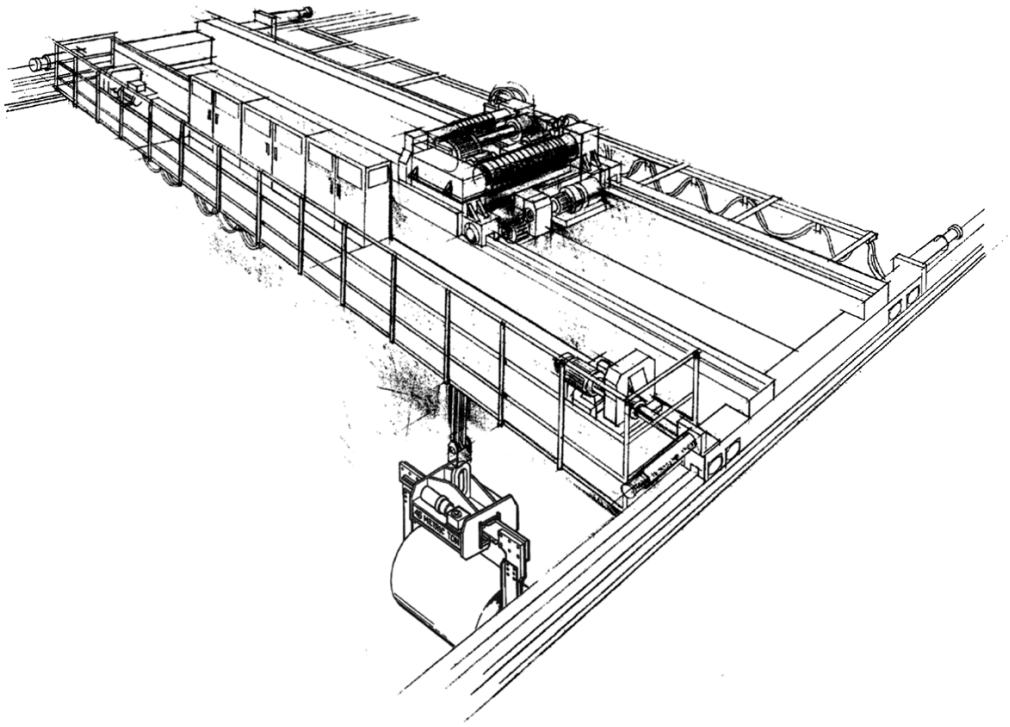


IMPULSE®•D+ HHP Regenerative Drive
Instruction Manual

MAGNETEK
MATERIAL HANDLING

Software #1015 January 2013
Part Number: 146-55048

Table of Contents

Preface and Safety

Product Safety Information

Magnetek, Inc. (Magnetek) offers a broad range of radio remote control products, control products and adjustable frequency drives, and industrial braking systems for material handling applications. This manual has been prepared by Magnetek to provide information and recommendations for the installation, use, operation and service of Magnetek's material handling products and systems (Magnetek Products). Anyone who uses, operates, maintains, services, installs or owns Magnetek Products should know, understand and follow the instructions and safety recommendations in this manual for Magnetek Products.

The recommendations in this manual do not take precedence over any of the following requirements relating to cranes, hoists, lifting devices or other equipment which use or include Magnetek Products:

- Instructions, manuals, and safety warnings of the manufacturers of the equipment where the Magnetek Products are used,
- Plant safety rules and procedures of the employers and the owners of the facilities where the Magnetek Products are being used,
- Regulations issued by the Occupational Health and Safety Administration (OSHA),
- Applicable local, state, or federal codes, ordinances, standards and requirements, or
- Safety standards and practices for the industries in which Magnetek Products are used.

This manual does not include or address the specific instructions and safety warnings of these manufacturers or any of the other requirements listed above. It is the responsibility of the owners, users and operators of the Magnetek Products to know, understand and follow all of these requirements. It is the responsibility of the employer to make its employees aware of all of the above listed requirements and to make certain that all operators are properly trained. **No one should use Magnetek Products prior to becoming familiar with and being trained in these requirements and the instructions and safety recommendations for this manual.**

Product Warranty Information

Magnetek, hereafter referred to as Company, assumes no responsibility for improper programming of a drive by untrained personnel. A drive should only be programmed by a trained technician who has read and understands the contents of this manual. Improper programming of a drive can lead to unexpected, undesirable, or unsafe operation or performance of the drive. This may result in damage to equipment or personal injury. Company shall not be liable for economic loss, property damage, or other consequential damages or physical injury sustained by the purchaser or by any third party as a result of such programming. Company neither assumes nor authorizes any other person to assume for Company any other liability in connection with the sale or use of this product.

For information on Magnetek's product warranties by product type, please visit www.magnetekmh.com.

Supplemental Safety Instructions

Read and understand this manual before installing, operating, or servicing this product. Install the product according to this manual and local codes.

The following conventions indicate safety messages, and may be used in this manual to emphasize important and critical information. Failure to heed these messages could cause fatal injury or damage products and related equipment and systems.

DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It may also be used to alert against unsafe practices.

NOTICE

NOTICE indicates an equipment damage message.

NOTE: A NOTE statement is used to notify installation, operation, programming, or maintenance information that is important, but not hazard-related.

Using the LCD Operator

Keys and Displays

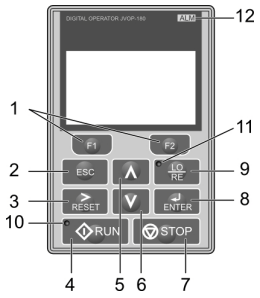


Figure 1: Keys and Displays on the LCD Operator

Table 1: Keys and Displays on the LCD Operator

No.	Key	Function
1	F1 / F2	The functions assigned to F1 and F2 vary depending on the menu that is currently displayed. The name of each function appears in the lower half of the display window. Refer to LCD Display on page 6 for the details of the functions assigned.
2	ESC	• Returns to the previous display • Moves the cursor one space to the left. • Pressing and holding this button will return to the Voltage Reference Display.
3	RESET	• Moves the cursor to the right. • Resets the regenerative converter to clear a fault situation.
4	RUN	Runs the regenerative converter in the LOCAL mode. • The Run LED is on, when the regenerative converter is operating the motor. • Flashes during deceleration to stop or when the frequency reference is 0. • Flashes quickly if the regenerative converter is disabled by a DI, the regenerative converter was stopped using a fast DI, or a run command was active during power up.
5		Scrolls up to display the next item, selects parameter numbers, and increments setting values.
6		Scrolls down to display the previous item, selects parameter numbers, and decrements setting values.
7	STOP	Stops regenerative converter operation. *1
8	ENTER	• Enters parameter values and settings. • Selects a menu item to move between displays.
9	LO RE	Switches regenerative converter control between the LCD operator (LOCAL) and the control circuit terminals (REMOTE). *2
10	RUN	Lit while the regenerative converter is operating. Refer to page 7 for flashing of the indicator.
11	LO RE	Lit while the operator is selected to run the regenerative converter (LOCAL mode).
12	ALM	Refer to ALARM (ALM) LED Displays on page 7 for the details.

**1 The STOP key has highest priority. Pressing the STOP key will always cause the regenerative converter to stop the motor, even if a Run command is active at any external Run command source. To disable the STOP key priority, set o2-02 to 0.*

**2 The LO/RE key can only switch between LOCAL and REMOTE when the regenerative converter is stopped. To enable the LO/RE key to switch between LOCAL and REMOTE, set parameter o2-01 to 1.*

LCD Display

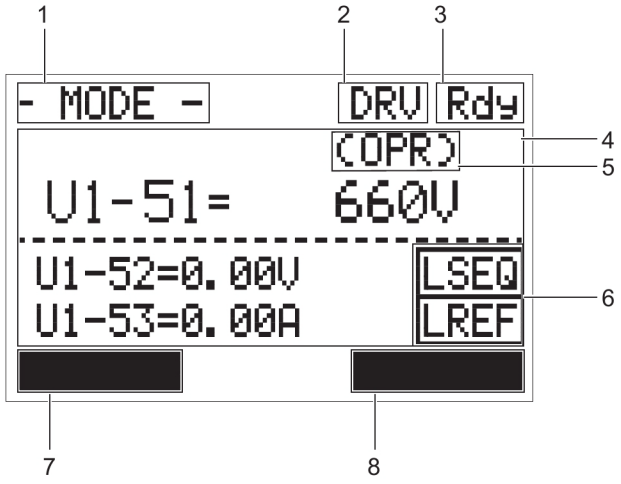


Figure 2: LCD Display

Table 2: Display and Contents

Key	Name	Display	Content
1	Operation Mode Menus	MODE	Displayed when in Mode Selection.
		MONITR	Displayed when in Monitor Selection.
		VERIFY	Indicates the Verify Menu.
		PRMSET	Displayed when in Parameter Setting Mode.
2	Mode Display Area	DRV	Displayed when in Drive Mode.
		PRG	Displayed when in Programming Mode.
3	Ready	Rdy	Indicates the regenerative converter is ready to run.
4	Data Display	--	Displays specific data and operation.
5	Voltage Reference Assignment *1	OPR	Displayed when the voltage reference is assigned to the LCD Operator Option.
6	LO/RE Display *2	RSEQ	Displayed when the run command is supplied from a remote source.
		LSEQ	Displayed when the run command is supplied from the LCD operator keypad.
		RREF	Displayed when the frequency reference is supplied from a remote source.
		LREF	Displayed when the frequency reference is supplied from the LCD operator keypad.
7	Function Key 1 (F1)	HELP	Pressing F1 displays the Help menu.
		←	Pressing F1 scrolls the cursor to the left.
		HOME	Pressing F1 returns to the top menu (Voltage Reference).
		ESC	Pressing F1 returns to the previous display.
8	Function Key 2 (F2)	DATA	Pressing F2 scrolls to the next display.
		→	Pressing F2 scrolls the cursor to the right.
		RESET	Pressing F2 resets the existing regenerative converter fault or error.

**1 Displayed when in Voltage Reference Mode.*

**2 Displayed when in Voltage Reference Mode and Monitor Mode.*

ALARM (ALM) LED Displays

Table 3: ALARM (ALM) LED Status and Contents

Status	Key	Function
Lit	When the regenerative converter detects a fault.	
Flashing	• When an alarm occurs. • When oPE is detected.	
Off	Normal operation (no fault or alarm).	

LO/RE LED and RUN LED Indications

Table 4: LO/RE LED and RUN LED Indications

LED	Lit	Flashing	Flashing Quickly *1	Off
	When source of the Run command is assigned to the LCD operator (LOCAL)	--	--	Run command to be given from a device other than the LCD operator (REMOTE)
	During Run	--	During stop by operation interlock *2	During Stop
Examples				

**1 Refer to Figure 3 for the difference between flashing and flashing quickly regarding the RUN indicator.*
**2 The LED will flash quickly in the following cases:*

- *While the regenerative converter is set for LOCAL, a Run command was entered to the input terminals after which the regenerative converter was then switched to REMOTE.*
- *A Run command was entered via the input terminals while not in the Drive Mode.*
- *During deceleration when a Fast Stop command was entered.*
- *While the regenerative converter was running in the REMOTE mode, the STOP key was pushed.*

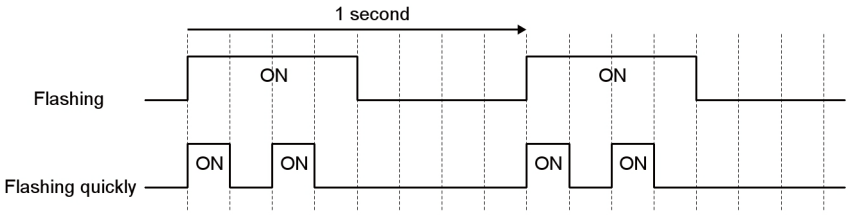


Figure 3: RUN LED Status and Meaning

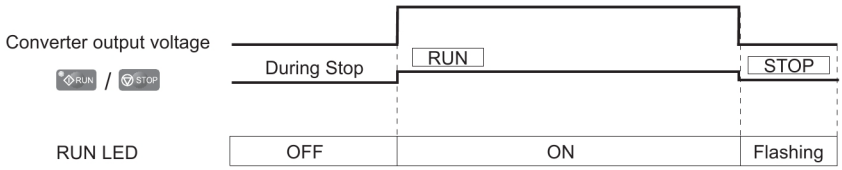
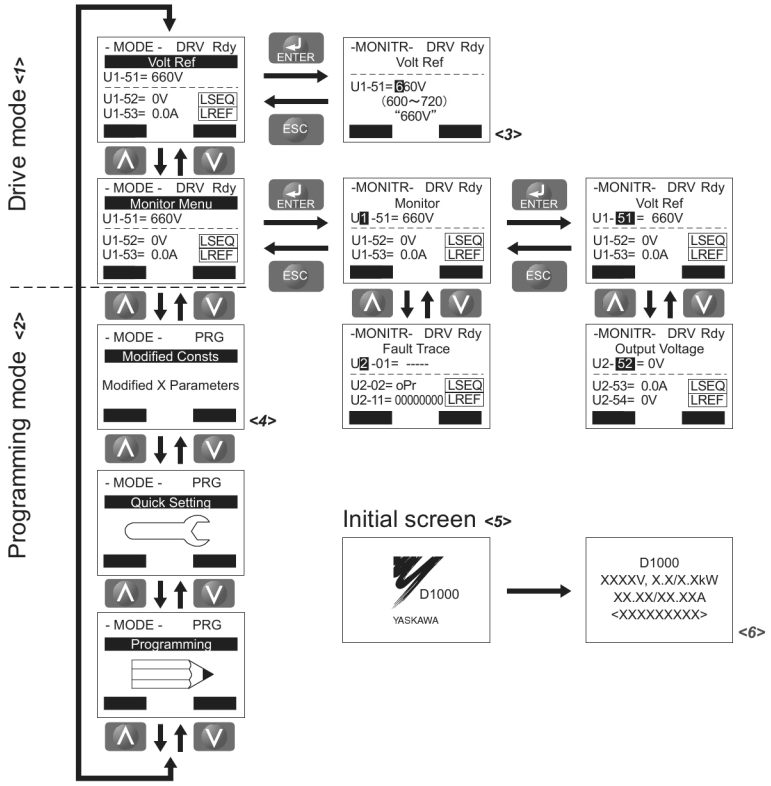


Figure 4: RUN LED and Regenerative Converter Operation

Menu Structure for LCD Operator



<1> Pressing RUN will start the motor.
<2> The regenerative converter cannot operate the motor.
<3> Flashing characters are shown as 0.
<4> X characters are shown in this manual. The LCD Operator will display the actual setting values.
<5> The Voltage Reference appears after the initial display.
<6> The information that appears on the display will vary depending on the regenerative converter.

Figure 5: Menu Structure

The Drive and Programming Modes

The regenerative converter has a Programming Mode to program the regenerative converter for operation, and a Drive Mode used to actually run the motor.

