattern 2

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
E3-01	319h	Motor 2 Control Method	0	V/F	N	A	A	A	A		0
			1	Closed Loop V/F							
			2	Open Loop Vector							
			3	Closed Loop Vector (Flux Vector)							
E3-02	31Ah	Motor 2 Maximum Output Freq		40.0 ~ 400.0Hz (E3-02 > E3-07)	N	A	A	A	A	E3-07 A1-02* o2-09*	60.0Hz
E3-03	31Bh	Motor 2 Maximum Output Voltage		0.0 ~ 255.0Vac (200Vac Class) 0.0 ~ 510.0Vac (400Vac Class)	N	A	A	A	A	kVA A1-02* o2-09*	230.0Vac
E3-04	31Ch	Motor 2 Base Output Freq		0.0 ~ 400.0Hz	N	A	A	A	A	A1-02* o2-09*	60.0Hz
E3-05	31Dh	Motor 2 Mid Output Freq		0.0 ~ 400.0Hz (3-07 <= E3-05 <= E3-02)	N	A	A	A	A	E3-07 E3-02 A1-02*	3.0Hz
E3-06	31Eh	Motor 2 Voltage @ Mid Output Freq		0.0 ~ 255.0Vac (200Vac Class) 0.0 ~ 510.0Vac (400Vac Class)	N	A	A	A	F	kVA A1-02* o2-09*	17.2Vac
E3-07	31Fh	Motor 2 Minimum Output Freq		0.0 ~ 400.0Hz (E3-06 >= E3-04)	N	A	A	A	A	E3-04 A1-02* o2-09*	60.0Hz
E3-08	320h	Motor 2 Voltage @ Minimum Output Freq		0.0 ~ 255.0Vac (200Vac Class) 0.0 ~ 510.0Vac (400Vac Class)	N	A	A	A	F	kVA A1-02* o2-09*	10.3Vac

Table 4.29 - Parameters (Read/Write) – Motor Setup 2

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
E4-01	321h	Motor 2 Rated Current		0.32 ~ 6.40 amps	N	A	A	A	A	kVA* o2-09*	1.90A
E4-02	322h	Motor 2 Rated Slip		0.00 ~ 20.00Hz	N	A	A	A	A	kVA* o2-09*	2.90Hz
E4-03	323h	Motor 2 No-Load Current		0.00 ~ 1.89 amps	N	A	A	A	A	kVA* o2-09*	1.20A
E4-04	324h	Motor 2 Number of Motor Poles		2 ~ 48 poles	N	A	A	A	A		4 poles
E4-05	325h	Motor 2 Terminal Resistance		0.00 ~ 65.000 ohms	N	A	A	A	A	kVA*	9.842ohms
E4-06	326h	Motor 2 Leakage Inductance		0.0 ~ 4000%	N	A	A	A	A	kVA*	18.2%
E4-07	327h	Motor 2 Rated Capacity		0.00 ~ 650.00 kw	N	A	A	A	A		0.40kW

Table 4.30 - Parameters (Read/Write) – Motor Setup 2

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
F1-01	380h	PG Parameter		0 ~ 60000	N	N	Q	N	Q	o2-09*	1024ppr
F1-02	381h	Operation @ PG Open	0	Ramp to Stop	N	N	Q	N	Q		1
			1	Coast to Stop							
			2	Decelerate to Stop							
			3	Operation Continues							
F1-03	382h	Operation @ Over Speed	0	Ramp to Stop	N	N	A	N	A		1
			1	Coast to Stop							
			2	Decelerate to Stop							
			3	Operation Continues							
F1-04	383h	Operation @ Speed Deviation	0	Ramp to Stop	N	N	A	N	A		3
			1	Coast to Stop							
			2	Decelerate to Stop							
			3	Operation Continues							
F1-05	384h	PG Rotation Direction	0	A-Phase FWD (CCW Rotation)	N	N	A	N	A		0
			1	B-Phase FWD (CW Rotation)							
F1-06	385h	PG Output Division Rate		1 ~ 132 (PB-2 Only)	N	N	A	N	A		1
F1-07	386h	Integral @ Accel/Decel	0	Disable	N	N	A	N	A		0
			1	Enable							
F1-08	387h	Over Speed Detect Level		0 ~ 120%	N	N	A	N	A		115%
F1-09	388h	Over Speed Detect Delay Time		0.0 ~ 2.0sec	N	N	A	N	A	A1-02*	1.0sec
F1-10	389h	Excessive Speed Detect Level		0 ~ 50%	N	N	A	N	A		10sec
F1-11	38Ah	Excessive Speed Detect Delay Time		0.0 ~ 10.0sec	N	N	A	N	A		0.5sec
F1-12	38Bh	PG Gear Teeth 1		0 ~ 1000	N	N	A	N	A		0
F1-13	38Ch	PG Gear Teeth 2		0 ~ 1000	N	N	A	N	N		0
F1-14	38Dh	PG Open Detect Time		0.0 ~ 10.0sec	N	N	A	N	N		2.0sec
F1-15	38Eh	Speed Detect Filter	0	No Moving Average	N	N	F	N	F		1
			1	PG – Moving Average							

Table 4.31 - Parameters (Read/Write) – AI-14 Setup											
Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
F2-01	38Fh	AI-14 Input	0	3-channels Separate	N	A	A	A	A		0
			1	3-channels Summed (ch 1 + ch 2 + ch 3)							

Table 4.32 - Parameters (Read/Write) – DI-08, 16 Setup											
Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
F3-01	390h	DI-08/DI-16H2 Input	0	BCD 1% Units	N	A	A	A	A		0
			1	BCD 0.1% Units							
			2	BCD 0.01% Units							
			3	BCD 1Hz Units							
			4	BCD 0.1Hz Units							
			5	BCD 0.01Hz Units							
			6	BCD (5 digit) 0.01Hz Units (DI-16H2 only)							
			7	Binary							

Table 4.33 - Parameters (Read/Write) – AO-08, 12 Setup

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
F4-01	391h	Channel 1 Monitor AO-8 or AO-12 Analog Output Card required	1	Frequency Reference	N	A					2
			2	Output Frequency							
			3	Output Current							
			5	Motor Speed							
			6	Output voltage							
			7	DC BUS Voltage							
			8	Output Watts							
			9	Torque Reference							
			15	Terminal A1 Level							
			16	Terminal A2 Level							
			17	Terminal A3 level							
			18	Motor SEC Current							
			19	Motor EXC Current							
			20	SFS Output							
			21	ASR Input							
			22	ASR Output							
			24	PID Feedback							
			26	Voltage Reference (Vq)							
			27	Voltage Reference (Vd)							
			31	Reserved							
			32	ACR(q) Output							
			33	ACR(D) Output							
			36	PID Input							
			37	PID Output							
			38	PID Setpoint							
			41	Actual Fin Temperature (°C)							
			44	ASR Output w/o Filter							
			45	Feed Forward Count Output							
46	Feed Forward Estimate Speed	N	N	N	N	A					
49	Occupation Rate	N	A	A	A	A					
F4-02	392h	Channel 1 Gain		0.00 ~ 2.50	N	A	A	A	A		1
F4-03	391h	Channel 2 Monitor AO-8 or AO-12 Analog Output Card required	1	Frequency Reference	N	A					2
			2	Output Frequency							
			3	Output Current							
			5	Motor Speed							
			6	Output voltage							
			7	DC BUS Voltage							
			8	Output Watts							
			9	Torque Reference							
			15	Terminal A1 Level							
			16	Terminal A2 Level							
			17	Terminal A3 level							
			18	Motor SEC Current							
			19	Motor EXC Current							
			20	SFS Output							
			21	ASR Input							
			22	ASR Output							
			24	PID Feedback							
			26	Voltage Reference (Vq)							
			27	Voltage Reference (Vd)							
			31	Reserved							
			32	ACR(q) Output							
			33	ACR(D) Output							
			36	PID Input							
			37	PID Output							
			38	PID Setpoint							
			41	Actual Fin Temperature (°C)							
			44	ASR Output w/o Filter							
			45	Feed Forward Count Output							
46	Feed Forward Estimate Speed	N	N	N	N	A					
49	Occupation Rate	N	A	A	A	A					
F4-04	394h	Channel 2 Gain		0.00 ~ 2.50	N	A	A	A	A		0.50%
F4-05	395h	CH1 Output Bias		-10.0 ~ 10.0%	N	A	A	A	A		0.0%
F4-06	396h	CH2 Output Bias		-10.0 ~ 10.0%	N	A	A	A	A		0.0%
F4-07	397h	CH1 Output Signal Level	0	0 ~ 10V	N	A	A	A	A		0
			1	-10 ~ +10V							
F4-08	398h	CH2 Output Signal Level	0	0 ~ 10V	N	A	A	A	A		0
			1	-10 ~ +10V							

Table 4.34 - Parameters (Read/Write) – DO-02, 08 Setup

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
F5-01	399h	CH1 Output DO-02 or DO-08 Digital Output Card Required	0h	During RUN 1	N	A	A	A	A		0
			1h	Zero Speed							
			2h	Fref/Fout Agree 1							
			3h	Fref/Set Agree 1							
			4h	Frequency Detection 1							
			5h	Frequency Detection 2							
			6h	Inverter Ready							
			7h	DC Bus Under-voltage							
			8h	Base Block 1 N.O.							
			9h	Option Reference							
			Ah	LOCAL/REMOTE Operation							
			Bh	Torque Detection 1 N.O.							
			Ch	Loss of Reference							
			Dh	Braking Resistor Fault							
			Eh	Fault							
			Fh	Not Used							
			10h	Minor Fault – Alarm							
			11h	Reset Command Active							
			12h	Timer Output							
			13h	Fref/Fout Agree 2							
			14h	Fref/Set Agree 2							
			15h	Frequency Detection 3							
			16h	Frequency Detection 4							
			17h	Torque Detection 1 N.C.							
			18h	Torque Detection 2 N.O.							
			19h	Torque Detection 2 N.C.							
			1Ah	Reverse Direction							
			1Bh	Base block 2 N.C.							
			1Ch	Motor 2 Selection							
			1Dh	Regenerating							
			1Eh	Restart Enabled							
			1Fh	Overload (OL1)							
			20h	OH Pre-alarm							
			30h	During Torque Limit (when in speed control)							
			31h	During Speed Limit							
			32h	During Speed Limit (when in torque control)							
			33h	Zero-Servo Complete							
			34h	Brake Command							
			37h	During Run 2							
			38h	When F7 drive is Enabled						o2-09*	
F5-02	39Ah	CH2 Output		0 ~ 38h ( See F5-01) DO-02 or DO-08 Card Required	N	A	A	A	A	o2-09*	1
F5-03	39Bh	CH3 Output		0 ~ 38h ( See F5-01) DO-08 Digital Output Card Required	N	A	A	A	A	o2-09*	2
F5-04	39Ch	CH4 Output		0 ~ 38h ( See F5-01) DO-08 Digital Output Card Required	N	A	A	A	A	o2-09*	4
F5-05	39Dh	CH5 Output		0 ~ 38h ( See F5-01) DO-08 Digital Output Card Required	N	A	A	A	A	o2-09*	6
F5-06	39Eh	CH6 Output		0 ~ 38h ( See F5-01) DO-08 Digital Output Card Required	N	A	A	A	A	o2-09*	55
F5-07	39Fh	CH7 Output		0 ~ 38h ( See F5-01) DO-08 Digital Output Card Required	N	A	A	A	A	o2-09*	0Fh
F5-08	3A0h	CH8 Output		0 ~ 38h ( See F5-01) DO-08 Digital Output Card Required	N	A	A	A	A	o2-09*	0Fh
F5-09	3A1h	CH8 Output Mode	0	8CH Independent Output	N	A	A	A	A		0
			1	Binary Code Input							
			2	Output set by F5-01 ~ F5-08							

Table 4.35 - Parameters (Read/Write) – Communications Option Setup

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
F6-01	3A2h	Stopping Method for Communication Error Detection	0	Ramp to Stop	N	A	A	A	A		1
			1	Coast to Stop							
			2	Emergency Stop (Decel Time Set by C1-09)							
			3	Operation Continues							
F6-02	3A3h	External Fault Detection	0	Always Detect	N	A	A	A	A		0
			1	Detect During Operation							
F6-03	3A4h	Stopping Method for External Fault	0	Ramp to Stop	N	A	A	A	A		1
			1	Coast to Stop							
			2	Emergency Stop (Decel Time Set by C1-09)							
			3	Operation Continues							
F6-04	3A5h	Trace Sample	0 ~ 60000		N	A	A	A	A		0
F6-05	3A6h	Current Monitor Display	0	0: Amp Display	N	A	A	A	A	02-09*	0
			1	0: Scaled Amp Display (100%/8192)							
F6-06	3A7h	Torque Ref/Torque Limit COM Option	0	Disable	N	N	N	N	A		0
			1	Enable							