Drive Mode: In the Drive Mode, the user can start the motor and observe operation status with the monitors that are available. Parameter settings cannot be edited or changed when in the Drive Mode.

Programming Mode: The Programming Mode allows access to edit, adjust, and verify parameters. Unless set to allow a Run command, the regenerative converter will not accept a Run command when the LCD operator is in the Programming Mode.

Table 5 describes the functions accessible by pressing the ∧ · ∨ keys of the LCD operator.

NOTE: To allow the regenerative converter to run the motor while in the Programming Mode, set b1-08 to 1.

Table 5: Modes

Mode	Contents	Key	LCD Display
Drive Mode (Operation/ Operation Status Monitor of the Regenerative Converter)	Output Voltage Reference	∧ · ∨	- MODE - DRV Rdy Volt Ref U1-51= 660V U1-52= 0V LSEQ U1-53= 0.0A LREF
	Monitor Display	∧ · ∨	- MODE - DRV Rdy Monitor Menu U1-51= 660V U1-52= 0V LSEQ U1-53= 0.0A LREF
Programming Mode (Parameter Setting)	Verify Menu	∧ · ∨	- MODE - PRG Modified Consts Modified X Parameters
	Setup Group	∧ · ∨	- MODE - PRG Quick Setting
	Parameter Setting Mode	∧ · ∨	- MODE - PRG Programming

Navigating the Drive and Programming Modes

NOTICE

Hazard Equipment

Confirm the following before turning on the power supply.

Confirm that the power supply voltage is correct.

460 V class: 380 to 480 VAC 50/60 Hz
575 V class: 500 to 575* VAC 50/60 Hz

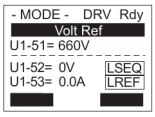
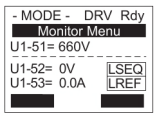
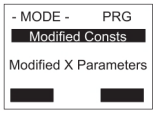
Confirm that the regenerative converter and the controller are correctly connected. (Confirm that the phase sequence is correct.) Confirm that the phases connection between the main circuit terminals of the regenerative converter (R/L1, S/L2, and T/L3) and the terminals of the power supply voltage detection (r1/I11, s1/I21, and t1/I31) are correct.

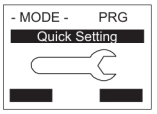
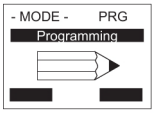
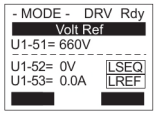
Confirm that the control circuit terminals of the regenerative converter and other controllers are correctly connected.

Confirm that Run commands of both the regenerative converter and the controller are turned off.

* For higher voltage, contact your Magnetek representative.

The regenerative converter is set to operate in Drive Mode when it is first powered up. Switch between display screens by using the ∧ or ∨ keys.

Power Up	Output Voltage Reference  Default Setting	This display screen allows the user to monitor and change the Output Voltage Reference. Refer to The Drive and Programming Modes on page 9 for the procedure to change the voltage set value. *NOTE: The user can select the data displayed when the regenerative converter is first powered up with parameter o1-02.*
		
Drive Mode	Monitor Display  	Lists the monitor parameters (UX-XX parameters) available in the regenerative converter.
		
Programming Mode	Verify Menu  	Lists all parameters that have been edited or changed from default settings. Refer to Verifying Parameter Changes: Verify Menu on page 14.
		

Programming Mode	Setup Group 	Lists parameters necessary to get the regenerative converter operating quickly. Refer to Figure 6 on page 12.
		
	Parameter Setting Mode 	Allows the user to access and edit all parameter settings.
		
Drive Mode	Output Voltage Reference 	Returns to the output voltage reference screen.

Drive Mode Details

The following actions are possible in the Drive Mode:

- Run and stop the regenerative converter
- Monitor the operation status of the regenerative converter (output voltage reference, output voltage, output current, etc.)
- View information on an alarm
- View a history of alarms that have occurred

NOTE: To run the regenerative converter, select the Drive Mode. Other modes are selectable while the regenerative converter is stopped but only the Drive Mode can start operation of the regenerative converter.

Key operations in the Drive Mode are shown in the following figure.

Figure 6 illustrates how to change the output voltage reference from 600 (600 V) to 720 (720 V) while in the Drive Mode. This example assumes the regenerative converter is set to LOCAL.

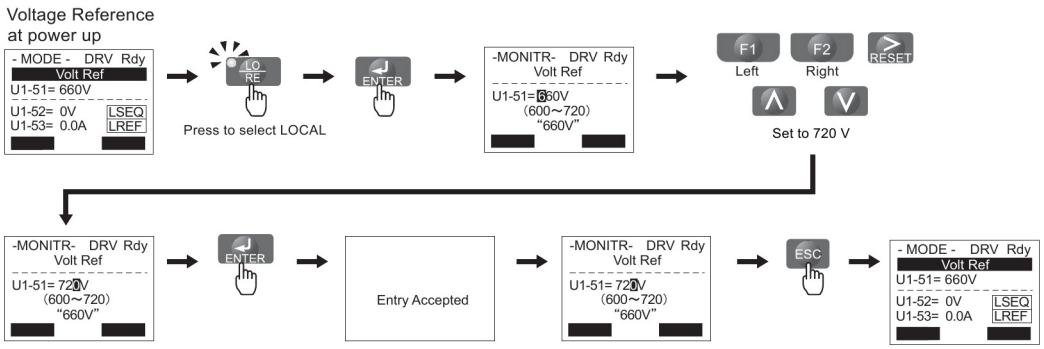


Figure 6: Setting the Voltage Reference while in the Drive Mode

NOTE: The regenerative converter will not accept a change to the output voltage reference until the ENTER key is pressed after the output voltage reference is entered. This feature prevents accidental setting of the voltage reference. To have the regenerative converter accept changes to the voltage reference as soon as changes are made without requiring the ENTER key, set o2-05 to 1.

Programming Mode Details

In the programming mode, parameter setting is enabled. The following actions are possible in the Programming Mode:

- **Verify Menu:** Check a list of parameters that have been changed from their original default values
- **Parameter Setting Mode:** Access and edit all parameter settings

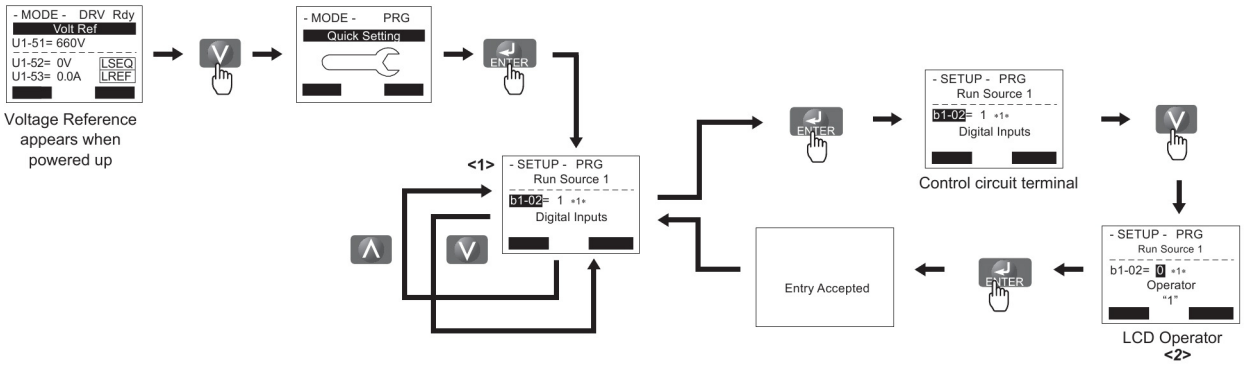
Simplified Setup Using the Setup Group

In the Setup Group, the regenerative converter lists the basic parameters needed to set up the regenerative converter for the application. It provides a simplified way to get the application running right away by showing only the most important parameters. Refer to Figure 7 as an operation example.

NOTE: Refer to Appendix for the parameters of the setup mode. The parameters indicated with the access level "S" can be set/monitored.

Key operations in the setup mode are shown in the following figure.

In this example, the Setup Group is accessed to change b1-02 from 1 to 0. This changes the source of the Run Command from the control circuit terminals to the LCD operator.



<1> Use the ∧ and ∨ arrow keys to scroll through the Setup Group. Press the ENTER key to view or change parameter settings.
<2> To return to the previous menu without saving changes, press the ESC key.

Figure 7: Setup Group Example

Changing Parameter Settings or Values

Key operations are shown in the following using Voltage up Times (C1-20) for an example.

This example explains changing C1-20 (Voltage up Times) setting from 10.0 seconds (default) to 20.0 seconds.

Table 6: Operating Procedure for Changing Parameter Settings/Values

	Operating Procedure		LCD Display
1	Display the Output Voltage Reference screen.	→	- MODE - DRV Rdy Volt Ref U1-51= 660V U1-52= 0V LSEQ U1-53= 0.0A LREF
2	Press ∧ or ∨ to display the parameter setting mode screen.	→	- MODE - PRG Programming
3	Press ENTER to enter the parameter menu tree.	→	-PRMSET- PRG Initialization A1-00= 1 Select Language
4	Select C1-20 by ∧, ∨, F1 or F2 and press ENTER.	→	-PRMSET- PRG VRef Up Rate C1-20= 010.0sec (0.0~100.0) "10.0sec"

	Operating Procedure		LCD Display
5	Press the ∧, ∨, F1 or F2 key and enter 0020.0.	→	-PRMSET- PRG VRef Up Rate C1-20= 0020.0sec (0.00~100.0) "10.0sec"
6	Press ENTER and the regenerative converter will confirm the change.	→	Entry Accepted

Verifying Parameter Changes: Verify Menu

The Verify Menu lists edited parameters from the Programming Mode. It helps determine which settings have been changed, and is particularly useful when replacing a regenerative converter. If no settings have been changed, the Verify Menu will read "nonE." The Verify Menu also allows users to quickly access and re-edit any parameters settings that have been changed. The procedure is shown below.

Table 7: Operating Procedure for Verifying Parameter Changes

	Operating Procedure		LCD Display
1	Turn on the power to the regenerative converter. The initial display appears.	→	- MODE - DRV Rdy Volt Ref U1-51= 660V U1-52= 0V LSEQ U1-53= 0.0A LREF
2	Press ∧ or ∨ until the verify screen is displayed.	→	- MODE - PRG Modified Consts Modified X Parameters
3	Press ENTER to enter the list of parameters that have been edited from their original default settings. Pressing ∧ or ∨ displays the changed parameters. Press ∧ or ∨ until C1-20 is displayed.	→	- VERIFY - PRG VRef Up Rate C1-20 = 20.0sec (0.0~100.0) "10.0sec"
4	Press ENTER to verify the changed set values (the left most digit flashes).	→	- VERIFY - PRG VRef Up Rate C1-20=0020.0sec (0.0~100.0) "10.0sec"

Switching between LOCAL and REMOTE

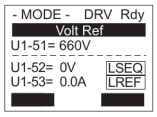
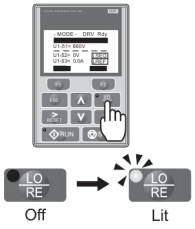
When the regenerative converter is set to accept the Run command from the LCD operator RUN key, this is referred to as LOCAL mode. When the regenerative converter is set to accept the Run command from an external device (via the input terminals, serial communications, etc.) this is referred to as REMOTE mode.

The operation can be switched between LOCAL and REMOTE either by using the LO/RE key on the LCD operator or a digital input.

NOTE: 1. After selecting LOCAL, the LO/RE light will remain lit.
2. The regenerative converter will not allow the user to switch between LOCAL and REMOTE during run.

Using the LO/RE Key on the LCD Operator

Table 8: Operating Procedure

	Operating Procedure		LCD Display
1	Turn on the power to the regenerative converter. The initial display appears.	➡	
2	Press LO/RE. The LO/RE light will light up. To set the regenerative converter for REMOTE operation, press the LO/RE key again. The LO/RE light will turn off.	➡	

Using Digital Input Terminals S1 through S8 to Switch between LO/RE

The user can also switch between LOCAL and REMOTE modes using one of the digital input terminals S1 through S8 (set the corresponding parameter H1-xx to “1”).

The following section describes the procedure of configuring the multi-function digital input terminals.

NOTE: Setting H1-xx to 1 disables the LO/RE key on the LCD operator.

Setup Group Parameters

Setup Group (STUP)

Parameters used in this regenerative converter are categorized into A to U. In order to simplify the regenerative converter's setup, only the frequently used parameters are selected into the setup mode.

1. Display the “Setup Group” screen first. Press the  or  key until the “Setup Group” screen is displayed.
2. Select a parameter, and change the setting.Table 9 shows the parameters that can be used in the Setup Group. If a parameter to set is not found in the Setup Group, use the “Parameter Setting Mode” screen.

NOTE: This manual explains also the parameters that are not displayed in the setup mode. Use the “Par” menu in the programming mode when setting a parameter that is not displayed in the setup mode.

Table 9: Setup Group Parameters

No.	Name
b1-02	Run Command Selection 1
b1-18	Voltage Reference Source Selection 1
d8-01	DC Bus Voltage Reference

Power Up and Checking the Operation Display Status

Power Up the Regenerative Converter and Checking the Operation Display Status

Power Up

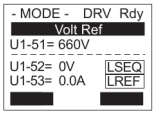
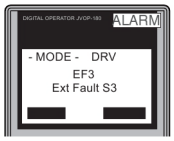
Confirm the following before turning on the power supply.

Item to Check	Description
Power Supply Voltage	Confirm that the power supply voltage is correct. 460 V class: 380 to 480 VAC, 50/60 Hz 575 V class: 500 to 575 VAC*, 50/60 Hz
	Be sure to connect to power supply input terminals R/L1, S/L2, and T/L3 respectively.
	Confirm that the phase connection between the power supply input terminals (R/L1, S/L2, and T/L3) and the power supply voltage detection lines (r1/l11, s1/l21, and t1/l31) is correct.
	Confirm that the regenerative converter is grounded correctly.
Connection between Regenerative Converter Output Terminals and Controller Input Terminals	Confirm that the regenerative converter output terminals (+ and –) and the controller DC power supply input terminals (+ and –) are securely and correctly connected.
Connection to Control Circuit Terminals of the Regenerative Converter	Confirm that the control circuit terminals of the regenerative converter and the controllers of periphery equipment are correctly connected.
Status of Run Command	Confirm that Run command of the regenerative converter and that of the controller of periphery equipment are turned off.

** For higher voltage, contact your Magnetek representative.*

Checking the Display Status

When the power is turned on, the LCD operator in the normal status displays the following.

Mode	LED Display	Description
Normal Operation		Monitor of the Output Voltage Reference is displayed on the data display section.
Fault	 (Example) External Fault	The display content depends on the details of fault. Take appropriate measures by referring to Fault Detection on page 43. ALM lights.

Parameters

Parameter Groups

Parameter Group	Name
A1	Initialization Parameters
A2	User Parameters
b1	Operation Mode Selection
C1	Voltage up/down Times
C6	Carrier Frequency
C7	Automatic DC Bus Voltage Regulator (AVR)
d8	DC Bus Voltage
F6	Communication Option Card
H1	Multi-Function Digital Inputs
H2	Multi-Function Digital Outputs
H4	Multi-Function Analog Outputs

Parameter Group	Name
L2	Momentary Power Loss Ride-Thru
L5	Fault Restart
L8	Regenerative Converter Protection
o1	Digital Operator Display Selection
o2	Digital Operator Keypad Functions
o3	Copy Function
o4	Maintenance Monitor Settings
U1	Operation Status Monitors
U2	Fault Trace
U3	Fault History
U4	Maintenance Monitors

Parameter Tables

Initialization Parameters

The A parameter group creates the operating environment for the regenerative converter. This includes the parameter Access Level, Password, User Parameters, and more.

Table 10: Initialization Parameters

Parameter Code	Display	Function	Range	Initial Value
A1-00*	Language Selection		0, 1	0
	0 English			
	1 Japanese			
A1-01	Access Level	Allows the “masking” of parameters according to user level.	0–2	2
	0 Operation Only	Access to only parameters A1-01, A1-04, and all U monitor parameters.		
	1 User Parameters	Accesses parameters selected by OEM or installer (A2-01 to A0-32).		
	2 Advanced Level	For advanced programming in special applications. All parameters can be viewed and edited.		
A1-03	Init Parameters		0, 1110, 2220	0
	0 No Initialize			
	1110 User Initialize	Parameter values must be stored using parameter o2-03.		
	2220 Initial	Resets all parameters to default values.		

** Parameter setting value is not reset to the default value when the regenerative converter is initialized by parameter A1-03.*

Parameter Code	Display	Function	Range	Initial Value
A1-04	Password	When the value set into A1-04 does not match the value set into A1-05, parameters A1-01 through A1-03, and A2-01 through A2-33 cannot be changed.	0–9999	0000

** Parameter setting value is not reset to the default value when the regenerative converter is initialized by parameter A1-03.*

Table 11: User Parameters

Parameter Code	Display	Function	Range	Initial Value
A2-01 to A2-32	User Parameters 1 to 32	Parameters that were recently edited are listed here. The user can also select parameters to appear here for quick access.	A1-00–o4-13	--
A2-33	User Param Sel		0, 1	1
	0 Disabled	Parameters A2-01 through A2-32 are reserved for the user to create a list of User Parameters.		
	1 Enabled	Save history of recently viewed parameters. Recently edited parameters will be saved to A2-17 through A2-32 for quick access.		

Application

Application parameters configure the sources of the Run command and voltage reference, and a variety of other application-related settings.

Table 12: Operation Mode Selection

Parameter Code	Display	Function	Range	Initial Value
b1-02	Run Source 1	Source from where the RUN command is generated.	0, 1	1*
	0 Operator	Digital Operator		
	1 Digital Inputs	Digital input terminals		
	2 Serial Com	MEMOBUS/Modbus communications		
	3 Option PBC	Option PBC		
b1-06	Cntl Input Scans	Selects the terminal scan time	0, 1	1
	0 1 Scan (1 ms)			
	1 2 Scans (2 ms)			
b1-08	RUN dur PRG Mode	Allows the Run Method to be changed via the Local/Remote key while the drive/motor are running.	0–2	0
	0 Run Disabled@PRG			
	1 Run Enabled@PRG			
	2 Run only @Stop	Prohibits entering Programming Mode during Run		
b1-18	Reference Sel	Selects voltage reference source	0	0
	0 Operator			

Tuning

These parameters are used to adjust the output voltage increase and decrease times, DC bus voltage control, and carrier frequency selections.

Table 13: Output Voltage Increase and Decrease Times

Parameter Code	Display	Function	Range	Initial Value
C1-20	Vref Up Rate	Sets the time to increase output voltage in 0.1 s.	0.0–100.0 sec	10.0
C1-21	Vref Down Rate	Sets the time to decrease output voltage in 0.1 s.	0.0–100.0 sec	10.0

Table 14: Carrier Frequency

Parameter Code	Display	Function	Range	Initial Value
C6-01	Heavy/NormalDuty	Constant Torque/Variable Torque Selection	0, 1	0
	0 Heavy Duty			
	1 Normal Duty			
C6-02	CarrierFreq Sel	Carrier Frequency Selection	1	1
	1 Fc = 2.0 kHz			

Table 15: Automatic DC Bus Voltage Regulator (AVR)

Parameter Code	Display	Function	Range	Initial Value
C7-01	AVR P Gain	Sets the AVR proportional gain.	1.00–300.00	20.00
C7-02	AVR I Time	Sets the AVR integral time.	0.000–10.000 sec	0.500
C7-03	AVR Delay Time	Sets the primary deay time for AVR	0.000–0.500 sec	0.000
C7-12	Auto I Bias Sel	Enables automatic current compensation when the current reference is disabled to keep the advance current phase at zero.	0, 1	1
	0 Disabled			
	1 Enabled	Automatically calculates the bias for the disabled current reference.		

Reference

Reference parameters are used to set the DC bus voltage reference value during operation.

Table 16: DC Bus Voltage Reference

Parameter Code	Display	Function	Range	Initial Value
d8-01	Reference	Sets the DC bus voltage reference.	600–720* VDC	660*

** Values shown here are for 460 V class regenerative converters. For the 575 V class, the setting range is between 750 V and 900 V, and the default setting is 860 V.*

Options

Table 17: Options Parameters

Parameter Code	Display	Function	Range	Initial Value
F6-90	Drive Trace Sampling Rate	Sets the trace sampling rate for the drive.	0–60000	0

Multi-Function Terminals

H parameters assign functions to the multi-function input and output terminals.

Table 18: Multi-Function Digital Inputs

Parameter Code	Display	Function	Range	Initial Value
H1-01	Term S1 Select	Selects the multi-function inputs. Reference Table 19. *NOTE: Unused terminals should be set to 0F.*	0–4C	4B
H1-02	Term S2 Select	Reference Table 19.	0–4C	4C
H1-03	Term S3 Select	Reference Table 19.	0–4C	0F
H1-04	Term S4 Select	Reference Table 19.	0–4C	0F
H1-05	Term S5 Select	Reference Table 19.	0–4C	0F
H1-06	Term S6 Select	Reference Table 19.	0–4C	0F
H1-07	Term S7 Select	Reference Table 19.	0–4C	0F
H1-08	Term S8 Select	Reference Table 19.	0–4C	0F

Table 19: Multi-Function Digital Inputs (MFDI) selectable for H1-0x

Setting	Display	Function
1	LOCAL/REMOTE Sel	Open: REMOTE (parameter settings determine the source of the voltage reference (b1-18). Closed: LOCAL (LCD operator is Run command and reference source.)
8	Ext BaseBlk N.O.	Closed: No regenerative converter output.
9	Ext BaseBlk N.C.	Open: No regenerative converter output.
F	Term Not Used	Set this value when not using the terminal.
14	Fault Reset	Closed: Resets faults if the cause is cleared and the Run command is removed.
1B	Program Lockout	Open: Parameters cannot be edited (except for U1-01 if the reference source is assigned to the LCD operator). Closed: Parameters can be edited and saved.
24 to 27, 2C to 2F	External Fault	24: NO/Always Det, Coast to Stop 25: NC/Always Det, Coast to Stop 26: NO/During Run, Coast to Stop 27: NC/During Run, Coast to Stop 2C: NO/Always Det, Alarm Only 2D: NC/Always Det, Alarm Only 2E: NO/During RUN, Alarm Only 2F: NC/During Alarm Only
4B	Run Command 3	Closed: Run *NOTE: After a Run command is received, the input terminal that is assigned to 4B closes, and the regenerative converter starts to run, and continues to run regardless of the input terminal status.* Use a Stop command to stop the regenerative converter.
4C	Stop Command 3	Open: Stop *NOTE: To stop the regenerative converter, close the input terminal assigned to 4C.*

Table 20: Multi-Function Digital Outputs

Parameter Code	Display	Function	Range	Initial Value
H2-01	MA/MB/MC FuncSel	Selects the function of terminal MA/MB/MC, and photocoupler output P1/PC and P2/PC.	0–160	0F
H2-02	P1/PC Func Sel		0–160	0F
H2-03	P2/PC Func Sel		0–160	0F

Table 21: Multi-Function Digital Inputs (MFDI) selectable for H2-0X

Setting	Function	Function
0	During Run 1	Closed: A Run command is active or voltage is output.
6	Drive Ready	Closed: Power up is complete and the regenerative converter is ready to accept a Run command.
7	DC Bus Undervolt	Closed: DC bus voltage is below the Uv trip level set in L2-05.
8	BaseBlk 1	Closed: Regenerative converter has entered the baseblock state (no output voltage).

Setting	Function	Function
E	Fault	Closed: Fault occurred.
F	Not Used	Set this value when not using the terminal.
10	Minor Fault	Closed: An alarm has been triggered, or the IGBTs have reached 90% of their expected life span.
11	Reset Cmd Active	Closed: A command has been entered to clear a fault via the input terminals or from the serial network.
1B	BaseBlk 2	Open: Regenerative converter has entered the baseblock state (no output voltage).
1D	Regenerating	Closed: Motor is regenerating energy into the regenerative converter.
1E	Dur Flt Restart	Closed: An automatic restart is performed.
20	oH Prealarm	Closed: Heatsink temperature exceeds the parameter L8-02 value.
24	PUF Detect	Closed: A fuse is blown.
25	Inverter Ready	Closed: Power up is complete and the drive is ready to accept a Run command.
26	MC on Output	Closed: Magnetic contactor is closed.
27	oL2 Prealarm	Closed: The converter's electric thermostat triggered converter overload protection.
2F	Maint Period	Closed: Cooling fan, electrolytic capacitors, IGBTs, or the soft charge bypass relay may require maintenance.
30	Torque Limit	Closed: When the active current limit has been reached.
3C	Local	Open: REMOTE Closed: LOCAL
4D	oH Pre-Alarm	Closed: oH pre-alarm time limit has passed.
60	Fan Alrm Det	Closed: Internal cooling fan alarm.
100 to 160	Function 0 to 60 with Inverse Output	Inverts the output switching of the multi-function output functions. Set the last two digits of 1xx to reverse the output signal of that specific function. Example: 108 - Inverts the output of 8 (During Baseblock)

Table 22: Multi-Function Analog Outputs

Parameter Code	Display	Function	Range	Initial Value
H4-01	Terminal FM Sel	Assigns one of the following function analog output parameters to Terminal FM. Reference the U monitor group for output function descriptions.	000–999	152
H4-02	Terminal FM Gain	Gain multiplier for Terminal FM analog output signal	-999.9–999.9%	100.0
H4-03	Terminal FM Bias	Bias multiplier for Terminal FM analog output signal	-999.9–999.9%	0.0
H4-04	Terminal AM Sel	Assigns one of the above function analog output parameters to Terminal AM	000–999	153
H4-05	Terminal AM Gain	Gain multiplier for Terminal AM analog output signal	-999.9–999.9%	50.0
H4-06	Terminal AM Bias	Bias multiplier for Terminal AM analog output signal	-999.9–999.9%	0.0

Parameter Code	Display	Function	Range	Initial Value
H4-07	FM Level Select	Sets the voltage output level of U Monitor data for Terminal FM (Some monitors may not be assigned)	0, 1	0
	0 0 to 10 V			
	1 -10 to +10 V			
H4-08	AM Level Select	Sets the voltage output level of U Monitor data for Terminal AM (Some monitors may not be assigned)	0, 1	0
	0 0 to 10 V			
	1 -10 to +10 V			

Protection Function

These parameters provide protection to the regenerative converter, such as: control during momentary power loss, fault restarts, and other types of hardware protection.

Table 23: Momentary Power Loss Ride-Thru

Parameter Code	Display	Function	Range	Initial Value
L2-01	PwrL Selection	Enables/disables the Power Loss Ride thru function	0–2	0
	0 Disabled	Regenerative converter trips on Uv1 fault when power is lost.		
	1 Enbl with Timer	Recover within the time set in L2-02. Uv1 will be detected if power loss is longer than L2-02.		
	2 Enbl whl CPU act	Recover as long as CPU has power. Uv1 is not detected.		
L2-02	PwrL Ridethru t	Power Loss Ride thru time. Enabled only when L2-01 = 1.	0.0–25.5 sec	2.0
L2-05	PUV Det Level	Under voltage fault detection level	300 V–420 V*	350 V*
L2-13	FDV Gain	Sets the gain for input power supply frequency fault (Fdv) detection. Decrease the setting value if Fdv occurs even when no power is lost.	0.1–2.0	1.0
L2-21	Power UV Level	Sets the input undervoltage (AUv) trip level.	200 V–400 V**	300V**

** Values shown here are for 460 V class regenerative converters. For the 575 V class, the setting range is between 431 V and 604 V, and the default setting is 475 V.*
*** Values shown here are for 460 V class regenerative converters. For the 575 V class, the setting range is between 300 V and 575 V, and the default setting is 430 V.*

Table 24: Fault Restart

Parameter Code	Display	Function	Range	Initial Value
L5-01	Num of Restarts	Sets the number of times the regenerative converter may attempt to restart after the following faults occur: GF, oC, ov, Uv1.	0–10	0

Parameter Code	Display	Function	Range	Initial Value
L5-02	Restart Sel	Selects the fault output action in the event of a system restart.	0, 1	0
	0 Flt Outp Disabld	Fault output not active.		
	1 Flt Outp Enabled	Fault output active during restart attempt.		
L5-04	Flt Reset Wait T	Sets the amount of time to wait between performing fault restarts.	0.5–600.0 sec	10.0
L5-05	Fault Reset Sel		0, 1	0
	0 Continuous	Continuously attempt to restart while incrementing restart counter only at a successful restart.		
	1 Use L5-04 Time	Attempt to restart with the interval time set in L5-04 and increment the restart counter with each attempt.		