Table 4.36 - Parameters (Read/Write) – Digital Inputs

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
H1-01	400h	Multi-Function Input 1 – S3	0h	3-Wire Control	N	A	A	A	A		36
			1h	LOCAL/REMOTE Selection							
			2h	Option/Inverter Selection							
			3h	Multi-Step Speed Reference 1							
			4h	Multi-Step Speed Reference 2							
			5h	Multi-Step Speed Reference 3							
			6h	Jog Frequency Reference							
			7h	Accel/Decel Time 1							
			8h	External Base-Block (N.O)							
			9h	External Base-Block (N.C)							
			Ah	Frequency Reference Hold - Accel/Decel Stop							
			Bh	External Over Heat (OH2)							
			Ch	Multi-Function Analog Input A2 Enable/Disable							
			Dh	V/F Mode Selection							
			Eh	ASR Integral Reset							
			Fh	Reserved							
			10h	MOP Command							
			11h	MOP Command							
			12h	FJOG Command (Jog Frequency Set by d1-17)							
			13h	RJOG Command (Jog Frequency Set by d1-17)							
			14h	Fault Reset							
			15h	Fast Stop (N.O.) (Decel Set by C1-09)							
			16h	Switch to Motor 2							
			17h	Fast Stop (N.C.) (Decel Set by C1-09)							
			18h	Timer Function Input (Set by b4-01 & b4-02)							
			19h	Disable PID Control							
			1Ah	Accel/Decel Time 2							
			1Bh	Program Lockout							
			1Ch	Trim Control Increase (Analog Freq Ref +d4-02)							
			1Dh	Trim control Decrease (Analog Freq Ref -d4-02)							
			1Eh	Analog Frequency Reference Sample/Hold							
			1Fh	Reserved							
			20h	Ramp to Stop N.O. – Always Detect							
			21h	Ramp to Stop N.C. – Always Detect							
			22h	Ramp to Stop N.O. – @ RUN Detect							
			23h	Ramp to Stop N.C. – @ RUN Detect							
			24h	Coast to Stop N.O. – Always Detect							
			25h	Coast to Stop N.C. – Always Detect							
			26h	Coast to Stop N.O. – @ RUN Detect							
			27h	Coast to Stop N.C. – @ RUN Detect							
			28h	Fast Stop N.O. – Always Detect							
			29h	Fast Stop N.C. – Always Detect							
			2Ah	Fast Stop N.O. – @ RUN Detect							
			2Bh	Fast Stop N.C. – @ RUN Detect							
			2Ch	Alarm N.O. – Always Detect							
			2Dh	Alarm N.C. – Always Detect							
			2Eh	Alarm N.O. – @ RUN Detect							
			2Fh	Alarm N.C. – @ RUN Detect							
			30h	PID Integral Reset							
			31h	PID Integral Hold							
			32h	Multi-Step Speed Reference 4							
			33h	Reserved							
			34h	PID SFS Cancel							
			35h	PID Input Switchover							
			36h ~ 59h	Reserved							
			60h	DC Injection Braking							
			61h	External Speed Search 1 (Max Output Freq)							
			62h	External Speed Search 2 (Set Freq Ref)							
			63h	Magnetic Field Ref (Set by d6-01 & d6-02)							
			64h	External Speed Search 3							
			65h	KEB Ride Through (N.C.)							
			66h	KEB Ride Through (N.O.)							
			67h	Communication Test Mode							
			68h	HSB (High Slip Braking)							
			69h	JOG Frequency 2							02-09*
			6Ah	F7 drive Enable							02-09*
			71h	Speed/Torque Control Change							02-09*
			72h	Zero Servo Command							02-09*
			77h	ASR Gain Switch							02-09*
			78h	Torque Reference Sign Change							02-09*
H1-02	401h	Multi-Function Input 2 – S4		0 ~ 78h (See H1-01)	N	A	A	A	A	02-09*	20
H1-03	402h	Multi-Function Input 3 – S5		0 ~ 78h (See H1-01)	N	A	A	A	A	02-09*	3

Table 4.36 - Parameters (Read/Write) – Digital Inputs

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
H1-04	403h	Multi-Function Input 4 – S6		0 ~ 78h (See H1-01)	N	A	A	A	A	o2-09*	4
H1-05	404h	Multi-Function Input 5 – S7		0 ~ 78h (See H1-01)	N	A	A	A	A	o2-09*	6
H1-06	405h	Multi-Function Input 6 – S8		0 ~ 78h (See H1-01)	N	A	A	A	A	o2-09*	8
H1-11	40Ah	External Base Block Operation	0	FOUT Held @ Base Block	N	F	F	F	F		0
			1	FOUT Set to 0 @ Base Block							

Table 4.37 - Parameters (Read/Write) – Digital Outputs

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
H2-01	40Bh	Multi-Function Output 1	0h	During RUN 1	N	A	A	A	A		0
			1h	Zero Speed							
			2h	Fref/Fout Agree 1							
			3h	Fref/Set Agree 1							
			4h	Frequency Detection 1							
			5h	Frequency Detection 2							
			6h	Inverter Ready							
			7h	DC Bus Under-voltage							
			8h	Base Block 1 N.O.							
			9h	Option Reference							
			Ah	LOCAL/REMOTE Operation							
			Bh	Torque Detection 1 N.O.							
			Ch	Loss of Reference							
			Dh	Braking Resistor Fault							
			Eh	Fault							
			Fh	Reserved							
			10h	Minor Fault – Alarm							
			11h	Reset Command Active							
			12h	Timer Output							
			13h	Fref/Fout Agree 2							
			14h	Fref/Set Agree 2							
			15h	Frequency Detection 3							
			16h	Frequency Detection 4							
			17h	Torque Detection 1 N.C.							
			18h	Torque Detection 2 N.O.							
			19h	Torque Detection 2 N.C.							
			1Ah	Reverse Direction							
			1Bh	Base block 2 N.C.							
			1Ch	Motor 2 Selection							
			1Dh	Regenerating							
			1Eh	Restart Enabled							
			1Fh	Overload (OL1)							
			20h	OH Pre-alarm							
			30h	During Torque Limit (when in speed control)							
			31h	During Speed Limit							
			32h	During Speed Limit (when in torque control)							
			33h	Zero-Servo Complete							
			34h	Brake Command							
			37h	During Run 2							
			38h	When F7 drive is Enabled						o2-09*	
H2-02	40Ch	Multi-Function Output 2		0 ~ 38h (See H2-01)	N	A	A	A	A	o2-09*	1
H2-03	40Dh	Multi-Function Output 3		0 ~ 38h (See H2-01)	N	A	A	A	A	o2-09*	2

Table 4.38 - Parameters (Read/Write) – Analog Inputs

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
H3-01	410h	Terminal A1 Signal Level	0	0 ~ 10Vdc	N	A	A	A	A	o2-09*	0
			1	-10 ~ 10Vdc							
H3-02	411h	Terminal A1 Gain		0.0 ~ 1000.0%	Y	A	A	A	A		100.0%
H3-03	412h	Terminal A1 Bias		-100.0 ~ 100.0%	Y	A	A	A	A		0.0%
H3-04	413h	Terminal A3 Signal Level	0	0 ~ 10Vdc	N	A	A	A	A		0
			1	-10 ~ 10Vdc							
H3-05	414h	Terminal A3 Function	0	Frequency Bias	N	A	A	A	A		2
			1	Frequency Gain							
			2	Aux Reference 1							
			3	Aux Reference 2							
			4	Output Voltage Bias							
			5	Acc/Dec Change							
			6	DC Injection Brake Current							
			7	Over Torque Level							
			8	Stall Prevent Level							
			9	Reference Lower Limit							
			Ah	Jump Frequency							
			Bh	PID Feedback							
			Ch	PID Set Point							
			Dh	Frequency Bias 2							
			Eh	Motor temperature							
			Fh	Reserved							
			10h	Forward Torque Limit							
			11h	Reverse Torque Limit							
			12h	Regeneration Torque Limit							
			13h	Torque Reference							
			14h	Torque Compensation							
			15h	Torque Limit							
			16h - 1Fh	Reserved							
H3-06	415h	Terminal A3 Gain		0.0 ~ 1000.0%	Y	A	A	A	A		100.0%
H3-07	416h	Terminal A3 Bias		-100.0 ~ 100.0%	Y	A	A	A	A		0.0%
H3-08	417h	Freq Ref Term A2 Signal Level	0	0 ~ 10V Low Limit Enabled	N	A	A	A	A		2
			1	0 ~ 10V Low Limit Disabled							
			2	4 ~ 20ma							
H3-09	418h	Freq Ref Terminal A2 Function		See H3-05	N	A	A	A	A		0
H3-10	419h	Freq Ref Terminal A2 Gain		0.0 ~ 1000.0%	N	A	A	A	A		100.0%
H3-11	41Ah	Freq Ref Terminal A2 Bias		-100.0 ~ 100.0%	N	A	A	A	A		0%
H3-12	41Bh	Analog Input Filter Time		0.00 ~ 2.00sec	N	A	A	A	A		0.03sec
H3-14	433h	Automatic Comp Circuit	0	Disable	N	F	F	F	F	o2-09*	0
			1	Enable							

Table 4.39 - Parameters (Read/Write) – Analog Outputs

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
H4-01	41Dh	Multi-Function Analog Out 1 FM Monitor		See F4-01	N	A	A	A	A		2
H4-02	41Eh	Multi-Function Analog Out 1 FM Gain		110.0 ~ 1000.0%	Y	Q	Q	Q	Q	o2-09*	100%
H4-03	41Fh	Multi-Function Analog Out 1 FM Bias		-110 ~ +110%	Y	A	A	A	A	o2-09*	0.0%
H4-04	420h	Multi-Function Analog Out 2 AM Monitor		See F4-01	N	A	A	A	A		3
H4-05	421h	Multi-Function Analog Out 2 AM Gain		0.0 ~ 1000.0%	Y	Q	Q	Q	Q	o2-09*	50.0%
H4-06	422h	Multi-Function Analog Out 2 AM Bias		-110.0 ~ +110.0%	Y	A	A	A	A	o2-09*	0.0%
H4-07	423h	Multi-Function Analog Out 1 FM Signal Level	0	0 ~ 10V	N	A	A	A	A	o2-09*	0
			1	0 ~ 10V							
			2	4 ~ 20ma							
H4-08	424h	Multi-Function Analog Out 2 AM Signal Level	0	0 ~ 10V	N	A	A	A	A	o2-09*	0
			1	0 ~ 10V							
			2	4 ~ 20ma							

Table 4.40 - Parameters (Read/Write) – Serial Communications Setup

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
H5-01	425h	Drive Node Address		0 ~ 20h	N	A	A	A	A		1Fh
H5-02	426h	Communications Baud Rate	0	1200 bps	N	A	A	A	A		3
			1	2400 bps							
			2	4800 bps							
			3	9600 bps							
			4	19200 bps							
H5-03	427h	Communications Parity	0	None	N	A	A	A	A	o2-09*	0
			1	Odd							
			2	Even							
H5-04	428h	Communications Error Stopping Method	0	Ramp to Stop	N	A	A	A	A		3
			1	Coast to Stop							
			2	Fast Stop							
			3	Alarm Only							
H5-05	429h	Communications Error Detect	0	Disable	N	A	A	A	A		1
			1	Enable							
H5-06	42Ah	Send Waiting Time		5 ~ 65ms	N	A	A	A	A		5ms
H5-07	42Bh	RTS Control	0	Disable (RTS Always ON)	N	A	A	A	A		1
			1	Enable (RTS ON Only During Send)							

Table 4.41 - Parameters (Read/Write) – Pulse I/O Setup

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
H6-01	42Ch	Pulse Input Function – Terminal RP	0	Frequency Reference	N	A	A	A	A		0
			1	PID Feedback							
			2	PID Target							
H6-02	42Dh	Pulse Input Scaling		1000 ~ 32000Hz	Y	A	A	A	A		1440Hz
H6-03	42Eh	Pulse Input Gain		0.0 ~ 1000.0%	Y	A	A	A	A		100.0%
H6-04	42Fh	Pulse Input Bias		-1000 ~ 1000%	Y	A	A	A	A		0%
H6-05	430h	Pulse Input Filter Time		0.00 ~ 2.00sec	Y	A	A	A	A		0.10sec
H6-06	431h	Pulse Monitor – Terminal MP	1	U1-01 (Frequency Reference)	Y	A	A	A	A		2
			2	U1-02 (Output Current)							
			5	U1-05 (Motor Speed)							
			20	U1-20 (Output Frequency After Soft Start)							
			24	U1-24 (PID Feedback Capacity)							
			31	U1-31 (LED Check)							
			36	U1-36 (PID Deviation)							
H6-07	432h	Pulse Monitor Scaling		0 ~ 32000Hz	Y	A	A	A	A		1440Hz

Table 4.42 – Parameters (Read/Write) – Motor Overload

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
L1-01	480h	Motor Overload Protection	0	Disable	N	A	A	A	A		1
			1	Standard Fan Cooled							
			2	Standard Blower Cooled							
			3	Vector Motor							
L1-02	481h	Motor Overload Protection Time		0.1 ~ 5.0 min	N	A	A	A	A	o2-09*	1.0min
L1-03	482h	Operation for Motor Overheat Alarm	0	Ramp to Stop	N	A	A	A	A		3
			1	Coast to Stop							
			2	Emergency Stop (C1-09 Decel time)							
			3	Operation Continues (OH3 Displayed on Operator)							
L1-04	483h	Operation for Motor Overheat Fault	0	Ramp to Stop	N	A	A	A	A		2
			1	Coast to Stop							
			2	Emergency Stop (C1-09 Decel time)							
L1-05	484h	Motor Temperature Input Filter Time		0.00 ~ 10.00sec	N	A	A	A	A		0.20sec