Table 25: Regenerative Converter Protection

Parameter Code	Display	Function	Range	Initial Value
L8-02	OH Pre-Alarm Lvl	Sets the heatsink temperature level for protection against overheat (OH). *NOTE: The inverter measures heatsink temperature by a negative temperature coefficient thermistor.*	50–150°C	*
L8-03	OH Pre-Alarm Sel	Selects the stopping method when heatsink overheat is detected.	1, 3	3
	1 Stop Command	Immediate stop		
	3 Alarm Only	An alarm is triggered.		
L8-09	Ground Fault Sel	Enables/disables ground fault detection	0, 1	1
	0 Disabled			
	1 Enabled			
L8-10	Fan On/Off Sel	Cooling fan operation select	0, 1	0
	0 Dur Run (OffDly)			
	1 Always On			
L8-11	Fan Delay Time	When L8-10 = 1, fan will operate L8-11 seconds after Run Command is removed	0–300 sec	60
L8-12	Ambient Temp	Adjusts Overload (OL2) Protection for high ambients	-10–50°C	40
L8-32	MC, FAN Fault Sel	Determines the action the regenerative converter should take when a fault occurs with the magnetic contactor or internal fan.	1, 3	1
	1 Stop Command			
	3 Alarm Only			

** Default setting is determined by the Regenerative Converter Model (o2-04).*
*** Values shown here are for 460 V class regenerative converters. For the 575 V class, the setting range is between 1 V to 300 V, and the default setting is 75 V.*

Parameter Code	Display	Function	Range	Initial Value
L8-41	High Cur Alm Sel	Triggers a high current alarm (HCA) when the output current exceeds 150% of the drive rated current.	0, 1	0
	0 Disabled			
	1 Enabled			
L8-65	Power Fault Sel	Determines the action the regenerative converter should take when input voltage falls below the level specified in parameter L8-66.	0–2	0
	0 Disabled			
	1 Coast to Stop			
	2 Alarm Only			
L8-66	Power Fault Lvl	Sets the fault detection level for the input voltage.	1 V–200 V*	50 V**
L8-67	Power Fault Cnt	Sets the number of times for input voltage fault detection.	1–10	5
L8-69	Inp Ph Loss Dets	Enables or disables the input phase loss and unbalance detection.	0, 1	1
	1 Disabled			
	2 Enabled	Detects phase loss and unbalanced three phases of the input power supply.		
L8-86	EFAN Err Sel	Selects the operation the drive performs when a cooling fan fault has been detected. EFAn will appear on the digital operator screen to indicate a panel fan fault.	1, 3, 5	1
	1 Coast to Stop			
	3 Alarm only	Drives continue operating		
	5 Fan Fault	Disabled panel fan fault detection (EFAn)		

** Default setting is determined by the Regenerative Converter Model (o2-04).*
*** Values shown here are for 460 V class regenerative converters. For the 575 V class, the setting range is between 1 V to 300 V, and the default setting is 75 V.*

LCD Operator Related Settings

These parameters are used to set up the LCD operator displays.

Table 26: LCD Operator Display Selection

Parameter Code	Display	Function	Range	Initial Value
o1-01	User Monitor Sel	Selects the content of the last monitor that is shown when scrolling through Drive Mode display. Enter the last three digits of the monitor parameter number to be displayed: UX-xx. Default: 158 (U1-58)	110–441	158

Parameter Code	Display	Function	Range	Initial Value
o1-02	Power-On Monitor	Selects the monitor to be displayed on the digital operator immediately after the power supply is turned on.	1–5	1
	1 Output V Command	*Output voltage reference (U1-51)*		
	2 Output V Feedbck	*Output voltage feedback (U1-52)*		
	3 Output Current	*(U1-53)*		
	4 Input Voltage	*(U1-54)*		
	5 User Monitor	*User-selected monitor (set by o1-01)*		

Table 27: LCD Operator Keypad Functions

Parameter Code	Display	Function	Range	Initial Value
o2-01	LO/RE Key		0, 1	1
	0 Disabled			
	1 Enabled	LO/RE key switches between LOCAL and REMOTE operation.		
o2-02	Oper STOP Key	Selects the action when the digital stop key is pressed.	0, 1	1
	0 Disabled	STOP key is disabled in REMOTE operation.		
	1 Enabled	STOP key is always enabled.		
o2-03	User Default Det		0–2	0
	0 No Change			
	1 Save User Init	Saves parameter settings as default values for a User Initialization.		
	2 Clear User Init	Clear user defaults.		
o2-04	Converter Model	Enter the regenerative converter model. Setting required only when replacing the regenerative converter or when changing the power supply voltage.	--	*
o2-06	Oper Detection	If the digital operator is disconnected from the inverter, this parameter selects whether the inverter detects this condition. The operator is only detected when the inverter is being commanded locally.	0, 1	0
	0 Disabled			
	1 Enabled			

** Determined by regenerative converter capacity.*

Table 28: Copy Function

Parameter Code	Display	Function	Range	Initial Value
o3-01	Copy Function Sel		0–3	0
	0 COPY SELECT	No action		
	1 INV→OP READ	Read parameters from the regenerative converter, saving them onto the LCD operator.		
	2 OP→INV WRITE	Copy parameters from the LCD operator, writing them to the regenerative converter.		
	3 OP↔INV VERIFY	Verify parameter settings on the regenerative converter to check if they match the data saved on the LCD operator.		
o3-02	Read Allowable		0, 1	0
	0 Disabled	Read operation prohibited		
	1 Enabled	Read operation allowed		

Table 29: Maintenance Monitor Settings

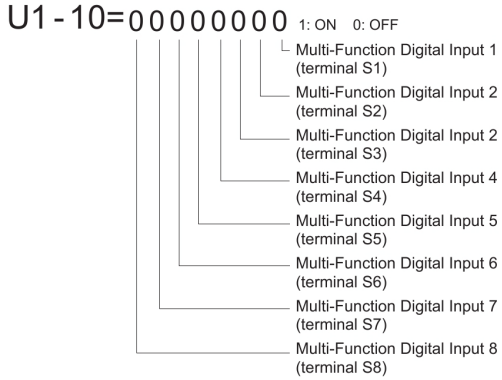
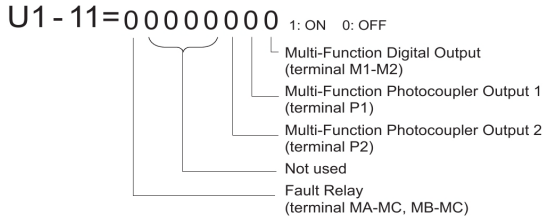
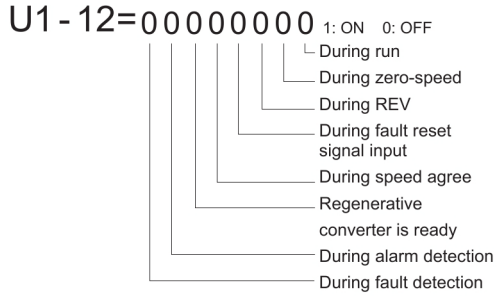
Parameter Code	Display	Function	Range	Initial Value
o4-01	Drv ElapsTimeCnt	Sets the value for the cumulative operation time of the regenerative converter in units of 10 h. EXAMPLE: 10 = 100 h.	0–9999 x 10h	0
o4-02	Elaps TimeCntSet		0, 1	0
	0 Power-On Time	Logs power-on time.		
	1 Running Time	Logs operation time when the regenerative converter output is active (output operation time).		
o4-03	Fan ElapsTimeCnt	Sets the value of the fan operation time monitor U4-03 in units of 10 h.	0–9999 x 10h	0
o4-05	BusCap Maint Set	Sets the value of the Maintenance Monitor for the capacitors. See U4-05 to check when the capacitors may need to be replaced.	0–150%	0
o4-07	ChrgCircMaintSet	Sets the value of the Maintenance Monitor for the soft charge bypass relay. See U4-06 to check when the bypass relay may need to be replaced.	0–150%	0
o4-09	IGBT Maint Set	Sets the value of the Maintenance Monitor for the IGBTs. See U4-07 to check when the IGBTs may need to be replaced.	0–150%	0

Parameter Code	Display	Function	Range	Initial Value
o4-11	Fault Data Init		0, 1	0
	0 Disabled	U2-xx and U3-xx monitor data is not reset when the regenerative converter is initialized (A1-03).		
	1 Enabled	U2-xx and U3-xx monitor data is reset when the regenerative converter is initialized (A1-03).		
o4-13	Run Counter Init		0, 1	0
	0 No Reset	Number of Run commands counter is not reset when the regenerative converter is initialized (A1-03).		
	1 Reset	Number of Run commands counter is reset when the regenerative converter is initialized (A1-03).		

Monitor Parameters

Monitor parameters allow the user to view regenerative converter status, fault information, and other data concerning regenerative converter operation.

Table 30: Operation Status Monitors

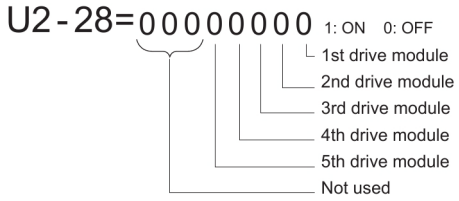
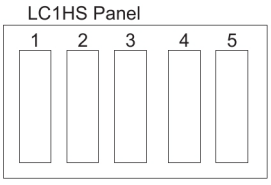
Parameter Code	Display	Function	Analog Output Level	Unit
U1-10	Input Term Sts	Displays the input terminal status. 	No signal output available	--
U1-11	Output Term Sts	Displays the output terminal status. 	No signal output available.	--
U1-12	Int CH Sts 1	Verifies the regenerative converter operation status. 	No signal output available.	--
U1-18	oPE Error Code	Displays the parameter number that caused the oPExx or Err (EEPROM write error) error.	--	--
U1-25	CPU 1 SW Number	FLASH ID	--	--
U1-26	CPU 2 SW Number	ROM ID	--	--

Parameter Code	Display	Function	Analog Output Level	Unit
U1-27	Message ID (OPR)	OPR ID	No signal output available.	--
U1-28	Message ID (INV)	INV ID	No signal output available.	--
U1-29	CPU 3 SW Number	PWM ID	No signal output available.	--
U1-51	Output V Command	Displays the output voltage reference before Soft Starter.	10 V: 800 V (400 V class) 10 V: 1380 V (690 V class)	VAC
U1-52	Output V Feedbck	Displays the output power value during regeneration	10 V: 800 V (400 V class) 10 V: 1380 V (690 V class)	VAC
U1-53	Output Current	Displays the output current value.	10 V: Rated output current	A
U1-54	Input Voltage	Displays the input voltage value.	10 V: 800 V (400 V class) 10 V: 1380 V (690 V class)	VAC
U1-55	Input Current	Displays the input current value.	10 V: Rated input current	A
U1-56	DC Side Power	Displays the power (kW) output to the DC bus.	10 V: Rated power (Output)	kW
U1-57	AC Side Power	Displays the power input from the power supply.	10 V: Rated power (Power supply)	kW
U1-58	Input Frequency	Displays the input frequency value.	10 V: Rated frequency	Hz
U1-59	Pri Current Ref	Displays the primary current reference value.	10 V: Rated input current	A
U1-60	Input PWR Factor	Displays the input power factor.	10 V: 100.0%	%
U1-61	Real Current	Displays the active current reference value.	10 V: 100.0%	%
U1-62	Reactive Current	Displays the reactive current reference value.	10 V: 100.0%	%
U1-63	Output V Com SFS	Displays the voltage reference value after soft starter.	10 V: 800 V (400 V class) 10 V: 1380 V (690 V class)	VAC
U1-64	AVR Input	Displays the AVR input value (Voltage Deviation).	10 V: 800 V (400 V class) 10 V: 1380 V (690 V class)	VAC
U1-65	AVR Output	Displays the AVR output value.	10 V: 100.0%	%
U1-66	Voltage Ref (Vq)	Displays the output voltage reference (Vq) value.	10 V: 400 V (400 V class) 10 V: 690 V (690 V class)	VAC

Parameter Code	Display	Function	Analog Output Level	Unit
U1-67	Voltage Ref (Vd)	Displays the output voltage reference (Vd) value.	10 V: 400 V (400 V class) 10 V: 690 V (690 V class)	VAC
U1-68	ACR(q) Output	Displays the ACRq output value.	10 V: 100.0%	%
U1-69	ACR(d) Output	Displays the ACRd output value.	10 V: 100.0%	%
U1-72	Power Status	--	No signal output available	--

Table 31: Fault Trace

Parameter Code	Display	Function	Analog Output Level	Unit
U2-01	Current Fault	Displays the current fault.	No signal output available	--
U2-02	Last Fault	Displays the previous fault.	No signal output available	--
U2-11	Input Term Sts	Displays the input terminal status at the previous fault. Displays the same status displayed as in U1-10.	No signal output available	--
U2-12	Output Term Sts	Displays the output status at the previous fault. Displays the same status displayed as in U1-11.	No signal output available	--
U2-13	Inverter Status	Displays the operation status of the regenerative converter at the previous fault. Displays the same status displayed in U1-12.	No signal output available	--
U2-14	Elapsed Time	Displays the cumulative operation time at the previous fault.	No signal output available	hrs
U2-20	Actual Fin Temp	Displays the temperature of the heatsink at the previous fault.	No signal output available	°C

Parameter Code	Display	Function	Analog Output Level	Unit
U2-28	Fault Axis	Displays the drive module where the pervious fault occurred. Drive modules are indicated from right to left, with the bit furthest to the right indicating the 1st module. • When a fault occurs at the 2nd module, U2-28 will display “00000010.” • When a fault occurs at the 5th module, U2-28 will display “00010000.”  *NOTE: Inside an enclosure, the drive module order is reversed so that the 1st drive module appears furthest to the left, followed by the 2nd and 3rd drive modules moving left to right. (1CNV, 2CNV, and so on.)*  	No signal output available	--
U2-51	Output V Common	Displays the output voltage reference at the previous fault.	10 V: 800 V (400 V class) 10 V: 1380 V (690 V class)	VAC
U2-52	Output V Feedbck	Displays the output voltage feedback at the previous fault.	10 V: 800 V (400 V class) 10 V: 1380 V (690 V class)	VAC
U2-53	Output Current	Displays the output current at the previous fault.	10 V: Rated output current	A
U2-54	Input Voltage	Displays the input voltage at the previous fault	10 V: 800 V (400 V class) 10 V: 1380 V (690 V class)	VAC
U2-55	Input Current	Displays the input current at the previous fault.	10 V: Rated input current	A
U2-56	DC Side Power	Displays the output power at the previous fault.	10V: Rated power (Output)	kW
U2-57	AC Side Power	Displays the input power at the previous fault.	10 V: Rated power (Input)	kW
U2-58	Input Frequency	Displays the input frequency at the previous fault.	10 V: Rated frequency	Hz

Parameter Code	Display	Function	Analog Output Level	Unit
U2-59	Primary Current	Displays the primary current at the previous fault.	10 V: Rated input current	A
U2-60	Power Factor	Displays the input power factor at the previous fault.	10 V: 100.0%	%
U2-61	Real Current	Displays the active current reference at the previous fault.	10 V: 100.0%	%
U2-62	Reactive Current	Displays the reactive current reference at the previous fault.	10 V: 100.0%	%
U2-63	Output V Com SFS	Displays the output voltage reference at the previous fault.	10 V: 800 V (400 V class) 10 V: 1380 V (690 V class)	VAC
U2-64	AVR Input	Displays the AVR input at the previous fault (Voltage Deviation).	10 V: 800 V (400 V class) 10 V: 1380 V (690 V class)	VAC
U2-65	Voltage Ref (Vq)	Displays the output voltage reference (Vq) at the previous fault.	10 V: 400 V (400 V class) 10 V: 690 V (690 V class)	VAC
U2-66	Voltage Ref (Vd)	Displays the output voltage reference (Vd) at the previous fault.	10 V: 400 V (400 V class) 10 V: 690 V (690 V class)	VAC