Table 4.43 – Parameters (Read/Write) – PowerLoss Ride Through

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
L2-01	485h	Momentary Power Loss	0	Disable (UV Fault)	N	A	A	A	A		0
			1	Enable (Power Not Restored Within L2-02 UV Fault)							
			2	CPU Power Active (UV Fault is Not Detected)							
L2-02	486h	Momentary Pwr Loss Ride Through Time		0.0 ~ 25.5sec	N	A	A	A	A	kVA*	0.1sec
L2-03	487h	Minimum Base Block Time		0.1 ~ 5.0sec	N	A	A	A	A	kVA*	0.1sec
L2-04	488h	Momentary Power Loss V/F Ramp Time		0.0 ~ 5.0sec	N	A	A	A	A	kVA*	0.3sec
L2-05	489h	Undervoltage Detection Level		150 ~ 210 Vdc (200Vac Class) 300 ~ 420 Vdc (400Vac Class)	N	A	A	A	A	kVA	190Vdc
L2-06	48Ah	KEB Decel Rate		0.0 ~ 200.0sec	N	A	A	A	A		0.0sec
L2-07	48Bh	Momentary Power Loss Recovery Time		0.0~ 25.5sec (0.0 = Acc Set by C1-01 ~ C1-08)	N	A	A	A	A		0.0sec
L2-08	48Ch	KEB Frequency		0 ~ 300% (Acc Decrease Step Width = E2-02 * L2-08 * 2)	N	A	A	A	A		100%
L2-09	48Dh	KEB Minimum Frequency Level		0 ~ 100% (Acc Decrease Step Width = E2-02 * L2-08)	N	F	F	F	F		20%
L2-10	48Eh	KEB Detection Time		0 ~ 2000ms	N	F	F	F	F		50ms

Table 4.44 – Parameters (Read/Write) – Stall Prevention

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
L3-01	48Fh	Stall Prevention @ Accel	0	Disable	N	A	A	A	N		1
			1	Enable (Acc Stopped During Output Current > L3-02)							
			2	Intelligent (Output Current Adjusted Based on L3-02)							
L3-02	490h	Stall Prevention Level @ Accel		0 ~ 200%	N	A	A	A	N		120%
L3-03	491h	Stall Prevention Limit @ Accel		0 ~ 100%	N	A	A	A	N		50%
L3-04	492h	Stall Prevention @ Decel	0	Disable	N	Q	Q	Q	Q		1
			1	Enable (Decel Stopped During OV)							
			2	Intelligent (Decel Time Set by Main Circuit Voltage)							
			3	Enable (With DB)							
L3-05	493h	Stall Prevention @ Run	0	Disable	N	A	A	N	N		1
			1	Enable (Decel is C1-02 @ Stall Prevention)							
			2	Enable (Decel is C1-04 @ Stall Prevention)							
L3-06	494h	Stall Prevention Level @ Run		30 ~ 200%	N	A	A	N	N		120%
L3-07	495h	Stall Prevention P Gain		10 ~ 200	N	F	F	N	N		1.00
L3-08	496h	Stall Prevention I Time		10 ~ 250ms	N	F	F	N	N		100ms
L3-09	497h	Decel Time Shortening Ratio		1.0 ~ 5.0	N	F	F	F	F		1.0
L3-10	498h	Stall Prevention @ Decel level		80 ~ 95%	N	F	F	F	F		92%
L3-11	4C7h	OV Suppression Function	0	Disabled	N	N	N	A	A		0
			1	Enable							
L3-12	4C8h	OV Suppression Voltage Level		350 ~ 390Vdc	N	N	N	A	A		

Table 4.45 – Parameters (Read/Write) – Reference Detection

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
L4-01	499h	Speed Agree Detect Level		0.0 ~ 400.0Hz	N	A	A	A	A		0.0Hz
L4-02	49Ah	Speed Agree Detect Width		0.0 ~ 20.0Hz	N	A	A	A	A		2.0Hz
L4-03	49Bh	Speed Agree Detect Level +/-		-400.0 ~ 400.0Hz	N	A	A	A	A		0.0Hz
L4-04	49Ch	Speed Agree Detect Width +/-		0.0 ~ 20.0Hz	N	A	A	A	A		2.0Hz
L4-05	49Dh	Operation @ Frequency Reference Loss Detection	0	Stop	N	A	A	A	A		0
			1	Operate @ (L4-06)% of Freq Ref @ Loss							
L4-06	4C2h	Freq Ref @ Freq Ref Loss		0.0 ~ 100.0%	N	A	A	A	A	o2-09*	80.0%

Table 4.46 – Parameters (Read/Write) – Fault Resetart

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
L5-01	49Eh	Number of Fault Retries		0 ~ 10	N	A	A	A	A		0
L5-02	49Fh	Fault Contact Operation @ Fault Retries	0	Disable	N	A	A	A	A		0
			1	Enable							
L5-03	4A0h	Fault Retry Maximum Time		0.5 ~ 180.0sec	N	F	F	F	F		10.0sec

Table 4.47 – Parameters (Read/Write) – Torque Detection

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
L6-01	4A1h	Over/Under Torque Detect 1 (Selections 0~4 are for Over Torque Selections 5~8 are for Under Torque)	0h	Disable	N	A	A	A	A		0
			1h	@ Speed Agree Operation Continues w/ Alarm							
			2h	@ RUN Operation Continues w/ Alarm							
			3h	@ Speed Agree Inverter output is Turned Off							
			4h	@ RUN Inverter output is Turned Off							
			5h	@ Speed Agree Operation Continues w/ Alarm							
			6h	@ RUN Operation Continues w/ Alarm							
			7h	@ Speed Agree Inverter output is Turned Off							
			8h	@ RUN Inverter output is Turned Off							
L6-02	4A2h	Over/Under Torque Detect Level 1		0 ~ 300%	N	A	A	A	A		150%
L6-03	4A3h	Over/Under Torque Detect Time 1		0.0 ~ 10.0sec	N	A	A	A	A		0.1sec
L6-04	4A4h	Over/Under Torque Detect 2 (Selections 0~4 are for Over Torque Selections 5~8 are for Under Torque)	0	Disable	N	A	A	A	A		0
			1	@ Speed Agree Operation Continues w/ Alarm							
			2	@ RUN Operation Continues w/ Alarm							
			3	@ Speed Agree Inverter output is Turned Off							
			4	@ RUN Inverter output is Turned Off							
			5	@ Speed Agree Operation Continues w/ Alarm							
			6	@ RUN Operation Continues w/ Alarm							
			7	@ Speed Agree Inverter output is Turned Off							
			8	@ RUN Inverter output is Turned Off							
L6-05	4A5h	Over/Under Torque Detect Level 2		0 ~ 300%	N	A	A	A	A		150%
L6-06	4A6h	Over/Under Torque Detect Time 2		0.0 ~ 10.0sec	N	A	A	A	A		0.1sec

Table 4.48 – Parameters (Read/Write) – Torque Limit

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
L7-01	4A7h	Forward Torque Limit		0 ~ 300%	N	N	N	A	A		200%
L7-02	4A8h	Reverse torque Limit		0 ~ 300%	N	N	N	A	A		200%
L7-03	4A9h	Forward Regen Torque Limit		0 ~ 300%	N	N	N	A	A		200%
L7-04	4AAh	Reverse Regen Torque Limit		0 ~ 300%	N	N	N	A	A		200%
L7-05	4ABh	Torque Limit Gain		0.0 ~ 10.0	N	N	N	F	N		2.0
L7-06	4ACh	Torque limit I Time		5 ~ 10000ms	N	N	N	F	N		200ms
L7-07	4C9h	Torque Limit Control @ Acc/Dec	0	Disable	N	N	N	A	N		0
			1	Enable							

Table 4.49 – Parameters (Read/Write) – Hardware Protection

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
L8-01	4ADh	Internal DB Resistor Protection	0	Disable	N	A	A	A	A		0
			1	Enable							
L8-02	4AEh	Overheat Pre-Alarm Level		50 ~ 130°C	N	A	A	A	A	kVA*	95°C
L8-03	4AFh	Operation for Overheat Pre-Alarm	0	Ramp to Stop	N	A	A	A	A		3
			1	Coast to Stop							
			2	Fast Stop							
			3	Alarm only							
L8-04	4B0h	Overheat Detect Level		50 ~ 130°C	N	F	F	F	F	kVA*	105°C
L8-05	4B1h	Input Phase Loss Protection	0	Disable	N	A	A	A	A		1
			1	Enable							
L8-06	4B2h	Input Phase Loss Detect Level		0.0 ~ 50.0%	N	F	F	F	F	kVA*	5.0%
L8-07	4B3h	Output Phase Loss Protection	0	Disable	N	A	A	A	A		1
			1	Enable							
L8-08	4B4h	Output Phase Loss Detect Level		0.0 ~ 20.0%	N	F	F	F	F		5.0%
L8-09	4B5h	Output Ground Fault Protection	0	Disable	N	A	A	A	A		1
			1	Enable							
L8-10	4B6h	Cooling Fan On/Off	0	ON @ RUN	N	A	A	A	A		0
			1	Always ON							
L8-11	4B7h	Cooling Fan On/Off Delay Time		0 ~ 300sec	N	A	A	A	A		60sec
L8-12	4B8h	Ambient Temperature		45 ~ 60°C	N	A	A	A	A		45°C
L8-13	4B9h	UV3 Detect	0	Disable	N	F	F	F	F		1
			1	Enable							
L8-14	4BAh	Inverter Overload	0	Disable	N	F	F	F	F		1
			1	Enable							
L8-15	4BBh	OL2 @ Low Speed	0	Disable	N	A	A	A	A		1
			1	Enable							
L8-16	4BCh	Low Freq OL Zero Speed Gain		0.0 ~ 10.0Hz	N	F	F	F	F		6.0Hz
L8-17	4BDh	IGBT Protection @ Low Freq		25 ~ 100%	N	F	F	F	F		50%

Table 4.49 – Parameters (Read/Write) – Hardware Protection

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
L8-18	4BEh	Soft CLA	0	Disable	N	A	A	A	A		1
			1	Enable							
L8-22	4C3h	Neutral Voltage Control 400Vac Class F7 drives Only	0	Disable	N	F	F	F	F	kVA	1
			1	Enable							
L8-23	4C4h	Primary Delay @ Neutral Voltage Start		0.0 ~ 10.0ms (400Vac Class F7 drives Only)	N	F	F	F	F		1.0ms
L8-24	4C5h	Primary Delay @ Neutral Voltage Stop		0.0 ~ 10.0 (400Vac Class F7 drives Only)	N	F	F	F	F		1.0ms
L8-25	4C6h	Neutral Voltage Start Current		0 ~ 100% (400Vac Class F7 drives Only)	N	F	F	F	F		10%

Table 4.50 – Parameters (Read/Write) – Hunting Prevention

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
n1-01	580h	Hunting Prevention	0	Disable	N	A	A	N	N		1
			1	Enable							
n1-02	581h	Hunting Prevention Gain		0.00 ~ 2.50	N	A	A	N	N		1.00
n1-03	582h	Hunting Prevention Time		0 ~ 500ms	N	F	F	N	N	kVA*	10ms
n1-04	583h	Hunting Prevention Limit		0 ~ 100%	N	F	F	N	N		5%

Table 4.51 – Parameters (Read/Write) – AFR Tuning

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
n2-01	584h	Speed Feedback Detect Suppress Gain		0.00 ~ 10.00	N	N	N	A	N		1.00
n2-02	585h	Speed Feedback Detect Suppress Time		0 ~ 2000ms	N	N	N	A	N		50ms
n2-03	586h	Speed Feedback Detect Suppress Time 2		0 ~ 2000ms	N	N	N	A	N		750ms
n2-04	587h	AFR Limit		0.0 ~ 60.0Hz	N	N	N	F	N		5.0Hz

Table 4.52 – Parameters (Read/Write) – High Slip

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
n3-01	588h	HSB Decel Freq Width		1 ~ 20%	N	A	A	N	N		5%
n3-02	589h	HSB Current Ref		100 ~ 200%	N	A	A	N	N		150%
n3-03	58Ah	HSB Stop Dwell Time		0.0 ~ 10.0sec	N	A	A	N	N		1.0sec
n3-04	58Bh	HSB OL Time		30 ~ 1200sec	N	A	A	N	N		4.0sec
n3-05	58Ch	HSB V/F Gain		1 ~ 50%	N	F	F	N	N		5%
n3-06	58Dh	Speed Agree Current		0 ~ 100%	N	F	F	N	N		50%
n3-07	58Eh	Speed Agree Detect Time		100 ~ 2000ms	N	F	F	N	N		800ms
n3-08	58Fh	Speed Decreasing Voltage Level 1		80 ~ 90%	N	F	F	N	N		87%
n3-09	590h	Speed Decreasing Voltage Level 2		90 ~ 95%	N	F	F	N	N		92%
n3-10	591h	RI Comp Coefficient		20 ~ 100%	N	F	F	N	N		50%
n3-11	592h	RI Comp Time		10 ~ 1000ms	N	F	F	N	N		200ms
n3-12	593h	HSB Decel Prohibit Frequency		0 ~ 20Hz	N	F	F	N	N		6Hz