Table 32: Fault History

Parameter Code	Display	Function	Analog Output Level	Unit
U3-01	Last Fault	Displays the first most recent fault.	No signal output available	--
U3-02	Fault Message 2	Displays the second most recent fault.	No signal output available	--
U3-03	Fault Message 3	Displays the third most recent faults.	No signal output available	--
U3-04	Fault Message 4	Displays the fourth most recent fault.	No signal output available	--
U3-05	Fault Message 5	Displays the fifth most recent fault.	No signal output available	--
U3-06	Fault Message 6	Displays the sixth most recent fault.	No signal output available	--
U3-07	Fault Message 7	Displays the seventh most recent fault.	No signal output available	--
U3-08	Fault Message 8	Displays the eighth most recent fault.	No signal output available	--
U3-09	Fault Message 9	Displays the ninth most recent fault.	No signal output available	--
U3-10	Fault Message 10	Displays the tenth most recent fault.	No signal output available	--
U3-11	Elapsed Time 1	Elapsed time of the first most recent fault.	No signal output available	hrs
U3-12	Elapsed Time 2	Elapsed time of the second most recent fault.	No signal output available	hrs

Parameter Code	Display	Function	Analog Output Level	Unit
U3-13	Elapsed Time 3	Elapsed time of the third most recent fault.	No signal output available	hrs
U3-14	Elapsed Time 4	Elapsed time of the fourth most recent fault.	No signal output available	hrs
U3-15	Elapsed Time 5	Elapsed time of the fifth most recent fault.	No signal output available	hrs
U3-16	Elapsed Time 6	Elapsed time of the sixth most recent fault.	No signal output available	hrs
U3-17	Elapsed Time 7	Elapsed time of the seventh most recent fault.	No signal output available	hrs
U3-18	Elapsed Time 8	Elapsed time of the eighth most recent fault.	No signal output available	hrs
U3-19	Elapsed Time 9	Elapsed time of the ninth most recent fault.	No signal output available	hrs
U3-20	Elapsed Time 10	Elapsed time of the tenth most recent fault.	No signal output available	hrs

Table 33: Maintenance Monitors

Parameter Code	Display	Function	Analog Output Levels	Units
U4-01	Drv Elapsed Time	Displays the cumulative operation time of the drive. The value for the cumulative operation time counter can be reset in parameter o3-01. Use parameter o3-02 to determine if the operation time should start as soon as the power is switched on or only while the Run command is present. The maximum number displayed is 99999, after which the value is reset to 0.	No signal output available	hrs
U4-02	RUN Cmd Counter	Displays the number of times the Run command is entered. Reset the number of Run commands using parameter o4-13. This value will reset to 0 and start counting again after reaching 65535.	No signal output available	--
U4-03	Fan Elapsed TIme	Displays the cumulative operation time of the cooling fan. The default value for the fan operation time is reset in parameter o3-03. After the count reaches 99999, the value will reset to 0 and start counting again.	No signal output available	hrs
U4-04	Fan Life Mon	Displays main cooling fan usage time in as a percentage of its expected performance life. Parameter o3-03 can be used to reset this monitor.	No signal output available	%
U4-05	Cap Life Mon	Displays main circuit capacitor usage time in as a percentage of their expected performance life. Parameter o3-05 can be used to reset this monitor.	No signal output available	%
U4-06	ChgCirc Life Mon	Displays the soft charge bypass relay maintenance time as a percentage of its estimated performance life. Parameter o3-07 can be used to reset this monitor.	No signal output available	%
U4-07	IGBT Life Mon	Displays IGBT usage time as a percentage of the expected performance life. Parameter o3-09 can be used to reset this monitor.	No signal output available	%
U4-08	Heatsink Temp	Displays the heatsink temperature.	10 V: 100°C	°C
U4-09	LED Oper Check	Lights all segments of the LED to verify that the display is working properly.	No signal output available	--

Parameter Code	Display	Function	Analog Output Levels	Units
U4-13	Current PeakHold	Displays the highest current value that occurred during run.	No signal output available	A
U4-35	UV Alarm Axis	Displays the module where the Uv alarm occurred as a binary number.	No signal output available	--
U4-36	OV Alarm Axis	Displays the module where the ov alarm occurred as a binary number.	No signal output available	--
U4-37	OH Alarm Axis	Displays the module where the oH alarm occurred as a binary number.	No signal output available	--
U4-38	FAN Alarm Axis	Displays the module where the FAn alarm occurred as a binary number.	No signal output available	--
U4-39	VOF Alarm Axis	Displays the module where the voF alarm occurred as a binary number.	No signal output available	--
U4-41	UNBC Current	Displays the largest degree of current unbalance for the drive modules.	No signal output available	--

Regenerative Converter model Selection (o2-04) Dependent Parameter Default Values

The tables below list the parameters that depend on Regenerative Converter Model Selection (o2-04). Parameter numbers shown in parenthesis are valid for motor 2.

Table 34: Regenerative Converter Model Dependent Parameter Default Values: 460 V Class

No.	Name	Unit	Default Settings				
Model 4XXXX-D+HHP		--	0414	0800	1200	1800	2000
o2-04	Regenerative Converter Model Selection	Hex.	B1	B2	B3	B4	B5
d8-01	DC Bus Voltage Reference	V	660	660	660	660	660
L2-05	Undervoltage Detection Level (Uv)	V	380	380	380	380	380
L2-21	Input Undervoltage (AUv) Detection Level	V	300	300	300	300	300
L8-02	Overheat Alarm Level	°C	125	125	125	125	125
L8-66	Input Voltage Fault Detection Voltage Level	V	50	50	50	50	50

Table 35: Regenerative Converter Model Dependent Parameter Default Values: 575 V Class

No.	Name	Unit	Default Settings				
Model 5XXXX-D+HHP		--	0414	0800	1200	1800	2000
o2-04	Regenerative Converter Model Selection	Hex.	E1	E2	E3	E4	E5
d8-01	DC Bus Voltage Reference	V	860	860	860	860	860
L2-05	Undervoltage Detection Level (Uv)	V	475	475	475	475	475
L2-21	Input Undervoltage (AUv) Detection Level	V	430	430	430	430	430
L8-02	Overheat Alarm Level	°C	130	130	130	130	130
L8-66	Input Voltage Fault Detection Voltage Level	V	75	75	75	75	75

Faults, Alarms, and Errors

Regenerative Converter Alarms, Faults, and Errors

Types of Alarms, Faults, and Errors

Check the LCD operator for information about possible faults if the regenerative converter fails to operate. Refer to Using the LCD Operator on page 5.

When troubles still remain after consulting this manual, confirm the following items in advance and contact your Magnetek representatives.

- Regenerative converter model
- Software version
- Date of purchase
- Description of the problem

Table 36 contains descriptions of the various types of alarms, faults, and errors that may occur while operating the regenerative converter.

Table 36: Types of Alarms, Faults, and Errors

Type	Drive Response
Faults	When the regenerative converter detects a fault: • The LCD operator displays text that indicates the specific fault and the ALM indicator LED remains lit until the fault is reset. • Some faults allow the user to select how the regenerative converter should stop when the fault occurs. • Fault output terminals MA-MC will close, and MB-MC will open. The regenerative converter will remain inoperable until that fault has been cleared. Refer to Fault Reset Methods on page 70 for the reset operations.
Minor Faults and Alarms	When the regenerative converter detects an alarm or a minor fault: • The LCD operator displays text that indicates the specific alarm or minor fault, and the ALM indicator LED flashes. • One of the multi-function contact outputs closes if set to be tripped by a minor fault (H2-xx = 10), but not by an alarm. To reset the a minor fault or alarm, remove whatever is causing the problem.
Operator Programming Errors	When parameter settings conflict with one another or do not match hardware settings (such as with an option card), it results in an Operator Programming Error. When the regenerative converter detects an Operator Programming Error: • The LCD operator displays text that indicates the specific error. • Multi-function contact outputs do not operate. The regenerative converter will not operate the motor until the error has been reset. Correct the settings that caused the Operator Programming Error to clear the error.
Copy Function Errors	These are the types of errors that can occur when using the LCD operator or the USB Copy Unit to copy, read, or verify parameter settings. • The LCD operator displays text indicating the specific error. • Multi-function contact outputs do not operate. Pressing any key on the LCD operator will clear the fault. Find out what is causing the problem (such as model incompatibility) and try again.

Alarms and Error Displays

Faults

Table 37 gives an overview of possible fault codes. As conditions such as overvoltage can trip both a fault and an alarm, it is important to distinguish between faults and alarms in order to find the right corrective action.

When the regenerative converter detects a fault, the ALM indicator LEDs lights and the fault code appears on the display. If the ALM LED blinks and the code appearing on the operator screen is flashes, then an alarm has been detected. Refer to Minor Faults and Alarms on page 41. For example, two types of indications, fault and minor fault, are allocated to the ov (Overvoltage).

Table 37: Fault Displays

Digital Operator Display		Name	Page
LED	LCD		
Aou	Aov	Power Supply Input Overvoltage	43
AUu	AUv	Power Supply Input Undervoltage	43
CoF	CoF	Current Offset Fault	43
CPF00, CPF01	CPF00, CPF01 <1>	Control Circuit Error	43
CPF02	CPF02	A/D Conversion Error	44
CPF06	CPF06	EEPROM Memory Data Error	44
CPF08	CPF08	Hardware Fault	44
CPF20, CPF21	CPF20, CPF21 <1>	Control Circuit Error	44
CPF22	CPF22	Hybrid IC Error	45
CPF23	CPF23	Control Board Connection Error	45
CPF24	CPF24	Regenerative Converter Unit Signal Fault	45
CPF26 to CPF34	CPF26 to CPF34	Control Circuit Error	45
CPF40 to CPF45	CPF40 to CPF45		45
EF1 to EF8	EF1 to EF8	External Fault (input terminal S1 to S8)	46
EFAn	EFAn	Panel Fan Fault	46
Err	Err	EEPROM Write Error	47
FAn	FAn	Regenerative Converter Cooling Fan Fault	47
Fdu	Fdv	Power Supply Frequency Fault	47
GF	GF	Ground Fault	48
oC	oC	Overcurrent	49
oH	oH	Heatsink Overheat	49
oH1	oH1	Overheat 1 (Heatsink Overheat)	50
oL2	oL2	Regenerative Converter Overload	50
oPr	oPr	External Digital Operator Connection Fault	50
ou	ov	Overvoltage	51
PF2	PF2	Input Power Supply Fault	51
PF3	PF3	Input Phase Loss Detection	52
PUF	PUF	Fuse Blown	52
SC	SC	IBGTUpper Arm and Lower Arm Short Circuit	52
SrC	SrC	Phase Order Fault	52
UnbC	UnbC	Current Unbalance	53
Uv1	Uv1	DC Bus Undervoltage	53
Uv2	Uv2	Control Power Supply Voltage Fault	54
Uv3	Uv3	Undervoltage 3 (Soft-Charge Bypass Circuit Fault)	54
Uv4	Uv4	Gate Drive Board Undervoltage	54
Uv5	Uv5	MC/FAN Power Supply Fault	54
voF	voF	Output Voltage Detection Fault	54
--	--	--	--

<1> Displayed as CPF00 or CPF20 when occurring at power up of the regenerative converter. When one of the faults occurs after successfully starting the regenerative converter, the display will show CPF01 or CPF21.

NOTE: Use parameter U2-28 to verify the drive module where the fault occurred.

Minor Faults and Alarms

Table 38 gives an overview of possible fault codes. As conditions such as overvoltage can trip both a fault and an alarm, it is important to distinguish between faults and alarms in order to find the right corrective action.

When the regenerative converter detects a fault, the ALM indicator LEDs will blink and the alarm code display flashes. If the ALM LED lights without blinking, this means that a fault has been detected (not an alarm). Information on fault codes can be found in Faults on page 40. For example, two types of indications, fault and minor fault, are allocated to the ov (Overvoltage).

Table 38: Minor Fault and Alarm Displays

Digital Operator Display		Name	Minor Fault Output (H2-xx = 10)	Page
LED	LCD			
Aou	Aov	Power Supply Input Overvoltage	Yes	55
AUu	AUv	Power Supply Input Undervoltage	Yes	55
bb	bb	Regenerative Converter Baseblock	No	56
CoF	CoF	Current Offset Fault	Yes	56
CrST	CrST	Cannot Reset	Yes	56
EF1 to EF8	EF1 to EF8	External Fault (input terminal S1 to S8)	Yes	57
EFAn	EFAn	Panel Fan Fault	Yes	58
FAn	FAn	Regenerative Converter Cooling Fan Fault	Yes	58
Fdv	Fdv	Power Supply Frequency Fault	Yes	58
LT-1	LT-1	Cooling Fan Maintenance Time	No*	59
LT-2	LT-2	Capacitor Maintenance Time	No*	59
LT-3	LT-3	Soft Charge Bypass Relay Maintenance Time	No*	59
LT-4	LT-4	IGBT Maintenance Time (50%)	No*	59
oH	oH	Heatsink Overheat	Yes	60
oL2	oL2	Regenerative Converter Overload	Yes	50
ou	ov	DC Bus Overvoltage	Yes	61
PF3	PF3	Input Phase Loss Detection	Yes	61
SrC	SrC	Phase Order Fault	Yes	62
TrPC	TrPC	IGBT Maintenance Time (90%)	Yes	62
Uu	Uv	Undervoltage	Yes	63
voF	voF	Output Voltage Detection Fault	Yes	63

** Output when H2-xx = 2F.*

Operator Programming Errors

Table 39: Operator Programming Error Displays

Digital Operator Display		Name	Page
LED	LCD		
oPE01	oPE01	Regenerative Converter Setting Fault	64
oPE02	oPE02	Parameter Range Setting Error	64
oPE03	oPE03	Multi-Function Input Selection Error	64

Errors and Displays When Using the Copy Function

Table 40: Copy Errors

Digital Operator Display		Name	Page
LED	LCD		
CoPy	CoPy	Writing Parameter Settings (flashing)	65
CPyE	CPyE	Error Writing Data	65
CSEr	CSEr	Copy Unit Error	65
dFPS	dFPS	Drive Model Mismatch	66
End	End	Task Complete	66
iFEr	iFEr	Communication Error	66
ndAT	ndAT	Model, Voltage Class, Capacity Mismatch	66
rdEr	rdEr	Error Reading Data	67
rEAd	rEAd	Reading Parameter Settings (flashing)	67
vAEr	vAEr	Voltage Class, Capacity Mismatch	67
vFyE	vFyE	Parameter settings in the regenerative converter and those saved to the copy function are not the same	67
vrFy	vrFy	Comparing Parameter Settings (flashing)	67

Fault Detection

Fault Displays, Causes, and Possible Solutions

Table 41: Detailed Fault Displays, Causes, and Possible Solutions

Digital Operator Display		Fault Name
		Power Supply Input Overvoltage
Aou	Aov	The input power supply voltage exceeds the input power supply overvoltage detection level. • For 460 V class: approximately 554 VAC • For 575 V class: approximately 796 VAC
Cause		**Possible Solution**
The input power supply voltage is too high.		Lower the voltage to a level within the power supply specification.
Digital Operator Display		**Fault Name**
		Power Supply Input Undervoltage
AUu	AUv	The input power supply voltage falls below the Input Undervoltage (AUv) Detection Level (L2-21). • For 460 V class: approximately 300 VAC • For 575 V class: approximately 430 VAC
Cause		**Possible Solution**
The power supply capacity is small.		Increase the power supply capacity.
Digital Operator Display		**Fault Name**
		Current Offset Fault
CoF	CoF	There is a problem with the current detection circuit, or the regenerative converter started to operate the motor with induced voltage still remaining in the motor (such as when the motor is coasting, or after sudden deceleration).
Cause		**Possible Solution**
Hardware is damaged.		Cycle power to the regenerative converter. ⇒If the problem continues, replace the regenerative converter. For instructions on replacing the regenerative converter, contact Magnetek.
Digital Operator Display		**Fault Name**
CPF00, CPF01 <1>	CPF00, CPF01	Control Circuit Error
Cause		**Possible Solution**
There is a self diagnostic error in control circuit.		Cycle power to the regenerative converter. ⇒If the problem continues, replace either the control board or control module. For instructions on replacing the control board, contact Magnetek.
Connector on the operator is damaged.		⇒Replace the operator.

Digital Operator Display		Fault Name
CPF02	CPF02	A/D Conversion Error
		An A/D conversion error or control circuit error occurred.
Cause		**Possible Solution**
Control circuit is damaged.		Cycle power to the regenerative converter. Refer to Diagnosing and Resetting Faults on page 68. ⇒If the problem continues, replace either the control board or control module. For instructions on replacing the control board, contact Magnetek.
Digital Operator Display		**Fault Name**
CPF06	CPF06	EEPROM Memory Data Error
		There is an error in the data saved to the EEPROM.
Cause		**Possible Solution**
There is an error in EEPROM control circuit.		Cycle power to the regenerative converter. Refer to Diagnosing and Resetting Faults on page 68. ⇒If the problem continues, replace either the control board or control module. For instructions on replacing the control board, contact Magnetek.
The power supply was switched off when parameters were being saved to the regenerative converter.		⇒Reinitialize the Initialize Parameters (A1-03).
Digital Operator Display		**Fault Name**
CPF08	CPF08	Hardware Fault
Cause		**Possible Solution**
Control board part fault		Cycle power to the regenerative converter. Refer to Diagnosing and Resetting Faults on page 68. ⇒If the problem continues, replace the control board. For instructions on replacing the control board, contact Magnetek.
Digital Operator Display		**Fault Name**
CPF20, CPF21 <1>	CPF20 or CPF21	Control Circuit Error
Cause		**Possible Solution**
Control circuit self-diagnosis error		Cycle power to the regenerative converter. Refer to Diagnosing and Resetting Faults on page 68. ⇒If the problem continues, replace either the control board or control module. For instructions on replacing the control board, contact Magnetek.
Connector on the operator is damaged.		⇒Replace the operator.

Digital Operator Display	Fault Name
CPF22	Hybrid IC Error
	Hybrid IC has an error.
Cause	**Possible Solution**
Hybrid IC on the main circuit is damaged.	Cycle power to the regenerative converter. Refer to Diagnosing and Resetting Faults on page 68. ⇒When the fault occurs again, replace the control board or control module. Contact your Magnetek representatives or Magnetek sales office for replacement of boards. For instructions on replacing the control board, contact Magnetek.

Digital Operator Display	Fault Name
CPF23	Control Board Connection Error.
	Connection error between the control board and the regenerative converter.
Cause	**Possible Solution**
Hardware is damaged.	Turn the power off and check the connection between the control board and the regenerative converter. ⇒If the problem continues, replace either the control board or control module. For instructions on replacing the control board, contact Magnetek or your nearest sales representative.

Digital Operator Display	Fault Name
CPF24	Regenerative Converter Unit Signal Fault
	Signal of the drive module changed after power up.
Cause	**Possible Solution**
Connection error with the drive module	Check the connection with the drive module. ⇒If the problem continues, replace either the control board or control module. For instructions on replacing the control board, contact Magnetek or your nearest sales representative.

Digital Operator Display	Fault Name
CPF26 to CPF34 CPF40 to CPF45	Control Circuit Error
	Control circuit error
Cause	**Possible Solution**
Hardware is damaged.	Cycle power to the regenerative converter. Refer to Diagnosing and Resetting Faults on page 68. ⇒If the problem continues, replace either the control board or control module. For instructions on replacing the control board, contact Magnetek or your nearest sales representative.

Digital Operator Display		Fault Name
EF 1	EF1	External Fault (input terminal S1) External fault at multi-function input terminal S1.
EF2	EF2	External Fault (input terminal S2) External fault at multi-function input terminal S2.
EF4	EF4	External Fault (input terminal S4) External fault at multi-function input terminal S4.
EF5	EF5	External Fault (input terminal S5) External fault at multi-function input terminal S5.
EF6	EF6	External Fault (input terminal S6) External fault at multi-function input terminal S6.
EF7	EF7	External Fault (input terminal S7) External fault at multi-function input terminal S7.
EF8	EF8	External Fault (input terminal S8) External fault at multi-function input terminal S8.

Cause	Possible Solution
An external device has tripped an alarm function.	⇒Remove the cause of the external fault and reset the fault. Refer to Diagnosing and Resetting Faults on page 68 for details.
Wiring is incorrect.	Ensure the signal lines have been connected properly to the terminals assigned for external fault detection (H1-xx = 24 to 27, or 2C to 2F). ⇒Reconnect the signal line. Refer to Diagnosing and Resetting Faults on page 68 for details.
Incorrect setting of multi-function contact inputs.	Check if the any unused terminals have been set for H1-xx = 24 to 27, or 2C to 2F (External Fault). ⇒Change the terminal settings. Refer to Diagnosing and Resetting Faults on page 68 for details.

Digital Operator Display		Fault Name
EFAn	EFAn	Panel Fan Fault A problem has occurred with the panel fan.

Cause	Possible Solution
The power supply for the panel fan does not have enough voltage.	Check the status of the panel fan. ⇒After finding the cause of the fault and taking corrective action, reset the fault status of the regenerative converter. Refer to Diagnosing and Resetting Faults on page 68.
The input power supply terminals for the panel fan are loose.	
There is too much voltage fluctuation in the input power supply of the panel fan.	
The power supply for the panel fan is damaged.	
The panel fan is damaged.	

Digital Operator Display	Fault Name
Err	EEPROM Write Error
	Data cannot be written to the EEPROM.
Cause	**Possible Solution**
Noise has corrupted data while writing to the EEPROM.	⇒Press the [ENTER] button. ⇒Correct the parameter setting. ⇒Cycle power to the regenerative converter. Refer to Diagnosing and Resetting Faults on page 68.
Hardware problem.	⇒Replace either the control board or the control module. For instructions on replacing the control board, contact Magnetek or your nearest sales representative.

Digital Operator Display	Fault Name
FAn	Regenerative Converter Cooling Fan Fault
	The internal cooling fan of the regenerative converter failed.
Cause	**Possible Solution**
Undervoltage of fan power supply occurred.	⇒After finding the cause of the fault and taking corrective action, reset the fault status of the regenerative converter. Refer to Diagnosing and Resetting Faults on page 68.
The wiring terminal of the fan power supply is loosened.	
There is excessive fluctuation in the input power voltage of the regenerative converter.	
Fan power supply failure occurred.	

Digital Operator Display	Fault Name
Fdv	Power Supply Frequency Fault
	The input power supply frequency exceeds the allowable frequency fluctuation value.
Cause	**Possible Solution**
Momentary power loss occurred.	⇒After finding the cause of the fault and taking corrective action, reset the fault status of the regenerative converter. Refer to Diagnosing and Resetting Faults on page 68.
There is loose wiring in the input power terminals of the regenerative converter.	
There is excessive fluctuation in the input power voltage of the regenerative converter.	

Digital Operator Display		Fault Name
GF	GF	Ground Fault
		A current short to ground exceeded approximately 50% of the rated current on the input side of the regenerative converter.
Cause		**Possible Solution**
The motor has been damaged due to overheating or the motor insulation is damaged.		Check the insulation resistance of the motor. ⇒Replace the motor.
One of the motor cables has shorted out or there is a grounding problem.		Check the motor cable. ⇒Remove the short circuit and turn the power back on.
		Check the resistance between the motor cables and the ground terminal ⏚. ⇒Replace damaged cables.
The leakage current at the regenerative converter input ⏚ is too high.		⇒Reduce the amount of stray capacitance.
Hardware problem.		⇒Replace the drive module.
Wiring of the voltage detection circuit (R1, S1, and T1) on the power supply side and wiring of the main circuit (R, S, and T) are incorrect.		⇒Correct the wiring.

Digital Operator Display	Fault Name
oC	Overcurrent
	Sensors of the regenerative converter have detected an input current greater than the specified overcurrent level.
Cause	**Possible Solution**
The motor has been damaged due to overheating or the motor insulation is damaged.	Check the insulation resistance of the motor. ⇒Replace the motor.
One of the motor cables has shorted out or there is a grounding problem.	Check the motor cables. ⇒Remove the short circuit and turn the power back on.
	Check the resistance between the motor cables and the ground terminal ⏚. ⇒Replace damaged cables.
Load is too heavy.	Measure the current flowing into the regenerative converter. ⇒Replace the regenerative converter with a larger capacity unit if the current value exceeds the rated current of the regenerative converter. Determine if there is sudden fluctuation in the current level. ⇒Reduce the load to avoid sudden changes in the current level or switch to a larger regenerative converter.
Regenerative converter fails to operate properly due to noise interference.	Check the various options available to minimize the effects of noise. ⇒Review the section on handling noise interference and check the control circuit lines, main circuit lines, and ground wiring.
Wiring of the voltage detection circuit (R1, S1, and T1) on the power supply side and wiring of the main circuit (R, S, and T) are incorrect.	⇒Correct the wiring.
Undervoltage on the power supply side is excessive.	Check the wiring. ⇒Correct the wiring. Check the load of periphery devices connected to the same power supply line. ⇒Check whether the load is too large again.

Digital Operator Display	Fault Name
oH	Heatsink Overheat
	The temperature of the heatsink of the regenerative converter exceeded the overheat alarm level set to L8-02. *NOTE: Default value for L8-02 is determined by the Regenerative Converter Model Selection (o2-04).*
Cause	**Possible Solution**
Surrounding temperature is too high.	Check the temperature surrounding the regenerative converter. ⇒Improve the air circulation within the enclosure control panel. ⇒Install a fan or air conditioner to cool the surrounding area. ⇒Remove anything near the regenerative converter that might be producing excessive heat.
Load is too heavy.	Measure the output current. ⇒Reduce the load.
Internal cooling fan in the regenerative converter has stopped.	⇒Replace the cooling fan. *NOTE: After replacing the cooling fan, reset the Cooling Fan Operation Time setting (o4-03 = 0) and start to re-measure the fan's operating time.*

Digital Operator Display	Fault Name
oH1	Overheat 1 (Heatsink Overheat)
	The temperature of the regenerative converter heatsink exceeded the allowable value. *NOTE: The Overheat Alarm Level (L8-02) is determined by the Regenerative Converter Model Selection (o2-04).*
Cause	**Possible Solution**
Surrounding temperature is too high.	Check the temperature surrounding the regenerative converter. ⇒Improve the air circulation within the enclosure control panel. ⇒Install a fan or air conditioner to cool the surrounding area. ⇒Remove anything near the regenerative converter that might be producing excessive heat.
Load is too heavy.	Measure the output current. ⇒Reduce the load.
Digital Operator Display	**Fault Name**
oL2	Regenerative Converter Overload
	The thermal sensor of the regenerative converter triggered overload protection.
Cause	**Possible Solution**
Load is too heavy.	Check the size of the load. ⇒Reduce the load.
Regenerative converter capacity is too small.	⇒Add the drive module.
Digital Operator Display	**Fault Name**
oPr	External Digital Operator Connection Fault
	The external digital operator has been disconnected from the regenerative converter. (When LOCAL (operation using the digital operator) is selected) *NOTE: An oPr fault will occur when all of the following conditions are true:* • *Output is interrupted when the operator is disconnected (o2-06 = 1).* • *The Run command is assigned to the digital operator (B3-02 = 0 or LOCAL has been selected).*
Cause	**Possible Solution**
External digital operator is not properly connected to the regenerative converter.	Check the connection between the digital operator and the regenerative converter. ⇒Replace the cable if damaged. ⇒Turn off the regenerative converter input power and disconnect the digital operator. Next reconnect the digital operator and turn the input power of the regenerative converter back on.

Digital Operator Display	Fault Name
	Overvoltage
ov	Voltage in the DC bus has exceeded the overvoltage detection level. For 400 V class: approximately 820 VDC For 690 V class: approximately 1200 VDC
Cause	**Possible Solution**
Excess load of regeneration	Check the motor and the regeneration load.
Ground fault of load (Ground current has over-charged the main circuit capacitors via the regenerative converter input power.)	Check the power cable, relay terminals, motor terminal box, etc., of the regenerative converter. ⇒Correct grounding shorts and turn the power back on.
The input power voltage of the regenerative converter is too high.	Check the voltage. ⇒Lower input power voltage of the regenerative converter within the limits listed in the specifications.
Regenerative converter fails to operate properly due to noise interference.	Check the various options available to minimize the effects of noise. ⇒Review the section on handling noise interference and check the control circuit lines, main circuit lines, and ground wiring.
Wiring of the voltage detection circuit (R1, S1, and T1) on the power supply side and wiring of the main circuit (R, S, and T) are incorrect.	⇒Correct the wiring.

Digital Operator Display	Fault Name
	Input Power Supply Fault
PF2	Abnormal oscillation of the main circuit DC bus voltage has continued (when L8-65 is set to 1 or 2).
Cause	**Possible Solution**
There is excessive fluctuation in the input power voltage of the regenerative converter.	⇒After finding the cause of the fault and taking corrective action, reset the fault status of the regenerative converter. Refer to Diagnosing and Resetting Faults on page 68.
There is phase loss in the regenerative converter input power.	
The power supply capacity is small.	
The cable is too long.	
There is poor balance between voltage phases.	

Digital Operator Display		Fault Name
PF3	PF3	Input Phase Loss Detection
		Abnormal oscillation of the input power supply voltage has continued. (Detected when L8-69 is set to 1)
Cause		**Possible Solution**
There is excessive fluctuation in the input power voltage of the regenerative converter.		⇒After finding the cause of the fault and taking corrective action, reset the fault status of the regenerative converter. Refer to Diagnosing and Resetting Faults on page 68.
There is phase loss in the regenerative converter input power.		
The power supply capacity is small.		
The cable is too long.		
There is poor balance between voltage phases.		