Table 4.53 – Parameters (Read/Write) – Observer

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
n4-01	594h	Magnetic Flux Observer	0	Disable	N	N	N	F	N		1
			1	Enable							
n4-02	595h	Observer Output Phase Comp Gain		0.0 ~ 2.0	N	N	N	F	N		0.6
n4-03	596h	Observer Output Phase Filter		0.00 ~ 2.00sec	N	N	N	F	N		1.00sec
n4-04	597h	Observer Output Voltage Comp Gain		0 ~ 200	N	N	N	F	N		40
n4-05	598h	Observer Speed Detect I time		0 ~ 200ms	N	N	N	F	N		2ms
n4-06	599h	Observer Gain		1.0 ~ 2.0	N	N	N	F	N	A1-02*	1.2

Table 4.54 – Parameters (Read/Write) – Feed Forward

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
n5-01	5B0h	Feed Forward Control	0	Disable	N	N	N	N	A	A1-02*	1
			1	Enable							
n5-02	5B1h	Motor Acc Time		0.001 ~ 10.000sec	N	N	N	N	A		0.178sec
n5-03	5B2h	Feed Forward Ratio Gain		0.00 ~ 100.00	N	N	N	N	A		1.00
n5-04	5B3h	Speed Command Response Frequency		0.00 ~ 50.00Hz	Y	N	N	N	F	A1-02*	40.00Hz

Table 4.55 – Parameters (Read/Write) – Factory Tuning

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
n9-01	5D0h	Inverter Rated Current		0.0 ~ 1500.0 amps	N	F	F	F	F	kVA*	3.2A
n9-02	5D1h	DDCT Gain		0.000 ~ 2.000	N	F	F	F	F	kVA*	1.002
n9-03	5D2h	ACR q Gain		0.00 ~ 6.00	N	N	N	F	F	A1-02*	0.10
n9-04	5D3h	ACR q I Time		0.0 ~ 1000.0ms	N	N	N	F	F	A1-02*	0.0ms
n9-05	5D4h	ACR q Limit		0 ~ 150%	N	N	N	F	F	A1-02*	5%
n9-06	5D5h	ACR d Gain		0.00 ~ 6.00	N	N	N	F	F		0.30
n9-07	5D6h	ACR d I Time		0.0 ~ 1000.0ms	N	N	N	F	F	A1-02*	0.0ms
n9-08	5D7h	ACR d Limit		0 ~ 150%	N	N	N	F	F	A1-02*	5%
n9-09	5D8h	AVR Function	0	Disable	N	F	F	F	F		1
			1	Enable							
n9-10	5D9h	AVR Time Const		0.0 ~ 100.0ms	N	F	F	F	F		1.0ms
n9-11	5DAh	On-Delay Time		0.0 ~ 20.0µs	N	F	F	F	F	kVA*	20.0µs
n9-12	5DBh	On-Delay Compensation		0.0 ~ 20.0µs	N	F	F	F	N	kVA*	2.6µs
n9-13	5DCh	IGBT Voltage Drop		0.0 ~ 10.0 Vdc	N	F	F	F	F	A1-02* kVA*	0.0Vdc
n9-14	5DDh	Power Factor Angle Detect Filter 1		0 ~ 1000ms	N	F	F	N	N	kVA*	5ms
n9-15	5DEh	Power Factor Angle Detect Filter 2		0 ~ 1000ms	N	F	F	N	N	kVA*	5ms
n9-16	5DFh	Power Factor Angle Detect Idfb Filter		0.00 ~ 2.50sec	N	N	N	F	N		1.00sec
n9-17	5E0h	R. Idfb Filter		0.00 ~ 2.50sec	N	N	N	F	N		1.00sec
n9-18	5E1h	I. Tuning Filter		0 ~ 1000ms	N	N	N	F	N		1000ms
n9-19	5E2h	Current Detect Delay Time		-1000 ~ 1000µs	N	F	F	F	F		0µs
n9-20	5E3h	Current Limit Gain		0.00 ~ 4.00	N	F	F	F	F		2.00
n9-21	5E4h	Current Limit Filter Time Const		0.0 ~ 100.0ms	N	F	F	F	F		0.5ms
n9-22	5E5h	Current Limit 1		0.0 ~ 300.0%	N	F	F	F	F		120.0%
n9-23	5E6h	Current Limit 2		0.0 ~ 300.0%	N	F	F	F	F		120.0%
n9-24	5E7h	Current Limit Switchover Point		0.0 ~ 100.0Hz	N	F	F	F	F		6.0Hz
n9-25	5E8h	Current Limit 3		0.0 ~ 300.0%	N	F	F	F	F		300.0%
n9-26	5E9h	On-Delay Comp		0.00 ~ 10.00%	N	F	F	F	F	kVA*	1.50%
n9-27	5EAh	IGBT Conversion Coef		0.00 ~ 2.00	N	F	F	F	F	kVA*	0.45
n9-28	5EBh	Aging Mode	0	Disable	N	F	F	F	F		0
			1	Enable							
n9-29	5ECh	IGBT Voltage Drop 2		0.0 ~ 10.0Vdc	N	F	F	F	F	kVA*	1.0Vdc
n9-31	5EEh	IGBT Voltage Drop 3		0.0 ~ 10.0Vdc	N	N	N	N	F	kVA*	1.2Vdc
n9-32	5EFh	On-delay Compensation 2		0.00 ~ 0.09µs	N	N	N	N	F		0.00µ
n9-33	5F0h	IGBT Voltage Drop Coef 1		0.0000 ~ 6.5535	N	F	F	F	F	kVA*	0.0283
n9-34	5F1h	IGBT Voltage Drop Coef 2		0.0000 ~ 6.5535	N	F	F	F	F	kVA*	0.0964
n9-35	5F2h	IGBT Voltage Drop Coef 3		0.0000 ~ 6.5535	N	F	F	F	F	kVA*	0.7563
n9-36	5F3h	IGBT Voltage Drop Correction		0.0 ~ 100.0%	N	F	F	F	F		8.00%

Table 4.56 – Parameters (Read/Write) – Monitor Select

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
o1-01	500h	User Monitor		4 ~ 33 (Monitor Parameter U1-##)	Y	A	A	A	A		6
o1-02	501h	Power-Up Monitor	1	Frequency Reference	Y	A	A	A	A		1
			2	Output Frequency							
			3	Output Current							
			4	Monitor Item Set by o1-01							
o1-03	502h	Display Scaling	0	0.01%	N	A	A	A	A		0
			1	0.01% (100% = FMAX)							
			2~39	RPM (Number of Motor Poles)							
			40 ~ 39999	User set							
o1-04	503h	Display Units	0	Hz	N	N	N	N	A		0
			1	RPM							
o1-05	504h	LCD Contrast	1	Lighter	N	N	N	N	A	o2-09*	3
			2	Light							
			3	Standard							
			4	Dark							
			5	Darker							



Table 4.57 – Parameters (Read/Write) –Key Selection

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
o2-01	505h	Local/Remote Key	0	Disable	N	A	A	A	A		1
			1	Enable							
o2-02	506h	Stop Key	0	Disable	N	A	A	A	A		1
			1	Enable							
o2-03	507h	User Parameter Initialization	0	Store – Not Set	N	A	A	A	A		0
			1	Store – Set @ Start							
			2	Clear							
o2-04	508h	kVA	0h	20P4 230Vac 0.4kW	N	A	A	A	A		
			1h	20P7 230Vac 0.75kW							
			2h	21P5 230Vac 1.5kW							
			3h	22P2 230Vac 2.2kW							
			4h	23P7 230Vac 3.7kW							
			5h	25P5 230Vac 5.5kW							
			6h	27P5 230Vac 7.5kW							
			7h	2011 230Vac 11.0kW							
			8h	2015 230Vac 15.0kW							
			9h	2018 230Vac 18.0kW							
			Ah	2022 230Vac 22.0kW							
			Bh	2030 230Vac 30.0kW							
			Ch	2037 230Vac 37.0kW							
			Dh	2045 230Vac 45.0kW							
			Fh	2055 230Vac 55.0kW							
			10h	2075 230Vac 75.0kW							
			11h	2090 230Vac 90.0kW							
			12h	2110 230Vac 110.0kW							
			20h	40P4 480Vac 0.4kW							
			21h	40P7 480Vac 0.7kW							
			22h	41P5 480Vac 1.5kW							
			23h	42P2 480Vac 2.2kW							
			24h	43P7 480Vac 3.7kW							
			25h	44P0 480Vac 4.0kW							
			26h	45P5 480Vac 5.5kW							
			27h	47P5 480Vac 7.5kW							
			28h	4011 480Vac 11.0kW							
			29h	4015 480Vac 15.0kW							
			2Ah	4018 480Vac 18.0kW							
			2Bh	4022 480Vac 22.0kW							
			2Ch	4030 480Vac 30.0kW							
			2Dh	4037 480Vac 37.0kW							
			2Eh	4045 480Vac 45.0kW							
			2Fh	4055 480Vac 55.0kW							
			30h	4075 480Vac 75.0kW							
			31h	4090 480Vac 90.0kW							
			32h	4110 480Vac 110.0kW							
			33h	4132 480Vac 132.0kW							
			34h	4160 480Vac 160.0kW							
			35h	4185 480Vac 185.0kW							
			36h	4220 480Vac 220.0kW							
			37h	4300 480Vac 300.0kW							
o2-05	509h	Frequency Reference Setting	0	ENTER Required	N	A	A	A	A		0
			1	ENTER Not Required							
o2-06	50Ah	Digital Operator Disconnect Operation	0	Disable	N	A	A	A	A	o2-09*	0
			1	Enable							
o2-07	50Bh	Elapsed Time Set		0 ~ 65535 hr	N	A	A	A	A		0hr
o2-08	50Ch	Elapsed Time	0	Accumulated Power ON Time	N	A	A	A	A	o2-09*	0
			1	Accumulated RUN Time							
o2-09	50Dh	Initialization Mode	0	Invalid	N	A	A	A	A	o2-09*	1
			1	YEA Initialization							
			2	YEG initialization							
o2-10	50Eh	Fan Operating Time		0 ~ 65535 hr	N	A	A	A	A		0hr
o2-11	50Fh	Tuning Test Mode	0	Disable	N	F	F	F	F		0
			1	Force test Mode 1							
			2	Force Test Mode 2							
			3	Force Test Modes 1 & 2							
o2-12	510h	Fault Trace/History Clear	0	Disable	N	A	A	A	A	o2-09*	0
			1	Enable							
o2-13	511h	PUF Continuous Detection	0	Disable	N	F	F	F	F	o2-09*	1
			1	Enable							
o2-14	512h	KWh Monitor Initialize	0	No Change	N	A	A	A	A		0
			1	Clear All							

Table 4.58 – Parameters (Read/Write) – COPY Function

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
o3-01	515h	COPY Function	0	Normal	N	A	A	A	A		0
			1	READ (Inverter → Operator)							
			2	COPY (Operator → Inverter)							
			3	VERIFY (Compare Inverter to Operator)							
o3-02	516h	Read	0	Read Prohibit	N	A	A	A	A		0
			1	Read Enable							

Table 4.59 – Parameters (Read/Write) – Auto-Tuning

Prm	Addr	Function	Data	+/- Limits - Description	R U N	Mode				Dep	Default
						0	1	2	3		
T1-00	700h	Motor 1/2	1	Motor 1	N	A	A	A	A		1
			2	Motor 2							
T1-01	701h	Tuning Mode	0	Auto Tune w/ Motor Rotation	N	A	A	A	A		0
			1	Auto tune w/o Motor Rotation							
			2	Line to Line Auto Tune							
T1-02	702h	Motor Output Power		0.0 ~ 650.00 kW	N	A	A	A	A		0.40kW
T1-03	703h	Motor Rated Voltage		0.0 ~ 255.0Vac (200Vac Class) 0.0 ~ 510.0Vac (400Vac Class)	N	N	N	A	A	kVA*	230.0Vac
T1-04	704h	Motor Rated Current		0.32 ~ 6.40 amps	N	A	A	A	A	kVA*	1.90A
T1-05	705h	Motor Rated Frequency		0.0 ~ 300.0Hz	N	A	A	A	A		60.0Hz
T1-06	706h	Number of Motor Poles		2 ~ 48	N	N	N	A	A		2
T1-07	707h	Motor Rated Speed		0 ~ 24000RPM	N	N	N	A	A		1750RPM
T1-08	708h	PG Pulses Per Rev		0 ~ 60000ppr	N	N	N	N	A		1024ppr

# ENTER/ACCEPT Command (Write Only)



## Caution

Data sent to the F7 drive serially, is sent to the F7 drive's RAM and may be lost when the F7 drive loses power. In order for this data to be retained upon power loss, it must be first transferred to non-volatile memory. The ENTER command transfers the current RAM parameter data to non-volatile memory. Caution should be exercised when using the ENTER command as the maximum number of non-volatile memory writes cannot exceed 100,000. Excessive use of the ENTER command will cause the F7 drive to fail. Entering data through the digital operator transfers the data to non-volatile memory without the use of the ENTER command. Data that cannot be changed while the F7 drive is in RUN mode, is stored in a temporary location. The ACCEPT command is used to move that data from temporary storage to active RAM. There is no restriction on the use of the ACCEPT command.

Table 4.60 - ENTER Command			
Addr	Function	Data	Description
910	ACCEPT	0	Transfer data to active RAM
900	ENTER	0	Transfers the current parameter data to non-volatile storage

# Parameter Dependencies

Certain F7 drive parameters, Master parameters, can affect the default values, range of values and accessibility of other, dependent, parameters. When a Master parameter's value is changed via serial communications (RS232, RS485, DeviceNet, Ethernet, etc.), the associated dependent parameters are not automatically updated and must be updated serially. For example, parameter d2-02 (frequency lower limit) affects the range of values for all frequency reference parameters (d1-01 through d1-17). If d2-02 is changed to 5.0Hz serially, all frequency reference parameters with values below 5.0Hz must be updated serially to have current values of 5.0Hz or greater. A F7 drive fault may occur if a dependent parameter's value is not updated.