Digital Operator Display		Fault Name
PUF	PUF	Fuse Blowout
		The fuse inserted in the main circuit was blown.
Cause		**Possible Solution**
Main transistor failed.		Check U2-28 (Malfunctioned Module) and replace the drive module.
The DC circuit fuse was blown.		

Digital Operator Display		Fault Name
SC	SC	IGBT Upper Arm and Lower Arm Short Circuit
		Insufficient power for the control power supply in the power supply module.
Cause		**Possible Solution**
IGBTs failed.		Cycle power to the regenerative converter. ⇒If the problem continues, replace either the control board or the drive module. For instructions on replacing the control board, contact Magnetek or your nearest sales representative.
The IGBT short-circuit detection sensor failed.		

Digital Operator Display		Fault Name
SrC	SrC	Phase Order Fault
		The detection direction of the phase order for the input power supply has changed after powering up.
Cause		**Possible Solution**
The power supply phase order changed during operation.		⇒After finding the cause of the fault and taking corrective action, reset the fault status of the regenerative converter. Refer to Diagnosing and Resetting Faults on page 68.
Momentary power loss occurred.		
There is loose wiring in the input power terminals of the regenerative converter.		
There is excessive fluctuation in the input power voltage of the regenerative converter.		

Digital Operator Display		Fault Name
		Current Unbalance
UnbC	UnbC	Current flow among modules has become unbalanced.

Cause	Possible Solution
Imbalance of output current of each drive module occurred.	Chck the wiring. Check if any transistors are damaged.
Fuses in the drive module were blown.	Check whether a short circuit or ground fault occurs at the load side.

Digital Operator Display		Fault Name
		DC Bus Undervoltage
Uv1	Uv1	One of the following conditions occurred while the regenerative converter was stopped (a RUN command was not entered): • Voltage in the DC bus fell below the Undervoltage Detection Level (Uv) (L2-05) • For 460 V class: approximately 380 VDC • For 575 V class: approximately 475 VDC

Cause	Possible Solution
There is phase loss in the regenerative converter input power.	The main circuit input power of the regenerative converter is wired incorrectly. ⇒Correct the wiring.
There is loose wiring in the input power terminals of the regenerative converter.	Check if the terminals are loosened. ⇒Apply the tightening torque specified in this manual to fasten the terminals.
There is a problem with the voltage from the regenerative converter input power.	Check the voltage. ⇒Correct the voltage to be within the range listed in specifications of the regenerative converter input power. ⇒If there is no problem with the power supply to the main circuit, check for problems with the main circuit magnetic contactor.
The power has been interrupted.	⇒Correct the regenerative converter input power.
The main circuit capacitors are worn.	Check the maintenance time for the Capacitor Maintenance (U4-05). ⇒Replace the drive module if U4-05 exceeds 90%.
The relay or contactor on the soft-charge bypass circuit is damaged.	Cycle power to the regenerative converter and see if the fault reoccurs. ⇒If the problem continues, replace the drive module. Check the Soft Charge Bypass Relay Maintenance (U4-06) for the performance life of the soft charge bypass. ⇒Replace the drive module if U4-06 exceeds 90%.
There is a fault in the devices on the power supply side.	Check the wiring of the devices on the power supply side. ⇒Correct the wiring.
There is a fault in the power supply.	Improve the power supply voltage.
The voltage detection circuit on the power supply side is damaged.	Check wiring. ⇒Correct the wiring.

Digital Operator Display		Fault Name
Uv2	Uv2	Control Power Supply Voltage Fault Voltage is too low for the control power supply.
Cause		**Possible Solution**
Voltage is too low for the control power supply.		Cycle power to the regenerative converter and see if the fault reoccurs. Check if the fault reoccurs. Refer to Diagnosing and Resetting Faults on page 68. If the problem continues, replace the drive module.
Digital Operator Display		**Fault Name**
Uv3	Uv3	Undervoltage 3 (Soft-Charge Bypass Circuit Fault) The soft-charge bypass circuit has failed.
Cause		**Possible Solution**
The relay or contactor on the soft-charge bypass circuit is damaged.		Cycle power to the regenerative converter and see if the fault reoccurs. Refer to Diagnosing and Resetting Faults on page 68. ⇒If the problem continues, replace the drive module. Check the Soft Charge Bypass Relay Maintenance (U4-06) for the performance life of the soft-charge bypass. ⇒Replace the drive module if U4-06 exceeds 90%.
Digital Operator Display		**Fault Name**
Uv4	Uv4	Gate Drive Board Undervoltage Voltage is too low for the control power supply within the drive module.
Cause		**Possible Solution**
Voltage is too low for the control power supply within the drive module.		Cycle power to the regenerative converter and see if the fault reoccurs. Refer to Diagnosing and Resetting Faults on page 68. ⇒If the problem continues, replace either the internal control board or drive module.
Digital Operator Display		**Fault Name**
Uv5	Uv5	MC/FAN Power Supply Fault Voltage is too low for the MC/FAN power supply within the drive module.
Cause		**Possible Solution**
Voltage is too low for the MC/FAN power supply within the drive module.		Cycle power to the regenerative converter and see if the fault reoccurs. Refer to Diagnosing and Resetting Faults on page 68. ⇒If the problem continues, replace either the internal control board or drive module.
Digital Operator Display		**Fault Name**
voF	voF	Output Voltage Detection Fault Problem detected with the voltage on the output side of the regenerative converter.
Cause		**Possible Solution**
Hardware is damaged.		⇒Replace the drive module.

<1> When a fault occurred at the startup of the regenerative converter, CPF00 or CPF20 is displayed. When a fault occurred after the startup, CPF01 or CPF21 is displayed.

Alarm Detection

Alarm Codes, Causes, and Possible Solutions

Alarms are regenerative converter protection functions that do not necessarily cause the regenerative converter to stop. Once the cause of an alarm is removed, the regenerative converter will return to the same status as before the alarm occurred.

When an alarm has been triggered, the ALM light on the digital operator display blinks and the alarm code display flashes. If a multi-function output is set for an alarm (H2-xx= 10), that output terminal will be triggered.

NOTE: If a multi-function output is set to close when an alarm occurs (H2-xx = 10), it will also close when maintenance periods are reached, triggering alarms LT-1 through LT-4 (triggered only if H2-xx = 2F).

After detecting the minor fault and alarm, refer to Table 55 to take proper measures and remove the cause.

Table 42: Alarm Codes, Causes, and Possible Solutions

Digital Operator Display		Minor Fault Name	
		Power Supply Input Overvoltage	
Aou	Aov	The input power supply voltage exceeds the input power supply overvoltage detection level. • For 460 V class: approximately 554 VAC • For 575 V class: approximately 796 VAC	
Cause		**Possible Solution**	**Minor Fault Output H2-xx=10**
The input power supply voltage is too high.		Lower the voltage to a level within the power supply specification.	Yes
Digital Operator Display		**Minor Fault Name**	
		Power Supply Input Undervoltage	
AUu	AUv	The input power supply voltage falls below the Input Undervoltage (AUv) Detection Level (L2-21). • For 460 V class: approximately 300 VAC • For 575 V class: approximately 430 VAC	
Cause		**Possible Solution**	**Minor Fault Output H2-xx=10**
The power supply capacity is small.		Increase the power supply capacity.	Yes

Digital Operator Display		Minor Fault Name	
bb	bb	Regenerative Converter Baseblock	
		Regenerative converter output interrupted as indicated by an external baseblock signal.	
Cause		**Possible Solution**	**Minor Fault Output H2-xx=10**
External baseblock signal was entered via one of the multi-function input terminals (S1 to S8).		⇒Check external sequence and baseblock signal input timing.	No

Digital Operator Display		Minor Fault Name	
CoF	CoF	Current Offset Fault	
		There is a problem with the current detection circuit, or the regenerative converter started to operate the motor with induced voltage still remaining in the motor (such as when the motor is coasting, or after sudden deceleration).	
Cause		**Possible Solution**	**Minor Fault Output H2-xx=10**
Hardware Fault		Cycle power to the regenerative converter. ⇒If the problem continues, replace the regenerative converter. For instructions on replacing the regenerative converter, contact Magnetek or your nearest sales representative.	Yes

Digital Operator Display		Minor Fault Name	
CrST	CrST	Cannot Reset	
		A fault reset command was entered while the Run command was still present.	
Cause		**Possible Solution**	**Minor Fault Output H2-xx=10**
A fault reset command was entered while the Run command was still present.		Ensure that a Run command cannot be entered from the external terminals during fault reset. ⇒Turn off the Run command.	Yes

Digital Operator Display		Minor Fault Name
EF1	EF1	External Fault (input terminal S1) External fault at multi-function input terminal S1.
EF2	EF2	External Fault (input terminal S2) External fault at multi-function input terminal S2.
EF3	EF3	External Fault (input terminal S3) External fault at multi-function input terminal S3.
EF4	EF4	External Fault (input terminal S4) External fault at multi-function input terminal S4.
EF5	EF5	External Fault (input terminal S5) External fault at multi-function input terminal S5.
EF6	EF6	External Fault (input terminal S6) External fault at multi-function input terminal S6.
EF7	EF7	External Fault (input terminal S7) External fault at multi-function input terminal S7.
EF8	EF8	External Fault (input terminal S8) External fault at multi-function input terminal S8.

Cause	Possible Solution	Minor Fault Output H2-xx=10
An external device has tripped an alarm function.	⇒Remove the cause of the external fault and reset the multi-function input value. Refer to Diagnosing and Resetting Faults on page 68 for details.	Yes
Wiring is incorrect.	Ensure the signal lines have been connected properly to the terminals assigned for external fault detection (H1-xx = 24 to 27, and 2C to 2F). ⇒Reconnect the signal line. Refer to Diagnosing and Resetting Faults on page 68 for details.	

Digital Operator Display		Minor Fault Name
EFAn	EFAn	Panel Fan Fault
		A problem has occurred with the panel fan.

Cause	Possible Solution	Minor Fault Output H2-xx=10
The power supply for the panel fan does not enough voltage.	Check the status of the panel fan.	Yes
The input power supply terminals for the panel fan are loose.		
There is too much voltage fluctuation in the input power supply of the panel fan.		
The power supply for the panel fan is damaged.		
The panel fan is damaged.		

Digital Operator Display		Minor Fault Name
FAn	FAn	Regenerative Converter Cooling Fan Fault
		The internal cooling fan of the regenerative converter failed.

Cause	Possible Solution	Minor Fault Output H2-xx=10
Undervoltage of fan power supply occurred	⇒After finding the cause of the fault and taking corrective action, reset the fault status of the regenerative converter. Refer to Diagnosing and Resetting Faults on page 68 for details.	Yes
The wiring terminal of the fan power supply is loosened.		
There is excessive fluctuation in the input power voltage of the regenerative converter.		
Fan power supply failure occurred.		

Digital Operator Display		Minor Fault Name
Fdv	Fdv	Power Supply Frequency Fault
		The input power supply frequency exceeds the allowable frequency fluctuation value.

Cause	Possible Solution	Minor Fault Output H2-xx=10
Momentary power loss occurred.	⇒After finding the cause of the fault and taking corrective action, reset the fault status of the regenerative converter. Refer to Diagnosing and Resetting Faults on page 68 for details.	Yes
There is loose wiring in the input power terminals of the regenerative converter.		
There is excessive fluctuation in the input power voltage of the regenerative converter.		

Digital Operator Display	Minor Fault Name
LT-1	Cooling Fan Maintenance Time
	The cooling fan has reached its expected maintenance period and may need to be replaced. *NOTE: An alarm output (H2-xx = 10) will only be triggered if H2-xx = 2F.*

Cause	Possible Solution	Minor Fault Output H2-xx=10
The cooling fan has reached 90% of its expected performance life.	⇒Replace the cooling fan and reset the Maintenance Monitor by setting o4-03 to 0.	Yes

Digital Operator Display	Minor Fault Name
LT-2	Capacitor Maintenance Time
	The main circuit and control circuit capacitors are nearing the end of their expected performance life. *NOTE: An alarm output (H2-xx = 10) will only be triggered if H2-xx = 2F.*

Cause	Possible Solution	Minor Fault Output H2-xx=10
The main circuit and control circuit capacitors have reached 90% of their expected performance life.	⇒Replace the drive module.	Yes

Digital Operator Display	Minor Fault Name
LT-3	Soft Charge Bypass Relay Maintenance Time
	The DC bus soft charge relay is nearing the end of its expected performance life. *NOTE: An alarm output (H2-xx = 10) will only be triggered if H2-xx = 2F.*

Cause	Possible Solution	Minor Fault Output H2-xx=10
The DC bus soft charge relay has reached 90% of their expected performance life.	⇒Replace the drive module.	Yes

Digital Operator Display	Minor Fault Name
LT-4	IGBT Maintenance Time (50%)
	IGBTs have reached 50% of their expected performance life. *NOTE: An alarm output (H2-xx = 10) will only be triggered if H2-xx = 2F.*

Cause	Possible Solution	Minor Fault Output H2-xx=10
IGBTs have reached 50% of their expected performance life.	⇒Check the load and output frequency.	Yes

Digital Operator Display		Minor Fault Name	
oH	oH	Heatsink Overheat The temperature of the heatsink exceeded the overheat alarm level set to L8-02 (90–100°C). Default value for L8-02 is determined by regenerative converter capacity.	
Cause		**Possible Solution**	**Minor Fault Output H2-xx=10**
Surrounding temperature is too high.		Check the surrounding temperature. ⇒Improve the air circulation within the enclosed control panel. ⇒Install a fan or air conditioner to cool surrounding area. ⇒Remove anything near the regenerative converter that may cause extra heat.	Yes
Internal cooling fan in the regenerative converter has stopped.		⇒Replace the cooling fan. *NOTE: After replacing the cooling fan, reset the Cooling Fan Operation Time Setting parameter (o4-03 = 0). Clear the Cooling Fan Operation Time (U4-03) and start to re-measure the fan's operating time.*	
Airflow around the regenerative converter is restricted.		Provided proper installation space around the regenerative converter as indicated in the manual. ⇒Allow for the specified space and ensure that there is sufficient circulation around the control panel.	Yes
		Check for dust or foreign materials clogging the cooling fan. ⇒Clear debris caught in the fan that restricts air circulation.	

Digital Operator Display		Minor Fault Name	
ou	ov	DC Bus Overvoltage The DC Bus voltage exceeded the trip point. For 460 V class: approximately 820 VDC. For 575 V class: approximately 1200 VDC.	
Cause		**Possible Solution**	**Minor Fault Output H2-xx=10**
Regenerative converter fails to operate properly due to noise interference.		Check the various options available to minimize the effects of noise. ⇒Review the section on handling noise interference and check the control circuit lines, main circuit lines, and ground wiring. ⇒If the magnetic contactor is identified as a source of noise, install a surge protector to the MC coil.	Yes
		Set the Number of Auto Restart Attempts (L5-01) to a value other than 0.	
Excess load of regeneration.		⇒Check the regeneration load.	
The input power voltage of the regenerative converter is too high.		⇒Lower input power voltage of the regenerative converter within the limits listed in the specifications.	
Wiring of the voltage detection circuit (R1, S1, and T1) on the power supply side and wiring of the main circuit (R, S, and T) are incorrect.		Check the wiring. ⇒Correct the wiring.	