The standard sequence for changing F7 drive parameters is

- Set A1-01 to 2 - Set the access value to Advanced
- Set Master parameter to desired value
- Send ENTER command
- Set any dependent parameter values
- Send ENTER command.

## ► Master Parameter Sequence Numbers

Some F7 drive parameters may be dependent on more than one Master parameter. For example o2-04 (kVA) and o2-09 (specification) affect a number of parameters together. In these cases it is necessary that the parameter with the lowest sequence number be changed first. The sequence table is shown below. Sequence numbers range from 1 through 9 with lower sequence parameters being changed before parameters with higher sequence numbers. In all cases the parameter access level (A1-02) should be changed first. Shaded parameters are factory set and are provided for information purposes only.

Table 4.61 – Master Parameter Sequence Numbers			
Prm	Seq	Name	Action after parameter change
o2-04	1	kVA or F7 drive Model	Send ENTER command, power cycle F7 drive, change dependent parameters, send ENTER If o2-09 is also going to be changed, set o2-09 before setting dependent or slave parameter values
o2-09	2	Initialization Mode	Send ENTER Change dependent parameters Send ENTER
A1-02	3	Control Method	
C1-10	5	Acc/Dec Time Units	
C6-01	4	Heavy/Normal Duty	
C6-02	5	Carrier Frequency	
C6-06	5	PWM Modulation Method	
d2-01	5	Freq Upper Limit	
d2-02	5	Freq Lower Limit	
E1-01	5	Input Voltage	
L3-04	5	Stall Prevention @ DEC	
L4-01	5	Speed Agree Detection Level	
L4-02	5	Speed Agree Detection Width	
L4-03	5	Speed Agree Detection Level ±	
L4-04	5	Speed Agree Detection Width ±	
L4-05	5	Operation @ Frequency Loss Detection	
L8-02	5	Overheat Pre-Alarm Level	
L8-15	5	OL2 @ Low Speed	

## ► A1-02 Control Mode Parameter Dependencies

Shaded parameters are factory set and are provided for information purposes only.

Prm	Addr	Function	*/- limits	A1-02				Notes
				0	1	2	3	
b3-01	191h	Speed Search @ Start	0 ~ 1	2	3	2		
b3-02	192h	Speed Search Current	0.0 ~ 10.0%	120%		100%		
b8-02	1CDh	Energy Save Gain	0.0 ~ 100.0			0.7	1.0	
b8-03	1CEh	Energy Save Control Filter Time Const	0.00 ~ 10.00sec			0.50sec	0.01sec	Inverters <= 55kW
						2.00sec	0.05sec	Inverters > 55kW
C3-01	20Fh	Slip Comp Gain	0.0 ~ 2.5			1.0	1.0	
C3-02	210h	Slip Comp Primary Delay Time	0 ~ 10000ms	2000ms		200ms		
C4-02	216h	Torque Comp Delay Time 1	0 ~ 10000ms	200ms	200ms	20ms		
C5-01	21Bh	ASR P Gain	0.00 ~ 300.00		0.20		20.00	
C5-02	21Ch	ASR I Time	0.000 ~ 10.000sec		0.200		0.500	
C5-03	21Dh	ASR P Gain 2	0.00 ~ 300.00		0.20		20.00	
C5-04	21Eh	ASR I Time 2	0.000 ~ 10.000sec		0.50		0.500	
C5-06	220h	ASR Primary Delay Time	0.000 ~ 0.500sec				0.004	
C6-06	228h	PWM Modulation Method	0 ~ 1	0	0	0	0	
d5-02	26Bh	Torque Reference Delay Time	0 ~ 1000ms				0	
E1-04	303h	Maximum Output Frequency	40.0 ~ 400.0Hz	60.0Hz	60.0Hz	60.0Hz	60.0Hz	E1-03 o2-09* kVA*
E1-05	304h	Maximum Output Voltage	0.0 ~ 255.0Vac 0.0 ~ 510.0Vac	230.0Vac	230.0Vac	230.0Vac	230.0Vac	E1-03 o2-09* kVA*
E1-06	305h	Base Frequency	0.0 ~ 400.0Hz	60.0Hz	60.0Hz	60.0Hz	60.0Hz	E1-03 o2-09* kVA*
E1-07	306h	Mid Output Frequency	0.0 ~ 400.0Hz	3.0Hz	3.0Hz	3.0Hz	3.0Hz	E1-03 kVA*
E1-08	307h	Voltage @ Mid Output Frequency	0.0 ~ 255.0Vac 0.0 ~ 510.0Vac	15.0Vac	15.0Vac	11.0Vac	0.0Vac	E1-03 kVA*
E1-09	308h	Minimum Output Frequency	0.0 ~ 400.0Hz	1.5Hz	1.5Hz	0.5Hz	0.0Hz	E1-03 kVA*
E1-10	309h	Voltage @ Minimum Output Frequency	0.0 ~ 255.0Vac 0.0 ~ 510.0Vac	9.0Vac	9.0Vac	2.0Vac	0.0Vac	E1-03 kVA*
E3-02	31Ah	Motor 2 Maximum Output Freq	40.0 ~ 400.0Hz	60.0Hz	60.0Hz	60.0Hz	60.0Hz	E1-03 kVA*
E3-03	31Bh	Motor 2 Maximum Output Voltage	0.0 ~ 255.0Vac 0.0 ~ 510.0Vac	230.0Vac	230.0Vac	230.0Vac	230.0Vac	E1-03 o2-09* kVA*
E3-04	31Ch	Motor 2 Base Output Freq	0.0 ~ 400.0Hz	60.0Hz	60.0Hz	60.0Hz	60.0Hz	E1-03 o2-09* kVA*
E3-05	31Dh	Motor 2 Mid Output Freq	0.0 ~ 400.0Hz	3.0Hz	3.0Hz	3.0Hz	3.0Hz	E1-03 kVA*
E3-06	31Eh	Motor 2 Voltage @ Mid Output Freq	0.0 ~ 255.0Vac 0.0 ~ 510.0Vac	15.0Vac	15.0Vac	11.0Vac	0.0Vac	E1-03 kVA*
E3-07	31Fh	Motor 2 Minimum Output Freq	0.0 ~ 400.0Hz	1.5Hz	1.5Hz	0.5Hz	0.0Hz	E1-03 kVA*
E3-08	320h	Motor 2 Voltage @ Min Output Freq	0.0 ~ 255.0Vac 0.0 ~ 510.0Vac	9.0Vac	9.0Vac	2.0Vac	0.0Vac	E1-03 kVA*
F1-09	388h	Over Speed Detect Delay Time	0.0 ~ 2.0sec	0.1sec		1.0sec		
n4-06	599h	Observer Gain	1.0 ~ 2.0			1.20		
n5-01	5B0h	Feed Forward Control	0 ~ 1				0	
n5-04	5B3h	Speed Command Response Frequency	0.00 ~ 50.00Hz				40.00	
n9-03	5D2h	ACR q Gain	0.00 ~ 6.00			0.10	0.30	
n9-04	5D3h	ACR q I Time	0.0 ~ 1000.0ms			0.0ms	10.0ms	
n9-05	5D4h	ACR q Limit	0 ~ 150%			5%	100%	
n9-07	5D6h	ACR d I Time	0.0 ~ 1000.0ms			0.0ms	10.0ms	
n9-08	5D7h	ACR d Limit	0 ~ 150%			5%	100%	
n9-13	5DCh	IGBT Voltage Drop	0.0 ~ 10.0 Vdc				2.0	kVA*

## ► o2-04 kVA Parameter Dependencies

F7 drive kVA or model is set at the factory and should **NOT** be changed. These values are included for information purposes only. Shaded parameters are factory set and are provided for information purposes only.

Co-Dependencies

- Parameters with an \* are also dependent on o2-09

Table 4.63— o2-04 Parameter Dependencies (200Vac Class) Default Values																			
Model	20P4	20P7	21P5	22P2	23P7	25P5	27P5	2011	2015	2018	2022	2030	2037	2045	2055	2075	2090	2110	
kW	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11.0	15.0	18.5	22.0	30.0	37.0	45.0	55.0	75.0	90.0	110.0	
Min Vac	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155	155	
Max Vac	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	255	
Prm	Unit	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	10	11
b3-04	%	100	100	100	100	100	100	100	100	100	100	100	80	80	80	80	80	80	80
b3-06		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.7	0.7	0.7
b3-08		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
b8-03	Sec	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	2.00	2.00	2.00	2.00
b8-04		288.20	233.70	169.40	156.80	122.90	94.75	72.69	70.44	63.13	57.87	51.79	46.27	38.16	35.78	31.35	23.10	20.65	18.12
C6-01		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
C6-02		6	6	6	6	6	6	6	6	6	6	6	4	4	4	4	4	4	1
E2-01*	A	1.90	3.30	6.20	8.50	14.00	19.60	26.60	39.70	53.00	65.80	77.20	105.00	131.00	160.00	190.00	260.0	260.0	260.0
E2-02*	Hz	2.90	2.05	2.60	2.90	2.73	1.50	1.30	1.70	1.60	1.67	1.70	1.80	1.33	1.60	1.43	1.39	1.39	1.39
E2-03*	A	1.20	1.80	2.80	3.00	4.50	5.10	8.00	11.20	15.20	15.70	18.50	21.90	38.20	44.00	45.60	72.0	72.0	72.0
E2-05	Ω	9.842	5.156	1.997	1.601	0.771	0.399	0.288	0.230	0.138	0.101	0.079	0.064	0.039	0.030	0.022	0.023	0.023	0.023
E2-06	%	18.2	13.8	18.5	18.4	19.6	18.2	15.5	19.5	17.2	20.1	19.5	20.8	18.8	20.2	20.5	20.0	20.0	20.0
E2-10	W	14	26	53	77	112	172	262	245	272	505	538	699	823	852	960	1200	1200	1200
E4-01*	A	1.90	3.30	6.20	8.50	14.00	19.60	26.60	39.70	53.00	65.80	77.20	105.00	131.00	160.00	190.00	1.39	1.39	1.39
E4-02*	Hz	2.90	2.05	2.60	2.90	2.73	1.50	1.30	1.70	1.60	1.67	1.70	1.80	1.33	1.60	1.43	72.0	72.0	72.0
E4-03*	A	1.20	1.80	2.80	3.00	4.50	5.10	8.00	11.20	15.20	15.70	18.50	21.90	38.20	44.00	45.60	0.023	0.023	0.023
E4-05	Ω	9.842	5.156	1.997	1.601	0.771	0.399	0.288	0.230	0.138	0.101	0.079	0.064	0.039	0.030	0.022	20.0	20.0	20.0
E4-06	%	18.2	13.8	18.5	18.4	19.6	18.2	15.5	19.5	17.2	20.1	19.5	20.8	18.8	20.2	20.5	1.39	1.39	1.39
L2-02	sec	0.1	0.1	0.2	0.3	0.5	1.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
L2-03	sec	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.0	1.1	1.1	1.2	1.2	1.3	1.5	1.7
L2-04	sec	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.6	0.6	0.6	0.6	0.6	1.0	1.0	1.0	1.0
L8-02	°C	95C	95	95	100	95	95	95	95	90	100	90	90	95	95	95	95	95	95
L8-04	°C	105C	105	105	110	105	105	105	105	100	110	100	100	105	105	105	105	105	105
L8-06	%	5.0	7.5	10.0	12.0	12.0	10.0	17.0	21.0	17.0	15	24	20	18	20	17	16	16	16
n1-03	ms	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	100	100	100
n9-01	A	3.2	4.1	7.0	9.6	15.0	23.0	31.0	45.0	58.0	71.0	85.0	115.0	145.0	180.0	215.0	283	346	415
n9-02		1.002	1.283	1.167	1.202	1.251	1.273	1.149	1.273	1.214	1.076	1.064	1.213	1.116	1.125	1.174	1.249	1.154	1.093
n9-11	μs	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3
n9-12	μs	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.3	2.3	2.3	2.3	2.3	4.0	4.0	4.0	4.0	4.0	4.0
n9-13	μs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
n9-14	ms	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
n9-15	ms	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
n9-26	%	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
n9-27		0.45	0.58	0.66	0.68	0.71	0.65	0.58	0.85	0.82	0.67	0.60	0.81	0.68	0.64	0.76	0.67	0.55	0.42
n9-29	Vdc	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
n9-31	μs	2.6	206	206	206	2.4	2.4	2.3	2.1	2.2	2.2	2.3	2.3	3.0	2.5	2.4	3.0	1.8	2.4
n9-33		0.0283	0.0283	0.0295	0.0148	0.0198	0.0202	0.0159	0.0156	0.0156	0.0175	0.0279	0.0294	0.0196	0.0204	0.0204	0.0462	0.0204	0.0462
n9-34		0.0964	0.0964	0.0993	0.1082	0.0882	0.0956	0.1110	0.1036	0.1036	0.1019	0.0694	0.0724	0.0942	0.0896	0.0896	0.0272	0.0896	0.0272
n9-35		0.7563	0.7563	0.7749	0.1937	0.7960	0.7979	0.8324	0.7154	0.7154	0.7408	0.7723	0.7358	0.7636	0.7753	0.7753	0.7851	0.7753	0.7851
T1-04	A	1.90	3.30	6.20	8.50	14.00	19.60	26.60	39.70	53.00	65.80	77.20	105.00	131.00	160.00	190.00	260.0	260.0	260.0

Table 4.64– o2-04 Parameter Dependencies (400Vac Class) Default Values																			
Model		40P4	40P7	41P5	4P2	43P7	44P0	45P5	47P5	4011	4015	4018	4022	4030	4037	4045	4055	4075	4090
kW		0.4	0.75	1.5	2.2	3.7	4.0	5.5	7.5	11	15	18.5	22.2	30.0	37.0	45.0	55.0	75.0	90.0
Min Vac		355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355	355
Max Vac		555	555	555	555	555	555	555	555	555	555	555	555	555	555	555	555	555	555
Prm	Unit	20	21	22	23	24	25	26	27	28	29	2A	2B	2C	2D	2E	2F	30	31
b3-04	%	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	80	80	80
b3-06		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.7	0.7
b3-08		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.8	0.8
b8-03	Sec	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	2.00	2.00	2.00
b8-04		576.40	447.40	338.80	313.60	245.80	236.44	189.50	145.38	140.88	126.26	115.74	103.58	92.54	76.32	71.56	67.20	46.20	38.91
C6-01		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
C6-02		6	6	6	6	6	6	6	6	6	6	6	6	4	4	4	4	4	4
E2-01*	A	1.00	1.60	3.10	4.20	7.00	7.00	9.80	13.30	19.90	26.50	32.09	38.6	52.3	65.6	79.7	95.0	130.0	156.0
E2-02*	Hz	2.90	2.60	2.50	3.00	2.70	2.70	1.50	1.30	1.70	1.60	1.67	1.70	1.80	1.33	1.60	1.46	1.39	1.40
E2-03*	A	0.60	0.80	1.40	1.50	2.30	2.30	2.60	4.00	5.60	7.60	7.8	9.2	10.9	19.1	22.0	24.0	36.0	40.0
E2-05	Ω	38.1989	22.459	10.100	6.495	3.333	3.333	1.595	1.152	0.922	0.550	0.403	0.316	0.269	0.155	0.122	0.088	0.092	0.056
E2-06	%	18.2	14.3	18.3	18.7	19.3	19.3	18.2	15.5	19.6	17.2	20.1	23.5	20.7	18.8	19.9	20.0	20.0	20.0
E2-10	W	14	26	53	77	130	130	193	263	385	440	508	586	750	925	1125	1260	1600	1760
E4-01*	A	1.00	1.60	3.10	4.20	7.00	7.00	9.80	13.30	19.90	26.50	32.09	38.6	52.3	65.6	79.7	95.0	130.0	156.0
E4-02*	Hz	2.90	2.60	2.50	3.00	2.70	2.70	1.50	1.30	1.70	1.60	1.67	1.70	1.80	1.33	1.60	1.46	1.39	1.40
E4-03*	A	0.60	0.80	1.40	1.50	2.30	2.30	2.60	4.00	5.60	7.60	7.8	9.2	10.9	19.1	22.0	24.0	36.0	40.0
E4-05	Ω	38.1989	22.459	10.100	6.495	3.333	3.333	1.595	1.152	0.922	0.550	0.403	0.316	0.269	0.155	0.122	0.088	0.092	0.056
E4-06	%	18.2	14.3	18.3	18.7	19.3	19.3	18.2	15.5	19.6	17.2	20.1	23.5	20.7	18.8	19.9	20.0	20.0	20.0
L2-02	sec	0.1	0.1	0.2	0.3	0.5	0.5	0.8	0.8	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
L2-03	sec	0.1	0.2	0.3	0.4	0.5	0.6	0.6	0.7	0.8	0.9	1.0	1.0	1.1	1.1	1.2	1.2	1.3	1.5
L2-04	sec	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.6	0.6	0.6	0.6	0.6	1.0	1.0	1.0
L8-02	°C	95	95	95	90	95	95	95	90	95	95	98	78	85	85	90	90	95	110
L8-04	°C	105	105	105	100	105	105	105	100	105	105	108	88	95	95	100	100	105	120
L8-06	%	5.0	7.5	10.0	10.0	12.0	10.0	10.0	20.0	23.0	17.0	17	20	20	20	20	20	16	16
n1-03	ms	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	30	30	30
n9-01	A	1.8	2.1	3.7	53	7.6	8.7	12.5	17.0	24.0	31.0	39.0	45.0	60.0	75.0	91.0	112.0	150.0	180.0
n9-02		0.996	1.162	1.087	1.106	1.224	0.966	1.136	1.133	1.143	1.149	1.146	1.074	1.255	1.155	1.139	1.180	1.171	1.091
n9-11	μs	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3
n9-12	μs	2.3	2.3	2.3	2.5	2.58	2.2	2.2	2.2	2.2	2.4	2.4	2.4	2.4	2.9	2.9	2.9	4.0	4.0
n9-13	μs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0
n9-14	ms	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	20	20
n9-15	ms	5	5	5	5	5	5	5	5	5	5	3	5	5	5	5	5	60	60
n9-26	%	4	4	4	4	4	7	7	7	7	7	3	3	3	1.5	1.5	1.5	1.5	1.5
n9-27		0.25	0.30	0.52	0.75	0.72	0.49	0.71	0.69	0.68	0.58	0.74	0.64	0.85	0.71	0.64	0.79	0.71	0.64
n9-29	Vdc	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
n9-31	μs	2.3	2.3	2.3	2.5	2.5	2.2	2.2	2.2	2.2	2.2	2.4	2.4	2.4	2.4	2.9	2.9	2.9	2.2
n9-33		0.0438	0.0438	0.0438	0.0438	0.0438	0.0438	0.0438	0.0438	0.0442	0.0442	0.0457	0.0383	0.0383	0.0428	0.0407	0.0407	0.0452	0.0372
n9-34		0.0829	0.0829	0.0829	0.0829	0.0829	0.0829	0.0829	0.0829	0.0904	0.0904	0.0812	0.0503	0.0503	0.0252	0.0382	0.0382	0.0228	0.0535
n9-35		0.7792	0.7792	0.7792	0.7792	0.7792	0.7792	0.7792	0.7792	0.8011	0.8011	0.7895	0.8858	0.8858	0.9127	0.8953	0.8953	0.9083	0.8822
T1-04	A	1.00	1.60	3.10	4.20	7.00	7.00	9.80	13.30	19.90	26.50	32.09	38.6	52.3	65.6	79.7	95.0	130.0	156.0

Table 4.64– o2-04 Parameter Dependencies (400Vac Class) Default Values																			
Model		4110	4132	4160	4185	4220	4300												
kW		110.0	132.0	160.0	185.0	220.0	300.0												
Min Vac		355	355	355	355	355	355												
Max Vac		555	555	555	555	555	555												
Prm	Unit	32	33	34	35	36	37												
b3-04	%	80	80	80	80	80	80												
b3-06		0.7	0.7	0.7	0.7	0.7	0.7												
b3-08		0.8	0.8	0.8	0.8	0.8	0.8												
b8-03	Sec	2.00	2.00	2.00	2.00	2.00	2.00												
b8-04		36.23	32.79	30.13	30.57	27.13	21.76												
C6-01		1	1	1	1	1	1												
C6-02		4	4	4	4	1	1												
E2-01*	A	190.0	223.0	270.0	310.0	370.0	500.0												
E2-02*	Hz	1.40	1.38	1.35	1.30	1.30	1.25												
E2-03*	A	49.0	58.0	70.0	81.0	96.0	130.0												
E2-05	Ω	0.046	0.035	0.029	0.025	0.020	0.014												
E2-06	%	20.0	20.0	20.0	20.0	20.0	20.0												
E2-10	W	2150	2350	2850	3200	3700	4700												
E4-01*	A	190.0	223.0	270.0	310.0	370.0	500.0												
E4-02*	Hz	1.40	1.38	1.35	1.30	1.30	1.25												
E4-03*	A	49.0	58.0	70.0	81.0	96.0	130.0												
E4-05	Ω	0.046	0.035	0.029	0.025	0.020	0.014												
E4-06	%	20.0	20.0	20.0	20.0	20.0	20.0												
L2-02	sec	2	2	2	2	2	2												
L2-03	sec	1.7	1.7	1.8	1.9	2.0	2.1												
L2-04	sec	1.0	1.0	1.0	1.0	1.0	1.0												
L8-02	°C	110	100	100	95	95	95												
L8-04	°C	120	110	110	105	105	105												
L8-06	%	16	16	14	15	15	15												
n1-03	ms	30	30	30	30	30	30												
n9-01	A	216	260	304	370	506	675												
n9-02		1.138	1.084	1.127	1.139	1.164	1.432												
n9-11	μs	3	3	3	3	3	3												
n9-12	μs	4.0	4.0	4.0	4.0	4.0	4.0												
n9-13	μs	2.0	2.0	2.0	2.0	2.0	2.0												
n9-14	ms	20	20	20	4	4	4												
n9-15	ms	60	60	60	4	4	4												
n9-26	%	1.5	1.5	1.5	1.5	1.5	1.5												
n9-29	Vdc	1.2	1.2	1.2	1.2	1.2	1.3												
n9-31	μs	2.0	2.0	1.8	1.8	2.0	4.0												
n9-33		0.0372	0.0372	0.0435	0.0435	0.0435	0.0765												
n9-34		0.0535	0.0535	0.0340	0.0340	0.0340	0.0115												
n9-35		0.8822	0.8822	0.8916	0.8916	0.8916	0.8577												
T1-04	A	190.0	223.0	270.0	310.0	370.0	500.0												



## ► o2-09 Specification

There are three (3) parameter sets that are referred to as specification parameters. After the kVA parameters, these are the most important and are the next highest of the sequence numbers. Specification parameters are those parameters that are most common to specific regions of the world and are referred to as YEC (Japanese), YEA (American) and YEG (European) specifications. The table below lists those parameters that are affected by setting parameter o2-09. Only the differences between specifications are shown.

The “Other” column

- N/A - that parameter is not available under that specification
- Shaded - that parameter is factory accessible only
- Prm = [#,#] – parameter selections are limited to those shown. In brackets

Co-Dependencies

- Parameters with an \* are also dependent on o2-04

Table 4.65– o2-09 Parameter Dependencies

Prm	Addr	o2-09 = N/A (YEC)			o2-09 = 1 (YEA)			o2-09 = 2 (YEG)		
		Limits	Default	Other	Limits	Default	Other	Limits	Default	Other
b2-04	18Ch	0.00 ~ 10.00	0.50		0.00 ~ 10.00	0.00		0.00 ~ 10.00	0.50	
b4-01	1A3h	0.0 ~ 300.0	0.0		0.0 ~ 3000.0	0.0		0.0 ~ 3000.0	0.0	
b4-02	1A4h	0.0 ~ 300.0	0.0		0.0 ~ 3000.0	0.0		0.0 ~ 3000.0	0.0	
b5-15	1B3h			Disabled @ b5-01 = 0			Enabled @ b5-01 = 0			Enabled @ b5-01 = 0
b5-18	1DCh			N/A	0 ~ 1	0		0 ~ 1	0	
b5-19	1DDh			N/A	0.0 ~ 100.0	0.0		0.0 ~ 100.0	0.0	
C4-03	217h			Factory Access						
C4-04	218h			Factory Access						
C4-05	219h			Factory Access						
E1-01*	300h		200/400			230/460			200/400	
E1-03	302h			A1-02 = [0,1,2]			A1-02 = [0,1]			A1-02 = [0,1]
E1-04	303h		60.0			60.0			50.0	
E1-05*	304h		200/400			230/460			200/400	
E1-06	305h		60.0			60.0			50.0	
E1-08*	307h		15.0/30.0			17.2/34.4			15.0/30.0	
E1-09	308h		1.5			1.5			1.2	
E1-10*	309h		9.0/18.0			10.3/20.6			9.0/18.0	
E1-12*	30Bh									
E1-13*	30Ch									
E2-01*	30Eh									
E2-02*	30Fh									
E2-03*	310h									
E3-02	31Ah		60.0			60.0			50.0	
E3-03*	31Bh		200/400			230/460			200/400	
E3-04	31Ch		60.0			60.0			50.0	
E3-06*	31Eh		15.0/30.0			17.2/34.4			15.0/30.0	
E3-07	31Fh		60.0			60.0			50.0	
E3-08*	320h		9.0/18.0			10.3/20.6			9.0/18.0	
E4-01*	321h									
E4-02*	322h									
E4-03*	323h									
F1-01	380h		600			1024			600	
F5-02	39Ah						Added 38h			Added 38h
F5-03	39Bh						Added 38h			Added 38h
F5-04	39Ch						Added 38h			Added 38h
F5-05	39Dh						Added 38h			Added 38h
F5-06	39Eh						Added 38h			Added 38h
F5-07	39Fh						Added 38h			Added 38h
F5-08	3A0h						Added 38h			Added 38h
F6-05	3A6h			N/A	0 ~ 1	0			0 ~ 1	0
H1-01	400h						Added 69h ~ 78h			Added 69h ~ 78h
H1-02	401h						Added 69h ~ 78h			Added 69h ~ 78h
H1-03	402h						Added 69h ~ 78h			Added 69h ~ 78h