Digital Operator Display		Minor Fault Name	
PF3	PF3	Input Phase Loss Detection Abnormal input power supply voltage oscillation continued (detected when L8-69 is set to 1).	
Cause		**Possible Solution**	**Minor Fault Output H2-xx=10**
There is excessive fluctuation in the input power voltage of the regenerative converter.		⇒After finding the cause of the fault and taking corrective action, reset the fault status of the regenerative converter. Refer to Diagnosing and Resetting Faults on page 68.	Yes
There is phase loss in the regenerative converter input power.			
The power supply capacity is small.			
The cable is too long.			
There is poor balance between voltage phases.			

Digital Operator Display		Minor Fault Name	
SrC	SrC	Phase Order Fault	
		The detection direction of the phase order for the input power supply has changed after the powering up.	
Cause		**Possible Solution**	**Minor Fault Output H2-xx=10**
The power supply phase order changed during operation.		⇒After finding the cause of the fault and taking corrective action, reset the fault status of the regenerative converter. Refer to Diagnosing and Resetting Faults on page 68.	Yes
Momentary power loss occurred.			
There is loose wiring in the input power terminals of the regenerative converter.			
There is excessive fluctuation in the input power voltage of the regenerative converter.			

Digital Operator Display		Minor Fault Name	
trPC	TrPC	IGBT Maintenance Time (90%)	
		IGBTs have reached 90% of their expected performance life. *NOTE: An alarm output (H2-xx = 10) will only be triggered if H2-xx = 10.*	
Cause		**Possible Solution**	**Minor Fault Output H2-xx=10**
IGBTs have reached 90% of their expected performance life.		⇒Replace the IGBTs (or the drive module).	Yes

Digital Operator Display	Minor Fault Name
	Undervoltage
Uv	One of the following conditions occurred while the regenerative converter was stopped (a Run command was not entered): • Voltage in the DC bus fell below the Undervoltage Detection Level (Uv) (L2-05) • Contactor to suppress inrush current in the regenerative converter was opened. • Low voltage in the input power of the control regenerative converter.

Cause	Possible Solution	Minor Fault Output H2-xx=10
There is phase loss in the regenerative converter input power.	The main circuit input power of the regenerative converter is wired incorrectly. ⇒Correct the wiring.	Yes
There is loose wiring in the input power terminals of the regenerative converter.	Check if the terminals are loosened. ⇒Apply the tightening torque specified in this manual to fasten the terminals.	
There is a problem with the voltage from the regenerative converter input power.	Check the voltage. ⇒Correct the voltage to be within the range listed in the specifications of the regenerative converter input power.	
The power has been interrupted.	⇒Correct the regenerative converter power input.	
The main capacitors are worn.	Check the maintenance time for the Capacitor Maintenance (U4-05). ⇒Replace the drive module if U4-05 exceeds 90%.	
The input power transformer of the regenerative converter is too small and voltage drops when the power is switched on.	Check for an alarm when the magnetic contactor, line breaker, and leakage breaker are closed. ⇒Check the capacity of the input power transformer of the regenerative converter.	
Air inside the regenerative converter is too hot.	⇒Check the temperature inside the regenerative converter.	
The CHARGE light is broken or disconnected.	⇒Replace the drive module.	
The frequency detection value of the power supply exceeded the allowable value.	⇒Correct the power supply.	
The phase rotation direction of the input side has changed.	⇒Correct the wiring.	

Digital Operator Display	Minor Fault Name
	Output Voltage Detection Fault
voF	Problem detected with the voltage on the output side of the regenerative converter.

Cause	Possible Solution	Minor Fault Output H2-xx=10
Hardware is damaged.	⇒Replace the drive module.	Yes

Operator Programming Errors

oPE Codes, Causes, and Possible Solutions

An Operator Programming Error (oPE) occurs when a contradictory parameter is set or an individual parameter is set to an inappropriate value.

The regenerative converter will not operate until the parameter or parameters causing the problem are set correctly. An oPE, however, does not trigger an alarm or fault output. If an oPE occurs, investigate the cause and refer to table 43 for the appropriate action. When an oPE appears on the operator display, press the ENTER button to view U1-18 and see the parameter that is causing the oPE Fault Parameter (U1-18)

Table 43: oPE Codes, Causes, and Possible Solutions

Digital Operator Display		Task
oPE01	oPE01	Regenerative Converter Setting Fault
		Regenerative converter capacity and the value set to the Regenerative Converter Model Selection (o2-04) do not match.
Cause		**Possible Solution**
The Regenerative Converter Model Selection (o2-04) and the actual capacity of the drive are not the same.		Correct the value set to o2-04.
Digital Operator Display		**Task**
oPE02	oPE02	Parameter Range Setting Error
		Parameters were set outside the possible setting range.
Cause		**Possible Solution**
Parameters were set outside the possible setting range.		Use the oPE Fault Parameter (U1-18) to find parameters set outside the range. ⇒Set parameters to the proper values.
Digital Operator Display		**Task**
oPE03	oPE03	Multi-Function Input Selection Error
		A contradictory setting is assigned to multi-function contact inputs H1-01 to H1-08.
Cause		**Possible Solution**
The same function is assigned to more than one multi-function input (excluding “Not Used” and “External Fault”).		Ensure all multi-function inputs are assigned to different functions. ⇒Re-enter the multi-function settings to ensure this does not occur.

Copy Function Related Displays

Tasks, Errors, and Troubleshooting

The table below lists the messages and errors that may appear when using the Copy function. When executing the tasks offered by the Copy function, the LCD operator will indicate the task being performed. When an error occurs, a code appears on the LCD operator to indicate the error. Note that errors related to the Copy function do not trigger a multi-function output terminal that has been set up to close when a fault or alarm occurs. To clear an error, simply press any key on the LCD operator and the error display will disappear.

Table 44 lists the corrective action that can be taken when an error occurs.

NOTE: 1. Whenever using the Copy function, the regenerative converter should be fully stopped. The Copy function is disabled while the regenerative converter is running.
2. The regenerative converter will not accept a Run command while the Copy function is being executed.
3. Parameters can only be saved to a regenerative converter when the voltage class, capacity, and software version match.

Table 44: Copy Function Task and Error Displays

Digital Operator Display		Task
CoPy	CoPy	Writing Parameter Settings (flashing)
Cause		**Possible Solution**
Parameters are being written to the regenerative converter.	Not an error.	
Digital Operator Display		**Task**
CPyE	CPyE	Error writing data
Cause		**Possible Solution**
Failed writing parameters.	⇒Try writing the parameters again.	
Digital Operator Display		**Task**
CSEr	CSEr	Copy Unit Error
Cause		**Possible Solution**
Hardware Fault	⇒Replace the LCD operator or the USB Copy Unit.	

Digital Operator Display		Task
dFPS	dFPS	Drive Model Mismatch

Cause	Possible Solution
The regenerative converter from which the parameters were copied and the regenerative converter you are attempting to write are not the same model. • The regenerative converter the parameters were copied from is a different model of the regenerative converter. • The regenerative converter you are attempting to write to is a different model.	Check the model numbers of the regenerative converter that the parameters were copied from and the model of the regenerative converter you are attempting to write those parameters to. ⇒Make sure the regenerative converter from which the parameter are copied and the regenerative converter to be written to have the same model numbers and software versions.

Digital Operator Display		Task
End	End	Task Complete

Cause	Possible Solution
Finished reading, writing, or verifying parameters.	Not an error.

Digital Operator Display		Task
iFEr	iFEr	Communication Error

Cause	Possible Solution
A communication error occurred between the regenerative converter and the LCD operator or the USB Copy Unit.	⇒Check the cable connection.
A non-compatible cable is being used to connect the USB Copy Unit and the regenerative converter.	⇒Use the cable originally packaged with the USB Copy Unit.

Digital Operator Display		Error Name
ndAT	ndAT	Model, Voltage Class, Capacity Mismatch

Cause	Possible Solution
The regenerative converter from which the parameters were copied and the regenerative converter to which you are attempting to write to have different electrical specifications, a different capacity, is set to a different control mode, or is a different model number.	⇒Make sure the regenerative converter from which the parameters are copied and the regenerative converter to be written to have the same model numbers and software versions.
The regenerative converter or USB Copy Unit being used to write the parameters is blank and does not have any parameters saved on it.	⇒Make sure all connections are correct, and copy the parameter settings onto the USB Copy Unit or the LCD Operator.

Digital Operator Display		Error Name
rdEr	rdEr	Error Reading Data

Cause	Possible Solution
Failed while attempting to read parameter settings from the regenerative converter.	⇒Press and hold the READ key on the USB Copy Unit for at least one second to have the unit read parameters from the regenerative converter.

Digital Operator Display		Error Name
rEAd	rEAd	Reading Parameter Settings (flashing)

Cause	Possible Solution
Displayed while the parameter settings are being read onto the USB Copy Unit.	Not an error.

Digital Operator Display		Error Name
vAEr	vAEr	Voltage Class, Capacity Mismatch

Cause	Possible Solution
The regenerative converter from which the parameters were copied and the regenerative converter to which you are attempting to write to have different electrical specifications, a different capacity, is set to a different control mode, or is a different model number.	⇒Make sure the regenerative converter from which the parameters are copied and the regenerative converter to be written to have the same model number and software versions.

Digital Operator Display		Error Name
vFyE	vFyE	Parameter settings in the regenerative converter and those saved to the copy function are not the same.

Cause	Possible Solution
Indicates that parameter settings that have been Read and loaded onto the Copy Unit or LCD operator are different.	⇒To have parameters be the same, either copy the parameter settings on the USB Copy Unit or the LCD operator and save them in the regenerative converter. Or, copy the parameter settings on the regenerative converter and save them to the USB Copy Unit or the LCD operator.

Digital Operator Display		Error Name
vrFy	vrFy	Comparing Parameter Settings (flashing)

Cause	Possible Solution
The Verify mode has confirmed that parameters settings on the regenerative converter and parameters read to the copy device are identical.	Not an error.

Diagnosing and Resetting Faults

When a fault occurs and the regenerative converter stops, follow the instructions below to remove whatever conditions triggered the fault, then restart the regenerative converter.

Fault Occurs Simultaneously with Power Loss

WARNING

Electrical Shock Hazard

Ensure there are no short circuits between the main circuit terminals before restarting the regenerative converter. Failure to comply may result in serious injury or death and will cause damage to equipment.

1. Turn on the regenerative converter input power.
2. Use monitor parameters U2-xx to display data on the operating status of the regenerative converter just before the fault occurred.
3. Remove the cause of the fault and reset. Refer to Fault Displays, Causes, and Possible Solutions on page 43 for more information on how to view fault data.

NOTE: 1. To find out what faults were triggered, check the fault history in U2-02 (Previous Fault). Information on regenerative converter status when the fault occurred such as the frequency, current, and voltage can be found in U2-03 through U2-20. Refer to Viewing Fault Trace Data After Fault on page 69 for more information on how to view fault data.
2. When the fault continues to be displayed after cycling power, remove the cause of the fault and reset.

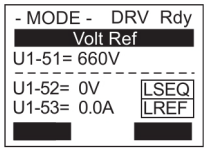
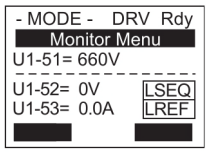
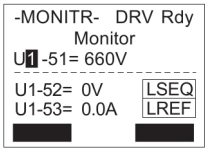
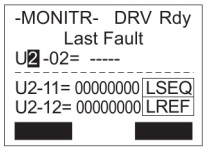
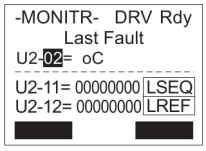
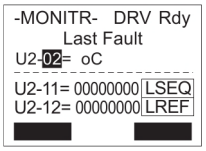
If the Regenerative Converter Still has Power After a Fault Occurs

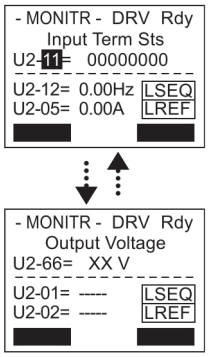
1. Look at the LCD operator for information on the fault that occurred.
2. Remove the cause of the fault and reset. Refer to Fault Displays, Causes, and Possible Solutions on page 43 for more information on how to view fault data.
3. Reset the data. Refer to Fault Reset Methods on page 70 for more information on how to reset the fault.

Viewing Fault Trace Data After Fault

A checking method is shown here using an example in which the regenerative converter detects oC (Overcurrent).

Table 45: Viewing Fault Trace Data

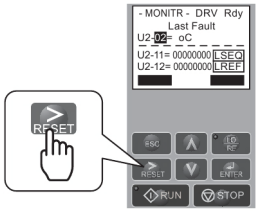
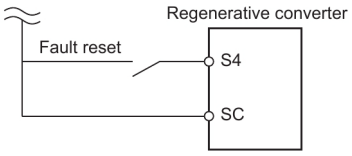
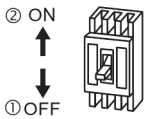
Step	Display/Result
1 Turn on the regenerative converter input power. The first screen displays.	
2 Press ∧ until the monitor screen is displayed.	
3 Press ENTER to display the parameter setting screen.	
4 Press ∧ and RESET until U2-02 (Previous Fault) is displayed.	
5 Press ENTER to view the most recent fault (oC in this example).	
6 Press ESC to go back to the U2-02 display.	

Step		Display/Result
7	Press ∧ to view the status information of the regenerative converter when fault occurred. Parameters U2-03 through U2-20 help determine the cause of a fault.	→ 

Fault Reset Methods

When a fault occurs, the cause of the fault must be removed and the regenerative converter must be restarted. The table below lists the different ways to restart the regenerative converter.

Table 46: Restarting the Regenerative Converter

After the Fault Occurs	Procedure	
After removing the cause of the fault, restart the regenerative converter, and reset the fault.	Press the RESET key or the F2 key of the LCD operator.	
Reset via Multi-Functional Digital Input S4.	Turn on the fault reset signal from the sequence input. (14 (Fault Reset) must be allocated to the multi-function digital input terminal (H1-xx) in advance.) *NOTE: The factory setting of H1-04 (Terminal S4 Function Selection) is 14 (Fault Reset).*	
If the above methods do not reset the fault, turn off the regenerative converter main power supply. Resupply power after the LCD operator display is out.		

NOTE: If the Run command is present, the regenerative converter will disregard any attempts to reset the fault. The Run command must first be removed before a fault situation can be cleared.