Table 4.65– o2-09 Parameter Dependencies

Prm	Addr	o2-09 = N/A (YEC)			o2-09 = 1 (YEA)			o2=-9 = 2 (YEG)		
		Limits	Default	Other	Limits	Default	Other	Limits	Default	Other
H1-04	403h						Added 69h ~ 78h			Added 69h ~ 78h
H1-05	404h						Added 69h ~ 78h			Added 69h ~ 78h
H1-06	405h						Added 69h ~ 78h			Added 69h ~ 78h
H2-01	40Bh						Added 38h			Added 38h
H2-02	40Ch						Added 38h			Added 38h
H2-03	40Dh						Added 38h			Added 38h
H3-01	410h			Factory Access						
H3-14	433h			N/A	0 ~ 1	0	Factory Access	0 ~ 1	0	Factory Access
H4-02	41Eh	0.0 ~ 1000.0	100.0		-100.0 ~ +100.0	0.0		-100.0 ~ +100.0	0.0	
H4-03	41Fh	0.0 ~ 1000.0	100.0		-100.0 ~ +100.0	0.0		-100.0 ~ +100.0	0.0	
H4-05	421h	0.00 ~ 2.50	0.50		0.0 ~ 1000.0	50.0		0.0 ~ 1000.0	50.0	
H4-06	422h	-10.0 ~ +10.0	0.0		-110.0 ~ +110.0	0.0		-110.0 ~ +110.0	0.0	
H4-07	423h	0 ~ 1	0		0 ~ 2	0		0 ~ 2	0	
H4-08	424h	0 ~ 1	0		0 ~ 2	0		0 ~ 2	0	
H5-03	427h		1			0			1	
L1-02	481h	0.1 ~ 5.0	1.0		0.1 ~ 20.0	8.0		0.1 ~ 5.0	1.0	
L4-06	4C2h			N/A	0.0 ~ 100.0	80.0		0.0 ~ 100.0	80.0	
o1-05	503h			N/A	0 ~ 5	3		0 ~ 5	3	
o2-06	50Ah	0 ~ 1	0		0 ~ 1	1		0 ~ 1	0	
o2-08	50Ch	0 ~ 1	0		0 ~ 1	1		0 ~ 1	1	
o2-09	50Dh			N/A	1 ~ 2	1		1 ~ 2	2	
o2-12	510h			N/A	0 ~ 1	0		0 ~ 1	0	
o2-13	511h			N/A	0 ~ 1	1	Factory Access	0 ~ 1	1	Factory Access
U3-01	90h			Addr @ 90h			Addr @ 800h			Addr @ 800h
U3-02	91h			Addr @ 91h			Addr @ 801h			Addr @ 801h
U3-03	92h			Addr @ 92h			Addr @ 802h			Addr @ 802h
U3-04	93h			Addr @ 93h			Addr @ 803h			Addr @ 803h
U3-05	94h			Addr @ 94h			Addr @ 80Ah			Addr @ 80Ah
U3-06	95h			Addr @ 95h			Addr @ 80Bh			Addr @ 80Bh
U3-07	96h			Addr @ 96h			Addr @ 80Ch			Addr @ 80Ch
U3-08	97h			Addr @ 97h			Addr @ 80Dh			Addr @ 80Dh
U3-09	804h			N/A						
U3-10	805h			N/A						
U3-11	806h			N/A						
U3-12	807h			N/A						
U3-13	808h			N/A						
U3-14	809h			N/A						
U3-15	80Eh			N/A						
U3-16	80Fh			N/A						
U3-17	810h			N/A						
U3-18	811h			N/A						
U3-19	812h			N/A						
U3-20	813h			N/A						

# Chapter 5 User Notes

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*This chapter allows the user to enter information specific to their application*

<b>Notes .....</b>	<b>5 - 3</b>
<b>Hex/Dec Conversion Table.....</b>	<b>5 – 13</b>

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## Notes

Enter the current application parameter data and any relevant notes.

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Table 5.1- Registers Notes

Prm	Function	Default	Notes
A1-00	Language	0	
A1-01	Access Level	2	
A1-02	Control Method	0	
A1-03	Initialize Parameters	0	
A1-04	Enter Password	0	
A1-05	Set Password	0	
A2-01	User Parameter #1	0	
A2-02	User Parameter #2	0	
A2-03	User Parameter #3	0	
A2-04	User Parameter #4	0	
A2-05	User Parameter #5	0	
A2-06	User Parameter #6	0	
A2-07	User Parameter #7	0	
A2-08	User Parameter #8	0	
A2-09	User Parameter #9	0	
A2-10	User Parameter #10	0	
A2-11	User Parameter #11	0	
A2-12	User Parameter #12	0	
A2-13	User Parameter #13	0	
A2-14	User Parameter #14	0	
A2-15	User Parameter #15	0	
A2-16	User Parameter #16	0	
A2-17	User Parameter #17	0	
A2-18	User Parameter #18	0	
A2-19	User Parameter #19	0	
A2-20	User Parameter #20	0	
A2-21	User Parameter #21	0	
A2-22	User Parameter #22	0	
A2-23	User Parameter #23	0	
A2-24	User Parameter #24	0	
A2-25	User Parameter #25	0	
A2-26	User Parameter #26	0	
A2-27	User Parameter #27	0	
A2-28	User Parameter #28	0	
A2-29	User Parameter #29	0	
A2-30	User Parameter #30	0	
A2-31	User Parameter #31	0	
A2-32	User Parameter #32	0	
b1-01	Frequency Reference Source	1	
b1-02	Run Command Source	1	
b1-03	Stopping Method	0	

Table 5.1- Registers Notes

Prm	Function	Default	Notes
b1-04	Reverse Operation	0	
b1-05	Minimum Output Frequency	0	
b1-06	Digital Input Scan Time	0	
b1-07	Local/Remote Switchover	0	
b1-08	Run Command @ Program	0	
b2-01	DC Injection Freq @ Start	0.5Hz	
b2-02	DC Injection Current	50%	
b2-03	DC Injection Brake @ Start	0sec	
b2-04	DC Injection Brake Time @ Stop	0.00sec	
b2-08	Field Compensation	0%	
b3-01	Speed Search @ Start	2	
b3-02	Speed Search Current	10.0%	
b3-03	Speed Search Deceleration Time	2.0sec	
b3-05	Speed Search Wait Time	0.2sec	
b3-14	Bi-Directional Speed Search	1	
b4-01	On-Delay Time	0.0sec	
b4-02	Off-Delay Time	0.0sec	
b5-01	PID Mode	0	
b5-02	P Gain	1.00	
b5-03	I Time	1.0sec	
b5-04	I Limit	100.0%	
b5-05	D Time	0.00sec	
b5-06	PID High Limit	100.0%	
b5-07	PID Offset	0.0%	
b5-08	PID Primary Delay Time	0.00sec	
b5-09	PID Output	0	
b5-10	PID Output Gain	1.0	
b5-11	PID Reverse	0	
b5-12	PID Feedback Missing Detect	0	
b5-13	PID Feedback Missing Detect Level	0%	
b5-14	PID Feedback Missing Detect Time	1.0sec	
b5-15	PID Sleep Function Level	0.0Hz	
b5-16	PID Sleep Delay Time	0.0sec	
b5-17	PID Accel/Decel Time	0.0sec	
b5-18	PID Set Point	0	
b5-19	PID Set Point Level	0.0%	
b6-01	Dwell Freq @ Start	0.0Hz	
b6-02	Dwell Time @ Start	0.0sec	
b6-03	Dwell Freq @ Stop	0.0Hz	
b6-04	Dwell Time @ Stop	0.0sec	
b7-01	Droop Control Level	0.0%	
b7-02	Droop Control Delay	0.05sec	

Table 5.1- Registers Notes

Prm	Function	Default	Notes
b8-01	Energy Saving Control	0	
b8-02	Energy Save Gain	0.7	
b8-03	Energy Save Control Filter Time	0.50sec	
b8-04	Energy Save Coefficient	0.00	
b8-05	Power detect Filter Time	20ms	
b8-06	Search Operation Voltage Limiter	0%	
b9-01	Zero Servo Gain	5	
b9-02	Zero Servo Completion Width	10	
C1-01	Acc Time 1	10.0sec	
C1-02	Dec Time 1	10.0sec	
C1-03	Acc Time 2	10.0sec	
C1-04	Dec Time 2	10.0sec	
C1-05	Acc Time 3	10.0sec	
C1-06	Dec Time 3	10.0sec	
C1-07	Acc Time 4	10.0sec	
C1-08	Dec Time 4	10.0sec	
C1-09	Emergency Stop Time	10.0sec	
C1-10	Acc/Dec Time Units	1	
C1-11	Acc/Dec Time Switchover Freq	0.0Hz	
C2-01	S-Curve Time @ Acc Start	0.20sec	
C2-02	S-Curve Time @ Acc End	0.20sec	
C2-03	S-Curve Time @ Dec Start	0.20sec	
C2-04	S-Curve Time @ Dec End	0.00sec	
C3-01	Slip Comp Gain	1.0	
C3-02	Slip Comp Primary Delay Time	2000ms	
C3-03	Slip Comp Limit	200%	
C3-04	Slip Comp @ Regen	0	
C3-05	Slip Comp Output voltage Limit	0	
C4-01	Torque Comp Gain	1.00	
C4-02	Torque Comp Delay Time 1	200ms	
C4-03	Torque Comp @ Forward	0.0%	
C4-04	Torque Comp @ Reverse	0.0%	
C4-05	Torque Comp Time Const	10ms	
C5-01	ASR P Gain	0.20	
C5-02	ASR I Time	0.200sec	
C5-03	ASR P Gain 2	0.02	
C5-04	ASR I Time 2	0.050sec	
C5-05	ASR Limit	5.0%	
C5-06	ASR Primary Delay	0.004sec	
C5-07	ASR Gain Switching Frequency	0.0Hz	
C5-08	ASR I Limit	400%	
C6-01	Heavy/Normal Duty	1	



Table 5.1- Registers Notes			
Prm	Function	Default	Notes
C6-02	Carrier Frequency	6	
C6-03	Carrier Frequency Upper Limit	15.0kHz	
C6-04	Carrier Frequency Lower Limit	15.0kHz	
C6-05	Carrier Frequency P Gain	0	
d1-01	Frequency Reference 1	0.00Hz	
d1-02	Frequency Reference 2	0.00Hz	
d1-03	Frequency Reference 3	0.00Hz	
d1-04	Frequency Reference 4	0.00Hz	
d1-05	Frequency Reference 5	0.00Hz	
d1-06	Frequency Reference 6	0.00Hz	
d1-07	Frequency Reference 7	0.00Hz	
d1-08	Frequency Reference 8	0.00Hz	
d1-09	Frequency Reference 9	0.00Hz	
d1-10	Frequency Reference 10	0.00Hz	
d1-11	Frequency Reference 11	0.00Hz	
d1-12	Frequency Reference 12	0.00Hz	
d1-13	Frequency Reference 13	0.00Hz	
d1-14	Frequency Reference 14	0.00Hz	
d1-15	Frequency Reference 15	0.00Hz	
d1-16	Frequency Reference 16	0.00Hz	
d1-17	Jog Frequency	6.00Hz	
d2-01	Frequency Reference Upper Limit	100.0%	
d2-02	Frequency Reference Lower Limit	0.0%	
d2-03	Master Speed Reference Lower Limit	0.0%	
d3-01	Jump Frequency 1	0.0Hz	
d3-02	Jump Frequency 2	0.0Hz	
d3-03	Jump Frequency 3	0.0Hz	
d3-04	Jump Frequency Bandwidth	1.0Hz	
d4-01	Frequency Reference Hold Function	0	
d4-02	Trim Control Limits	10%	
d5-01	Torque Control	0	
d5-02	Torque Reference Delay Time	0ms	
d5-03	Speed Limit	1	
d5-04	Speed Limit	0%	
d5-05	Speed Limit Bias	10%	
d5-06	Speed/Torque Switchover Time	0ms	
d6-01	Magnetic Field Weakening Level	80%	
d6-02	Magnetic Field Freq	0.0Hz	
d6-03	Magnetic Field Force Function	0	
d6-06	Magnetic Field Force Limit	400%	
E1-01	Input Voltage	230Vac	
E1-03	V/F Pattern	Fh	

Table 5.1- Registers Notes

Prm	Function	Default	Notes
E1-04	Maximum Output Frequency	60.0Hz	
E1-05	Maximum Output Voltage	230.0Vac	
E1-06	Base Output Frequency	60.0Hz	
E1-09	Minimum Output Frequency	1.5Hz	
E1-11	Mid Output Frequency 2	0.0Hz	
E1-12	Voltage @ Mid Output Frequency 2	0.0Vac	
E1-13	Voltage @ Base Output Frequency	0.0Vac	
E2-01	Motor 1 Rated Current)	1.90A	
E2-02	Motor 1 Rated Slip	2.90Hz	
E2-03	Motor 1 No-Load Current	1.20A	
E2-04	Motor 1 Number of Motor Poles	4poles	
E2-05	Motor 1 Terminal Resistance	9.842ohms	
E2-06	Motor 1 Leakage Inductance	18.2%	
E2-07	Motor 1 Iron Core Saturation Coef 1	0.50	
E2-08	Motor 1 Iron Core Saturation Coef 2	0.75	
E2-10	Motor 1 Iron Loss of Torque Comp	14W	
E2-11	Motor 1 Rated Output	0.40kW	
E2-12	Motor Iron Core Saturation 3	1.30	
E3-01	Motor 2 Control Method	0	
E3-02	Motor 2 Maximum Output Freq	60.0Hz	
E3-03	Motor 2 Maximum Output Voltage	230.0Vac	
E3-04	Motor 2 Base Output Freq	60.0Hz	
E3-05	Motor 2 Mid Output Freq	3.0Hz	
E3-07	Motor 2 Minimum Output Freq	60.0Hz	
E4-01	Motor 2 Rated Current	1.90A	
E4-02	Motor 2 Rated Slip	2.90Hz	
E4-03	Motor 2 No-Load Current	1.20A	
E4-04	Motor 2 Number of Motor Poles	4 poles	
E4-05	Motor 2 Terminal Resistance	9.842ohms	
E4-06	Motor 2 Leakage Inductance	18.2%	
E4-07	Motor 2 Rated Capacity	0.40kW	
F1-01	PG Const	1024	
F1-02	Operation @ PG Open	1	
F1-03	Operation @ Over Speed	1	
F1-04	Operation @ Speed Deviation	3	
F1-05	PG Rotation Direction	0	
F1-06	PG Output Division Rate	1	
F1-07	I @ Accel/Decel	0	
F1-08	Over Speed Detect Level	115%	
F1-09	Over Speed Detect Delay	1.0sec	
F1-10	Excessive Speed Detect Level	10sec	
F1-11	Excessive Speed Detect Delay	0.5sec	

Table 5.1- Registers Notes

Prm	Function	Default	Notes
F1-12	PG Gear Teeth 1	0	
F1-13	PG Gear Teeth 2	0	
F1-14	PG Open Detect Time	2.0sec	
F2-01	AI-14 Input	0	
F3-01	DI-08/DI-16H2 Input	0	
F4-01	Channel 1 Monitor	2	
F4-02	Channel 1 Gain	1	
F4-03	Channel 2 Monitor	2	
F4-04	Channel 2 Gain	0.50%	
F4-05	CH1 Output Bias	0.0%	
F4-06	CH2 Output Bias	0.0%	
F4-07	CH1 Output Signal Level	0	
F4-08	CH2 Output Signal Level	0	
F5-01	CH1 Output	0	
F5-02	CH2 Output	1	
F5-03	CH3 Output	2	
F5-04	CH4 Output	4	
F5-05	CH5 Output	6	
F5-06	CH6 Output	55	
F5-07	CH7 Output	0Fh	
F5-08	CH8 Output	0Fh	
F5-09	CH8 Output Mode	0	
F6-01	Stopping Method for COM Error Detection	1	
F6-02	External Fault Detect	0	
F6-03	External Fault Action	1	
F6-04	Tracer Sampling	0	
F6-05	Current Monitor Display	0	
F6-06	Torque Ref/Torque Limit COM Option	0	
H1-01	Multi-Function Input 1 – S3	36	
H1-02	Multi-Function Input 2 – S4	20	
H1-03	Multi-Function Input 3 – S5	3	
H1-04	Multi-Function Input 4 – S6	4	
H1-05	Multi-Function Input 5 – S7	6	
H1-06	Multi-Function Input 6 – S8	8	
H2-01	Multi-Function Output 1	0	
H2-02	Multi-Function Output 2	1	
H2-03	Multi-Function Output 3	2	
H3-01	Terminal A1 Signal Level	0	
H3-02	Terminal A1 Gain	100.0%	
H3-03	Terminal A1 Bias	0.0%	
H3-04	Terminal A3 Signal Level	0	
H3-05	Terminal A3 Function	2	

Table 5.1- Registers Notes			
Prm	Function	Default	Notes
H3-06	Terminal A3 Gain	100.0%	
H3-07	Terminal A3 Bias	0.0%	
H3-08	Freq Ref Term A2 Signal Level	2	
H3-09	Freq Ref Terminal A2 Function	0	
H3-10	Freq Ref Terminal A2 Gain	100.0%	
H3-11	Freq Ref Terminal A2 Bias	0%	
H3-12	Analog Input Filter Time	0.03sec	
H3-13	Terminal A1/A2 Switchover	0	
H4-01	Multi-Function Analog Out 1 FM Monitor	2	
H4-02	Multi-Function Analog Out 1 FM Gain	100%	
H4-03	Multi-Function Analog Out 1 FM Bias	0.0%	
H4-04	Multi-Function Analog Out 2 AM Monitor	3	
H4-05	Multi-Function Analog Out 2 AM Gain	50.0%	
H4-06	Multi-Function Analog Out 2 AM Bias	0.0%	
H4-07	Multi-Function Analog Out 1 FM Signal Level	0	
H4-08	Multi-Function Analog Out 2 AM Signal Level	0	
H5-01	Drive Node Address	1Fh	
H5-02	Communications Baud Rate	3	
H5-03	Communications Parity	0	
H5-04	Communications Error Stopping Method	3	
H5-05	Communications Error Detect	1	
H5-06	Send Waiting Time	5ms	
H5-07	RTS Control	1	
H6-01	Pulse Input Function – Terminal RP	0	
H6-02	Pulse Input Scaling	1440Hz	
H6-03	Pulse Input Gain	100.0%	
H6-04	Pulse Input Bias	0%	
H6-05	Pulse Input Filter Time	0.10sec	
H6-06	Pulse Monitor – Terminal MP	2	
H6-07	Pulse Monitor Scaling	1440Hz	
L1-01	Motor Overload Protection	1	
L1-02	Motor Overload Protection Time	1.0min	
L1-03	Operation for Motor Overheat Alarm	3	
L1-04	Operation for Motor Overheat	2	
L1-05	Motor Temp Input Filter Time	0.20sec	
L2-01	Momentary Power Loss Detect	0	
L2-02	Momentary Power Loss Ride Through Time	0.1sec	
L2-03	Minimum Base Block Time	0.1sec	
L2-04	Momentary Power Loss V/F Ramp Time	0.3sec	
L2-05	Undervoltage Detect Level	190Vdc	
L2-06	KEB Decel Rate	0.0sec	
L2-07	Momentary Power Loss Recovery Time	0.0sec	

Table 5.1- Registers Notes			
Prm	Function	Default	Notes
L2-08	KEB Freauency	100%	
L3-01	Stall Prevention @ Accel	1	
L3-02	Stall Prevention Level @ Accel	120%	
L3-03	Stall Prevention Limit @ Accel	50%	
L3-04	Stall Prevention @ Decel	1	
L3-05	Stall Prevention @ Run	1	
L3-06	Stall Prevention Level @ Run	120%	
L3-11	OV Suppression	0	
L3-12	OV Suppression Voltage Level		
L4-01	Speed Agree Detect Level	0.0Hz	
L4-02	Speed Agree Detect Width	2.0Hz	
L4-03	Speed Agree Detect Level +/-	0.0Hz	
L4-04	Speed Agree Detect Width +/-	2.0Hz	
L4-05	Frequency Loss Detect	0	
L4-06	Freq Ref @ Freq Ref Loss	80.0%	
L5-01	Number of Fault Retries	0	
L5-02	Fault Contact Operation @ Fault Retries	0	
L6-01	Over/Under Torque Detect 1	0	
L6-02	Over/Under Torque Detect Level 1	150%	
L6-03	Over/Under Torque Detect Time 1	0.1sec	
L6-04	Over/Under Torque Detect 2	0	
L6-05	Over/Under Torque Detect Level 2	150%	
L6-06	Over/Under Torque Detect Time 2	0.1sec	
L7-01	Forward Torque Limit	200%	
L7-02	Reverse torque Limit	200%	
L7-03	Forward Regen Torque Limit	200%	
L7-04	Reverse Regen Torque Limit	200%	
L7-07	Torque Limit Control @ Acc/Dec	0	
L8-01	Internal DB Resistor Protection	0	
L8-02	Overheat Pre-Alarm Level	95°C	
L8-03	Operation for Overheat Pre-Alarm	3	
L8-05	Input Phase Loss Protection	1	
L8-07	Output Phase Loss Protection	1	
L8-09	Ground Fault Protection	1	
L8-10	Cooling Fan On/Off	0	
L8-11	Cooling Fan On/Off Delay Time	60sec	
L8-12	Ambient Temperature	45°C	
L8-15	OL2 @ Low Speed	1	
L8-18	Soft CLA	1	
n1-01	Hunting Prevention	1	
n1-02	Hunting Prevention Gain	1.00	
n2-01	Speed Fdbk Detect Suppress Gain	1.00	

Table 5.1- Registers Notes			
Prm	Function	Default	Notes
n2-02	Speed Fdbk Detect Suppress Time	50ms	
n2-03	Speed Fdbk Detect Suppress Time 2	750ms	
n3-01	HSB Decel Freq Width	5%	
n3-02	HSB Current Ref	150%	
n3-03	HSB Stop Dwell Time	1.0sec	
n3-04	HSB OL Time	4.0sec	
n5-01	Feed Forward Control	1	
n5-02	Motor Acc Time	0.178sec	
n5-03	Feed Forward Ratio Gain	1.00	
o1-01	Monitor	6	
o1-02	Power-Up Monitor	1	
o1-03	Display Scaling	0	
o1-04	Display Units	0	
o1-05	LCD Contrast	3	
o2-01	Local/Remote Key	1	
o2-02	Stop Key	1	
o2-03	User Parameter Initialization	0	
o2-04	kVA		
o2-05	Frequency Reference Setting	0	
o2-06	Digital Operator Disconnect Operation	0	
o2-07	Elapsed Time Set	0hr	
o2-08	Elapsed Time	0	
o2-09	Initialization Mode	1	
o2-10	Fan Operating Time	0hr	
o2-12	Fault Trace/History Clear	0	
o3-01	COPY Function	0	
o3-02	Read	0	
T1-00	Motor Select 1/2	1	
T1-01	Tuning Mode	0	
T1-02	Motor Output Power	0.40kW	
T1-03	Motor Rated Voltage	230.0Vac	
T1-04	Motor Rated Current	1.90A	
T1-05	Motor Rated Frequency	60Hz	
T1-06	Number of Motor Poles	2	
T1-07	Motor Rated Speed	1750RPM	
T1-08	PG Pulses/Rev	1024ppr	

# Hex/Dec Conversion Table

Table 5.2 – Hexadecimal-Decimal Conversion

Hex	Dec		Hex	Dec		Hex	Dec		Hex	Dec		Hex	Dec
0	0		34	52		68	104		9C	156		D0	208
1	1		35	53		69	105		9D	157		D1	209
2	2		36	54		6A	106		9E	158		D2	210
3	3		37	55		6B	107		9F	159		D3	211
4	4		38	56		6C	108		A0	160		D4	212
5	5		39	57		6D	109		A1	161		D5	213
6	6		3A	58		6E	110		A2	162		D6	214
7	7		3B	59		6F	111		A3	163		D7	215
8	8		3C	60		70	112		A4	164		D8	216
9	9		3D	61		71	113		A5	165		D9	217
A	10		3E	62		72	114		A6	166		DA	218
B	11		3F	63		73	115		A7	167		DB	219
C	12		40	64		74	116		A8	168		DC	220
D	13		41	65		75	117		A9	169		DD	221
E	14		42	66		76	118		AA	170		DE	222
F	15		43	67		77	119		AB	171		DF	223
10	16	44	68	78	120	AC	172	E0	224				
11	17	45	69	79	121	AD	173	E1	225				
12	18	46	70	7A	122	AE	174	E2	226				
13	19	47	71	7B	123	AF	175	E3	227				
14	20	48	72	7C	124	B0	176	E4	228				
15	21	49	73	7D	125	B1	177	E5	229				
16	22	4A	74	7E	126	B2	178	E6	230				
17	23	4B	75	7F	127	B3	179	E7	231				
18	24	4C	76	80	128	B4	180	E8	232				
19	25	4D	77	81	129	B5	181	E9	233				
1A	26	4E	78	82	130	B6	182	EA	234				
1B	27	4F	79	83	131	B7	183	EB	235				
1C	28	50	80	84	132	B8	184	EC	236				
1D	29	51	81	85	133	B9	185	ED	237				
1E	30	52	82	86	134	BA	186	EE	238				
1F	31	53	83	87	135	BB	187	EF	239				
20	32	54	84	88	136	BC	188	F0	240				
21	33	55	85	89	137	BD	189	F1	241				
22	34	56	86	8A	138	BE	190	F2	242				
23	35	57	87	8B	139	BF	191	F3	243				
24	36	58	88	8C	140	C0	192	F4	244				
25	37	59	89	8D	141	C1	193	F5	245				
26	38	5A	90	8E	142	C2	194	F6	246				
27	39	5B	91	8F	143	C3	195	F7	247				
28	40	5C	92	90	144	C4	196	F8	248				
29	41	5D	93	91	145	C5	197	F9	249				
2A	42	5E	94	92	146	C6	198	FA	250				
2B	43	5F	95	93	147	C7	199	FB	251				
2C	44	60	96	94	148	C8	200	FC	252				
2D	45	61	97	95	149	C9	201	FD	253				
2E	46	62	98	96	150	CA	202	FE	254				
2F	47	63	99	97	151	CB	203	FF	255				
30	48	64	100	98	152	CC	204	100	256				
31	49	65	101	99	153	CD	205						
32	50	66	102	9A	154	CE	206						
33	51	67	103	9B	155	CF	207						

# F7 Drive Parameter Access



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